

# B

## ROLLER BEARINGS



### **B** ROLLER BEARINGS

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# *Spherical Roller Bearings*

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## INTRODUCTION

The Timken self-aligning spherical roller bearing is a combination radial and thrust bearing, designed to operate even if shaft and housing are, or become, misaligned under load. This high-capacity bearing is the favored choice when conditions include heavy loads, plus difficulties in establishing or maintaining housing alignment, or when shaft deflection can be expected.

Shaft deflections and housing distortions caused by shock or heavy loads, which lead to misalignment, are compensated for by the internal self-alignment of the bearing elements during operation. Edge loading of rollers, a condition that limits service life on other types of bearings, does not develop in spherical roller bearings. Optimum bearing capacity can often be realized with up to  $\pm 1\frac{1}{2}$  degrees of misalignment, depending on the size and series of bearing selected.

The inherent compensation for misalignment provided by the spherical roller bearing offers the designer the opportunity to use weldments for housing frames instead of complex castings, eliminating high-cost machining operations. Even when castings may be preferred, bore alignment is less critical if spherical roller bearings are specified. Unit design and construction also make the spherical roller bearing convenient to handle during installation or maintenance.

Several types of radial spherical roller bearings include CJ, YM, YMB, YMD, and VCSJ types.

Bearings are made to RBEC-1 tolerances. Life calculations, shaft and housing fits, internal clearances, tolerances and other technical data for these bearings are found in the engineering section of this catalog.

## BEARING TYPES



CJ



YM



Tapered Bore with Adapter Sleeve

### YM

- Higher load ratings for longer life.
- Incorporates advanced features and precision-machined roller-riding one piece brass cage.
- Suited for severe conditions of use.

### YMB

- Higher load ratings for longer life.
- Incorporates advanced features and precision-machined, land-riding one piece brass cage.
- Suited for use in severe conditions.

### YMD

- Incorporates advanced features and offers higher load ratings for longer life.
- Precision-machined, land-riding and two-pieced brass cages.
- Suited for use in severe conditions.

### CJ

- High load ratings for longer life.
- Incorporates stamped steel window type cage for a broad range of applications.
- Utilize advanced features.

### VCSJ

- Compact design for general use.
- Stamped steel finger type cage.

## TAPERED BORE BEARINGS WITH ADAPTER SLEEVES

- SNW adapter assemblies consist of a sleeve and locknut. Lockwashers are available for shaft mounting of tapered bore "K" bearings.
- Description of shaft mounting techniques for tapered bore bearings with adapter sleeves are found on page B380.

## SHAKER SCREEN EQUIPMENT

- Vibrating equipment commonly found in the aggregate industry is one of the most demanding applications for spherical roller bearings.
- Timken manufactures spherical roller bearings suited for high rotational speeds, high radial and impact loads, fluctuating and unbalanced loads, misalignment and extreme centrifugal forces in tough environmental conditions.
- The design allows for static and dynamic misalignment in the application while maintaining the bearing's full dynamic capacity. This achieves maximum expected service life.
- Standards and special modification codes are available for shaft (s4 or m6) and housing (P6 or H7) fits as in the engineering section.

TIMKEN SPHERICAL ROLLER BEARING MODIFICATIONS

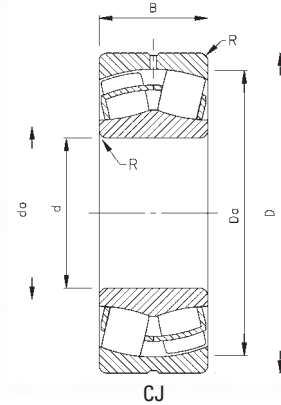
TKN	SKF	FAG	TIMKEN GENERAL DEFINITION
Other modifications available, contact your local Timken representative for more information.			
CJ	CJ, CC	J	Spherical with stamped steel cage
YM	M2	M	One-piece roller riding machined brass cage
YMB	MC	MB	One-piece inner ring piloted machined brass cage
C02	C02	T52BE	Inner ring with P5 running accuracy, W4 (SKF does not include W4)
C02 C3	C023	C3, T52BE	Inner ring with P5 running accuracy, C3 RIC
C02 C4	C024	C4, T52BE	Inner ring with P5 running accuracy, C4 RIC
C04	C04	T52BN	Outer ring with P5 running accuracy, W4 (SKF does not include W4)
C04 C3	C043	C3, T52BN	Outer ring with P5 running accuracy, C3 RIC
C04 C4	C044	C4, T52BN	Outer ring with P5 running accuracy, C4 RIC
C08	C08	T52BW C02	P5 running accuracy (C02 and C04)
C08 C3	C083	C3, T52BW	P5 running accuracy (C02 and C04), C3 RIC
C08 C4	C084	C4, T52BW	PS running accuracy (C02 and C04), C4 RIC
C6	C6	—	Special RIC non-specific
K	K	K	Tapered bore (1: 12 on diameter 22, 23, 30, 31, 32, 33, 39 series)
K	K30	K30	Tapered bore (1: 30 on diameter 40,41,42 series)
W4	W4	J26A	Mark high and low points of eccentricity on face of rings
W6R	—	—	Engineered coating on rollers to combat low lube or abrasive contamination
W8	—	—	Rings and rollers TDC <sup>®</sup> coated
W20	W20	SY	Outer ring with standard lubrication holes
W22	W22	700855	Special reduced O.D. tolerance on outer rings
W25	W73	—	Outer ring with counter drilled lubrication hole
W31	W31	—	Bearing inspected to certain quality control requirements
W33	W33	S	Standard lubrication holes and groove in outer ring (FAG drops S from number for sizes larger than 315 mm O.D.)
W33 W4	W503	S + J26A	Timken and FAG drop W33 W4 in conjunction with C08, W507
W33 W22 W31	W512 (W22 + W31 + W33)	S + 700855	Timken and FAG drop W31 in conjunction with C02, C04, and C08
W33 W94	W513 (W26 + W33)	S + H40A	See other component description
W37			Special finish
W40I	ECB (Prefix)	W209B	Inner ring only made of carburizing grade steel
W40R	—	—	Rollers only made of carburizing grade steel
W45A	W61	—	Tapped lifting holes in face of outer ring to facilitate lifting and handling
W84	W77	H44S (H40)*	Outer ring with standard lubrication holes plugged
W88	—	—	Special reduced bore tolerance on inner ring
W93	—	—	Inner ring with keyway in bore
W94	W26	H40A	Inner ring lubrication holes and retainer face grooves SKF and FAG - no retainer face grooves
W502	W502 (W22 + W33)	S + 700855	W22, W33 and W45A (where feasible)
W507	W507 (W4 + W31 + W33)	S +	W31, W33 and W45A (where feasible)
W509	W509 (W26 + W31 + W33)	S.H40A + ...	W31, W33, W94 and W45A (where feasible)
W525	W525 (W31 + W77)	S.H44S (H40)*	W31, W33, W84 and W45A (where feasible)
W534	W534 (C08 + W507)	—	W507 and C08
W800	VA405	T41A	W22 + W88 + radial internal clearance in upper two-thirds of range specified range (shaker screen modification)
W906A	—	—	C02 + C04 + W31 + W33 + W401 + W40R (offered on tapered bore product, supercedes W507A, W534A)

Data in this chart has been compiled to make the information as complete as possible, Timken cannot assume any responsibility for errors, omissions or accuracy of the published data.



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- Bearings are available with a tapered bore for adapter type mounting. To order, add the suffix "K" to bearing number (e.g., 23120K).



B

Bearing Number	d Bore	D O.D.	B Width	R Fillet <sup>(2)</sup> (max.)	Backing Diameter		Load Ratings		Equivalent Radial load Factors <sup>(1)</sup>			Lubrication Life Adjustment Factor <sup>(4)</sup> C <sub>g</sub>	Reference Speed RPM	Thermal Ratings <sup>(3)</sup>		Weight kg lbs.
					d <sub>a</sub> Shaft	D <sub>a</sub> Housing	Static Load Rating C <sub>0</sub>	Dynamic Load Rating C	Dynamic		Static			Grease RPM	Oil RPM	
									T/R ≤ e X = 1	T/R > e X = .67						
	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	kN lbs.	kN lbs.	e	Y	Y	Y <sub>0</sub>		RPM	RPM	kg lbs.
22205CJ	25 0.9843	52 2.0472	18.0 0.7087	1.0 0.04	30 1.2	47 1.9	43.0 9700	44.0 9800	0.34	2.00	2.98	1.96	0.0384	7700	9600	0.2 0.4
21305VCSJ	25 0.9843	62 2.4409	17.0 0.6693	1.0 0.04	33 1.3	54 2.1	38.0 8400	41.0 9200	0.29	2.33	3.47	2.28	0.0403	7000	8700	0.30 0.6
22206CJ	30 1.1811	62 2.4409	20.0 0.7874	1.0 0.04	38 1.5	56 2.2	61.0 13700	58.0 13100	0.31	2.15	3.20	2.10	0.0435	6600	8100	0.3 0.6
21306VCSJ	30 1.1811	72 2.8346	19.0 0.7480	1.0 0.04	39 1.5	63 2.5	51.0 11300	53.0 12000	0.28	2.45	3.64	2.39	0.0444	6200	7600	0.40 0.8
22207CJ	35 1.3780	72 2.8346	23.0 0.9055	1.0 0.04	45 1.8	65 2.6	88.0 19700	78.0 17500	0.31	2.21	3.29	2.16	0.0484	5900	7200	0.5 1.0
21307VCSJ	35 1.3779	80 3.1496	21.0 0.8268	1.5 0.06	44 1.7	71 2.8	66.0 14800	67.0 15000	0.27	2.48	3.69	2.42	0.0484	5600	6900	0.50 1.1
22208CJ	40 1.5748	80 3.1496	23.0 0.9055	1.0 0.04	50 2.0	72 2.9	100 22400	90.0 20100	0.27	2.47	3.67	2.41	0.0494	5100	6300	0.6 1.2
22208YM	40 1.5748	80 3.1496	23.0 0.9055	1.0 0.04	50 2.0	72 2.9	93.5 21000	85.5 19200	0.27	2.47	3.67	2.41	0.0514	5200	6400	0.6 1.2
21308VCSJ	40 1.5748	90 3.5433	23.0 0.9055	1.5 0.06	51 2.0	81 3.2	85.0 19100	81.0 18200	0.26	2.55	3.80	2.50	0.0529	5100	6200	0.70 1.5
22308CJ	40 1.5748	90 3.5433	33.0 1.2992	1.5 0.06	53 2.1	81 3.2	148 33100	133 29800	0.36	1.87	2.79	1.83	0.0541	4900	5800	1.1 2.3
22308YM	40 1.5748	90 3.5433	33.0 1.2992	1.5 0.06	53 2.1	81 3.2	148 33100	133 29800	0.36	1.87	2.79	1.83	0.0541	4900	5800	1.1 2.3
22209CJ	45 1.7717	85 3.3465	23.0 0.9055	1.0 0.04	55 2.2	77 3.0	108 24200	94.0 21100	0.26	2.64	3.93	2.58	0.0547	4700	5700	0.6 1.3
22209YM	45 1.7717	85 3.3465	23.0 0.9055	1.0 0.04	55 2.2	77 3.0	101 22800	90.0 20100	0.26	2.64	3.93	2.58	0.0547	4700	5800	0.6 1.3
21309VCSJ	45 1.7717	100 3.9370	25.0 0.9843	1.5 0.06	57 2.2	91 3.6	106 23900	100 22500	0.26	2.64	3.93	2.58	0.0567	4600	5700	0.90 2
22309CJ	45 1.7717	100 3.9370	36.0 1.4173	1.5 0.06	58 2.3	90 3.5	182 40800	162 36400	0.36	1.90	2.83	1.86	0.0565	4500	5300	1.4 3.1
22309YM	45 1.7717	100 3.9370	36.0 1.4173	1.5 0.06	58 2.3	90 3.5	182 40800	162 36400	0.36	1.90	2.83	1.86	0.0579	4500	5300	1.4 3.1
22210CJ	50 1.9685	90 3.5433	23.0 0.9055	1.0 0.04	59 2.3	82 3.2	118 26000	101 22600	0.24	2.84	4.23	2.78	0.0575	4300	5200	0.6 1.4
22210YM	50 1.9685	90 3.5433	23.0 0.9055	1.0 0.04	59 2.3	82 3.2	112 25100	96.5 21700	0.24	2.84	4.23	2.78	0.0575	4300	5300	0.6 1.4
22310CJ	50 1.9685	110 4.3307	40.0 1.5748	2.0 0.08	64 2.5	98 3.9	226 51000	197 44200	0.36	1.87	2.79	1.83	0.0422	4200	4900	1.9 4.2
22310YM	50 1.9685	110 4.3307	40.0 1.5748	2.0 0.08	64 2.5	98 3.9	226 51000	197 44200	0.36	1.87	2.79	1.83	0.0422	4200	4900	1.9 4.2
22211CJ	55 2.1654	100 3.9370	25.0 0.9843	1.5 0.06	66 2.6	91 3.6	142 32000	120 27000	0.23	2.95	4.40	2.89	0.0604	4000	4800	0.9 1.9

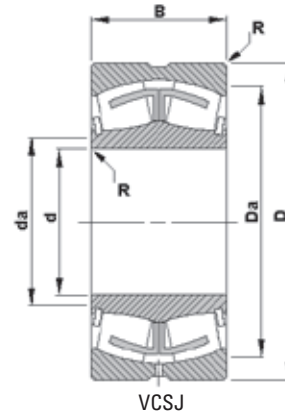
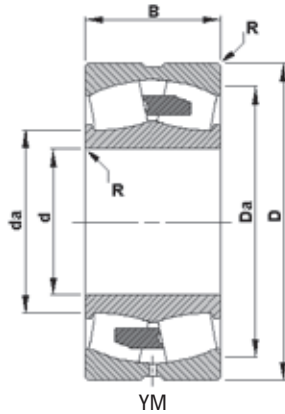
(1) These factors apply for both inch and metric calculations. See engineering section for instructions on use.

(2) Maximum shaft or housing fillet radius that bearing corners will clear.

\* Available in standard shaker screen bearing design configuration (example: 223xxYMW33W800C4).

(3) See thermal speed ratings in the engineering section.

(4) Geometry constant for Lubrication Life Adjustment Factor a3l. See "Bearing Load Ratings and Life Calculations."



B

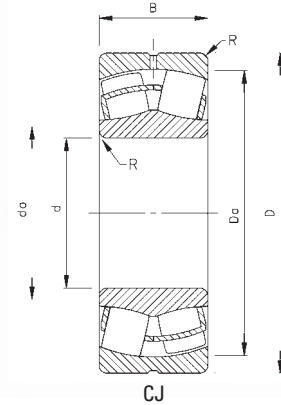
Bearing Number	d Bore	D O.D.	B Width	R Fillet <sup>(2)</sup> (max.)	Backing Diameter		Load Ratings		Equivalent Radial load Factors <sup>(1)</sup>			Lubrication Life Adjustment Factor <sup>(4)</sup> C <sub>g</sub>	Reference Speed RPM	Thermal Ratings <sup>(3)</sup>		Weight kg lbs.
					d <sub>a</sub> Shaft	D <sub>a</sub> Housing	Static Load Rating C <sub>0</sub>	Dynamic Load Rating C	Dynamic		Static			Grease	Oil	
									e	T <sub>R</sub> ≤ e X = 1						
mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	kN lbs.	kN lbs.		Y	Y	Y <sub>0</sub>	RPM	RPM			
22311CJ	55 2.1654	120 4.7244	43.0 1.6929	2.0 0.08	69 2.7	107 4.2	248 55800	221 49600	0.36	1.87	2.79	1.83	0.0446	3900	4700	2.4 5.3
22311YM	55 2.1654	120 4.7244	43.0 1.6929	2.0 0.08	69 2.7	107 4.2	248 55800	221 49600	0.36	1.87	2.79	1.83	0.0446	3900	4700	2.4 5.3
21311VCSJ	55 2.1654	120 4.7244	29.0 1.1417	2.0 0.08	70 2.8	109 4.3	158 35500	141 31700	0.24	2.82	4.20	2.76	0.0446	4000	4800	1.50 3.3
22212CJ	60 2.3622	110 4.3307	28.0 1.1024	1.5 0.06	72 2.8	100 4.0	174 39100	146 32800	0.24	2.84	4.23	2.78	0.0652	3800	4600	1.2 2.6
22212YM	60 2.3622	110 4.3307	28.0 1.1024	1.5 0.06	72 2.8	100 4.0	164 36900	140 31400	0.24	2.84	4.23	2.78	0.0645	3800	4700	1.2 2.6
22312CJ	60 2.3622	130 5.1181	46.0 1.8110	2.0 0.08	75 3.0	117 4.6	312 70100	269 60400	0.35	1.95	2.90	1.91	0.0463	3600	4300	3.0 6.6
22312YM	60 2.3622	130 5.1181	46.0 1.8110	2.0 0.08	75 3.0	117 4.6	312 70100	269 60400	0.35	1.95	2.90	1.91	0.0471	3600	4300	3.0 6.6
21312VCSJ	60 2.3622	130 5.1181	31.0 1.2205	2.0 0.08	76 3.0	118 4.7	179 40200	158 35500	0.24	2.81	4.19	2.75	0.0467	3700	4600	1.90 4.2
22213CJ	65 2.5591	120 4.7244	31.0 1.2205	1.5 0.06	78 3.1	109 4.3	217 49000	177 39800	0.24	2.79	4.15	2.73	0.0473	3600	4400	1.6 3.4
22213YM	65 2.5591	120 4.7244	31.0 1.2205	1.5 0.06	78 3.1	109 4.3	204 46000	170 38200	0.24	2.79	4.15	2.73	0.0468	3600	4400	1.6 3.4
21313VCSJ	65 2.5591	140 5.5118	33.0 1.2992	2.0 0.08	82 3.2	128 5.0	215 48300	189 42500	0.23	2.91	4.33	2.84	0.0463	3500	4300	2.40 5.3
22313CJ	65 2.5591	140 5.5118	48.0 1.8898	2.0 0.08	82 3.2	126 5.0	333 74900	290 65200	0.33	2.06	3.06	2.01	0.0455	3400	4100	3.6 8.0
22313YM	65 2.5591	140 5.5118	48.0 1.8898	2.0 0.08	82 3.2	126 5.0	333 74900	290 65200	0.33	2.06	3.06	2.01	0.0464	3400	4100	3.6 8.0
22214CJ	70 2.7559	125 4.9213	31.0 1.2205	1.5 0.06	84 3.3	115 4.5	231 52000	184 41400	0.22	3.01	4.48	2.94	0.0464	3400	4100	1.6 3.6
22314CJ	70 2.7559	150 5.9055	51.0 2.0079	2.0 0.08	87 3.4	131 5.2	385 86500	331 74300	0.34	2.00	2.98	1.96	0.0482	3200	3800	4.4 9.7
21314VCSJ	70 2.7559	150 5.9055	35.0 1.3780	2.0 0.08	88 3.5	138 5.4	240 54000	208 46700	0.23	2.90	4.31	2.83	0.0480	3300	4100	2.90 6.4
22314YM	70 2.7559	150 5.9055	51.0 2.0079	2.0 0.08	87 3.4	131 5.2	385 86500	331 74300	0.34	2.00	2.98	1.96	0.0482	3200	3800	4.4 9.7
22215CJ	75 2.9528	130 5.1181	31.0 1.2205	1.5 0.06	88 3.5	120 4.7	241 54100	191 42900	0.22	3.14	4.67	3.07	0.0477	3200	3900	1.7 3.8
22315CJ	75 2.9528	160 6.2992	55.0 2.1654	2.0 0.08	93 3.7	140 5.5	456 102000	387 87100	0.34	2.00	2.98	1.96	0.0505	3100	3600	5.4 11.9
21315VCSJ	75 2.9528	160 6.2992	37.0 1.4567	2.0 0.08	94 3.7	148 5.8	274 61600	237 53200	0.23	2.94	4.37	2.87	0.0502	3200	3800	3.50 7.7
22315YM	75 2.9528	160 6.2992	55.0 2.1654	2.0 0.08	93 3.7	140 5.5	456 102000	387 87100	0.34	2.00	2.98	1.96	0.0505	3100	3600	5.4 11.9

Continued on next page.



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Bearing Number	d Bore	D O.D.	B Width	R Fillet <sup>(2)</sup> (max.)	Backing Diameter		Load Ratings		Equivalent Radial load Factors <sup>(1)</sup>			Lubrication Life Adjustment Factor <sup>(4)</sup> C <sub>g</sub>	Reference Speed RPM	Thermal Ratings <sup>(3)</sup>		Weight	
					d <sub>a</sub> Shaft	D <sub>a</sub> Housing	Static Load Rating C <sub>0</sub>	Dynamic Load Rating C	Dynamic		Static			Grease	Oil		
									T/R ≤ e X = 1	T/R > e X = .67							In All Cases X <sub>0</sub> = 1
<b>22216CJ</b>	80 3.1496	140 5.5118	33.0 1.2992	2.0 0.08	95 3.7	129 5.1	278 62500	218 49100	0.22	3.14	4.67	3.07	0.0499	3000	3700	2.2 4.7	kg lbs.
<b>22216YM</b>	80 3.1496	140 5.5118	33.0 1.2992	2.0 0.08	95 3.7	129 5.1	263 59200	210 47100	0.22	3.14	4.67	3.07	0.0495	3000	3700	2.2 4.7	
<b>21316VCSJ</b>	80 3.1496	170 6.6929	39.0 1.5354	2.0 0.08	100 3.9	158 6.2	305 68500	260 58400	0.23	2.95	4.40	2.89	0.0522	3000	3700	4.10 9	
<b>22316CJ</b>	80 3.1496	170 6.6929	58.0 2.2835	2.0 0.08	97 3.8	148 5.8	510 115000	427 96100	0.34	2.00	2.98	1.96	0.0526	2900	3500	6.4 14.2	
<b>22316YM</b>	80 3.1496	170 6.6929	58.0 2.2835	2.0 0.08	97 3.8	148 5.8	510 115000	427 96100	0.34	2.00	2.98	1.96	0.0526	2900	3500	6.4 14.2	
<b>22217CJ</b>	85 3.3465	150 5.9055	36.0 1.4173	2.0 0.08	101 4.0	139 5.5	320 72000	255 57200	0.22	3.07	4.57	3.00	0.0518	2900	3500	2.7 6.0	
<b>22217YM</b>	85 3.3465	150 5.9055	36.0 1.4173	2.0 0.08	101 4.0	139 5.5	302 67900	244 54800	0.22	3.07	4.57	3.00	0.0513	2900	3600	2.7 6.0	
<b>21317VCSM</b>	85 3.3465	180 7.0866	41.0 1.6142	3.0 0.12	107 4.2	166 6.5	365 82000	301 67800	0.23	2.99	4.46	2.93	0.0547	2900	3500	5.20 11.5	
<b>22317CJ</b>	85 3.3465	180 7.0866	60.0 2.3622	2.5 0.10	106 4.2	158 6.2	591 133000	474 107000	0.32	2.09	3.11	2.04	0.0554	2700	3200	7.5 16.4	
<b>22317YM</b>	85 3.3465	180 7.0866	60.0 2.3622	2.5 0.10	106 4.2	158 6.2	591 133000	474 107000	0.32	2.09	3.11	2.04	0.0554	2700	3200	7.5 16.4	
<b>22218CJ</b>	90 3.5433	160 6.2992	40.0 1.5748	2.0 0.08	105 4.2	146 5.8	388 87200	303 68100	0.23	2.90	4.31	2.83	0.0536	2800	3400	3.5 7.6	
<b>22218YM</b>	90 3.5433	160 6.2992	40.0 1.5748	2.0 0.08	105 4.2	146 5.8	388 87200	303 68100	0.23	2.90	4.31	2.83	0.0536	2800	3400	3.5 7.6	
<b>23218CJ</b>	90 3.5433	160 6.2992	52.0 2.0630	2.0 0.08	104 4.1	146 5.8	504 113000	369 83000	0.30	2.25	3.34	2.20	0.0536	2300	2700	4.5 10.0	
<b>23218YM</b>	90 3.5433	160 6.2992	52.0 2.0630	2.0 0.08	104 4.1	146 5.8	504 113000	369 83000	0.30	2.25	3.34	2.20	0.0536	2300	2700	4.5 10.0	
<b>22318CJ</b>	90 3.5433	190 7.4803	64.0 2.5197	2.5 0.10	110 4.3	167 6.6	642 144000	529 119000	0.35	1.92	2.86	1.88	0.0565	2600	3000	8.8 19.4	
<b>22318YM</b>	90 3.5433	190 7.4803	64.0 2.5197	2.5 0.10	110 4.3	167 6.6	642 144000	529 119000	0.33	2.06	3.06	2.01	0.0565	2600	3000	8.8 19.4	
<b>21318VCSM</b>	90 3.5433	190 7.4803	43.0 1.6929	3.0 0.12	113 4.5	176 6.9	398 89500	327 73400	0.23	3.00	4.47	2.93	0.0567	2800	3300	6.00 13.5	
<b>22319CJ</b>	90 3.5433	190 7.4803	64.0 2.5197	2.5 0.10	110 4.3	167 6.6	642 144000	529 119000	0.33	2.06	3.06	2.01	0.0593	2600	3000	8.8 19.4	
<b>23318YM</b>	90 3.5433	190 7.4803	73.0 2.8740	2.5 0.10	110 4.3	167 6.6	664 149000	516 116000	0.40	1.70	2.52	1.66	0.0555	1900	2200	10.1 22.2	
<b>22219CJ</b>	95 3.7402	170 6.6929	43.0 1.6929	2.0 0.08	112 4.4	152 6.0	383 86200	289 65000	0.25	2.68	3.99	2.62	0.0556	2800	3400	4.2 9.3	
<b>22219YM</b>	95 3.7402	170 6.6929	43.0 1.6929	2.0 0.08	112 4.4	152 6.0	383 86200	289 65000	0.25	2.68	3.99	2.62	0.0558	2800	3400	4.2 9.3	

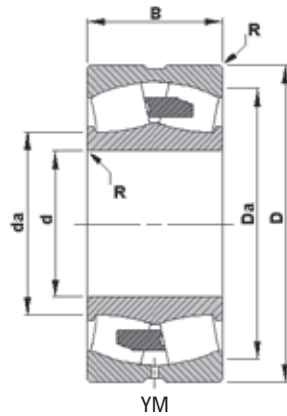
(1) These factors apply for both inch and metric calculations. See engineering section for instructions on use.

(2) Maximum shaft or housing fillet radius that bearing corners will clear.

\* Available in standard shaker screen bearing design configuration (example: 223xxYMW33W800C4).

(3) See thermal speed ratings in the engineering section.

(4) Geometry constant for Lubrication Life Adjustment Factor a3l. See "Bearing Load Ratings and Life Calculations."



B

Bearing Number	d Bore	D O.D.	B Width	R Fillet <sup>(2)</sup> (max.)	Backing Diameter		Load Ratings		Equivalent Radial load Factors <sup>(1)</sup>				Lubrication Life Adjustment Factor <sup>(4)</sup> C <sub>g</sub>	Reference Speed RPM	Thermal Ratings <sup>(3)</sup>		Weight kg lbs.
					d <sub>a</sub> Shaft	D <sub>a</sub> Housing	Static Load Rating C <sub>0</sub>	Dynamic Load Rating C	Dynamic		Static	Grease			Oil		
									$\frac{T}{R} \leq e$ X = 1	$\frac{T}{R} > e$ X = .67						In All Cases X <sub>0</sub> = 1	
	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	kN lbs.	kN lbs.	e	Y	Y	Y <sub>0</sub>		RPM	RPM	kg lbs.	
22319YM	95 3.7402	200 7.8740	67.0 2.6378	2.5 0.10	119 4.7	175 6.9	735 165000	580 130000	0.32	2.09	3.11	2.04	0.0593	2400	2800	10.2 22.5	
23120YM	100 3.9370	165 6.4961	52.0 2.0472	2.0 0.08	112 4.5	151 6.0	575 129000	379 85200	0.28	2.39	3.56	2.34	0.0567	2400	2800	4.4 9.7	
22220CJ	100 3.9370	180 7.0866	46.0 1.8110	2.0 0.08	119 4.7	160 6.3	484 109000	373 83800	0.24	2.84	4.23	2.78	0.0577	2700	3200	5.1 11.2	
22220YM	100 3.9370	180 7.0866	46.0 1.8110	2.0 0.08	119 4.7	160 6.3	484 109000	373 83800	0.24	2.84	4.23	2.78	0.0577	2700	3200	5.1 11.2	
23220CJ	100 3.9370	180 7.0866	60.3 2.3740	2.0 0.08	118 4.7	165 6.5	646 145000	463 104000	0.31	2.18	3.24	2.13	0.0579	2100	2500	6.6 15.0	
23220YM	100 3.9370	180 7.0866	60.3 2.3740	2.0 0.08	118 4.7	165 6.5	646 145000	463 104000	0.31	2.18	3.24	2.13	0.0579	2100	2500	6.6 15.0	
22320CJ	100 3.9370	215 8.4646	73.0 2.8740	2.5 0.10	125 4.9	187 7.4	756 170000	586 132000	0.36	1.90	2.82	1.85	0.0618	2300	2700	13.0 28.7	
22320YM	100 3.9370	215 8.4646	73.0 2.8740	2.5 0.10	125 4.9	187 7.4	756 170000	586 132000	0.36	1.90	2.82	1.85	0.0618	2300	2700	13.0 28.7	
23122CJ	110 4.3307	180 7.0866	56.0 2.2047	2.0 0.08	127 5.0	169 6.7	615 138000	377 84800	0.28	2.37	3.53	2.32	0.0596	2200	2600	5.6 12.3	
23122YM	110 4.3307	180 7.0866	56.0 2.2047	2.0 0.08	127 5.0	169 6.7	615 138000	377 84800	0.28	2.37	3.53	2.32	0.0596	2200	2600	5.6 12.3	
24122CJ	110 4.3307	180 7.0866	69.0 2.7165	2.0 0.08	124 4.9	164 6.5	676 152000	448 101000	0.36	1.85	2.76	1.81	0.0588	1800	2100	6.9 15.2	
22222CJ	110 4.3307	200 7.8740	53.0 2.0866	2.0 0.08	132 5.2	179 7.0	627 141000	475 107000	0.25	2.69	4.00	2.63	0.0616	2500	3000	7.3 16.1	
22222YM	110 4.3307	200 7.8740	53.0 2.0866	2.0 0.08	132 5.2	179 7.0	627 141000	475 107000	0.25	2.69	4.00	2.63	0.0616	2500	3000	7.3 16.1	
23222CJ	110 4.3307	200 7.8740	69.8 2.7480	2.0 0.08	130 5.1	183 7.2	853 192000	596 134000	0.32	2.12	3.15	2.07	0.0618	1900	2200	9.6 21.1	
23222YM	110 4.3307	200 7.8740	69.8 2.7480	2.0 0.08	130 5.1	183 7.2	853 192000	596 134000	0.32	2.12	3.15	2.07	0.0618	1900	2200	9.6 21.1	
22322CJ	110 4.3307	240 9.4488	80.0 3.1496	2.5 0.10	139 5.5	208 8.2	962 216000	733 165000	0.35	1.92	2.86	1.88	0.0654	2000	2300	18.0 39.5	
22322YM	110 4.3307	240 9.4488	80.0 3.1496	2.5 0.10	139 5.5	208 8.2	962 216000	733 165000	0.35	1.92	2.86	1.88	0.0654	2000	2300	18.0 39.5	
23322YM	110 4.3307	240 9.4488	92.1 3.6260	2.5 0.10	137 5.4	210 8.3	1070 240000	808 182000	0.40	1.67	2.49	1.63	0.0641	1500	1700	20.7 45.5	
23024CJ	120 4.7244	180 7.0866	46.0 1.8110	2.0 0.08	134 5.3	169 6.6	564 127000	352 79200	0.22	3.14	4.67	3.07	0.0616	2300	2900	4.1 9.0	
24024CJ	120 4.7244	180 7.0866	60.0 2.3622	2.0 0.08	131 5.2	164 6.5	642 144000	393 88400	0.30	2.25	3.34	2.20	0.0610	2000	2400	5.3 11.7	
23124CJ	120 4.7244	200 7.8740	62.0 2.4409	2.0 0.08	142 5.6	189 7.4	803 180000	524 118000	0.30	2.28	3.39	2.23	0.0636	2000	2300	7.8 17.2	

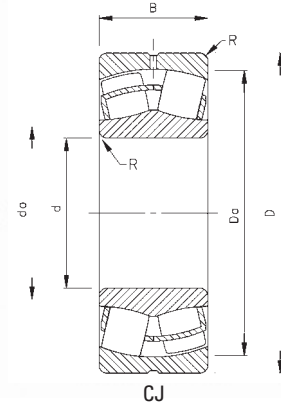
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**SPHERICAL ROLLER BEARINGS - continued**

- Timken inventory systems are designed to provide fast delivery for frequently-ordered sizes and styles.
- Consult your Timken representative for up-to-date information about the availability of the bearings you have selected.
- Life calculations, shaft and housing fits, internal clearances, tolerances and other technical data for these bearings are found in the engineering section of this catalog.
- Bearings are available with a tapered bore for adapter type mounting. To order, add the suffix "K" to bearing number (e.g., 23120K).



B

Bearing Number	d Bore	D O.D.	B Width	R Fillet <sup>(2)</sup> (max.)	Backing Diameter		Load Ratings		Equivalent Radial load Factors <sup>(1)</sup>			Lubrication Life Adjustment Factor <sup>(4)</sup> C <sub>g</sub>	Reference Speed RPM	Thermal Ratings <sup>(3)</sup>		Weight
					d <sub>a</sub> Shaft	D <sub>a</sub> Housing	Static Load Rating C <sub>0</sub>	Dynamic Load Rating C	Dynamic		Static			Grease	Oil	
									T/R ≤ e X = 1	T/R > e X = .67						
	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	kN lbs.	kN lbs.	e	Y	Y	Y <sub>0</sub>				kg lbs.
23124YM	120 4.7244	200 7.8740	62.0 2.4409	2.0 0.08	142 5.6	189 7.4	803 180000	524 118000	0.30	2.28	3.39	2.23	0.0636	2000	2300	7.8 17.2
24124CJ	120 4.7244	200 7.8740	80.0 3.1496	2.0 0.08	136 5.4	181 7.1	923 207000	590 133000	0.39	1.74	2.59	1.70	0.0625	1600	1800	10.1 22.2
22224CJ	120 4.7244	215 8.4646	58.0 2.2835	2.0 0.08	142 5.6	192 7.6	667 150000	475 107000	0.27	2.51	3.74	2.46	0.0648	2400	2900	9.1 20.0
22224YM	120 4.7244	215 8.4646	58.0 2.2835	2.0 0.08	142 5.6	192 7.6	667 150000	475 107000	0.27	2.51	3.74	2.46	0.0648	2400	2900	9.1 20.0
23224YM	120 4.7244	215 8.4646	76.0 2.9921	2.0 0.08	140 5.5	197 7.8	977 220000	678 152000	0.32	2.09	3.11	2.04	0.0647	1700	2000	12.0 26.0
22324CJ	120 4.7244	260 10.2362	86.0 3.3858	2.5 0.10	151 5.9	225 8.9	1090 245000	825 185000	0.35	1.92	2.85	1.87	0.0680	1800	2100	22.6 49.6
22324YM	120 4.7244	260 10.2362	86.0 3.3858	2.5 0.10	151 5.9	225 8.9	1090 245000	825 185000	0.35	1.92	2.85	1.87	0.0704	1800	2100	22.6 49.6
23324YM	120 4.7244	260 10.2362	106.0 4.1732	2.5 0.10	147 5.8	226 8.9	1420 320000	1030 232000	0.43	1.57	2.34	1.54	0.0681	1300	1400	27.8 61.2
23926YM	130 5.1181	180 7.0866	37.0 1.4567	1.5 0.06	142 5.6	169 6.7	427 95900	245 55000	0.18	3.76	5.60	3.68	0.0880	2000	2500	2.8 6.2
23026CJ	130 5.1181	200 7.8740	52.0 2.0472	2.0 0.08	146 5.8	187 7.4	703 158000	446 100000	0.22	3.01	4.48	2.94	0.0654	2200	2700	5.9 13.0
24026CJ	130 5.1181	200 7.8740	69.0 2.7165	2.0 0.08	144 5.7	182 7.2	795 179000	501 113000	0.32	2.09	3.11	2.04	0.0642	1900	2200	7.9 17.3
23126CJ	130 5.1181	210 8.2677	64.0 2.5197	2.0 0.08	149 5.9	195 7.7	888 200000	562 126000	0.29	2.34	3.49	2.29	0.0663	1800	2100	8.6 19.0
23126YM	130 5.1181	210 8.2677	64.0 2.5197	2.0 0.08	149 5.9	195 7.7	888 200000	562 126000	0.29	2.34	3.49	2.29	0.0663	1800	2100	8.6 19.0
24126CJ	130 5.1181	210 8.2677	80.0 3.1496	2.0 0.08	147 5.8	190 7.5	967 217000	608 137000	0.36	1.85	2.76	1.81	0.0655	1500	1700	10.7 23.6
22226CJ	130 5.1181	230 9.0551	64.0 2.5197	2.5 0.10	152 6.0	206 8.1	805 181000	562 126000	0.27	2.47	3.68	2.42	0.0676	2200	2600	11.4 25.0
22226YM	130 5.1181	230 9.0551	64.0 2.5197	2.5 0.10	152 6.0	206 8.1	805 181000	562 126000	0.27	2.47	3.68	2.42	0.0676	2200	2600	11.4 25.0
23226YM	130 5.1181	230 9.0551	80.0 3.1496	2.5 0.10	151 5.9	211 8.3	1110 249000	759 171000	0.32	2.12	3.15	2.07	0.0676	1600	1800	14.0 31.0
22326CJ	130 5.1181	280 11.0236	93.0 3.6614	3.0 0.12	161 6.4	242 9.5	1270 286000	952 214000	0.35	1.92	2.85	1.87	0.0610	1700	1900	28.2 62.1
22326YM	130 5.1181	280 11.0236	93.0 3.6614	3.0 0.12	161 6.4	242 9.5	1270 286000	952 214000	0.35	1.92	2.85	1.87	0.0610	1700	1900	28.2 62.1
23326YM	130 5.1181	280 11.0236	112.0 4.4094	3.0 0.12	164 6.5	244 9.6	1550 348000	1090 245000	0.42	1.62	2.42	1.59	0.0600	1200	1300	34.0 74.7
23928YM	140 5.5118	190 7.4803	37.0 1.4567	1.5 0.06	152 6.0	179 7.1	456 102000	253 56900	0.17	4.01	5.97	3.92	0.0920	1900	2300	3.0 6.6

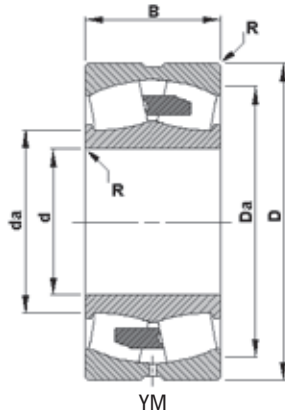
(1) These factors apply for both inch and metric calculations. See engineering section for instructions on use.

(2) Maximum shaft or housing fillet radius that bearing corners will clear.

\* Available in standard shaker screen bearing design configuration (example: 223xxYMW33W800C4).

(3) See thermal speed ratings in the engineering section.

(4) Geometry constant for Lubrication Life Adjustment Factor a3L. See "Bearing Load Ratings and Life Calculations."



B

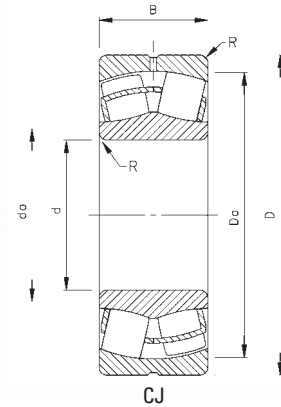
Bearing Number	d Bore	D O.D.	B Width	R Fillet <sup>(2)</sup> (max.)	Backing Diameter		Load Ratings		Equivalent Radial load Factors <sup>(1)</sup>			Lubrication Life Adjustment Factor <sup>(4)</sup> C <sub>g</sub>	Reference Speed RPM	Thermal Ratings <sup>(3)</sup>		Weight kg lbs.
					d <sub>a</sub> Shaft	D <sub>a</sub> Housing	Static Load Rating C <sub>0</sub>	Dynamic Load Rating C	Dynamic		Static			Grease	Oil	
									$\frac{T}{R} \leq e$ X = 1	$\frac{T}{R} > e$ X = .67						
	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	kN lbs.	kN lbs.	e	Y	Y	Y <sub>0</sub>		RPM	RPM	kg lbs.
23028CJ	140 5.5118	210 8.2677	53.0 2.0866	2.0 0.08	156 6.1	197 7.8	764 173000	471 106000	0.22	3.14	4.67	3.07	0.0680	2000	2500	6.4 14.0
24028CJ	140 5.5118	210 8.2677	69.0 2.7165	2.0 0.08	154 6.1	192 7.6	899 202000	527 118000	0.31	2.21	3.29	2.16	0.0676	1700	2000	8.3 18.3
23128YM	140 5.5118	225 8.8583	68.0 2.6772	2.0 0.08	159 6.3	209 8.2	1010 228000	636 143000	0.29	2.37	3.52	2.31	0.0670	1700	2000	10.0 23.0
24128CJ	140 5.5118	225 8.8583	85.0 3.3465	2.0 0.08	156 6.2	203 8.0	1120 252000	701 158000	0.36	1.90	2.83	1.86	0.0684	1300	1500	13.0 28.6
26228YM	140 5.5118	240 9.4488	80.0 3.1496	2.5 0.10	161 6.3	217 8.6	1120 251000	726 163000	0.32	2.08	3.10	2.04	0.0693	1200	1400	14.7 32.4
22228CJ	140 5.5118	250 9.8425	68.0 2.6772	2.5 0.10	166 6.5	225 8.9	930 209000	646 145000	0.27	2.51	3.73	2.45	0.0713	2000	2400	14.4 31.7
22228YM	140 5.5118	250 9.8425	68.0 2.6772	2.5 0.10	166 6.5	225 8.9	930 209000	646 145000	0.27	2.51	3.73	2.45	0.0713	2000	2400	14.4 31.7
22328CJ	140 5.5118	300 11.8110	102.0 4.0157	3.0 0.12	174 6.9	262 10.3	1520 341000	1120 252000	0.36	1.88	2.81	1.84	0.0648	1500	1700	35.4 77.9
22328YM	140 5.5118	300 11.8110	102.0 4.0157	3.0 0.12	174 6.9	262 10.3	1520 341000	1120 252000	0.36	1.88	2.81	1.84	0.0648	1500	1700	35.4 77.9
23328YM	140 5.5118	300 11.8110	118.0 4.6457	3.0 0.12	175 6.9	261 10.3	1920 432000	1310 295000	0.41	1.64	2.45	1.61	0.0632	1000	1100	41.0 90.1
23030YM	150 5.9055	225 8.8583	56.0 2.2047	2.0 0.08	169 6.6	211 8.3	872 196000	521 117000	0.21	3.20	4.77	3.13	0.0714	1900	2300	7.8 17.0
24030CJ	150 5.9055	225 8.8583	75.0 2.9528	2.0 0.08	166 6.5	206 8.1	1000 226000	603 136000	0.31	2.18	3.24	2.13	0.0699	1600	1900	10.4 22.9
23130YM	150 5.9055	250 9.8425	80.0 3.1496	2.0 0.08	172 6.8	230 9.1	1320 298000	837 188000	0.31	2.20	3.27	2.15	0.0614	1500	1700	16.0 35.0
24130CJ	150 5.9055	250 9.8425	100.0 3.9370	2.0 0.08	169 6.7	225 8.9	1400 315000	901 203000	0.38	1.78	2.65	1.74	0.0603	1200	1300	19.7 43.4
22230CJ	150 5.9055	270 10.6299	73.0 2.8740	2.5 0.10	179 7.0	242 9.5	1100 247000	752 169000	0.27	2.52	3.75	2.46	0.0626	1800	2200	18.2 39.9
22230YM	150 5.9055	270 10.6299	73.0 2.8740	3.0 0.10	177 7.0	248 9.8	1200 269000	853 192000	0.25	2.74	4.08	2.68	0.0626	1800	2100	18.0 40.0
23230YM	150 5.9055	270 10.6299	96.0 3.7795	2.5 0.10	175 6.9	247 9.7	1590 357000	1060 239000	0.33	2.03	3.02	1.98	0.0625	1300	1500	24.0 53.0
22330CJ	150 5.9055	320 12.5984	108.0 4.2520	3.0 0.12	186 7.3	280 11.0	1720 386000	1260 283000	0.35	1.91	2.84	1.87	0.0667	1400	1600	42.6 93.6
22330YM	150 5.9055	320 12.5984	108.0 4.2520	3.0 0.12	186 7.3	280 11.0	1720 386000	1260 283000	0.35	1.91	2.84	1.87	0.0667	1400	1600	42.6 93.6
23330YM	150 5.9055	320 12.5984	128.0 5.0394	3.0 0.12	185 7.3	280 11.0	2130 478000	1480 332000	0.41	1.64	2.44	1.60	0.0654	960	1100	50.4 111
23932YM	160 6.2992	220 8.6614	45.0 1.7717	2.0 0.08	175 6.9	206 8.1	655 147000	348 78200	0.19	3.60	5.35	3.52	0.0724	1800	2100	5.1 11.1

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**SPHERICAL ROLLER BEARINGS - continued**

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- Consult your Timken representative for up-to-date information about the availability of the bearings you have selected.
- Life calculations, shaft and housing fits, internal clearances, tolerances and other technical data for these bearings are found in the engineering section of this catalog.
- Bearings are available with a tapered bore for adapter type mounting. To order, add the suffix "K" to bearing number (e.g., 23120K).



B

Bearing Number	d Bore	D O.D.	B Width	R Fillet <sup>(2)</sup> (max.)	Backing Diameter		Load Ratings		Equivalent Radial load Factors <sup>(1)</sup>				Lubrication Life Adjustment Factor <sup>(4)</sup> C <sub>g</sub>	Reference Speed RPM	Thermal Ratings <sup>(3)</sup>		Weight
					d <sub>a</sub> Shaft	D <sub>a</sub> Housing	Static Load Rating C <sub>0</sub>	Dynamic Load Rating C	Dynamic		Static	Grease			Oil		
									T/R ≤ e X = 1	T/R > e X = .67						In All Cases X <sub>0</sub> = 1	
mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	kN lbs.	kN lbs.	e	Y	Y	Y <sub>0</sub>	RPM	RPM	kg lbs.			
23032YM	160 6.2992	240 9.4488	60.0 2.3622	2.0 0.08	179 7.0	225 8.9	979 220000	591 133000	0.21	3.20	4.77	3.13	0.0620	1700	2100	9.4 21.0	
24032CJ	160 6.2992	240 9.4488	80.0 3.1496	2.0 0.08	173 6.8	224 8.8	1100 246000	665 150000	0.30	2.28	3.39	2.23	0.0611	1500	1800	12.6 27.8	
23132YM	160 6.2992	270 10.6299	86.0 3.3858	2.0 0.08	189 7.4	244 9.6	1560 350000	968 218000	0.30	2.23	3.32	2.18	0.0633	1400	1600	20.1 44.1	
22232CJ	160 6.2992	290 11.4173	80.0 3.1496	2.5 0.10	192 7.6	260 10.2	1280 288000	864 194000	0.27	2.47	3.67	2.41	0.0655	1700	2000	23.1 50.8	
23232YM	160 6.2992	290 11.4173	104.0 4.0945	2.5 0.10	187 7.4	260 10.2	1680 377000	1090 246000	0.34	1.96	2.91	1.91	0.0645	1200	1400	30.0 66.0	
22332CJ	160 6.2992	340 13.3858	114.0 4.4882	3.0 0.12	198 7.8	298 11.7	1920 432000	1400 314000	0.35	1.92	2.86	1.88	0.0702	1300	1500	50.6 111	
22332YMB	160 6.2992	340 13.3858	114.0 4.4882	3.0 0.12	198 7.8	298 11.7	1920 432000	1400 314000	0.35	1.92	2.86	1.88	0.0702	1300	1500	50.6 111	
23332YM	160 6.2992	340 13.3858	136.0 5.3543	3.0 0.12	202 8.0	297 11.7	2540 572000	1670 375000	0.42	1.62	2.41	1.58	0.0686	850	940	60.4 133	
23934YM	170 6.6929	230 9.0551	45.0 1.7717	2.0 0.08	184 7.3	217 8.6	692 156000	371 83400	0.18	3.79	5.65	3.71	0.0627	1600	2000	5.3 11.7	
23034YM	170 6.6929	260 10.2362	67.0 2.6378	2.0 0.08	192 7.6	243 9.6	1220 274000	724 163000	0.22	3.07	4.57	3.00	0.0649	1600	1900	12.8 28.1	
24034CJ	170 6.6929	260 10.2362	90.0 3.5433	2.0 0.08	185 7.3	242 9.5	1430 322000	851 191000	0.32	2.12	3.15	2.07	0.0641	1300	1600	17.2 38.0	
23134YM	170 6.6929	280 11.0236	88.0 3.4646	2.0 0.08	194 7.7	255 10.2	1670 375000	1010 226000	0.30	2.28	3.40	2.23	0.0654	1300	1500	21.5 47.3	
24134CJ	170 6.6929	280 11.0236	109.0 4.2913	2.0 0.08	191 7.5	252 10.1	1840 413000	1110 248000	0.37	1.83	2.72	1.79	0.0657	980	1100	26.6 58.5	
22234CJ	170 6.6929	310 12.2047	86.0 3.3858	3.0 0.12	201 7.9	278 10.9	1450 326000	999 225000	0.28	2.44	3.63	2.38	0.0672	1600	1900	28.5 62.7	
23234YM	170 6.6929	310 12.2047	110.0 4.3307	3.0 0.12	200 7.9	276 10.9	1960 441000	1240 279000	0.34	1.97	2.94	1.93	0.0676	1100	1200	36.5 80.2	
23036YM	180 7.0866	280 11.0236	74.0 2.9134	2.0 0.08	204 8.0	261 10.3	1420 321000	851 192000	0.23	2.95	4.40	2.89	0.0677	1500	1800	17.0 37.0	
24036CJ	180 7.0866	280 11.0236	100.0 3.9370	2.0 0.08	198 7.8	260 10.2	1700 385000	992 223000	0.33	2.03	3.02	1.98	0.0671	1200	1500	23.0 50.0	
23136YM	180 7.0866	300 11.8110	96.0 3.7795	2.5 0.10	205 8.1	273 10.8	1810 406000	1100 247000	0.31	2.20	3.28	2.15	0.0677	1200	1400	27.0 60.0	
24136CJ	180 7.0866	300 11.8110	118.0 4.6457	2.5 0.10	201 7.9	275 10.8	2050 464000	1250 280000	0.38	1.78	2.65	1.74	0.0680	920	1000	33.0 74.0	
22236CJ	180 7.0866	320 12.5984	86.0 3.3858	3.0 0.12	213 8.4	288 11.3	1540 346000	1030 231000	0.27	2.54	3.78	2.48	0.0698	1500	1700	30.0 65.0	
23236YM	180 7.0866	320 12.5984	112.0 4.4094	3.0 0.12	209 8.2	288 11.3	2110 473000	1330 298000	0.34	2.00	2.97	1.95	0.0694	1000	1200	39.0 85.0	

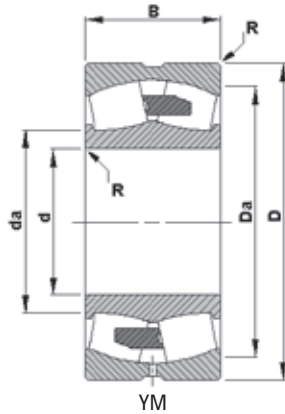
(1) These factors apply for both inch and metric calculations. See engineering section for instructions on use.

(2) Maximum shaft or housing fillet radius that bearing corners will clear.

\* Available in standard shaker screen bearing design configuration (example: 223xxYMW33W800C4).

(3) See thermal speed ratings in the engineering section.

(4) Geometry constant for Lubrication Life Adjustment Factor a3L. See "Bearing Load Ratings and Life Calculations."



B

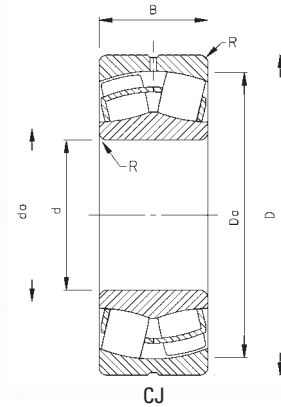
Bearing Number	d Bore	D O.D.	B Width	R Fillet <sup>(2)</sup> (max.)	Backing Diameter		Load Ratings		Equivalent Radial load Factors <sup>(1)</sup>			Lubrication Life Adjustment Factor <sup>(4)</sup> C <sub>g</sub>	Reference Speed RPM	Thermal Ratings <sup>(3)</sup>		Weight
					d <sub>a</sub> Shaft	D <sub>a</sub> Housing	Static Load Rating C <sub>0</sub>	Dynamic Load Rating C	Dynamic		Static			Grease	Oil	
									e	T <sub>R</sub> ≤ e X = 1						
mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	kN lbs.	kN lbs.		Y	Y		RPM	RPM	kg lbs.		
22336YMB	180 7.0866	380 14.9606	126.0 4.9606	3.0 0.12	222 8.8	334 13.1	2460 554000	1760 395000	0.34	1.98	2.94	1.93	0.0730	1100	1200	69.0 153
23938YM	190 7.4803	260 10.2362	52.0 2.0472	2.0 0.08	207 8.2	245 9.6	910 205000	480 108000	0.18	3.84	5.72	3.75	0.0677	1400	1700	8.1 18.0
23038YM	190 7.4803	290 11.4173	75.0 2.9528	2.0 0.08	213 8.4	271 10.7	1540 349000	901 203000	0.22	3.01	4.48	2.94	0.0698	1400	1700	18.0 39.0
24038CJ	190 7.4803	290 11.4173	100.0 3.9370	2.0 0.08	211 8.3	264 10.4	1810 407000	957 215000	0.31	2.16	3.22	2.12	0.0682	1200	1400	24.0 52.0
23138YM	190 7.4803	320 12.5984	104.0 4.0945	2.5 0.10	218 8.6	290 11.4	2090 470000	1250 282000	0.31	2.15	3.21	2.11	0.0716	1100	1300	34.0 75.0
24138CJ	190 7.4803	320 12.5984	128.0 5.0394	2.5 0.10	211 8.3	286 11.3	2310 520000	1350 305000	0.40	1.68	2.50	1.64	0.0710	860	950	42.0 92.0
22238YM	190 7.4803	340 13.3858	92.0 3.6220	3.0 0.12	224 8.8	306 12.0	1810 407000	1200 270000	0.27	2.53	3.77	2.48	0.0725	1400	1600	36.0 79.0
23238YM	190 7.4803	340 13.3858	120.0 4.7244	3.0 0.12	221 8.7	306 12.0	2390 536000	1490 335000	0.34	1.99	2.96	1.95	0.0714	960	1100	47.0 104
22338YMB	190 7.4803	400 15.7480	132.0 5.1969	4.0 0.16	236 9.3	350 13.8	2730 614000	1900 428000	0.34	1.97	2.94	1.93	0.0761	1000	1200	80.0 177
23940YM	200 7.8740	280 11.0236	60.0 2.3622	2.0 0.08	219 8.6	263 10.3	1140 256000	608 137000	0.19	3.65	5.43	3.57	0.0704	1400	1600	11.0 25.0
23040YM	200 7.8740	310 12.2047	82.0 3.2283	2.0 0.08	225 8.9	289 11.4	1760 398000	1040 234000	0.23	2.95	4.40	2.89	0.0723	1300	1600	23.0 50.0
24040CJ	200 7.8740	310 12.2047	109.0 4.2913	2.0 0.08	223 8.8	284 11.2	2080 468000	1120 251000	0.32	2.09	3.11	2.04	0.0710	1100	1300	30.0 66.0
23140YM	200 7.8740	340 13.3858	112.0 4.4094	2.5 0.10	230 9.0	308 12.1	2300 518000	1390 313000	0.31	2.15	3.20	2.10	0.0730	1100	1200	42.0 92.0
23140YMB	200 7.8740	340 13.3858	112.0 4.4094	2.5 0.10	230 9.0	308 12.1	2300 518000	1390 313000	0.31	2.15	3.20	2.10	0.0730	1100	1200	42.0 92.0
24140YMB	200 7.8740	340 13.3858	140.0 5.5118	2.5 0.10	226 8.9	308 12.1	2950 663000	1690 380000	0.39	1.74	2.59	1.70	0.0730	750	830	52.0 115
22240YMB	200 7.8740	360 14.1732	98.0 3.8583	3.0 0.12	236 9.3	323 12.7	2030 456000	1330 300000	0.27	2.50	3.72	2.44	0.0751	1300	1500	43.0 95.0
23240YM	200 7.8740	360 14.1732	128.0 5.0394	3.0 0.12	233 9.2	323 12.7	2720 611000	1670 376000	0.35	1.95	2.90	1.91	0.0746	890	1000	56.0 124
26340YM	200 7.8740	380 14.9606	126.0 4.9606	4.0 0.16	240 9.4	337 13.3	2710 610000	1740 391000	0.33	2.02	3.01	1.98	0.0759	700	780	65.8 145
22340YMB	200 7.8740	420 16.5354	138.0 5.4331	4.0 0.16	247 9.7	369 14.5	2950 663000	2070 465000	0.33	2.02	3.01	1.98	0.0778	970	1100	93.0 204
23340YM	200 7.8740	420 16.5354	165.0 6.4961	4.0 0.16	246 9.7	366 14.4	3750 844000	2450 550000	0.41	1.66	2.47	1.62	0.0784	640	700	111 244
23944YM	220 8.6614	300 11.8110	60.0 2.3622	2.0 0.08	239 9.4	283 11.2	1220 275000	632 142000	0.17	3.94	5.87	3.85	0.0743	1200	1500	12.0 27.0

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**SPHERICAL ROLLER BEARINGS - continued**

- Timken inventory systems are designed to provide fast delivery for frequently-ordered sizes and styles.
- Consult your Timken representative for up-to-date information about the availability of the bearings you have selected.
- Life calculations, shaft and housing fits, internal clearances, tolerances and other technical data for these bearings are found in the engineering section of this catalog.
- Bearings are available with a tapered bore for adapter type mounting. To order, add the suffix "K" to bearing number (e.g., 23120K).



B

Bearing Number	d Bore	D O.D.	B Width	R Fillet <sup>(2)</sup> (max.)	Backing Diameter		Load Ratings		Equivalent Radial load Factors <sup>(1)</sup>			Lubrication Life Adjustment Factor <sup>(4)</sup> C <sub>g</sub>	Reference Speed RPM	Thermal Ratings <sup>(3)</sup>		Weight
					d <sub>a</sub> Shaft	D <sub>a</sub> Housing	Static Load Rating C <sub>0</sub>	Dynamic Load Rating C	Dynamic		Static			Grease	Oil	
									T/R ≤ e X = 1	T/R > e X = .67						
	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	kN lbs.	kN lbs.	e	Y	Y	Y <sub>0</sub>				kg lbs.
23044YM	220 8.6614	340 13.3858	90.0 3.5433	2.5 0.10	247 9.7	313 12.3	1990 447000	1130 254000	0.24	2.77	4.13	2.71	0.0767	1200	1400	30.0 66.0
24044YM	220 8.6614	340 13.3858	118.0 4.6457	2.5 0.10	245 9.6	313 12.3	2740 616000	1450 326000	0.32	2.14	3.18	2.09	0.0762	930	1100	39.0 86.0
23144YM	220 8.6614	370 14.5669	120.0 4.7244	3.0 0.12	252 9.9	336 13.2	2760 621000	1630 366000	0.31	2.17	3.24	2.12	0.0777	940	1100	52.0 115
23144YMB	220 8.6614	370 14.5669	120.0 4.7244	3.0 0.12	252 9.9	336 13.2	2760 621000	1630 366000	0.31	2.17	3.24	2.12	0.0777	940	1100	52.0 115
24144YMB	220 8.6614	370 14.5669	150.0 5.9055	3.0 0.12	248 9.8	337 13.3	3250 730000	1870 421000	0.36	1.86	2.77	1.82	0.0773	690	760	65.0 144
22244YMB	220 8.6614	400 15.7480	108.0 4.2520	3.0 0.12	261 10.3	359 14.1	2330 524000	1550 349000	0.27	2.51	3.73	2.45	0.0810	1200	1400	59.0 131
23244YM	220 8.6614	400 15.7480	144.0 5.6693	3.0 0.12	257 10.1	359 14.1	3380 760000	2080 467000	0.35	1.95	2.90	1.90	0.0790	780	870	79.0 174
26344YM	220 8.6614	420 16.5354	138.0 5.4331	4.0 0.16	265 10.4	372 14.6	3280 738000	2080 468000	0.33	2.04	3.03	1.99	0.0808	610	680	88.2 194
22344YMB	220 8.6614	460 18.1102	145.0 5.7087	4.0 0.16	273 10.7	404 15.9	3490 784000	2400 540000	0.32	2.08	3.10	2.04	0.0834	840	950	116 257
23344YM	220 8.6614	460 18.1102	180.0 7.0866	4.0 0.16	269 10.6	402 15.8	4500 1010000	2900 652000	0.40	1.67	2.48	1.63	0.0832	560	610	145 319
23948YM	240 9.4488	320 12.5984	60.0 2.3622	2.0 0.08	260 10.2	303 11.9	1360 306000	666 150000	0.16	4.19	6.24	4.09	0.0782	1100	1300	13.0 29.0
23048YM	240 9.4488	360 14.1732	92.0 3.6220	2.5 0.10	267 10.5	334 13.1	2150 484000	1180 266000	0.23	2.91	4.34	2.85	0.0797	1100	1300	33.0 72.0
24048YM	240 9.4488	360 14.1732	118.0 4.6457	2.5 0.10	265 10.4	334 13.1	2920 657000	1500 338000	0.29	2.31	3.44	2.26	0.0797	850	980	42.0 92.0
23148YMB	240 9.4488	400 15.7480	128.0 5.0394	3.0 0.12	276 10.9	364 14.3	3200 719000	1850 415000	0.30	2.28	3.40	2.23	0.0817	850	970	65.0 142
24148YMB	240 9.4488	400 15.7480	160.0 6.2992	3.0 0.12	271 10.7	364 14.3	4090 919000	2250 505000	0.37	1.80	2.68	1.76	0.0817	580	640	81.0 178
22248YMB	240 9.4488	440 17.3228	120.0 4.7244	3.0 0.12	284 11.2	395 15.6	2970 668000	1960 441000	0.27	2.46	3.67	2.41	0.0840	1000	1200	80.0 177
23248YM	240 9.4488	440 17.3228	160.0 6.2992	3.0 0.12	281 11.1	394 15.5	4190 942000	2540 571000	0.35	1.92	2.86	1.88	0.0839	680	760	107 236
26348YM	240 9.4488	460 18.1102	147.0 5.7874	4.0 0.16	286 11.3	410 16.2	3720 836000	2430 547000	0.32	2.08	3.10	2.04	0.0852	550	610	113 248
22348YMB	240 9.4488	500 19.6850	155.0 6.1024	4.0 0.16	297 11.7	439 17.3	3990 897000	2740 616000	0.32	2.10	3.13	2.05	0.0880	760	850	147 324
23348YM	240 9.4488	500 19.6850	195.0 7.6772	4.0 0.16	293 11.5	437 17.2	5320 1200000	3380 761000	0.40	1.67	2.49	1.64	0.0878	500	540	185 407
26250YM	250 9.8425	410 16.1417	128.0 5.0394	3.0 0.12	284 11.2	374 14.7	3180 714000	1830 412000	0.30	2.28	3.39	2.23	0.0831	580	650	64.0 141

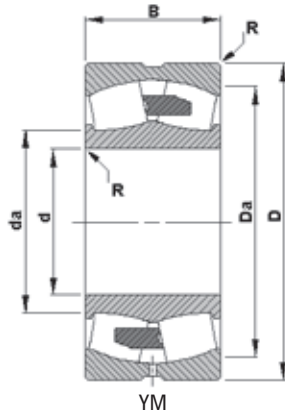
(1) These factors apply for both inch and metric calculations. See engineering section for instructions on use.

(2) Maximum shaft or housing fillet radius that bearing corners will clear.

\* Available in standard shaker screen bearing design configuration (example: 223xxYMW33W800C4).

(3) See thermal speed ratings in the engineering section.

(4) Geometry constant for Lubrication Life Adjustment Factor a3l. See "Bearing Load Ratings and Life Calculations."



B

Bearing Number	d Bore	D O.D.	B Width	R Fillet <sup>(2)</sup> (max.)	Backing Diameter		Load Ratings		Equivalent Radial load Factors <sup>(1)</sup>			Lubrication Life Adjustment Factor <sup>(4)</sup> C <sub>g</sub>	Reference Speed RPM	Thermal Ratings <sup>(3)</sup>		Weight
					d <sub>a</sub> Shaft	D <sub>a</sub> Housing	Static Load Rating C <sub>0</sub>	Dynamic Load Rating C	Dynamic		Static			Grease	Oil	
									$\frac{T}{R} \leq e$ X = 1	$\frac{T}{R} > e$ X = .67						
mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	kN lbs.	kN lbs.	e	Y	Y	Y <sub>0</sub>	RPM	RPM	kg lbs.		
23952YM	260 10.2362	360 14.1732	75.0 2.9528	2.0 0.08	284 11.2	339 13.3	1880 422000	951 214000	0.18	3.74	5.56	3.65	0.0830	1000	1200	23.0 50.0
23052YM	260 10.2362	400 15.7480	104.0 4.0945	3.0 0.12	291 11.5	369 14.5	2770 622000	1540 345000	0.24	2.85	4.24	2.78	0.0847	990	1200	47.0 104
23052YMB	260 10.2362	400 15.7480	104.0 4.0945	3.0 0.12	291 11.5	369 14.5	2770 622000	1540 345000	0.24	2.85	4.24	2.78	0.0847	990	1200	47.0 104
24052YM	260 10.2362	400 15.7480	140.0 5.5118	3.0 0.12	288 11.3	369 14.5	3870 871000	1990 448000	0.32	2.12	3.15	2.07	0.0846	750	860	64.0 140
23152YMB	260 10.2362	440 17.3228	144.0 5.6693	3.0 0.12	302 11.9	400 15.7	3970 891000	2240 504000	0.30	2.23	3.31	2.18	0.0867	760	860	89.0 197
24152YMB	260 10.2362	440 17.3228	180.0 7.0866	3.0 0.12	296 11.7	398 15.7	4840 1090000	2630 592000	0.37	1.82	2.70	1.78	0.0865	530	570	112 246
22252YMB	260 10.2362	480 18.8976	130.0 5.1181	4.0 0.16	309 12.2	430 16.9	3530 793000	2300 518000	0.27	2.46	3.66	2.41	0.0887	910	1100	104 230
23252YM	260 10.2362	480 18.8976	174.0 6.8504	4.0 0.16	308 12.1	430 16.9	4880 1100000	2930 658000	0.34	1.98	2.95	1.94	0.0893	610	680	139 307
22352YMB	260 10.2362	540 21.2598	165.0 6.4961	5.0 0.20	321 12.6	475 18.7	4590 1030000	3130 703000	0.32	2.13	3.17	2.08	0.0924	680	770	182 401
23352YM	260 10.2362	540 21.2598	206.0 8.1102	5.0 0.20	318 12.5	473 18.6	6040 1360000	3830 861000	0.39	1.71	2.54	1.67	0.0923	450	480	227 501
23956YMB	280 11.0236	380 14.9606	75.0 2.9528	2.0 0.08	304 12.0	360 14.2	2000 450000	1000 225000	0.17	3.95	5.88	3.86	0.0865	920	1100	24.0 54.0
23056YMB	280 11.0236	420 16.5354	106.0 4.1732	3.0 0.12	312 12.3	389 15.3	2830 636000	1540 346000	0.23	2.92	4.35	2.86	0.0879	930	1100	51.0 113
24056YMB	280 11.0236	420 16.5354	140.0 5.5118	3.0 0.12	310 12.2	388 15.3	4130 927000	2030 456000	0.30	2.25	3.35	2.20	0.0883	690	790	68.0 149
23156YMB	280 11.0236	460 18.1102	146.0 5.7480	4.0 0.16	320 12.6	419 16.5	4200 944000	2330 524000	0.30	2.26	3.36	2.21	0.0900	710	800	96.0 211
24156YMB	280 11.0236	460 18.1102	180.0 7.0866	4.0 0.16	319 12.6	419 16.5	5100 1150000	2670 601000	0.36	1.86	2.77	1.82	0.0899	490	530	118 260
22256YMB	280 11.0236	500 19.6850	130.0 5.1181	4.0 0.16	331 13.0	449 17.7	3780 850000	2360 530000	0.26	2.62	3.91	2.57	0.0927	850	990	110 242
23256YMB	280 11.0236	500 19.6850	176.0 6.9291	4.0 0.16	329 13.0	450 17.7	5290 1190000	3070 689000	0.33	2.07	3.08	2.02	0.0921	560	620	149 328
22356YMB	280 11.0236	580 22.8346	175.0 6.8898	5.0 0.20	345 13.6	511 20.1	5320 1200000	3590 806000	0.32	2.13	3.17	2.08	0.0968	620	690	222 490
23356YM	280 11.0236	580 22.8346	224.0 8.8189	5.0 0.20	341 13.4	508 20.0	7100 1600000	4430 997000	0.40	1.69	2.52	1.65	0.0966	400	430	284 627
23960YMB	300 11.8110	420 16.5354	90.0 3.5433	2.5 0.10	328 12.9	394 15.5	2650 596000	1330 300000	0.19	3.59	5.34	3.51	0.0911	840	1000	38.0 84.0
23060YMB	300 11.8110	460 18.1102	118.0 4.6457	3.0 0.12	336 13.2	425 16.8	3600 809000	1970 442000	0.24	2.87	4.27	2.80	0.0926	830	980	71.0 156

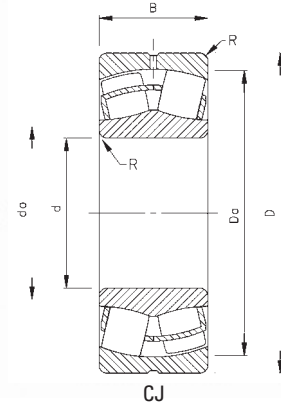
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**SPHERICAL ROLLER BEARINGS - continued**

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Bearing Number	d Bore	D O.D.	B Width	R Fillet <sup>(2)</sup> (max.)	Backing Diameter		Load Ratings		Equivalent Radial load Factors <sup>(1)</sup>				Lubrication Life Adjustment Factor <sup>(4)</sup> C <sub>g</sub>	Reference Speed RPM	Thermal Ratings <sup>(3)</sup>		Weight kg lbs.
					d <sub>a</sub> Shaft	D <sub>a</sub> Housing	Static Load Rating C <sub>0</sub>	Dynamic Load Rating C	Dynamic		Static	Grease			Oil		
									T/R ≤ e X = 1	T/R > e X = .67						In All Cases X <sub>0</sub> = 1	
24060YMB	300 11.8110	460 18.1102	160.0 6.2992	3.0 0.12	334 13.1	423 16.7	5230 1180000	2560 576000	0.32	2.11	3.13	2.06	0.0928	620	700	96.0 211	
23160YMB	300 11.8110	500 19.6850	160.0 6.2992	4.0 0.16	345 13.6	453 17.8	5160 1160000	2810 632000	0.30	2.25	3.35	2.20	0.0946	630	710	126 278	
24160YMB	300 11.8110	500 19.6850	200.0 7.8740	4.0 0.16	338 13.3	455 17.9	6320 1420000	3380 759000	0.37	1.82	2.71	1.78	0.0942	430	460	158 347	
22260YMB	300 11.8110	540 21.2598	140.0 5.5118	4.0 0.16	355 14.0	484 19.1	4430 997000	2760 621000	0.26	2.59	3.86	2.53	0.0965	770	890	139 306	
23260YMB	300 11.8110	540 21.2598	192.0 7.5591	4.0 0.16	353 13.9	482 19.0	6210 1400000	3510 788000	0.34	2.00	2.98	1.96	0.0967	510	560	191 420	
23964YMB	320 12.5984	440 17.3228	90.0 3.5433	2.5 0.10	349 13.8	414 16.3	2800 629000	1360 305000	0.18	3.79	5.65	3.71	0.0946	780	930	40.0 89.0	
23064YMB	320 12.5984	480 18.8976	121.0 4.7638	3.0 0.12	357 14.1	444 17.5	3910 880000	2040 458000	0.23	2.93	4.36	2.86	0.0962	780	910	76.0 168	
24064YMB	320 12.5984	480 18.8976	160.0 6.2992	3.0 0.12	354 13.9	444 17.5	5420 1220000	2620 588000	0.30	2.24	3.34	2.19	0.0961	580	660	101 222	
23164YMB	320 12.5984	540 21.2598	176.0 6.9291	4.0 0.16	367 14.4	490 19.3	6000 1350000	3330 749000	0.31	2.14	3.19	2.10	0.0988	580	650	164 361	
24164YMB	320 12.5984	540 21.2598	218.0 8.5827	4.0 0.16	362 14.3	489 19.3	7580 1710000	3980 894000	0.38	1.77	2.63	1.73	0.0986	380	410	203 448	
22264YMB	320 12.5984	580 22.8346	150.0 5.9055	4.0 0.16	380 15.0	519 20.4	5040 1130000	3110 700000	0.26	2.58	3.84	2.52	0.1009	710	820	173 381	
23264YMB	320 12.5984	580 22.8346	208.0 8.1890	4.0 0.16	379 14.9	516 20.3	7140 1610000	3960 891000	0.34	1.98	2.94	1.93	0.1013	460	510	240 528	
23968YMB	340 13.3858	460 18.1102	90.0 3.5433	2.5 0.10	369 14.5	435 17.1	3020 678000	1420 320000	0.17	3.98	5.93	3.89	0.0983	730	860	43.0 94.0	
23068YMB	340 13.3858	520 20.4724	133.0 5.2362	4.0 0.16	384 15.1	481 18.9	4670 1050000	2430 546000	0.23	2.96	4.40	2.89	0.1005	710	830	101 223	
24068YMB	340 13.3858	520 20.4724	180.0 7.0866	4.0 0.16	377 14.9	479 18.9	6590 1480000	3190 717000	0.32	2.14	3.18	2.09	0.1004	530	600	137 302	
23168YMB	340 13.3858	580 22.8346	190.0 7.4803	4.0 0.16	397 15.6	526 20.7	6900 1550000	3750 843000	0.30	2.22	3.30	2.17	0.1033	530	590	206 455	
24168YMB	340 13.3858	580 22.8346	243.0 9.5669	4.0 0.16	385 15.2	525 20.7	8970 2020000	4720 1060000	0.39	1.75	2.61	1.71	0.1033	340	370	264 582	
23268YMB	340 13.3858	620 24.4094	224.0 8.8189	5.0 0.20	399 15.7	554 21.8	8290 1860000	4700 1060000	0.35	1.91	2.84	1.86	0.1051	420	460	296 653	
23972YMB	360 14.1732	480 18.8976	90.0 3.5433	2.5 0.10	389 15.3	455 17.9	3170 712000	1460 328000	0.16	4.12	6.13	4.03	0.1013	680	810	45.0 98.0	
23072YMB	360 14.1732	540 21.2598	134.0 5.2756	4.0 0.16	403 15.9	499 19.7	4640 1040000	2390 538000	0.23	2.94	4.38	2.88	0.1035	680	800	107 236	
24072YMB	360 14.1732	540 21.2598	180.0 7.0866	4.0 0.16	398 15.7	500 19.7	6900 1550000	3270 736000	0.30	2.24	3.33	2.19	0.1036	500	560	144 316	

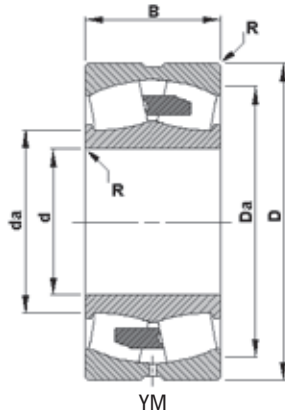
(1) These factors apply for both inch and metric calculations. See engineering section for instructions on use.

(2) Maximum shaft or housing fillet radius that bearing corners will clear.

\* Available in standard shaker screen bearing design configuration (example: 223xxYMW33W800C4).

(3) See thermal speed ratings in the engineering section.

(4) Geometry constant for Lubrication Life Adjustment Factor a3l. See "Bearing Load Ratings and Life Calculations."



B

Bearing Number	d Bore	D O.D.	B Width	R Fillet <sup>(2)</sup> (max.)	Backing Diameter		Load Ratings		Equivalent Radial load Factors <sup>(1)</sup>			Lubrication Life Adjustment Factor <sup>(4)</sup> C <sub>g</sub>	Reference Speed RPM	Thermal Ratings <sup>(3)</sup>		Weight kg lbs.
					d <sub>a</sub> Shaft	D <sub>a</sub> Housing	Static Load Rating C <sub>0</sub>	Dynamic Load Rating C	Dynamic		Static			Grease	Oil	
									T/R ≤ e X = 1	T/R > e X = .67						
mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	kN lbs.	kN lbs.	e	Y	Y	Y <sub>0</sub>					
23172YMB	360 14.1732	600 23.6220	192.0 7.5591	4.0 0.16	419 16.5	546 21.5	7360 1650000	3880 872000	0.29	2.29	3.42	2.24	0.1065	500	560	218 480
24172YMB	360 14.1732	600 23.6220	243.0 9.5669	4.0 0.16	406 16.0	545 21.4	9620 2160000	4890 1100000	0.38	1.79	2.67	1.75	0.1064	320	340	276 608
23272YMB	360 14.1732	650 25.5906	232.0 9.1339	5.0 0.20	420 16.5	583 22.9	8900 2000000	5040 1130000	0.35	1.95	2.91	1.91	0.1086	400	430	334 737
23976YMB	380 14.9606	520 20.4724	106.0 4.1732	3.0 0.12	416 16.4	488 19.2	3970 893000	1810 407000	0.18	3.80	5.66	3.72	0.1057	640	750	66.0 145
23076YMB	380 14.9606	560 22.0472	135.0 5.3150	4.0 0.16	422 16.6	520 20.5	5150 1160000	2590 581000	0.22	3.08	4.58	3.01	0.1068	630	740	112 248
24076YMB	380 14.9606	560 22.0472	180.0 7.0866	4.0 0.16	418 16.4	520 20.5	7150 1610000	3360 755000	0.29	2.32	3.45	2.27	0.1062	470	530	150 330
23176YMB	380 14.9606	620 24.4094	194.0 7.6378	4.0 0.16	431 17.0	566 22.3	7670 1720000	4100 922000	0.30	2.28	3.39	2.23	0.1090	470	530	229 505
24176YMB	380 14.9606	620 24.4094	243.0 9.5669	4.0 0.16	427 16.8	565 22.3	10200 2290000	5080 1140000	0.36	1.87	2.79	1.83	0.1097	300	320	287 633
23276YMB	380 14.9606	680 26.7717	240.0 9.4488	5.0 0.20	442 17.4	611 24.1	9630 2170000	5430 1220000	0.34	1.98	2.95	1.94	0.1119	370	400	376 828
23980YMB	400 15.7480	540 21.2598	106.0 4.1732	3.0 0.12	436 17.2	511 20.1	4050 910000	1850 415000	0.17	3.99	5.94	3.90	0.1086	600	720	69.0 151
23080YMB	400 15.7480	600 23.6220	148.0 5.8268	4.0 0.16	447 17.6	555 21.9	6020 1350000	3050 685000	0.23	2.98	4.44	2.92	0.1109	590	690	146 321
24080YMB	400 15.7480	600 23.6220	200.0 7.8740	4.0 0.16	442 17.4	555 21.9	8550 1920000	3990 898000	0.30	2.24	3.33	2.19	0.1108	430	480	197 434
23180YMB	400 15.7480	650 25.5906	200.0 7.8740	5.0 0.20	454 17.9	594 23.4	8210 1850000	4350 979000	0.29	2.32	3.46	2.27	0.1123	440	500	258 570
24180YMB	400 15.7480	650 25.5906	250.0 9.8425	5.0 0.20	449 17.7	594 23.4	10500 2350000	5280 1190000	0.35	1.91	2.84	1.87	0.1123	290	310	323 712
23280YMB	400 15.7480	720 28.3465	256.0 10.0787	5.0 0.20	466 18.4	646 25.4	11000 2460000	6110 1370000	0.34	1.96	2.93	1.92	0.1159	340	370	452 996
22380YMB	400 15.7480	820 32.2835	243.0 9.5669	6.0 0.24	496 19.5	729 28.7	10200 2290000	6570 1480000	0.30	2.28	3.40	2.23	0.1213	390	430	613 1350
23984YMB	420 16.5354	560 22.0472	106.0 4.1732	3.0 0.12	454 17.9	531 20.9	4270 961000	1930 434000	0.16	4.14	6.17	4.05	0.1117	570	670	72.0 158
23084YMB	420 16.5354	620 24.4094	150.0 5.9055	4.0 0.16	467 18.4	576 22.7	6430 1450000	3170 713000	0.22	3.05	4.54	2.98	0.1139	560	650	154 339
24084YMB	420 16.5354	620 24.4094	200.0 7.8740	4.0 0.16	463 18.2	575 22.7	8710 1960000	4010 901000	0.29	2.37	3.52	2.31	0.1138	410	460	205 451
23184YMB	420 16.5354	700 27.5591	224.0 8.8189	5.0 0.20	480 18.9	637 25.1	9760 2190000	5210 1170000	0.31	2.21	3.28	2.16	0.1166	410	450	346 762
24184YMB	420 16.5354	700 27.5591	280.0 11.0236	5.0 0.20	473 18.6	637 25.1	12500 2810000	6330 1420000	0.37	1.81	2.70	1.77	0.1166	260	280	432 953

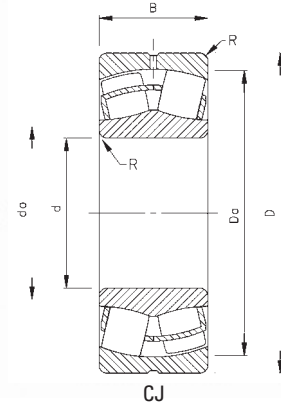
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B

Bearing Number	d Bore	D O.D.	B Width	R Fillet <sup>(2)</sup> (max.)	Backing Diameter		Load Ratings		Equivalent Radial load Factors <sup>(1)</sup>			Lubrication Life Adjustment Factor <sup>(4)</sup> C <sub>g</sub>	Reference Speed RPM	Thermal Ratings <sup>(3)</sup>		Weight
					d <sub>a</sub> Shaft	D <sub>a</sub> Housing	Static Load Rating C <sub>0</sub>	Dynamic Load Rating C	Dynamic		Static			Grease	Oil	
									T/R ≤ e X = 1	T/R > e X = .67						
	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	kN lbs.	kN lbs.	e	Y	Y	Y <sub>0</sub>		RPM	RPM	kg lbs.
23284YMB	420 16.5354	760 29.9213	272.0 10.7087	6.0 0.24	490 19.3	681 26.8	12000 2690000	6670 1500000	0.35	1.90	2.83	1.86	0.1187	320	350	537 1180
23988YMB	440 17.3228	600 23.6220	118.0 4.6457	3.0 0.12	479 18.9	566 22.3	5080 1140000	2340 525000	0.17	3.93	5.85	3.84	0.1157	530	630	97.0 213
23088YMB	440 17.3228	650 25.5906	157.0 6.1811	5.0 0.20	489 19.3	603 23.8	7050 1590000	3460 777000	0.22	3.04	4.53	2.97	0.1173	520	610	177 390
24088YMB	440 17.3228	650 25.5906	212.0 8.3465	5.0 0.20	485 19.1	603 23.7	9870 2220000	4480 1010000	0.29	2.31	3.44	2.26	0.1173	380	430	239 527
23188YMB	440 17.3228	720 28.3465	226.0 8.8976	5.0 0.20	500 19.7	657 25.9	10400 2340000	5440 1220000	0.30	2.26	3.37	2.21	0.1198	380	430	361 797
24188YMB	440 17.3228	720 28.3465	280.0 11.0236	5.0 0.20	495 19.5	656 25.8	13100 2930000	6450 1450000	0.36	1.88	2.79	1.84	0.1197	250	260	448 987
23288YMB	440 17.3228	790 31.1024	280.0 11.0236	6.0 0.24	512 20.1	710 27.9	13400 3010000	7350 1650000	0.35	1.95	2.91	1.91	0.1231	300	320	593 1310
23992YMB	460 18.1102	620 24.4094	118.0 4.6457	3.0 0.12	504 19.9	582 22.9	4700 1060000	2050 460000	0.16	4.13	6.15	4.04	0.1187	520	620	101 221
23092YMB	460 18.1102	680 26.7717	163.0 6.4173	5.0 0.20	512 20.1	631 24.8	7660 1720000	3740 840000	0.22	3.06	4.56	2.99	0.1207	500	570	202 444
24092YMB	460 18.1102	680 26.7717	218.0 8.5827	5.0 0.20	507 20.0	630 24.8	10400 2350000	4750 1070000	0.28	2.37	3.53	2.32	0.1207	360	410	270 593
23192YMB	460 18.1102	760 29.9213	240.0 9.4488	6.0 0.24	524 20.6	692 27.2	11200 2530000	5920 1330000	0.30	2.24	3.33	2.19	0.1230	370	410	433 953
24192YMB	460 18.1102	760 29.9213	300.0 11.8110	6.0 0.24	517 20.4	692 27.2	15000 3360000	7420 1670000	0.37	1.82	2.71	1.78	0.1239	220	240	542 1190
23292YMB	460 18.1102	830 32.6772	296.0 11.6535	6.0 0.24	535 21.1	746 29.4	14200 3190000	7870 1770000	0.34	1.96	2.93	1.92	0.1259	280	310	697 1530
23996YMB	480 18.8976	650 25.5906	128.0 5.0394	4.0 0.16	522 20.6	614 24.2	5430 1220000	2490 559000	0.17	3.86	5.75	3.78	0.1224	500	590	121 267
23096YMB	480 18.8976	700 27.5591	165.0 6.4961	5.0 0.20	532 21.0	650 25.6	8070 1810000	3840 863000	0.22	3.14	4.67	3.07	0.1236	470	550	211 465
24096YMB	480 18.8976	700 27.5591	218.0 8.5827	5.0 0.20	527 20.7	652 25.7	11000 2470000	4970 1120000	0.28	2.45	3.64	2.39	0.1233	340	380	279 614
23196YMB	480 18.8976	790 31.1024	248.0 9.7638	6.0 0.24	547 21.5	719 28.3	12600 2830000	6480 1460000	0.30	2.26	3.36	2.21	0.1269	340	370	482 1060
24196YMB	480 18.8976	790 31.1024	308.0 12.1260	6.0 0.24	542 21.3	717 28.2	16300 3660000	7840 1760000	0.37	1.85	2.75	1.80	0.1266	210	220	598 1320
23296YMB	480 18.8976	870 34.2520	310.0 12.2047	6.0 0.24	561 22.1	779 30.7	16600 3740000	8940 2010000	0.35	1.92	2.85	1.87	0.1305	250	270	805 1770
239/500YMB	500 19.6850	670 26.3780	128.0 5.0394	4.0 0.16	544 21.4	634 25.0	5730 1290000	2540 571000	0.17	4.02	5.98	3.93	0.1251	470	560	126 276
230/500YMB	500 19.6850	720 28.3465	167.0 6.5748	5.0 0.20	551 21.7	673 26.5	8260 1860000	3950 889000	0.21	3.26	4.85	3.18	0.1263	460	530	221 486

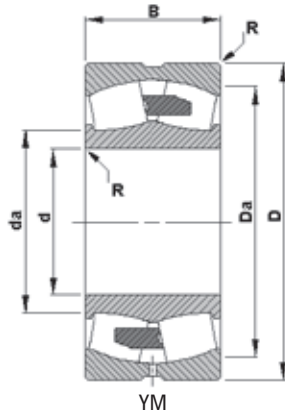
(1) These factors apply for both inch and metric calculations. See engineering section for instructions on use.

(2) Maximum shaft or housing fillet radius that bearing corners will clear.

\* Available in standard shaker screen bearing design configuration (example: 223xxYMW33W800C4).

(3) See thermal speed ratings in the engineering section.

(4) Geometry constant for Lubrication Life Adjustment Factor a3l. See "Bearing Load Ratings and Life Calculations."



B

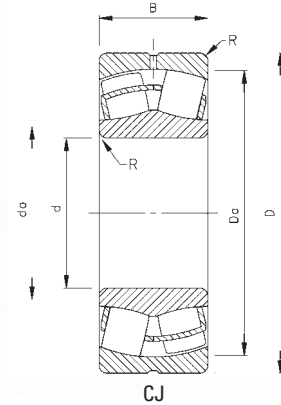
Bearing Number	d Bore	D O.D.	B Width	R Fillet <sup>(2)</sup> (max.)	Backing Diameter		Load Ratings		Equivalent Radial load Factors <sup>(1)</sup>			Lubrication Life Adjustment Factor <sup>(4)</sup> C <sub>g</sub>	Reference Speed RPM	Thermal Ratings <sup>(3)</sup>		Weight kg lbs.
					d <sub>a</sub> Shaft	D <sub>a</sub> Housing	Static Load Rating C <sub>0</sub>	Dynamic Load Rating C	Dynamic		Static			Grease	Oil	
									$\frac{T}{R} \leq e$ X = 1	$\frac{T}{R} > e$ X = .67						
	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	kN lbs.	kN lbs.	e	Y	Y	Y <sub>0</sub>				
240/500YMB	500 19.6850	720 28.3465	218.0 8.5827	5.0 0.20	547 21.5	672 26.5	11300 2540000	5040 1130000	0.27	2.51	3.74	2.45	0.1263	330	370	289 635
231/500YMB	500 19.6850	830 32.6772	264.0 10.3937	6.0 0.24	573 22.5	753 29.6	14100 3170000	7180 1610000	0.30	2.22	3.30	2.17	0.1307	320	350	572 1260
241/500YMB	500 19.6850	830 32.6772	325.0 12.7953	6.0 0.24	563 22.2	755 29.7	17700 3990000	8720 1960000	0.37	1.81	2.69	1.77	0.1300	200	210	704 1550
232/500YMB	500 19.6850	920 36.2205	336.0 13.2283	6.0 0.24	585 23.0	823 32.4	18100 4070000	9910 2230000	0.36	1.90	2.83	1.86	0.1340	240	260	988 2170
239/530YMB	530 20.8661	710 27.9528	136.0 5.3543	4.0 0.16	575 22.6	672 26.4	6950 1560000	3030 682000	0.16	4.11	6.12	4.02	0.1298	430	500	149 329
230/530YMB	530 20.8661	780 30.7087	185.0 7.2835	5.0 0.20	588 23.2	725 28.5	9840 2210000	4740 1070000	0.21	3.14	4.68	3.07	0.1319	420	480	299 657
240/530YMB	530 20.8661	780 30.7087	250.0 9.8425	5.0 0.20	583 23.0	725 28.5	13900 3110000	6170 1390000	0.28	2.37	3.53	2.32	0.1318	300	330	403 888
231/530YMB	530 20.8661	870 34.2520	272.0 10.7087	6.0 0.24	603 23.7	793 31.2	15300 3440000	7770 1750000	0.30	2.27	3.38	2.22	0.1350	300	320	637 1400
241/530YMB	530 20.8661	870 34.2520	335.0 13.1890	6.0 0.24	596 23.5	792 31.2	19800 4440000	9430 2120000	0.37	1.84	2.74	1.80	0.1352	180	190	785 1730
232/530YMB	530 20.8661	980 38.5827	355.0 13.9764	7.0 0.28	621 24.4	878 34.6	20500 4610000	11200 2520000	0.35	1.91	2.85	1.87	0.1395	220	240	1190 2620
239/560YMB	560 22.0472	750 29.5276	140.0 5.5118	4.0 0.16	607 23.9	710 28.0	7370 1660000	3240 729000	0.16	4.21	6.27	4.12	0.1339	400	470	172 378
230/560YMB	560 22.0472	820 32.2835	195.0 7.6772	5.0 0.20	620 24.4	764 30.1	10900 2460000	5230 1180000	0.22	3.14	4.67	3.07	0.1364	390	450	344 759
240/560YMB	560 22.0472	820 32.2835	258.0 10.1575	5.0 0.20	617 24.3	761 30.0	15000 3360000	6500 1460000	0.28	2.42	3.60	2.37	0.1365	280	310	456 1000
231/560YMB	560 22.0472	920 36.2205	280.0 11.0236	6.0 0.24	638 25.1	838 33.0	16600 3730000	8410 1890000	0.29	2.33	3.47	2.28	0.1399	270	300	734 1620
241/560YMB	560 22.0472	920 36.2205	355.0 13.9764	6.0 0.24	629 24.8	839 33.0	22100 4960000	10600 2370000	0.36	1.87	2.78	1.83	0.1400	160	170	931 2050
232/560YMB	560 22.0472	1030 40.5512	365.0 14.3701	7.0 0.28	661 26.0	918 36.1	22600 5090000	11900 2690000	0.34	1.96	2.91	1.91	0.1449	200	220	1340 2960
239/600YMB	600 23.6220	800 31.4961	150.0 5.9055	4.0 0.16	650 25.6	757 29.8	8690 1950000	3680 827000	0.16	4.20	6.25	4.11	0.1404	370	430	207 456
230/600YMB	600 23.6220	870 34.2520	200.0 7.8740	5.0 0.20	664 26.1	811 31.9	11900 2670000	5530 1240000	0.21	3.27	4.87	3.20	0.1413	360	410	391 861
240/600YMB	600 23.6220	870 34.2520	272.0 10.7087	5.0 0.20	658 25.9	811 31.9	17000 3820000	7320 1650000	0.28	2.44	3.64	2.39	0.1421	260	280	531 1170
231/600YMB	600 23.6220	980 38.5827	300.0 11.8110	6.0 0.24	681 26.8	895 35.2	19100 4290000	9560 2150000	0.29	2.32	3.46	2.27	0.1458	250	270	887 1950
239/630YMB	630 24.8031	850 33.4646	165.0 6.4961	5.0 0.20	684 26.9	804 31.6	10200 2290000	4390 986000	0.17	4.02	5.99	3.93	0.1451	340	400	264 583

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**SPHERICAL ROLLER BEARINGS - continued**

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- Bearings are available with a tapered bore for adapter type mounting. To order, add the suffix "K" to bearing number (e.g., 23120K).



Bearing Number	d Bore	D O.D.	B Width	R Fillet <sup>(2)</sup> (max.)	Backing Diameter		Load Ratings		Equivalent Radial load Factors <sup>(1)</sup>				Lubrication Life Adjustment Factor <sup>(4)</sup> C <sub>g</sub>	Reference Speed RPM	Thermal Ratings <sup>(3)</sup>		Weight
					d <sub>a</sub> Shaft	D <sub>a</sub> Housing	Static Load Rating C <sub>0</sub>	Dynamic Load Rating C	Dynamic			Static			Grease	Oil	
									e	T/R ≤ e X = 1	T/R > e X = .67						
	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	kN lbs.	kN lbs.						RPM	RPM	kg lbs.	
<b>230/630YMB</b>	630 24.8031	920 36.2205	212.0 8.3465	6.0 0.24	696 27.4	858 33.8	13600 3050000	6370 1430000	0.21	3.18	4.74	3.11	0.1466	330	380	469 1030	
<b>240/630YMB</b>	630 24.8031	920 36.2205	290.0 11.4173	6.0 0.24	691 27.2	856 33.7	18900 4240000	8180 1840000	0.28	2.41	3.59	2.36	0.1465	240	260	642 1410	
<b>231/630YMB</b>	630 24.8031	1030 40.5512	315.0 12.4016	6.0 0.24	716 28.2	940 37.0	21500 4820000	10600 2390000	0.29	2.30	3.42	2.25	0.1505	230	250	1030 2270	
<b>241/630YMB</b>	630 24.8031	1030 40.5512	400.0 15.7480	6.0 0.24	707 27.8	939 37.0	27900 6270000	13000 2920000	0.37	1.84	2.74	1.80	0.1504	140	140	1310 2880	
<b>239/670YMB</b>	670 26.3780	900 35.4331	170.0 6.6929	5.0 0.20	727 28.6	851 33.5	11200 2510000	4720 1060000	0.16	4.15	6.18	4.06	0.1509	320	370	302 666	
<b>230/670YMB</b>	670 26.3780	980 38.5827	230.0 9.0551	6.0 0.24	744 29.3	911 35.9	16000 3590000	7230 1630000	0.22	3.12	4.65	3.05	0.1531	310	350	579 1280	
<b>240/670YMB</b>	670 26.3780	980 38.5827	308.0 12.1260	6.0 0.24	738 29.0	910 35.8	22100 4960000	9280 2090000	0.28	2.39	3.55	2.33	0.1530	220	240	775 1710	
<b>231/670YMB</b>	670 26.3780	1090 42.9134	336.0 13.2283	6.0 0.24	760 29.9	995 39.2	23700 5340000	11600 2610000	0.29	2.31	3.44	2.26	0.1560	210	230	1220 2700	
<b>241/670YMD</b>	670 26.3780	1090 42.9134	412.0 16.2205	6.0 0.24	751 29.6	996 39.2	30400 6830000	14100 3180000	0.36	1.90	2.82	1.85	0.1560	130	130	1500 3300	
<b>232/670YMD</b>	670 26.3780	1220 48.0315	438.0 17.2441	9.0 0.35	779 30.7	1097 43.2	32100 7220000	16900 3800000	0.35	1.95	2.91	1.91	0.1608	160	170	2240 4940	
<b>239/710YMB</b>	710 27.9528	950 37.4016	180.0 7.0866	5.0 0.20	771 30.4	898 35.3	12500 2820000	5150 1160000	0.16	4.13	6.15	4.04	0.1565	300	340	353 778	
<b>230/710YMB</b>	710 27.9528	1030 40.5512	236.0 9.2913	6.0 0.24	785 30.9	960 37.8	16900 3800000	7680 1730000	0.21	3.26	4.86	3.19	0.1583	290	330	647 1430	
<b>240/710YMD</b>	710 27.9528	1030 40.5512	315.0 12.4016	6.0 0.24	779 30.7	960 37.8	23400 5260000	9880 2220000	0.27	2.49	3.71	2.44	0.1582	200	220	863 1900	
<b>231/710YMB</b>	710 27.9528	1150 45.2756	345.0 13.5827	7.0 0.28	809 31.8	1048 41.3	26200 5880000	12500 2800000	0.28	2.38	3.54	2.32	0.1622	200	210	1390 3060	
<b>241/710YMD</b>	710 27.9528	1150 45.2756	438.0 17.2441	7.0 0.28	795 31.3	1050 41.4	34300 7720000	15700 3520000	0.36	1.87	2.78	1.83	0.1613	120	120	1760 3890	
<b>239/750YMB</b>	750 29.5276	1000 39.3701	185.0 7.2835	5.0 0.20	813 32.0	946 37.3	13500 3040000	5550 1250000	0.16	4.23	6.30	4.14	0.1619	280	320	398 878	
<b>230/750YMB</b>	750 29.5276	1090 42.9134	250.0 9.8425	6.0 0.24	830 32.7	1015 40.0	19000 4270000	8550 1920000	0.21	3.26	4.85	3.18	0.1641	270	300	770 1700	
<b>240/750YMD</b>	750 29.5276	1090 42.9134	335.0 13.1890	6.0 0.24	824 32.4	1014 39.9	26400 5940000	11000 2480000	0.27	2.48	3.69	2.42	0.1640	190	200	1030 2270	
<b>241/750YMD</b>	750 29.5276	1220 48.0315	475.0 18.7008	7.0 0.28	840 33.1	1114 43.9	39200 8800000	17800 4000000	0.36	1.86	2.77	1.82	0.1676	110	110	2170 4770	
<b>239/800YMB</b>	800 31.4961	1060 41.7323	195.0 7.6772	5.0 0.20	868 34.2	1007 39.6	13800 3100000	5700 1280000	0.16	4.20	6.25	4.10	0.1685	270	310	465 1020	
<b>230/800YMB</b>	800 31.4961	1150 45.2756	258.0 10.1575	6.0 0.24	888 35.0	1074 42.3	20300 4570000	8940 2010000	0.19	3.50	5.22	3.43	0.1696	250	280	868 1910	

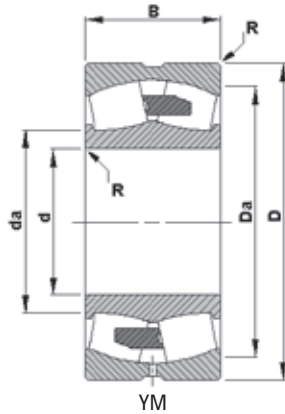
(1) These factors apply for both inch and metric calculations. See engineering section for instructions on use.

(2) Maximum shaft or housing fillet radius that bearing corners will clear.

\* Available in standard shaker screen bearing design configuration (example: 223xxYMW33W800C4).

(3) See thermal speed ratings in the engineering section.

(4) Geometry constant for Lubrication Life Adjustment Factor a3l. See "Bearing Load Ratings and Life Calculations."



B

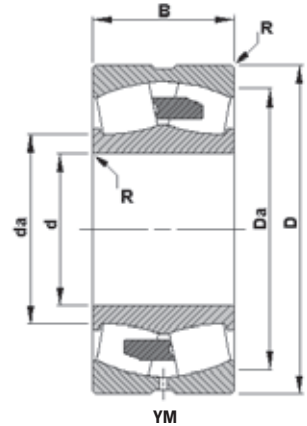
Bearing Number	d Bore	D O.D.	B Width	R Fillet <sup>(2)</sup> (max.)	Backing Diameter		Load Ratings		Equivalent Radial load Factors <sup>(1)</sup>			Lubrication Life Adjustment Factor <sup>(4)</sup> C <sub>g</sub>	Reference Speed RPM	Thermal Ratings <sup>(3)</sup>		Weight kg lbs.
					d <sub>a</sub> Shaft	D <sub>a</sub> Housing	Static Load Rating C <sub>0</sub>	Dynamic Load Rating C	Dynamic		Static			Grease	Oil	
									$\frac{T}{R} \leq e$ X = 1	$\frac{T}{R} > e$ X = .67						
	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	kN lbs.	kN lbs.	e	Y	Y	Y <sub>0</sub>				
240/800YMD	800 31.4961	1150 45.2756	345.0 13.5827	6.0 0.24	877 34.5	1072 42.2	28900 6500000	11800 2650000	0.26	2.55	3.80	2.50	0.1790	170	190	1160 2560
231/800YMB	800 31.4961	1280 50.3937	365.0 14.3701	7.0 0.28	906 35.7	1171 46.1	31900 7170000	15000 3380000	0.28	2.45	3.65	2.40	0.1741	160	180	1800 3950
241/800YMD	800 31.4961	1280 50.3937	475.0 18.7008	7.0 0.28	896 35.3	1170 46.1	41900 9430000	18500 4170000	0.35	1.95	2.90	1.90	0.1740	97	100	2340 5150
232/800YMD	800 31.4961	1420 55.9055	488.0 19.2126	11.0 0.43	935 36.8	1272 50.1	44000 9900000	21500 4830000	0.33	2.04	3.03	1.99	0.1798	120	130	3310 7290
238/850YMB	850 33.4646	1030 40.5512	136.0 5.3543	4.0 0.16	900 35.4	993 39.1	10500 2350000	3650 822000	0.11	6.23	9.27	6.09	0.1718	130	150	233 513
239/850YMB	850 33.4646	1120 44.0945	200.0 7.8740	5.0 0.20	919 36.2	1050 41.4	14700 3300000	5720 1290000	0.15	4.54	6.76	4.44	0.1747	250	290	525 1150
230/850YMB	850 33.4646	1220 48.0315	272.0 10.7087	6.0 0.24	938 36.9	1138 44.8	23400 5250000	10200 2290000	0.20	3.37	5.02	3.30	0.1771	230	260	1030 2260
240/850YMD	850 33.4646	1220 48.0315	365.0 14.3701	6.0 0.24	931 36.7	1138 44.8	32600 7320000	13200 2960000	0.26	2.56	3.81	2.50	0.1770	160	170	1380 3030
231/850YMB	850 33.4646	1360 53.5433	400.0 15.7480	9.0 0.35	962 37.9	1245 49.0	36200 8140000	16900 3800000	0.28	2.44	3.63	2.39	0.1810	150	160	2220 4890
232/850YMD	850 33.4646	1500 59.0551	515.0 20.2756	11.0 0.43	990 39.0	1347 53.0	48400 10900000	23500 5280000	0.33	2.06	3.06	2.01	0.1864	110	120	3880 8540
239/900YMB	900 35.4331	1180 46.4567	206.0 8.1102	5.0 0.20	965 38.0	1112 43.8	18300 4110000	7120 1600000	0.14	4.69	6.98	4.58	0.1801	220	250	592 1300
230/900YMB	900 35.4331	1280 50.3937	280.0 11.0236	6.0 0.24	990 39.0	1198 47.2	25900 5820000	11100 2500000	0.20	3.41	5.08	3.33	0.1828	210	240	1140 2520
240/900YMD	900 35.4331	1280 50.3937	375.0 14.7638	6.0 0.24	983 38.7	1197 47.1	35600 7990000	14200 3200000	0.26	2.60	3.87	2.54	0.1827	150	160	1530 3370
231/900YMB	900 35.4331	1420 55.9055	412.0 16.2205	9.0 0.35	1018 40.1	1300 51.2	39400 8860000	17800 4010000	0.27	2.49	3.71	2.43	0.1871	140	150	2450 5390
241/900YMD	900 35.4331	1420 55.9055	515.0 20.2756	9.0 0.35	1008 39.7	1298 51.1	51000 11500000	21700 4870000	0.34	2.00	2.98	1.96	0.1869	82	85	3060 6740
232/900YMD	900 35.4331	1580 62.2047	515.0 20.2756	11.0 0.43	1056 41.6	1423 56.0	51400 11600000	24700 5560000	0.32	2.11	3.13	2.06	0.1926	100	110	4280 9420
239/950YMB	950 37.4016	1250 49.2126	224.0 8.8189	6.0 0.24	1025 40.3	1187 46.7	20700 4660000	8160 1830000	0.15	4.39	6.54	4.29	0.1874	210	240	729 1600
230/950YMB	950 37.4016	1360 53.5433	300.0 11.8110	6.0 0.24	1046 41.2	1273 50.1	27600 6190000	12100 2720000	0.19	3.49	5.19	3.41	0.1899	200	230	1400 3080
240/950YMD	950 37.4016	1360 53.5433	412.0 16.2205	6.0 0.24	1039 40.9	1269 50.0	41300 9290000	16400 3680000	0.27	2.53	3.77	2.47	0.1898	130	140	1920 4230
231/950YMB	950 37.4016	1500 59.0551	438.0 17.2441	9.0 0.35	1074 42.3	1373 54.1	44400 9980000	19900 4460000	0.27	2.47	3.68	2.42	0.1937	130	140	2910 6400
241/950YMD	950 37.4016	1500 59.0551	545.0 21.4567	9.0 0.35	1064 41.9	1371 54.0	57100 12800000	24100 5410000	0.34	2.00	2.97	1.95	0.1935	75	77	3620 7970

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Bearing Number	d Bore	D O.D.	B Width	R Fillet <sup>(2)</sup> (max.)	Backing Diameter		Load Ratings		Equivalent Radial load Factors <sup>(1)</sup>			Lubrication Life Adjustment Factor <sup>(4)</sup> C <sub>g</sub>	Reference Speed RPM	Thermal Ratings <sup>(3)</sup>		Weight
					d <sub>a</sub> Shaft	D <sub>a</sub> Housing	Static Load Rating C <sub>0</sub>	Dynamic Load Rating C	Dynamic		Static			Grease RPM	Oil RPM	
									e	T/R ≤ e X = 1						
mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	kN lbs.	kN lbs.		Y	Y				kg lbs.		
239/1000YMB	1000 39.3701	1320 51.9685	236.0 9.2913	6.0 0.24	1080 42.5	1252 49.3	23100 5190000	9020 2030000	0.15	4.39	6.54	4.29	0.1939	190	220	864 1900
230/1000YMB	1000 39.3701	1420 55.9055	308.0 12.1260	6.0 0.24	1101 43.4	1327 52.2	32100 7220000	13400 3010000	0.20	3.44	5.12	3.36	0.1960	180	200	1540 3400
240/1000YMD	1000 39.3701	1420 55.9055	412.0 16.2205	6.0 0.24	1094 43.1	1329 52.3	41800 9390000	16600 3730000	0.25	2.69	4.01	2.63	0.1952	130	140	2070 4540
231/1000YMB	1000 39.3701	1580 62.2047	462.0 18.1890	9.0 0.35	1131 44.5	1446 56.9	49500 11100000	22000 4940000	0.27	2.47	3.68	2.42	0.2002	120	130	3410 7500
241/1000YMB	1000 39.3701	1580 62.2047	580.0 22.8346	9.0 0.35	1120 44.1	1444 56.9	64400 14500000	26800 6030000	0.34	1.98	2.95	1.93	0.2000	69	71	4280 9420
239/1060YMB	1060 41.7323	1400 55.1181	250.0 9.8425	6.0 0.24	1145 45.1	1328 52.3	26500 5950000	10200 2300000	0.16	4.25	6.32	4.15	0.2004	180	200	1030 2270
230/1060YMB	1060 41.7323	1500 59.0551	325.0 12.7953	7.0 0.28	1165 45.9	1404 55.3	35800 8050000	14800 3330000	0.20	3.44	5.12	3.36	0.2031	170	190	1810 3970
240/1060YMD	1060 41.7323	1500 59.0551	438.0 17.2441	7.0 0.28	1157 45.6	1403 55.2	49500 11100000	19000 4280000	0.26	2.61	3.88	2.55	0.2030	110	120	2430 5350
231/1060YMB	1060 41.7323	1660 65.3543	475.0 18.7008	11.0 0.43	1194 47.0	1524 60.0	53500 12000000	23700 5330000	0.27	2.53	3.77	2.48	0.2070	110	120	3820 8410
239/1120YMB	1120 44.0945	1460 57.4803	250.0 9.8425	6.0 0.24	1205 47.4	1389 54.7	27100 6090000	10400 2330000	0.15	4.62	6.87	4.51	0.2077	170	190	1080 2380
230/1120YMB	1120 44.0945	1580 62.2047	345.0 13.5827	7.0 0.28	1229 48.4	1480 58.3	40200 9040000	16500 3710000	0.20	3.42	5.09	3.34	0.2101	160	170	2110 4650
240/1120YMD	1120 44.0945	1580 62.2047	462.0 18.1890	7.0 0.28	1220 48.1	1480 58.3	55600 12500000	21200 4760000	0.26	2.62	3.90	2.56	0.2100	110	110	2830 6230
231/1120YMB	1120 44.0945	1750 68.8976	475.0 18.7008	11.0 0.43	1262 49.7	1609 63.3	56100 12600000	25000 5620000	0.25	2.67	3.98	2.62	0.2142	110	110	4240 9320
239/1180YMB	1180 46.4567	1540 60.6299	272.0 10.7087	6.0 0.24	1269 50.0	1465 57.7	31500 7090000	11900 2670000	0.15	4.48	6.67	4.38	0.2148	160	180	1310 2890
230/1180YMB	1180 46.4567	1660 65.3543	355.0 13.9764	7.0 0.28	1293 50.9	1557 61.3	43500 9780000	17800 4000000	0.19	3.50	5.21	3.42	0.2170	150	160	2390 5250
240/1180YMD	1180 46.4567	1660 65.3543	475.0 18.7008	7.0 0.28	1284 50.6	1557 61.3	59800 13400000	22700 5110000	0.25	2.67	3.98	2.61	0.2169	98	110	3190 7030
231/1180YMB	1180 46.4567	1850 72.8346	500.0 19.6850	11.0 0.43	1332 52.5	1698 66.9	62400 14000000	27600 6200000	0.25	2.68	4.00	2.62	0.2217	97	100	5010 11000
239/1250YMB	1250 49.2126	1630 64.1732	280.0 11.0236	6.0 0.24	1345 52.9	1551 61.1	34200 7680000	12800 2890000	0.15	4.60	6.85	4.50	0.2227	140	160	1510 3330
230/1250YMB	1250 49.2126	1750 68.8976	375.0 14.7638	7.0 0.28	1370 54.0	1640 64.6	48800 11000000	19400 4350000	0.19	3.50	5.21	3.42	0.2250	140	150	2770 6100
240/1250YMD	1250 49.2126	1750 68.8976	500.0 19.6850	7.0 0.28	1362 53.6	1639 64.5	66700 15000000	24600 5530000	0.25	2.68	3.99	2.62	0.2249	90	96	3700 8140
231/1250YMB	1250 49.2126	1950 76.7717	530.0 20.8661	11.0 0.43	1407 55.4	1794 70.6	70000 15700000	30700 6900000	0.25	2.67	3.98	2.62	0.2296	89	95	5860 12900

<sup>(1)</sup> These factors apply for both inch and metric calculations. See engineering section for instructions on use.

<sup>(2)</sup> Maximum shaft or housing fillet radius that bearing corners will clear.

\* Available in standard shaker screen bearing design configuration (example: 223xxYMW33W800C4).

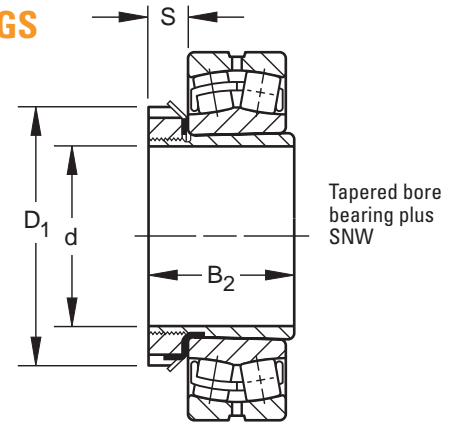
<sup>(3)</sup> See thermal speed ratings in the engineering section.

<sup>(4)</sup> Geometry constant for Lubrication Life Adjustment Factor a3l. See "Bearing Load Ratings and Life Calculations."

## SHAFT ADAPTER ACCESSORIES FOR TAPERED BORE BEARINGS

### SNW/SNP – PULL TYPE SLEEVE, LOCKNUT, LOCKWASHER/LOCKPLATE ASSEMBLIES

- The table below shows dimensions for adapter assemblies and components used in the mounting of tapered bore bearings on shafts.
- SNW assembly consists of a sleeve, locknut and lockwasher.
- SNP assembly consists of a sleeve, locknut and lockplate.



Bearing Number SNW/SNP	Accessory Numbers				Shaft Dimensions Inches		Adapter Dimensions Inches			Assembly Weight lbs.
	Assembly	Sleeve	Locknut	Lockwasher Lockplate	Diameter d	Tolerance +0.000	B <sub>2</sub>	S	D <sub>1</sub>	
					in.		in.	in.	in.	

#### FOR SERIES 222K

22209K	SNW-09	S-09	N-09	W-09	1 7/16	-0.003	1 37/64	1/2	2 17/32	0.6
22210K	SNW-10	S-10	N-10	W-10	1 11/16	-0.003	1 49/64	9/16	2 11/16	0.7
22211K	SNW-11	S-11	N-11	W-11	1 15/16	-0.003	1 27/32	9/16	2 31/32	0.8
22212K	SNW-12	S-12	N-12	W-12	2 1/16	-0.004	1 63/64	19/32	3 5/32	1.1
22213K	SNW-13	S-13	N-13	W-13	2 3/16	-0.004	2 3/32	5/8	3 3/8	1.4
22214K	SNW-14	S-14	N-14	W-14	2 5/16	-0.004	2 11/64	5/8	3 5/8	1.8
22215K	SNW-15	S-15	AN-15	W-15	2 7/16	-0.004	2 19/64	43/64	3 7/8	2
22216K	SNW-16	S-16	AN-16	W-16	2 11/16	-0.004	2 3/8	43/64	4 5/32	2.4
22217K	SNW-17	S-17	AN-17	W-17	2 15/16	-0.004	2 31/64	45/64	4 13/32	3
22218K	SNW-18	S-18	AN-18	W-18	3 3/16	-0.004	2 41/64	25/32	4 21/32	3
22219K	SNW-19	S-19	AN-19	W-19	3 5/16	-0.004	2 49/64	13/16	4 15/16	3.3
22220K	SNW-20	S-20	AN-20	W-20	3 7/16	-0.004	2 7/8	27/32	5 3/16	4.4
22222K	SNW-22	S-22	AN-22	W-22	3 15/16	-0.004	3 13/64	29/32	5 23/32	5
22224K	SNW-24	S-24	AN-24	W-24	4 3/16	-0.005	3 15/32	15/16	6 1/8	6.7
22226K	SNW-26	S-26	AN-26	W-26	4 7/16	-0.005	3 49/64	1	6 3/4	8.6
22228K	SNW-28	S-28	AN-28	W-28	4 15/16	-0.005	3 63/64	1 1/16	7 3/32	10.3
22230K	SNW-30	S-30	AN-30	W-30	5 3/16	-0.005	4 15/64	1 1/8	7 11/16	13.5
22232K	SNW-32	S-32	AN-32	W-32	5 7/16	-0.005	4 37/64	1 3/16	8 1/16	15.6
22234K	SNW-34	S-34	AN-34	W-34	5 15/16	-0.005	4 27/32	1 7/32	8 21/32	19.4
22236K	SNW-36	S-36	AN-36	W-36	6 7/16	-0.005	5 1/32	1 1/4	9 1/16	20.5
22238K	SNW-38	S-38	AN-38	W-38	6 15/16	-0.005	5 17/64	1 9/32	9 15/32	23.4
22240K	SNW-40	S-40	AN-40	W-40	7 3/16	-0.005	5 31/64	1 11/32	9 27/32	30.5
22244K	SNW-44	S-44	AN-44	W-44	7 15/16	-0.005	5 29/32	1 3/8	11	33

#### FOR SERIES 230K

23024K	SNW-3024	S-3024	N-024	W-024	4 3/16	-0.005	2 61/64	13/16	5 11/16	6.1
23026K	SNW-3026	S-3026	N-026	W-026	4 7/16	-0.005	3 15/64	7/8	6 1/8	7.5
23028K	SNW-3028	S-3028	N-028	W-028	4 15/16	-0.005	3 11/32	15/16	6 1/2	8.4
23030K	SNW-3030	S-3030	N-030	W-030	5 3/16	-0.005	3 31/64	31/32	7 1/8	9.8
23032K	SNW-3032	S-3032	N-032	W-032	5 7/16	-0.005	3 23/32	1 1/32	7 1/2	11.8
23034K	SNW-3034	S-3034	N-034	W-034	5 15/16	-0.005	4 1/64	1 1/16	7 7/8	13.3
23036K	SNW-3036	S-3036	N-036	W-036	6 7/16	-0.005	4 11/32	1 1/32	8 1/4	15.2
23038K	SNW-3038	S-3038	N-038	W-038	6 15/16	-0.005	4 13/32	1 1/8	8 11/16	16.7
23040K	SNW-3040	S-3040	N-040	W-040	7 3/16	-0.005	4 3/4	1 3/16	9 7/16	19.7
23044K	SNW-3044	S-3044	N-044	W-044	7 15/16	-0.005	5 1/8	1 1/4	10 1/4	24.4
23048K	SNP-3048	S-3048	N-048	P-048	8 15/16	-0.006	5 7/16	1 11/32	11 7/16	32.2
23052K	SNP-3052	S-3052	N-052	P-052	9 7/16	-0.006	6 1/64	1 13/32	12 3/16	41.1
23056K	SNP-3056	S-3056	N-056	P-056	10 7/16	-0.007	6 3/16	1 1/2	13	45.4
23060K	SNP-3060	S-3060	N-060	P-060	10 15/16	-0.007	6 47/64	1 9/16	14 3/16	58.9
23064K	SNP-3064	S-3064	N-064	P-064	11 15/16	-0.007	6 61/64	1 21/32	15	65.7
23068K	SNP-3068	S-3068	N-068	P-068	12 7/16	-0.008	7 35/64	1 25/32	15 3/4	77.8
23072K	SNP-3072	S-3072	N-072	P-072	13 7/16	-0.008	7 37/64	1 25/32	16 1/2	86.2
23076K	SNP-3076	S-3076	N-076	P-076	13 15/16	-0.008	7 3/4	1 57/64	17 3/4	94.3
23080K	SNP-3080	S-3080	N-080	P-080	15	-0.008	8 13/32	2 1/16	18 1/2	105

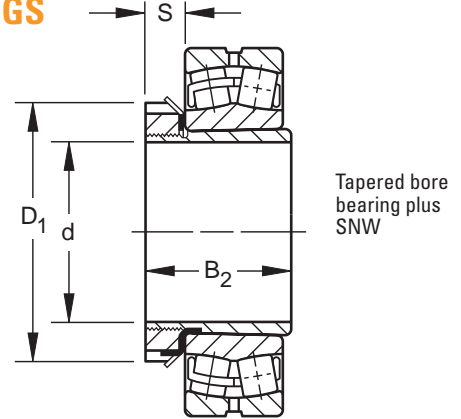




**SHAFT ADAPTER ACCESSORIES FOR TAPERED BORE BEARINGS**

**SNW/SNP – PULL TYPE SLEEVE, LOCKNUT, LOCKWASHER/LOCKPLATE ASSEMBLIES**

- The table below shows dimensions for adapter assemblies and components used in the mounting of tapered bore bearings on shafts.
- SNW assembly consists of a sleeve, locknut and lockwasher.
- SNP assembly consists of a sleeve, locknut and lockplate.



Bearing Number	Accessory Numbers				Shaft Dimensions Inches		Adapter Dimensions Inches			SNW/SNP Assembly Weight
	Assembly	Sleeve	Locknut	Lockwasher Lockplate	Diameter d	Tolerance +.000	B <sub>2</sub>	S	D <sub>1</sub>	
					in.		in.	in.	in.	lbs.

**FOR SERIES 223K and 232K**

22308K		SNW-108	S-108	N-08	W-08	1 5/16	-.003	2 1/64	1/2	2 1/4	0.8
22309K		SNW-109	S-109	N-09	W-09	1 7/16	-.003	2 9/64	1/2	2 17/32	0.8
22310K		SNW-110	S-110	N-10	W-10	1 11/16	-.003	2 25/64	9/16	2 11/16	0.9
22311K		SNW-111	S-111	N-11	W-11	1 15/16	-.003	2 33/64	9/16	2 31/32	0.9
22312K		SNW-112	S-112	N-12	W-12	2 1/16	-.004	2 21/32	19/32	3 5/32	1.2
22313K		SNW-113	S-113	N-13	W-13	2 3/16	-.004	2 49/64	5/8	3 3/8	1.7
22314K		SNW-114	S-114	N-14	W-14	2 5/16	-.004	2 61/64	5/8	3 5/8	2.3
22315K		SNW-115	S-115	AN-15	W-15	2 7/16	-.004	3 5/64	43/64	3 7/8	3
22316K		SNW-116	S-116	AN-16	W-16	2 11/16	-.004	3 13/64	43/64	4 5/32	3.2
22317K		SNW-117	S-117	AN-17	W-17	2 15/16	-.004	3 5/16	45/64	4 13/32	3.5
22318K		SNW-118	S-118	AN-18	W-18	3 3/16	-.004	3 35/64	25/32	4 21/32	4
22319K		SNW-119	S-119	AN-19	W-19	3 5/16	-.004	3 45/64	13/16	4 15/16	5
22320K	23220K	SNW-120	S-120	AN-20	W-20	3 7/16	-.004	3 31/32	27/32	5 3/16	6.2
22322K	23222K	SNW-122	S-122	AN-22	W-22	3 15/16	-.004	4 11/32	29/32	5 23/32	6.5
22324K	23224K	SNW-124	S-124	AN-24	W-24	4 3/16	-.005	4 41/64	15/16	6 1/8	8
22326K	23226K	SNW-126	S-126	AN-26	W-26	4 7/16	-.005	4 63/64	1	6 3/4	12.4
22328K	23228K	SNW-128	S-128	AN-28	W-28	4 15/16	-.005	5 21/64	1 1/16	7 3/32	13
22330K	23230K	SNW-130	S-130	AN-30	W-30	5 3/16	-.005	5 5/8	1 1/8	7 11/16	17.6
22332K	23232K	SNW-132	S-132	AN-32	W-32	5 7/16	-.005	5 59/64	1 3/16	8 1/16	18.5
22334K	23234K	SNW-134	S-134	AN-34	W-34	5 15/16	-.005	6 3/16	1 7/32	8 21/32	21
22336K	23236K	SNW-136	S-136	AN-36	W-36	6 7/16	-.005	6 29/64	1 1/4	9 1/16	22.5
22338K	23238K	SNW-138	S-138	AN-38	W-38	6 15/16	-.005	6 3/4	1 9/32	9 15/32	28
22340K	23240K	SNW-140	S-140	AN-40	W-40	7 3/16	-.005	7 3/32	1 11/32	9 27/32	36
22344K	23244K	SNW-144	S-144	AN-44	W-44	7 15/16	-.005	7 9/32	1 3/8	11	47
22348K	23248K	SNP-148	S-148	N-048	P-48	8 15/16	-.006	8 7/64	1 11/32	11 7/16	38.3
22352K	23252K	SNP-152	S-152	N-052	P-52	9 7/16	-.006	8 49/64	1 13/32	12 13/16	53.4
22356K	23256K	SNP-3256	S-3256	N-056	P-56	10 7/16	-.007	8 15/16	1 1/2	13	61.3

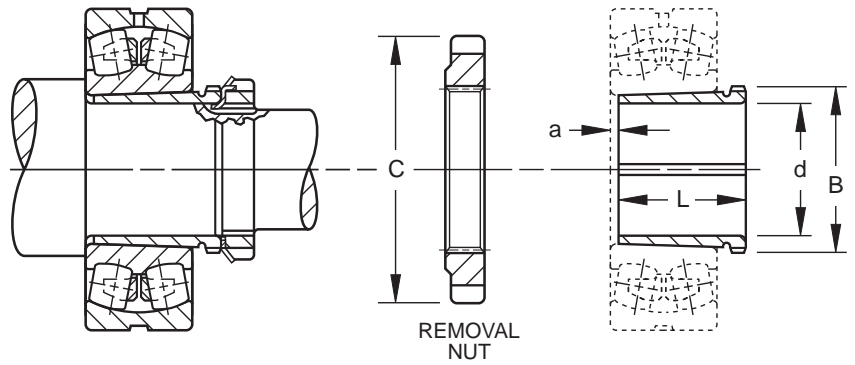
**FOR SERIES 231K**

23122K		SNW-3122	S-22	N-022	W-022	3 15/16	-.004	3 13/64	25/32	5 5/32	4.2
23124K		SNW-3124	S-24	N-024	W-024	4 3/16	-.005	3 15/32	13/16	5 11/16	5.8
23126K		SNW-3126	S-26	N-026	W-026	4 7/16	-.005	3 49/64	7/8	6 1/8	8.3
23128K		SNW-3128	S-28	N-028	W-028	4 15/16	-.005	3 63/64	15/16	6 1/2	8.8
23130K		SNW-3130	S-30	N-030	W-030	5 3/16	-.005	4 15/64	31/32	7 1/8	13.7
23132K		SNW-3132	S-32	N-032	W-032	5 7/16	-.005	4 37/64	1 1/32	7 1/2	13.3
23134K		SNW-3134	S-34	N-034	W-034	5 15/16	-.005	4 27/32	1 1/16	7 7/8	16.1
23136K		SNW-3136	S-36	N-036	W-036	6 7/16	-.005	5 1/32	1 3/32	8 1/4	17.1
23138K		SNW-3138	S-38	N-038	W-038	6 15/16	-.005	5 17/64	1 1/8	8 11/16	19.7
23140K		SNW-3140	S-40	N-040	W-040	7 3/16	-.005	5 31/64	1 3/16	9 7/16	28.4
23144K		SNW-3144	S-44	N-044	W-044	7 15/16	-.005	5 29/32	1 1/4	10 1/4	28.1
23148K		SNP-3148	S-48	N-048	P-48	8 15/16	-.006	6 41/64	1 11/32	11 7/16	36
23152K		SNP-3152	S-52	N-052	P-52	9 7/16	-.006	7 19/32	1 13/32	12 3/16	39
23156K		SNP-3156	S-3156	N-056	P-56	10 7/16	-.007	7 49/64	1 1/2	13	60
23160K		SNP-3160	S-3160	N-060	P-060	10 15/16	-.007	8 3/8	1 9/16	14 3/16	65
23164K		SNP-3164	S-3164	N-064	P-064	11 15/16	-.007	9 7/64	1 21/32	15	70

**SHAFT ADAPTER ACCESSORIES FOR TAPERED BORE BEARINGS**

**PUSH TYPE REMOVABLE SLEEVE LOCKNUT AND LOCKWASHER**

- The table below shows dimensions for adapter assemblies and components used in the mounting of tapered bore bearings on shafts.



Tapered bore bearing mounted with push type removable sleeve

Bearing Number	Accessory Numbers				Shaft Dimensions		Sleeve Dimensions			C Removal Nut O.D.	Sleeve Weight
	Sleeve	Locknut	Lockwasher Lockplate	Removal Nut	Diameter d	Tolerance +.000	B Pitch Dia.	L	a		
					mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	kg. lbs.
<b>SERIES 222K</b>											
22216K	SK-8022	N-14	W-14	AN-18	70 2.7559	-.10 -.004	88.19 3.472	50 1.969	3.5 0.138	118.39 4.661	0.57 1.25
22217K	SK-8522	AN-15	W-15	AN-19	75 2.9528	-.10 -.004	93.35 3.675	52 2.047	3.5 0.138	125.55 4.943	0.65 1.44
22218K	SK-9022	AN-16	W-16	AN-20	80 3.1496	-.10 -.004	98.12 3.863	53 2.087	3.5 0.138	131.90 5.193	0.69 1.53
22219K	SK-9522	AN-17	W-17	AN-21	85 3.3465	-.10 -.004	103.28 4.066	57 2.244	4.0 0.157	138.25 5.443	0.82 1.81
22220K	SK-10022	AN-18	W-18	AN-22	90 3.5433	-.10 -.004	109.12 4.269	59 2.323	4.0 0.157	145.39 5.724	0.91 2.00
22222K	SK-11022	AN-20	W-20	ARN-22	100 3.9370	-.10 -.004	119.94 4.722	65 2.559	4.0 0.157	158.75 6.250	1.12 2.47
22224K	SK-12022	AN-22	W-22	ARN-24	110 4.3307	-.13 -.005	130.28 5.129	72 2.835	4.0 0.157	174.63 6.875	1.42 3.13
22226K	SK-13022	AN-22	W-22	ARN-26	115 4.5276	-.13 -.005	141.38 5.566	78 3.071	4.0 0.157	184.15 7.250	2.27 5.00
22228K	SK-14022	AN-24	W-24	RN-28	125 4.9213	-.13 -.005	152.73 6.013	82 3.228	5.0 0.197	200.03 7.875	2.67 5.88
22230K	SK-15022	AN-26	W-26	RN-30	135 5.3150	-.13 -.005	163.04 6.419	88 3.465	5.0 0.197	209.55 8.250	3.09 6.81
22232K	SK-16022	AN-28	W-28	RN-32	140 5.5118	-.13 -.005	173.76 6.841	96 3.780	5.0 0.197	225.43 8.875	4.51 9.94
22234K	SK-17022	AN-30	W-30	RN-34	150 5.9055	-.13 -.005	184.07 7.247	104 4.095	5.0 0.197	234.95 9.250	5.22 11.50
22236K	SK-18022	AN-32	W-32	RN-36	160 6.2992	-.13 -.005	194.79 7.669	104 4.095	5.0 0.197	247.65 9.750	5.67 12.50
22238K	SK-19022	AN-34	W-34	RN-38	170 6.6929	-.13 -.005	205.92 8.107	112 4.409	5.0 0.197	269.88 10.625	6.58 14.50
22240K	SK-20022	AN-36	W-36	N-44	180 7.0866	-.13 -.005	217.02 8.544	118 4.646	5.0 0.197	279.53 11.005	7.43 16.37
22244K	SK-22022	AN-40	W-40	N-048	200 7.8740	-.13 -.005	236.98 9.330	130 5.118	6.0 0.236	290.65 11.443	8.89 19.60
22248K	SK-24022	N-44	W-44	N-052	220 8.6614	-.15 -.006	256.03 10.080	144 5.689	6.0 0.236	309.70 12.193	11.02 24.30
22252K	SK-26022	N-048	P-48	N-056	240 9.4488	-.15 -.006	276.66 10.892	155 6.102	6.0 0.236	330.33 13.005	14.02 30.90
22256K	SK-28022	N-052	P-52	RN-56	260 10.2362	-.15 -.006	301.27 11.861	155 6.102	8.0 0.315	425.45 16.75	15.01 33.10
22260K	SK-30022	N-056	P-56	RN-60	280 11.0236	-.15 -.006	325.88 12.830	170 6.693	8.0 0.315	416.10 16.382	17.78 39.20
22264K	SK-32022	N-060	P-60	RN-64	300 11.8110	-.15 -.006	345.72 13.611	180 7.087	10.0 0.394	431.80 17.000	21.00 46.30

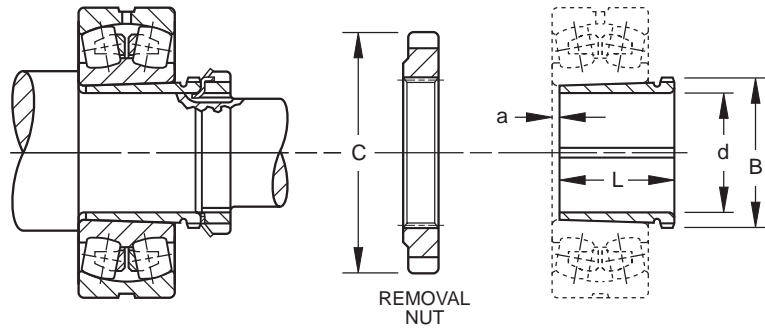




**SHAFT ADAPTER ACCESSORIES  
FOR TAPERED BORE BEARINGS**

**PUSH TYPE REMOVABLE SLEEVE, LOCKNUT  
AND LOCKWASHER**

- The table below shows dimensions for adapter assemblies and components used in the mounting of tapered bore bearings on shafts.



Tapered bore bearing mounted with push type removable sleeve

Bearing Number	Accessory Numbers				Dimensions Shaft		Sleeve Dimensions			C Removal Nut O.D.	Sleeve Weight
	Sleeve	Locknut	Lockwasher Lockplate	Removal Nut	Diameter d	Tolerance ±.000	B Pitch Dia.	L	a		
					mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	kg. lbs.

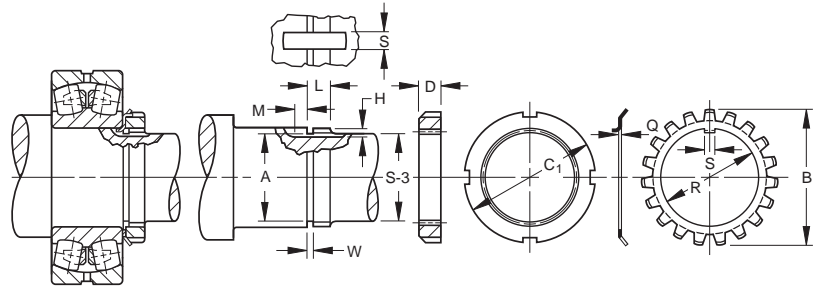
**SERIES 223K**

22308K	SK-4023	N-07	W-07	N-09	35	-.08	43.94	40	3.0	64.41	0.11
					1.3780	-.003	1.730	1.575	0.118	2.536	0.25
22309K	SK-4523	N-08	W-08	N-10	40	-.08	49.02	44	3.0	68.40	0.14
					1.5748	-.003	1.930	1.732	0.118	2.693	0.31
22310K	SK-5023	N-09	W-09	RN-10	45	-.08	55.04	50	3.0	76.20	0.21
					1.7717	-.003	2.167	1.969	0.118	3.000	0.47
22311K	SK-5523	N-10	W-10	RN-11	50	-.08	60.20	54	3.0	81.76	0.25
					1.9685	-.003	2.370	2.126	0.118	3.219	0.56
22312K	SK-6023	N-11	W-11	RN-12	55	-.10	65.76	57	3.5	87.33	0.31
					2.1654	-.004	2.589	2.244	0.138	3.438	0.69
22313K	SK-6523	N-12	W-12	AN-15	60	-.10	73.10	61	3.5	98.55	0.38
					2.3622	-.004	2.878	2.402	0.138	3.880	0.84
22314K	SK-7023	N-12	W-12	AN-16	60	-.10	78.28	65	3.5	105.69	0.69
					2.3622	-.004	3.082	2.559	0.138	4.161	1.53
22315K	SK-7523	N-13	W-13	AN-17	65	-.10	83.44	69	3.5	112.04	0.81
					2.5591	-.004	3.285	2.717	0.138	4.411	1.78
22316K	SK-8023	N-14	W-14	AN-18	70	-.10	88.19	72	3.5	118.39	0.91
					2.7559	-.004	3.472	2.835	0.138	4.661	2.00
22317K	SK-8523	AN-15	W-15	AN-19	75	-.10	93.35	75	3.5	125.55	1.02
					2.9528	-.004	3.675	2.953	0.138	4.943	2.25
22318K	SK-9023	AN-16	W-16	AN-20	80	-.10	98.12	80	3.5	131.90	1.16
					3.1496	-.004	3.863	3.150	0.138	5.193	2.56
22319K	SK-9523	AN-17	W-17	AN-21	85	-.10	103.28	85	4.0	138.25	1.33
					3.3465	-.004	4.066	3.346	0.157	5.443	2.94
22320K	SK-10023	AN-18	W-18	AN-22	90	-.10	109.12	90	4.0	145.39	1.53
					3.5433	-.004	4.269	3.543	0.157	5.724	3.38
22322K	SK-11023	AN-20	W-20	ARN-22	100	-.10	119.94	98	4.0	158.75	1.93
					3.9370	-.004	4.722	3.858	0.157	6.250	4.25
22324K	SK-12023	AN-22	W-22	ARN-24	110	-.13	130.28	105	4.0	174.63	2.27
					4.3307	-.005	5.129	4.134	0.157	6.875	5.00
22326K	SK-13023	AN-22	W-22	ARN-26	115	-.13	141.38	115	4.0	184.15	3.63
					4.5276	-.005	5.566	4.528	0.157	7.250	8.00
22328K	SK-14023	AN-24	W-24	RN-28	125	-.13	152.73	125	5.0	200.03	4.31
					4.9213	-.005	6.013	4.921	0.197	7.875	9.50
22330K	SK-15023	AN-26	W-26	RN-30	135	-.13	163.04	135	5.0	209.55	5.18
					5.3150	-.005	6.419	5.315	0.197	8.250	11.43
22332K	SK-16023	AN-28	W-28	RN-32	140	-.13	173.76	140	6.0	225.43	7.03
					5.5118	-.005	6.841	5.512	0.236	8.875	15.50
22334K	SK-17023	AN-30	W-30	RN-34	150	-.13	184.07	146	6.0	234.95	7.82
					5.9055	-.005	7.247	5.748	0.236	9.250	17.25
22336K	SK-18023	AN-32	W-32	RN-36	160	-.13	194.79	154	6.0	247.65	9.19
					6.2992	-.005	7.669	6.063	0.236	9.750	20.25
22338K	SK-19023	AN-34	W-34	RN-38	170	-.13	205.92	160	7.0	269.88	10.03
					6.6929	-.005	8.107	6.299	0.276	10.625	22.12
22340K	SK-20023	AN-36	W-36	N-44	180	-.13	217.02	170	7.0	279.53	11.45
					7.0866	-.005	8.544	6.693	0.276	11.005	25.25
22344K	SK-22023	AN-40	W-40	N-048	200	-.13	236.98	181	8.0	290.65	13.38
					7.8740	-.005	9.330	7.126	0.315	11.443	29.50
22348K	SK-24023	N-44	W-44	N-052	220	-.15	256.03	189	8.0	309.70	15.51
					8.6614	-.006	10.080	7.441	0.315	12.193	34.20
22352K	SK-26023	N-048	P-48	N-056	240	-.15	276.66	200	8.0	330.33	18.26
					9.4488	-.006	10.892	7.874	0.315	13.005	40.25
22356K	SK-28023	N-052	P-52	RN-56	260	-.15	301.27	210	10.0	425.45	22.00
					10.2362	-.006	11.861	8.268	0.394	16.75	48.50

## SHAFT ADAPTER ACCESSORIES FOR CYLINDRICAL BORE BEARINGS

### LOCKNUT AND LOCKWASHER

- The table below shows dimensions for locknuts and lockwashers used in the mounting of cylindrical bore bearings on shafts.
- Other dimensions and tolerances related to shaft configurations also are shown.
- Dimensions are presented according to bearing bore size and are applicable to bearings in the various series (e.g., 222, 223, etc.).



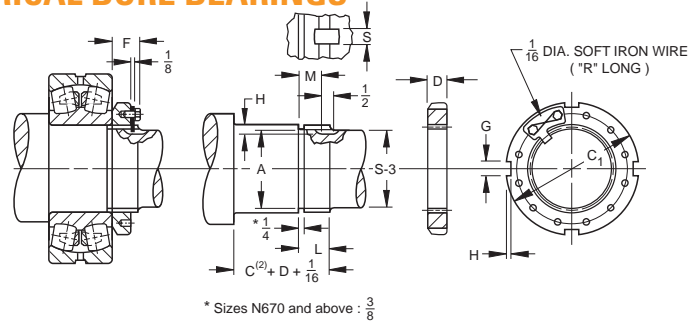
Bearing Bore	Lock-nut	Lock-washer	Thds. Per Inch	Threads				Shaft							Locknut		Lockwasher				
				Major Dia. Max.	Major Dia. Min.	Pitch Dia. Max.	Pitch Dia. Min.	Minor Dia. A	Relief Dia.	S-3 <sup>(1)</sup>	W + 1/64 -0	L + 1/64 -0	H + 1/64 -0	S + 1/64 -0	M + 1/64 -0	C <sub>1</sub>	D	Q	R	B	S
mm				mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.
35	N 07	W 07	18	34.95	34.74	34.03	33.93	33.22	32.82	31.75	2.4	12.7	2.4	4.8	3.2	52.39	11.4	1.3	36.0	57.2	4.5
				1.376	1.3678	1.3399	1.3359	1.3078	1.2922	1 1/4	3/32	1/2	3/32	3/16	1/8	2 1/16	0.448	0.050	1.416	2 1/4	0.176
40	N 08	W 08	18	39.7	39.49	38.78	38.67	37.97	37.57	36.51	3.2	13.5	2.4	7.9	3.2	57.15	11.4	1.5	40.7	62.7	7.4
				1.563	1.5548	1.5269	1.5224	1.4948	1.4792	1 7/16	1/8	17/32	3/32	5/16	1/8	2 1/4	0.448	0.058	1.603	2 15/32	0.290
45	N 09	W 09	18	44.88	44.67	43.96	43.85	43.15	42.75	42.86	3.2	13.5	2.4	7.9	4.0	64.3	11.4	1.5	46.2	69.5	7.4
				1.767	1.7588	1.7309	1.7264	1.6988	1.6832	1 11/16	1/8	17/32	3/32	5/16	5/32	2 17/32	0.448	0.058	1.817	2 47/64	0.290
50	N 10	W 10	18	49.96	49.75	49.05	48.93	48.23	47.83	47.63	3.2	15.1	2.4	7.9	4.0	68.3	13.0	1.5	51.2	74.2	7.4
				1.967	1.9588	1.9309	1.9264	1.8988	1.8832	1 7/8	1/8	19/32	3/32	5/16	5/32	2 11/16	0.510	0.058	2.017	2 59/64	0.290
55	N 11	W 11	18	54.79	54.58	53.87	53.74	53.06	52.66	52.39	3.2	15.1	3.2	7.9	4.0	75.4	13.0	1.6	56.1	79.0	7.4
				2.157	2.1488	2.1209	2.1158	2.0888	2.0732	2 1/16	1/8	19/32	1/8	5/16	5/32	2 31/32	0.510	0.063	2.207	3 7/64	0.290
60	N 12	W 12	18	59.94	59.74	59.03	58.90	58.21	57.82	57.15	3.2	15.9	3.2	7.9	4.0	80.2	13.7	1.6	61.6	85.0	7.4
				2.360	2.3518	2.3239	2.3188	2.2918	2.2762	2 1/4	1/8	5/8	1/8	5/16	5/32	3 5/32	0.541	0.063	2.425	3 11/32	0.290
65	N 13	W 13	18	64.72	64.51	63.80	63.67	62.99	62.59	61.91	3.2	16.7	3.2	7.9	4.0	85.7	14.6	1.6	66.4	90.9	7.4
				2.548	2.5398	2.5119	2.5068	2.4798	2.4642	2 7/16	1/8	21/32	1/8	5/16	5/32	3 3/8	0.573	0.063	2.613	3 37/64	0.290
70	N 14	W 14	18	69.88	69.67	68.96	68.83	68.14	67.75	66.68	3.2	16.7	3.2	7.9	6.4	92.1	14.6	1.6	71.5	97.2	7.4
				2.751	2.7428	2.7149	2.7098	2.6828	2.6672	2 5/8	1/8	21/32	1/8	5/16	1/4	3 5/8	0.573	0.063	2.816	3 53/64	0.290
75	AN 15	W 15	12	74.50	74.21	73.12	72.99	71.90	71.11	71.44	4.0	17.5	3.2	7.9	6.4	98.4	15.3	1.6	76.3	104.4	7.4
				2.933	2.9218	2.8789	2.8735	2.8308	2.7995	2 13/16	5/32	11/16	1/8	5/16	1/4	3 7/8	0.604	0.072	3.003	4 7/64	0.290
80	AN 16	W 16	12	79.68	79.40	78.31	78.16	77.08	76.29	76.20	4.0	17.5	3.2	9.5	6.4	105.6	15.3	1.8	81.5	111.1	9.0
				3.137	3.1258	3.0829	3.0770	3.0348	3.0035	3	5/32	11/16	1/8	3/8	1/4	4 5/32	0.604	0.063	3.207	4 3/8	0.353
85	AN 17	W 17	12	84.84	84.55	83.46	83.31	82.24	81.45	80.96	4.0	16.7	3.2	9.5	6.4	111.9	16.1	1.8	87.0	117.5	9.0
				3.340	3.3288	3.2859	3.2800	3.2378	3.2065	3 3/16	5/32	21/32	1/8	3/8	1/4	4 13/32	0.635	0.072	3.425	4 5/8	0.353
90	AN 18	W 18	12	89.59	89.30	88.21	88.02	86.99	86.20	85.73	4.0	20.6	4.0	9.5	6.4	118.3	17.7	2.4	91.7	125.4	9.0
				3.527	3.5158	3.4729	3.4655	3.4248	3.3935	3 3/8	5/32	13/16	5/32	3/8	1/4	4 21/32	0.698	0.094	3.612	4 15/16	0.353
95	AN 19	W 19	12	94.74	94.46	93.37	93.18	92.15	91.35	90.49	4.0	21.4	4.0	9.5	6.4	125.4	18.5	2.4	97.3	132.6	9.0
				3.730	3.7188	3.6759	3.6685	3.6278	3.5965	3 9/16	5/32	27/32	5/32	3/8	1/4	4 15/16	0.729	0.094	3.830	5 7/32	0.353
100	AN 20	W 20	12	99.52	99.23	98.14	97.96	96.92	96.13	96.84	4.0	22.2	4.0	9.5	7.9	131.8	19.3	2.4	102.1	139.7	9.0
				3.918	3.9068	3.8639	3.8565	3.8158	3.7845	3 13/16	5/32	7/8	5/32	3/8	5/16	5 3/16	0.760	0.094	4.018	5 1/2	0.353
105	AN 21	W 21	12	104.70	104.41	103.32	103.11	102.10	101.31	100.01	4.0	22.2	4.0	9.5	7.9	138.1	19.3	2.4	107.2	144.9	9.0
				4.122	4.1108	4.0679	4.0596	4.0198	3.9885	3 15/16	5/32	7/8	5/32	3/8	5/16	5 7/16	0.760	0.094	4.222	5 45/64	0.353
110	AN 22	W 22	12	109.86	109.57	108.48	108.27	107.26	106.46	106.36	4.0	23.0	4.8	9.5	7.9	145.3	20.1	3.2	112.4	154.0	9.0
				4.325	4.3138	4.2709	4.2626	4.2228	4.1915	4 3/16	5/32	29/32	3/16	3/8	5/16	5 23/32	0.791	0.125	4.425	6 1/16	0.353
120	AN 24	W 24	12	119.79	119.50	118.41	118.20	117.19	116.40	115.89	4.0	23.8	4.8	9.5	7.9	155.6	20.9	3.2	122.7	164.3	9.0
				4.716	4.7048	4.6619	4.6536	4.6138	4.5825	4 9/16	5/32	15/16	3/16	3/8	5/16	6 1/8	0.823	0.125	4.831	6 15/32	0.353
130	AN 26	W 26	12	129.69	129.41	128.32	128.11	127.10	126.30	125.41	4.0	25.4	4.8	12.7	7.9	171.5	22.5	3.2	132.7	178.6	11.1
				5.106	5.0948	5.0519	5.0436	5.0038	4.9725	4 15/16	5/32	1	3/16	1/2	5/16	6 3/4	0.885	0.125	5.226	7 1/32	0.435
140	AN 28	W 28	12	139.62	139.34	138.25	138.04	137.03	136.23	134.94	4.0	27.0	4.8	15.9	7.9	180.2	24.1	3.2	142.7	188.9	15.0
				5.497	5.4858	5.4429	5.4346	5.3948	5.3635	5 5/16	5/32	1 1/16	3/16	5/8	5/16	7 3/32	0.948	0.125	5.617	7 7/16	0.590
150	AN 30	W 30	12	149.56	149.27	148.18	147.97	146.96	146.16	146.05	4.0	28.6	5.6	15.9	9.5	195.3	24.9	4.0	152.9	204.8	15.0
				5.888	5.8768	5.8339	5.8256	5.7858	5.7545	5 3/4	5/32	1 1/8	7/32	5/8	3/8	7 11/16	0.979	0.156	6.018	8 1/16	0.590
160	AN 32	W 32	8	159.61	159.23	157.55	157.32	155.72	154.92	153.99	6.4	30.2	6.0	15.9	9.5	204.8	26.4	4.0	163.2	214.3	15.0
				6.284	6.2688	6.2028	6.1937	6.1306	6.0993	6 1/16	1/4	1 3/16	15/64	5/8	3/8	8 1/16	1.041	0.156	6.424	8 7/16	0.590
170	AN 34	W 34	8	169.14	168.75	167.08	166.85	165.24	164.45	163.51	6.4	31.0	6.0	19.1	9.5	219.9	27.3	4.0	172.7	230.2	18.2
				6.659	6.6438	6.5778	6.5687	6.5056	6.4743	6 7/16	1/4	1 7/32	15/64	3/4	3/8	8 21/32	1.073	0.156	6.799	9 1/16	0.715
180	AN 36	W 36	8	179.48	179.09	177.41	177.18	175.58	174.79	174.63	6.4	31.8	6.0	19.1	9.5	230.2	28.0	4.0	183.0	239.7	18.2
				7.066	7.0508	6.9848	6.9757	6.9126	6.8813	6 7/8	1/4	1 1/4	15/64	3/4	3/8	9 1/16	1.104	0.156	7.206	9 7/16	0.715
190	AN 38	W 38	8	189.79	189.40	187.73	187.50	185.89	185.10	184.15	6.4	32.5	6.0	19.1	9.5	240.5	28.8	4.0	193.3	250.8	18.2
				7.472	7.4568	7.3908	7.3817	7.3186	7.2873	7 1/4	1/4	1 9/32	15/64	3/4	3/8	9 15/32	1.135	0.156	7.612	9 7/8	0.715
200	AN 40	W 40	8	199.31	198.93	197.25	196.96	195.42	194.62	193.68	6.4	34.1	6.0	22.2	9.5	250.0	30.4	4.0	203.6	261.9	21.3
				7.847	7.8318	7.7658	7.7544	7.6936	7.6623	7 5/8	1/4	1 11/32	15/64	7/8	3/8	9 27/32	1.198	0.156	8.017	10 5/16	0.840
220	N 44	W 44	8	219.15	218.77	217.09	216.78	215.25	214.46	211.14	6.4	34.9	9.5	27.0	9.5	279.4	31.8	3.2	221.1</		



**SHAFT ADAPTER ACCESSORIES FOR CYLINDRICAL BORE BEARINGS**

**LOCKNUT AND LOCKPLATE**

- The table below shows dimensions for locknuts and lockwashers used in the mounting of cylindrical bore bearings on shafts.
- Other dimensions and tolerances related to shaft configurations also are shown.
- Dimensions are presented according to bearing bore size and are applicable to bearings in the various series (e.g., 222, 223, etc.).



Bearing Bore	Lock-nut	Lock-washer	Thds. Per Inch	Threads				Shaft					Locknut/Lockplate							
				Major Dia. Max.	Major Dia. Min.	Pitch Dia. Max.	Pitch Dia. Min.	Minor Dia.	Relief Dia. A	S-3 <sup>(1)</sup>	L +1/64 -0	H +1/64 -0	S +1/64 -0	M +1/64 -0	C <sub>1</sub>	D	G	H ±.010"	R	F
mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm
240	N 048	P 48	6	239.83	239.31	237.08	236.76	234.63	233.44	233.36	42.86	11.1	28.6	34.9	290.5	34.1	22.48	9.5	203.2	43.26
260	N 052	P 52	6	258.88	258.36	256.13	255.8	253.68	252.49	252.41	45.24	11.1	30.2	37.3	309.6	35.7	22.48	9.5	228.6	44.85
280	N 056	P 56	6	279.50	278.99	276.75	276.42	274.31	273.11	273.05	47.63	11.1	31.8	39.7	330.2	38.1	25.65	9.5	228.6	47.23
300	N 060	P 60	6	299.34	298.83	296.59	296.26	294.14	292.95	292.1	49.21	11.1	34.9	41.3	360.4	39.7	25.65	12.7	254.0	50.01
320	N 064	P 64	6	319.08	318.56	316.32	315.98	313.88	312.69	312.74	51.59	11.1	36.5	43.7	381.0	42.1	25.65	12.7	254.0	52.39
340	N 068	P 68	5	337.90	337.49	335.36	334.95	332.31	331.11	331.79	56.36	11.1	38.1	48.4	400.1	45.2	25.65	12.7	279.4	55.56
360	N 072	P 72	5	359.00	358.60	356.46	356.06	353.42	352.22	350.84	56.36	12.7	38.1	48.4	419.1	45.2	32.00	12.7	279.4	55.56
380	N 076	P 76	5	378.99	378.59	376.45	376.05	373.41	372.21	371.48	59.53	12.7	38.1	51.59	450.9	48.4	32.00	15.1	304.8	61.12
400	N 080	P 80	5	399.01	398.60	396.47	396.06	393.42	392.23	390.53	63.50	12.7	41.3	55.6	469.9	52.4	32.00	15.1	330.2	65.09
420	N 084	P 84	5	419.00	418.59	416.46	416.05	413.41	412.22	411.16	63.50	12.7	41.3	55.6	490.5	52.4	35.18	15.1	330.2	65.09
440	N 088	P 88	5	438.99	438.58	436.45	436.05	433.40	432.21	431.80	71.44	12.7	46.0	63.50	520.7	60.3	35.18	15.1	355.6	75.41
460	N 092	P 92	5	459.00	458.60	456.46	456.06	453.42	452.22	450.85	71.44	12.7	46.0	63.50	539.8	60.3	35.18	15.1	406.4	75.41
480	N 096	P 96	5	478.99	478.59	476.45	476.05	473.41	472.21	469.9	71.44	12.7	46.0	63.50	560.4	60.3	38.35	15.1	406.4	75.41
500	N 500	P 500	5	499.01	498.60	496.47	496.06	493.42	492.23	489.0	79.4	12.7	46.0	71.4	579.4	68.3	38.35	15.1	406.4	83.3
530	N 530	P 530	4	529.01	528.50	525.83	525.32	522.15	520.55	517.5	79.4	12.7	46.0	71.4	630.2	68.3	41.53	20.6	425.5	83.3
560	N 560	P 560	4	559.00	558.50	555.83	555.32	552.15	550.55	549.3	85.7	12.7	46.0	77.8	649.3	71.4	41.53	20.6	476.3	89.7
600	N 600	P 600	4	599.01	598.50	595.83	595.33	592.15	590.55	587.4	85.7	12.7	46.0	77.8	700.1	74.6	41.53	20.6	508.0	89.7
630	N 630	P 630	4	629.01	628.50	625.83	625.32	622.15	620.55	619.1	85.7	12.7	50.8	77.8	730.3	74.6	47.88	20.6	520.7	92.1
670	N 670	P 670	4	669.01	668.50	665.84	665.33	662.15	660.55	657.2	90.5	12.7	50.8	82.6	779.5	79.4	47.88	20.6	546.1	96.8
710	N 710	P 710	3	709.02	708.33	704.77	704.09	700.02	698.42	695.3	101.6	15.9	50.8	93.7	830.3	90.5	51.30	25.4	571.5	108.0
750	N 750	P 750	3	749.02	748.34	744.78	744.09	740.03	738.43	736.6	101.6	15.9	50.8	93.7	870.0	90.5	57.66	25.4	584.2	108.0
800	N 800	P 800	3	799.01	798.32	794.77	794.08	790.02	788.42	787.4	101.6	15.9	50.8	93.7	920.8	90.5	57.66	25.4	616.0	108.0
850	N 850	P 850	3	849.02	848.34	844.78	844.09	840.03	838.43	835.0	101.6	15.9	50.8	93.7	979.5	90.5	64.01	25.4	647.7	108.0
900	N 900	P 900	3	899.01	898.32	894.77	894.08	890.02	888.42	885.8	111.1	15.9	50.8	103.2	1030.3	100.0	64.01	25.4	666.8	117.5
950	N 950	P 950	3	949.02	948.33	944.78	944.09	940.03	938.43	933.5	114.3	19.1	50.8	108	1092.2	100.0	64.01	25.4	692.2	117.5

<sup>(1)</sup> See page B395 for suggested S-3 shaft tolerances.

<sup>(2)</sup> C is outer ring width which may be obtained from bearing dimension tables.

## MOUNTING PROCEDURES

Depending on the size of the bearing and the application, there are different methods for mounting roller bearings. In all methods, certain basic rules must be followed.

### CLEANLINESS

- Choose a clean environment, free from dust or moisture.
- The installer should make every effort to ensure cleanliness by use of protective screens and clean cloths.

### PLAN THE WORK

- Know in advance your plans and have the necessary tools at hand. This reduces the amount of time for the job and decreases the chance for dirt to get into the bearing.

### INSPECTION AND PREPARATION

- All component parts of the machine should be on hand and thoroughly cleaned before proceeding.
- Housings should be cleaned, including blowing out the oil holes.
- Do not use air hose on bearings.
- If blind holes are used, insert a magnetic rod to remove metal chips that might be lodged there during fabrication.
- Shaft shoulders and spacer rings contacting the bearing should be square with the shaft axis.
- The shaft fillet must be small enough to clear the radius of the bearing.
- On original installations, all component parts should be checked against the detail specification prints for dimensional accuracy. Shaft and housing should be carefully checked for size and form (roundness, etc.).

### SHAFT AND HOUSING FINISH

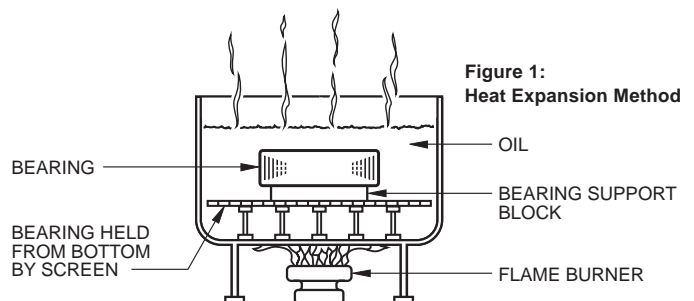
- Shaft surfaces on which the bearing will be mounted must be clean and free from nicks and burrs.
- For applications with stationary housing and rotating shaft, it is suggested that the bearing seat on the shaft be ground to 63 RMS (micro-inches) maximum.
- If it is impractical to use a ground finish, a machined finish of 125 RMS is acceptable in many cases, but the amount of interference fit should be slightly increased.
- For a stationary outer ring, which is required to float (e.g., slide axially in the housing), a housing finish of 63 RMS maximum is suggested.
- Where the outer ring is not required to float, a surface finish of 125 RMS maximum is generally satisfactory.

**DO NOT REMOVE THE BEARING FROM ITS WRAPPING UNTIL YOU ARE READY TO MOUNT IT.**

## MOUNTING CYLINDRICAL BORE BEARINGS

### HEAT EXPANSION METHOD

- Most applications require a tight interference fit on the shaft.
- Mounting is simplified by heating the bearing to expand it sufficiently to slide easily onto the shaft.
- Two methods of heating are commonly used:
  - Tank of heated oil.
  - Induction heating.
- The first is accomplished by heating the bearing in a tank of oil that has a high flash point.
- The oil temperature should not be allowed to exceed 121° C (250° F). A temperature of 93° C (200° F) is sufficient for most applications.
- The bearing should be heated for 20 or 30 minutes, until it is expanded sufficiently to slide onto the shaft easily.
- Induction heating method is used for mounting small bearings in production line assembly.
- Induction heating is rapid. Care must be taken to prevent bearing temperature from exceeding 93° C (200° F).
- Trial runs with the unit and bearing are usually necessary to obtain proper timing.
- Thermal crayons melted at predetermined temperatures can be used to check the bearing temperature.
- While bearing is hot, it should be positioned squarely against the shoulder.
- Lockwashers and locknuts or clamping plates are then installed to hold the bearing against the shoulder of the shaft.
- As the bearing cools, the locknut or clamping plate should be tightened.
- In cases of outer ring rotation, where the outer ring is a tight fit in the housing, the housing member can be expanded by heating.
- The oil bath is shown in Figure 1. The bearing should not be in direct contact with the heat source.
- The usual arrangement is to have a screen several inches from the bottom of the tank. Small support blocks separate the bearing from the screen.
- It is important to keep the bearing away from any localized high-heat source that may raise its temperature excessively, resulting in race hardness reduction.



- Flame-type burners are commonly used. An automatic device for temperature control is desirable.
- If safety regulations prevent the use of an open heated oil bath, a mixture of 15 percent soluble-oil water may be used. This mixture may be heated to a maximum of 93° C (200° F) without being flammable.



## ARBOR PRESS METHOD

- The alternate method of mounting, generally used only on smaller sizes, is to press the bearing onto the shaft or into the housing. This can be done by using an arbor press and a mounting tube as shown in Figure 2.
- The tube can be made from soft steel with an inside diameter slightly larger than the shaft.
- The O.D. of the tube should not exceed the maximum shoulder height given in the table of dimensions.
- The tube should be faced square at both ends. It should be thoroughly clean inside and out, and long enough to clear the end of the shaft after the bearing is mounted.

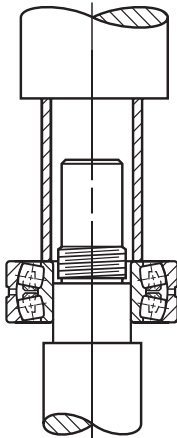
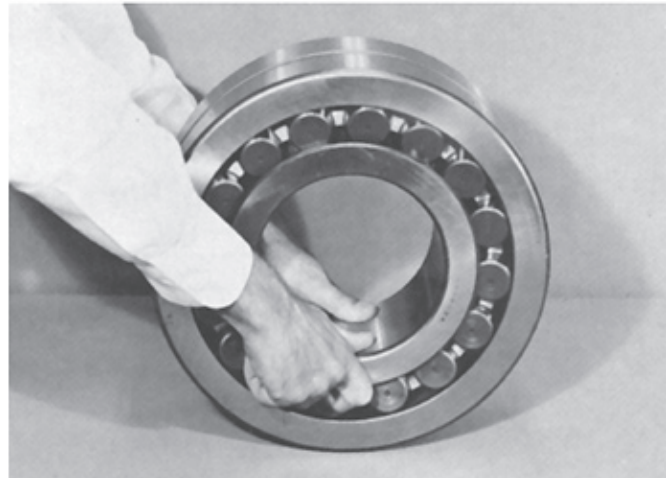


Figure 2:  
Arbor Press Method

- If outer ring is being pressed into housing, the O.D. of the mounting tube should be slightly smaller than the housing bore. The I.D. should not be less than the suggested housing basking diameter in the tables of dimensions.
- Coat the shaft with a light machine oil to reduce the force needed for a press fit.
- Carefully place the bearing on the shaft, making sure it is square with the shaft axis.
- Apply steady pressure from the arbor ram to drive the bearing firmly against the shoulder.
- Never attempt a press fit on a shaft by applying pressure to the outer ring, or a press fit in a housing by applying pressure to the inner ring.

## SHAFT MOUNTING TAPERED BORE SPHERICAL ROLLER BEARINGS

- Use a feeler gage with the thinnest blade of .0015 in.
- Place the bearing in an upright position with the inner and outer ring faces parallel.
- Place the thumbs on the inner ring bore and oscillate the inner ring two or three elements.
- Position the individual roller assemblies so that a roller is at the top of the inner ring on both sides of the bearing.
- With the roller in the correct position, insert a thin blade of the feeler gage between the roller and the outer ring.
- Move it carefully along the top roller, between the roller and outer ring raceway. Repeat this procedure, using thicker feeler gage blades, until one is found that will not go through.
- The blade thickness that preceded the “no-go” blade is a measure of RIC before installation.



- Start the mounting procedure by lubricating the tapered shaft with a light coat of machine oil.
- Slide bearing onto the shaft as far as it will go.
- As the locknut is tightened, the interference fit builds up resulting in expansion of the inner ring.
- Periodically measure to keep track of the reduction in RIC.
- Continue the procedure until the proper amount of reduction is obtained. Do not exceed suggested amount of reduction.
- As a final check, make sure that the remaining RIC equals or exceeds the minimum mounted clearance shown in the table to the right.

B



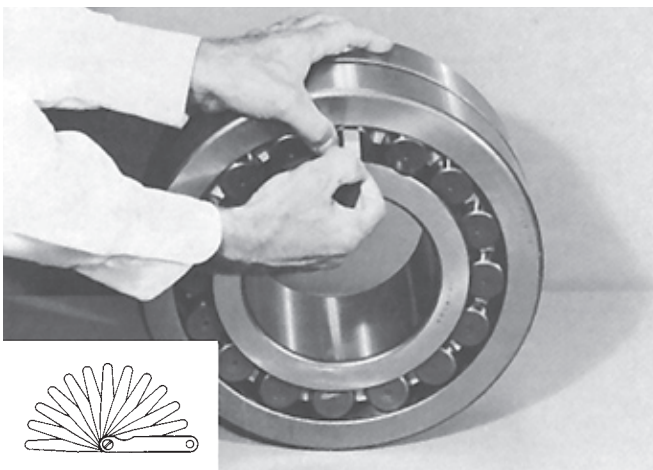
MOUNTING TIMKEN® TAPERED BORE SPHERICAL ROLLER BEARINGS

Nominal bearing bore (mm)		Radial Internal Clearance prior to mounting (mm)						Suggested reduction of RIC (mm)		Axial displacement tapered shaft installation (mm)				Minimum permissible RIC after installation		
		Normal		C3		C4				1:12 Taper**		1:30 Taper**				
		over	incl.	Min.	Max.	Min.	Max.			Min.	Max.	Min.	Max.	Min.	Max.	Normal
30	40	0.035	0.050	0.050	0.065	0.065	0.085	0.020	0.025	0.300	0.380	-	-	0.015	0.025	0.040
40	50	0.045	0.060	0.060	0.080	0.080	0.100	0.025	0.030	0.380	0.460	-	-	0.020	0.030	0.050
50	65	0.055	0.075	0.075	0.095	0.095	0.120	0.030	0.040	0.460	0.560	-	-	0.025	0.040	0.060
65	80	0.070	0.095	0.095	0.120	0.120	0.150	0.040	0.050	0.560	0.760	-	-	0.025	0.045	0.075
80	100	0.080	0.110	0.100	0.140	0.140	0.180	0.045	0.065	0.680	0.970	-	-	0.035	0.050	0.075
100	120	0.100	0.135	0.135	0.170	0.170	0.220	0.050	0.070	0.760	1.070	1.900	2.540	0.050	0.060	0.100
120	140	0.120	0.160	0.160	0.200	0.200	0.260	0.065	0.090	0.890	1.270	2.290	3.050	0.055	0.075	0.115
140	160	0.130	0.180	0.180	0.230	0.230	0.300	0.075	0.100	1.140	1.520	2.670	3.430	0.055	0.075	0.125
160	180	0.140	0.200	0.200	0.260	0.260	0.340	0.075	0.115	1.140	1.650	2.670	4.060	0.060	0.090	0.150
180	200	0.160	0.220	0.220	0.290	0.290	0.370	0.090	0.125	1.400	1.900	3.050	4.450	0.070	0.100	0.165
200	225	0.180	0.250	0.250	0.320	0.320	0.410	0.100	0.140	1.520	2.030	3.560	4.830	0.075	0.115	0.180
225	250	0.200	0.270	0.270	0.350	0.350	0.450	0.115	0.150	1.780	2.290	4.060	5.330	0.090	0.115	0.200
250	280	0.220	0.300	0.300	0.390	0.390	0.490	0.115	0.165	1.780	2.540	4.060	5.840	0.100	0.140	0.230
280	315	0.240	0.330	0.330	0.430	0.430	0.540	0.125	0.180	1.900	2.670	4.450	6.220	0.100	0.150	0.250
315	355	0.270	0.360	0.360	0.470	0.470	0.590	0.140	0.190	2.030	2.790	4.830	6.600	0.115	0.165	0.280
355	400	0.300	0.400	0.400	0.520	0.520	0.650	0.150	0.200	2.290	3.050	5.330	7.110	0.130	0.190	0.330
400	450	0.330	0.440	0.440	0.570	0.570	0.720	0.165	0.215	2.540	3.300	5.840	7.620	0.150	0.230	0.360
450	500	0.370	0.490	0.490	0.630	0.630	0.790	0.180	0.230	2.670	3.430	6.220	8.000	0.165	0.270	0.410
500	560	0.410	0.540	0.540	0.680	0.680	0.870	0.200	0.250	3.050	3.810	7.110	8.890	0.180	0.290	0.440
560	630	0.460	0.600	0.600	0.760	0.760	0.980	0.230	0.280	3.430	4.190	8.000	9.780	0.200	0.320	0.510
630	710	0.510	0.670	0.670	0.850	0.850	1.090	0.250	0.300	3.810	4.570	8.890	10.670	0.200	0.370	0.550
710	800	0.570	0.750	0.750	0.960	0.960	1.220	0.280	0.350	4.190	5.330	9.780	12.450	0.230	0.390	0.610
800	900	0.640	0.840	0.840	1.070	1.070	1.370	0.300	0.380	4.570	5.720	10.670	13.330	0.250	0.460	0.690
900	1000	0.710	0.930	0.930	1.190	1.190	1.520	0.350	0.430	5.334	6.480	12.450	15.110	0.280	0.490	0.750
1000	1120	0.770	1.030	1.030	1.300	1.300	1.670	0.400	0.480	6.100	7.240	14.220	16.890	0.280	0.550	0.810
1120	1250	0.830	1.120	1.120	1.420	1.420	1.830	0.430	0.500	6.480	7.620	15.110	17.780	0.330	0.610	0.910

B



\* Axial displacement values apply to solid steel shafts or to hollow steel shafts with bore diameter less than half the shaft diameter. For shaft materials other than steel or for thin-wall shafts, please consult your Timken representative.  
 \*\* 1:12 Taper used for 222, 223, 230, 231, 232, 233, 239 series. 1: 30 Taper used for 240, 241, 242 series. For sleeve mounting, multiply axial displacement values by 1.1 for 1:12 taper or by 1.05 for 1:30 taper. Questions on tapered shaft data, consult your Timken representative.



Example: Bearing 22328K C3 (140 mm bore with a C3 clearance pattern) is being mounted on a tapered shaft.

- By measuring with feeler gage, initial RIC is established to be .007 in.
- Reference to chart above indicates proper fit is obtained when RIC is reduced by .0025 in. to .0035 in., or approximately .003in.
 

Initial clearance	.007"
Reduction of RIC	<u>-.003"</u>
	.004"
- Locknut is tightened until RIC reaches .004 in.. Final check against minimum RIC after mounting shows this value to be safe.

**Note:** Tapered bore bearings must have the proper amount of radial internal clearance before installation to provide for the required reduction of RIC during mounting and to compensate for any further internal reduction from abnormal temperature conditions. For special applications, send complete operating data to your Timken representative for suggestions on radial internal clearance.

- During mounting, the RIC should be checked at the unloaded roller. If this is at the bottom, make sure that the roller is raised to seat firmly at the inboard position of the inner race.
- When the suggested amount of reduction of RIC has been accomplished, the bearing is properly fitted.
- Complete the procedure by peening the lockwasher tang into the locknut slot or securing the lockplate.



**NOTES**

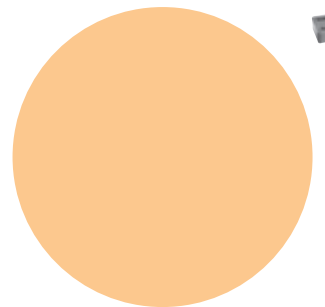
**B**



## SPHERICAL ROLLER BEARING PILLOW BLOCKS

**Overview:** Spherical roller bearing pillow blocks combine rugged cast iron or steel housings with high-capacity bearings to meet the toughest demands of industry. Each pillow block contains an advanced-design spherical roller bearing with improved geometry and raceway finish for maximum load capacity and service life. Integrated housing and bearing features enhance unit lubrication characteristics. Multiple sealing options protect against contamination.

- **Sizes:** 35 mm - 300 mm shafts (1.37795 in. - 11.811 in.). Special shaft sizes up to 1000 mm (39.37 in.) and beyond.
- **Markets:** Conveyors, mining, rolling mills and pulp and paper mills.
- **Features:** Split construction for convenient assembly and disassembly. These units include pry tool slots and the exclusive Pry-Lug fulcrum, which simplify bearing inspection, service and replacement.
- **Benefits:** Caps can be removed easily and quickly without damage to the bearing or housing.







### Pillow Blocks

- SAF** two- or four-bolt pillow block, cast iron
- SDAF** four-bolt heavy duty type pillow block, cast iron
- SAFS** two- or four-bolt pillow block, cast steel
- FSAF** four-bolt pillow block, cast iron (only when an option)
- FSAFS** four-bolt pillow block, cast steel (only when an option)
- SDAFS** four-bolt heavy-duty pillow block, cast steel

To indicate shaft size and used only for pillow block units of 8 7/16 in. shaft size or larger.

**SDAF**

**23152**

**K - 9 1/2**

**FXOP**

Number indicates basic spherical bearing series. See product data charts for spherical bearing number.

**K** indicated on adapter type mounting arrangement (for 230, 231, 232 Series, SDAF231K and SDAF232K Series)  
**DV** DUSTAC seals - both sides  
**DC** DUSTAC seals - one side

**Indicate construction:**  
**FXOP** fixed open  
**FXCL** fixed closed  
**FLOP** float open  
**FLCL** float closed



# Spherical Roller Bearing Pillow Blocks

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## INTRODUCTION

Timken capabilities in the engineering and manufacture of heavy-duty pillow blocks provide important benefits to users.

Another very important benefit is Timken's worldwide sales organization, staffed with experienced bearing engineers who are available for consultation on any pillow block or bearing application. Expert engineering assistance is available for applications involving shaft sizes 40 inches and larger such as BOF trunnions, bridge blocks and ball mills. If your design calls for shaft sizes or loads not listed in this catalog, contact your Timken representative for information about availability of special units.

## DESIGN AND CONSTRUCTION

Timken supplies pillow blocks equipped with either tapered bore bearings plus adapters for mounting on straight shafts or cylindrical bore bearings for assembly on shouldered shafts.

Timken spherical roller bearing pillow blocks are made of split construction for convenient assembly and disassembly. These units include pry tool slots and the exclusive Pry-Lug fulcrum that simplify bearing inspection, service, and replacement. Caps can be removed easily and quickly without damage to the bearing or housing.

Precision fit is assured by the Timken system of doweling caps and bases together at an early stage of manufacturing so that they remain a single unit during machining. They are not interchangeable as separate parts and become precisely mated components.

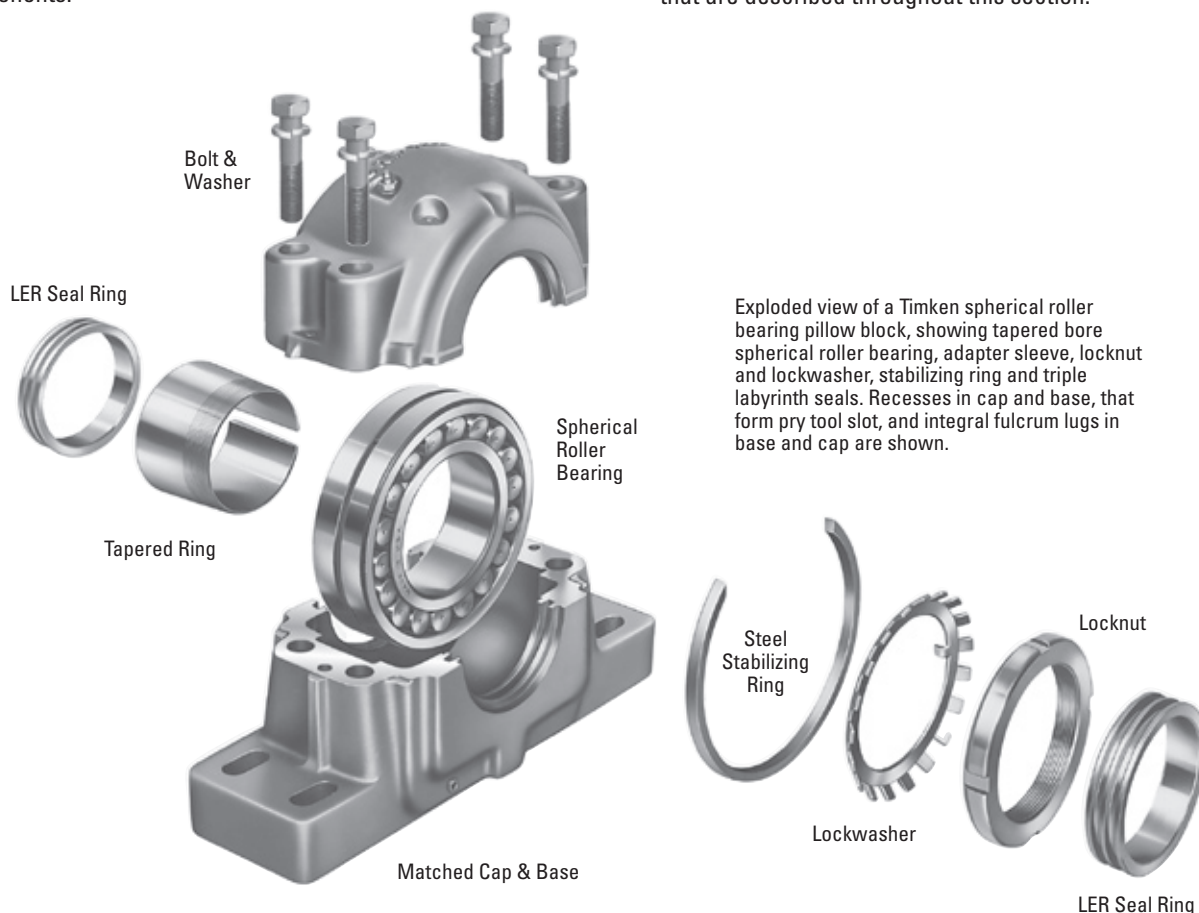
Timken manufactures pillow blocks in two styles: SAF and SDAF. The larger SDAF block is suggested for extreme duty applications.

Caps and bases are made from high-grade stress-relieved cast iron as standard. They also are available in cast steel.

All Timken pillow blocks are designed for four-bolt mounting. Certain smaller sizes are normally furnished for two-bolt mounting. These assemblies are indicated in the tables and can be ordered with optional four-bolt base.

Four cap bolts are used in most Timken pillow blocks in order to equalize the pressure between cap and base, preventing loss of lubricant.

The illustration below shows all parts of a pillow block assembly that are described throughout this section.



Exploded view of a Timken spherical roller bearing pillow block, showing tapered bore spherical roller bearing, adapter sleeve, locknut and lockwasher, stabilizing ring and triple labyrinth seals. Recesses in cap and base, that form pry tool slot, and integral fulcrum lugs in base and cap are shown.

## MOUNTING

### ADAPTER VS. STRAIGHT BORE

Usually a spherical roller bearing pillow block assembly is mounted on a straight shaft using a tapered bore bearing and adapter assembly. Standard commercial shafting can be used without additional machining. (Suggested shaft diameters are shown on page B395). Adapter mount also permits maximum flexibility in the axial positioning of the bearing on the shaft and will accommodate light locational thrust loads. Timken pillow blocks for tapered bore and adapter mounted bearings are available in Series 225, 226, 230, 231K and 232K.

Adapter mounted spherical roller bearings require the correct removal of diametral clearance from the bearing to prevent relative rotation between inner race and sleeve or shaft. Failure to employ proper mounting procedures can cause heating and reduced bearing performance. For proper shaft mounting of adapter type spherical roller bearings, see B380 of the spherical roller bearing section.

When application conditions produce heavy thrust loads, or a need exists for exact axial location or a positive shaft interference fit, a direct straight bore mounting may be the best option. This requires a shouldered shaft, machined for proper fit, and a straight bore bearing. Timken pillow block assemblies for straight bore applications are available in Series 222, 223, 231 and 232.

Suggested fits for shafts in cylindrical bore spherical roller bearings are shown in the engineering section. For applications involving heavy shock, vibration, unbalanced rotating loads or other abnormal conditions, consult your Timken representative.

### FIXED AND FLOAT PILLOW BLOCKS

Any style of Timken pillow blocks can be easily installed either at the float or fixed position on the shaft. For the fixed position, a stabilizing ring is added between the bearing outer face ring and the housing shoulder to positively locate the shaft and prevent axial movement.

Some applications require centering of the bearing in its housing. To accomplish this, two special width stabilizing rings can be ordered.

In the float position, the ring is not used, allowing the bearing to move axially (a maximum of  $\frac{3}{8}$  in.) to compensate for thermal expansion or contraction of the shaft.

Pillow blocks ordered by the numbers in the dimension tables are fixed units. To order float units, specify by adding suffix "Float" or "FL" to the pillow block number.

### CLOSED END INSTALLATIONS

In some applications, the shaft end is designed to terminate inside the pillow block. For this design, positive fitting end-closure inserts are available to seal out contaminants and retain lubricant. Timken heavy-duty end plugs include O-rings for positive sealing.

Designers and installers need to make sure the shaft end does not contact the closure. A minimum of  $\frac{1}{8}$  in. clearance at maximum thermal expansion is suggested between the end of the shaft and the closure. Dimension "Y" in the tables defines the maximum permissible length of shaft from centerline of the pillow block housing. If end closure is desired, specify by adding "CL" (one end closed) to the pillow block assembly number.

## LUBRICATION

Timken pillow block housings have been designed for grease and oil bath lubrication. They also can be modified easily to accommodate circulating oil or oil/air mist systems. Grease fittings or sight gages are available upon request.

A lubrication groove and oil holes are provided in the bearing outer ring. This feature, designated by adding suffix "W33" to the bearing number, should be specified whenever re-ordering bearings for pillow blocks. In most cases, the fresh lubricant is fed directly to the center of the bearing between the rows of rollers and distributed to the rest of the bearing. This assures the used lubricant is purged from the bearing.

## SEALS

Precision triple ring labyrinth seals are supplied with all Timken pillow blocks to exclude foreign matter and retain lubricants. The pillow block base includes extra large oil return holes at the bottom of the seal grooves to prevent leakage past the seals.

For extremely contaminated or abrasive environments, Timken has developed the exclusive DUSTAC™ seal. This patented seal offers protection against concentrations of dust or abrasive material that a labyrinth seal cannot keep out. See page B398 for further information on DUSTAC.

## LOAD RATINGS AND LIFE

Load ratings for the spherical roller bearings that are used in pillow blocks are found in the dimension tables on pages B356 through B372.

Life calculation formulas are found in the engineering section.

In addition to individual bearing selection, the ability of the pillow block to carry the operating load should be considered.

It should be noted that the load rating figures supplied in this catalog are applicable only when the load direction is generally toward the base of the pillow block. If the pillow block must be mounted so that the load could be applied in any other direction, consult your Timken representative.



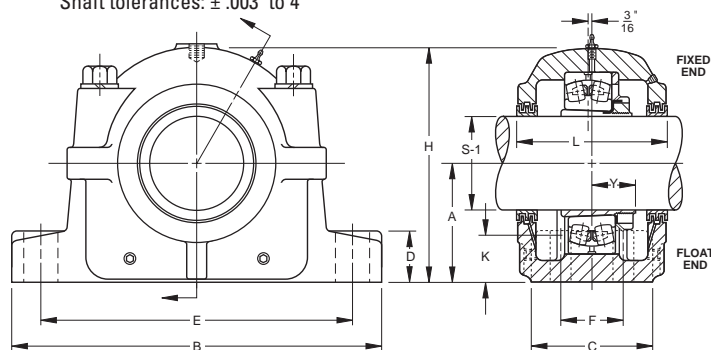


# SPHERICAL ROLLER BEARINGS

## TAPERED BORE MOUNTING SAF225 AND SAF226 SERIES

- The basic number for ordering complete pillow block assemblies is listed in the table below.
- Each assembly includes the housing cap and base, cap bolts, bearing, bearing adapter, locknut and washer, stabilizing ring, and triple ring seals.
- If only the pillow block housing is desired, use the numbers listed in column headed "Housing Only". These units include: cap, base, cap bolts, triple ring seals and stabilizing ring.
- Assembly and pillow blocks as described on this page constitute a fixed unit. To order float units, specify part number plus suffix "Float" or "FL".

Shaft tolerances: ± .003" to 4"



- Assemblies shown are furnished in cast iron. If cast steel is desired, add the letter "S" to the alpha prefix (e.g., SAFS 22515).
- Four-bolt bases are standard on all assemblies except as noted.

Pillow Block Assembly	Standard Shaft <sup>(1)</sup> Diam S-1	A	B	C	D		E		F	H	K	L	Y	Base Bolts Required No. Size	Bearing Number	Adapter <sup>(4)</sup> Assembly Number	Housing <sup>(2)</sup> Only	Stabi. <sup>(3)</sup> lizing Ring 1 Req'd	Triple Seal 2 Req'd	Ass'y Wt.
		in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.							

### SERIES SAF225

SAF22509	1 7/16	2 1/4	8 1/4	2 3/8	1 5/16	7	6 1/4	—	4 3/8	3 1/32	3 5/8	1 3/32	2 1/2	22209K	SNW-9	SAF509	SR-9-9	LER 17	12
SAF22510	1 11/16	2 1/2	8 1/4	2 3/8	1 5/16	7	6 1/2	—	4 3/4	1 3/32	3 5/8	1 3/32	2 1/2	22210K	SNW-10	SAF510	SR-10-0	LER 20	13
SAF22511	1 15/16	2 3/4	9 5/8	2 3/4	1 5/16	7 7/8	7 3/8	—	5 11/32	1 3/16	3 3/4	1 3/16	2 1/2	22211K	SNW-11	SAF511	SR-11-0	LER-24	16
SAF22513	2 3/16	3	11	3 1/8	1	9 1/2	8 1/8	—	5 25/32	1 1/8	4 5/16	1 7/32	2 1/2	22213K	SNW-13	SAF513	SR-13-0	LER-29	19.5
SAF22515	2 7/16	3 3/4	11 1/4	3 1/8	1 1/8	9 5/8	8 5/8	—	6 3/8	1 1/4	4 3/4	1 3/32	2 5/8	22215K	SNW-15	SAF515	SR-15-0	LER37	30
FSAF22515	2 7/16	3 3/4	11 1/4	3 1/8	1 1/8	9 5/8	8 5/8	1 7/8	6 3/8	1 1/4	4 3/4	1 3/32	4 1/2	22215K	SNW-15	FSAF515	SR-15-0	LER37	30
SAF22516	2 11/16	3 1/2	13	3 1/2	1 3/16	11	9 5/8	—	6 7/8	1 11/32	4 7/8	1 21/64	2 3/4	22216K	SNW-16	SAF516	SR-16-13	LER44	37
FSAF22516	2 11/16	3 1/2	13	3 1/2	1 3/16	11	9 5/8	2 1/8	6 7/8	1 11/32	4 7/8	1 21/64	4 5/8	22216K	SNW-16	FSAF516	SR-16-13	LER44	37
SAF22517	2 15/16	3 3/4	13	3 1/2	1 1/4	11	9 7/8	—	7 1/4	1 7/16	4 15/16	1 27/64	2 3/4	22217K	SNW-17	SAF517	SR-17-14	LER53	40
FSAF22517	2 15/16	3 3/4	13	3 1/2	1 1/4	11	9 7/8	2 1/8	7 1/4	1 7/16	4 15/16	1 27/64	4 5/8	22217K	SNW-17	FSAF517	SR-17-14	LER53	40
SAF22518	3 3/16	4	13 3/4	3 7/8	1 1/2	11 5/8	10 3/8	—	7 3/4	1 17/32	6 1/4	1 37/64	2 3/4	22218K	SNW-18	SAF518	SR-18-15	LER69	49
FSAF22518	3 3/16	4	13 3/4	3 7/8	1 1/2	11 5/8	10 3/8	2 1/8	7 3/4	1 17/32	6 1/4	1 37/64	4 5/8	22218K	SNW-18	FSAF518	SR-18-15	LER69	49
SAF22520	3 7/16	4 1/2	15 1/4	4 3/8	1 3/4	13 1/8	11 5/8	—	8 11/16	1 3/4	6	1 49/64	2 7/8	22220K	SNW-20	SAF520	SR-20-17	LER102	65
FSAF22520	3 7/16	4 1/2	15 1/4	4 3/8	1 3/4	13 1/8	11 5/8	2 3/8	8 11/16	1 3/4	6	1 49/64	4 3/4	22220K	SNW-20	FSAF520	SR-20-17	LER102	65
SAF22522	3 15/16	4 15/16	16 1/2	4 3/4	2	14 1/2	12 5/8	2 3/4	9 9/16	1 7/8	6 3/8	1 61/64	4 3/4	22222K	SNW-22	SAF522	SR-22-19	LER109	81
SAF22524	4 3/16	5 1/4	16 1/2	4 3/4	2 1/8	14 1/2	13 1/4	2 3/4	10 1/4	1 15/16	7 3/8	2 3/32	4 3/4	22224K	SNW-24	SAF524	SR-24-20	LER113	94
SAF22526	4 7/16	6	18 3/8	5 1/8	2 3/8	16	14 5/8	3 1/4	11 9/16	2 7/16	8	2 17/64	4 7/8	22226K	SNW-26	SAF526	SR-26-0	LER117	137
SAF22528	4 15/16	6	20 1/8	5 7/8	2 3/8	17 1/8	16	3 3/8	11 3/4	2 1/8	7 3/4	2 13/32	4 1	22228K	SNW-28	SAF528	SR-28-0	LER122	159
SAF22530	5 3/16	6 3/16	21 1/4	6 1/4	2 1/2	18 1/4	17	3 3/4	12 1/2	2 3/16	8 3/8	2 37/64	4 1	22230K	SNW-30	SAF530	SR-30-0	LER125	189
SAF22532	5 7/16	6 11/16	22	6 1/4	2 5/8	19 1/4	17 3/8	3 3/4	13 5/16	2 3/16	8 3/4	2 49/64	4 1	22232K	SNW-32	SAF532	SR-32-0	LER130	225
SAF22534	5 15/16	7 1/16	24 3/4	6 3/4	2 3/4	21 5/8	19 3/8	4 1/4	14 9/16	2 5/16	9 3/8	2 59/64	4 1	22234K	SNW-34	SAF534	SR-34-0	LER140	300
SAF22536	6 7/16	7 1/2	26 3/4	7 1/8	3	23 5/8	20 7/8	4 5/8	15 1/2	2 9/16	9 11/16	2 51/64	4 1	22236K	SNW-36	SAF536	SR-36-30	LER148	330
SAF22538	6 15/16	7 7/8	28	7 1/2	3 1/8	24 3/8	21 5/8	4 1/2	15 11/16	2 5/8	10 3/4	3 7/64	4 1 1/4	22238K	SNW-38	SAF538	SR-38-32	LER155	375
SAF22540	7 3/16	8 1/4	29 1/2	8	3 3/8	25	22 1/2	5	17 3/16	2 11/16	10 13/16	3 3/32	4 1 1/4	22240K	SNW-40	SAF540	SR-40-34	LER159	445
SAF22544	7 15/16	9 1/2	32 3/4	8 3/4	3 3/4	27 7/8	24 3/4	5 1/4	19 5/8	3 3/8	11 1/2	3 17/32	4 1 1/2	22244K	SNW-44	SAF544	SR-44-38	LER167	615

### SERIES SAF226

SAF22615	2 7/16	4	13 3/4	3 7/8	1 5/8	11 5/8	10 3/8	2 1/8	7 9/16	1 19/32	5 7/8	1 7/8	2,4 3/4, 5/8	22315K	SNW-115	SAF615	SR-18-15	LOR 37	52
SAF22616	2 11/16	4 1/4	14 1/4	3 7/8	1 3/4	12 3/8	10 3/8	2 1/8	8 1/4	1 11/16	6 1/2	1 15/16	2,4 3/4, 5/8	22316K	SNW-116	SAF616	SR-19-16	LOR 44	71
SAF22617	2 15/16	4 1/2	15 1/4	4 3/8	1 3/4	13 1/8	11 5/8	—	8 11/16	1 13/16	6 5/8	1 57/64	2 7/8	22317K	SNW-117	SAF617	SR-20-17	LER184	81
FSAF22617	2 15/16	4 1/2	15 1/4	4 3/8	1 3/4	13 1/8	11 5/8	2 3/8	8 11/16	1 13/16	6 5/8	1 57/64	4 3/4	22317K	SNW-117	FSAF617	SR-20-17	LER184	81
SAF22618	3 3/16	4 3/4	15 1/2	4 3/8	2	13 1/2	12	2 1/4	9 3/16	2	7	2 3/64	4 3/4	22318K	SNW-118	SAF618	SR-21-18	LER188	90
SAF22620	3 7/16	5 1/4	16 1/2	4 3/4	2 1/8	14 1/2	13 1/4	2 3/4	10 1/4	2 1/8	7 3/8	2 19/64	4 3/4	22320K	SNW-120	SAF620	SR-24-20	LER102	113
SAF22622	3 15/16	6	18 3/8	5 1/8	2 3/8	16	14 5/8	3 1/4	11 9/16	2 1/2	8	2 31/64	4 7/8	22322K	SNW-122	SAF622	SR-0-22	LER109	151
SAF22624	4 3/16	6 3/16	21 1/4	6 1/4	2 1/2	18 1/4	17	3 3/4	12 1/2	2 9/16	8 3/8	2 41/64	4 1	22324K	SNW-124	SAF624	SR-0-24	LER113	201
SAF22626	4 7/16	6 11/16	22	6 1/4	2 5/8	19 1/4	17 3/8	3 3/4	13 5/16	2 5/8	8 3/4	2 27/32	4 1	22326K	SNW-126	SAF626	SR-0-26	LER117	245
SAF22628	4 15/16	7 1/16	24 3/4	6 3/4	2 3/4	21 5/8	19 3/8	4 1/4	14 9/16	2 11/16	9 3/8	3 3/64	4 1	22328K	SNW-128	SAF628	SR-0-28	LER122	310
SAF22630	5 3/16	7 1/2	26 3/4	7 1/8	3	23 5/8	20 7/8	4 5/8	15 1/2	2 7/8	9 11/16	3 17/64	4 1	22330K	SNW-130	SAF630	SR-36-30	LER125	350
SAF22632	5 7/16	7 7/8	28	7 1/2	3 1/8	24 3/8	21 5/8	4 1/2	15 11/16	2 15/16	10 3/4	3 7/16	4 1 1/4	22332K	SNW-132	SAF632	SR-38-32	LER130	420
SAF22634	5 15/16	8 1/4	29 1/2	8	3 3/8	25	22 1/2	5	17 3/16	3 1/16	10 13/16	3 19/32	4 1 1/4	22334K	SNW-134	SAF634	SR-40-34	LER140	485
SAF22636	6 7/16	8 7/8	31 1/4	8 1/4	3 1/2	26 5/8	24	5 1/4	18 1/2	3 3/8	11 1/4	3 47/64	4 1 1/4	22336K	SNW-136	SAF636	SR-0-36	LER148	545
SAF22638	6 15/16	9 1/2	32 3/4	8 3/4	3 3/4	27 7/8	24 3/4	5 1/4	19 5/8	3 11/16	11 1/2	3 57/64	4 1 1/2	22338K	SNW-138	SAF638	SR-44-38	LER155	655
SAF22640	7 3/16	9 7/8	34 1/4	9	4	29 1/2	26 1/4	5 1/2	20 3/16	3 3/4	12 1/4	4 5/64	4 1 1/2	22340K	SNW-140	SAF640	SR-0-40	LER159	725

(1) See page B395 for suggested shaft diameter S-1 tolerances.

(2) "Housing Only" includes: cap, base, cap bolts, triple ring seals and stabilizing rings as required.

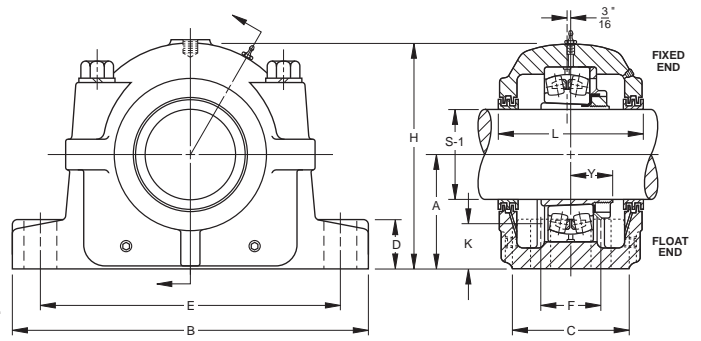
(3) Stabilizing ring is used for fixed (FX) block; do not use for float (FL) mounting.

(4) Includes sleeve, locknut and lockwasher. Add shaft size to order.

Note: Limiting speeds are found in dimension tables in the spherical roller bearing section.

**TAPERED BORE MOUNTING**  
**SDAF225 AND SDAF226 SERIES**

- Each assembly includes the housing cap and base, cap bolts, bearing, bearing adapter, locknut and washer, stabilizing ring and triple ring seals.
- To order pillow block housing only, use the number listed in the "Housing Only" column. These units include: cap, base, cap bolts, triple ring seals and stabilizing ring.
- Assembly and pillow blocks as described on this page constitute fixed units.
- To order float units, specify part number plus suffix "Float" or "FL".
- Assemblies shown are furnished in cast iron. If cast steel is desired, add the letter "S" to the alpha prefix (e.g., SAFS 22515).



Pillow Block Assembly	Standard Shaft <sup>(1)</sup> Diam. S-1	A	B	C	D	E		F	H	K	L	Y	Base Bolts Required No. Size	Bearing Number	Adapter <sup>(4)</sup> Assembly Number	Housing <sup>(2)</sup> Only	Stabi- lizing Ring 1 Req'd	Triple Seal 2 Req'd	Ass'y Wt. lbs.
		in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.							

<b>SERIES SDAF225</b>																			
SDAF22520	3 7/16	4 1/2	15 1/4	6	1 7/8	13 1/8	11 5/8	3 3/8	8 15/16	1 3/4	6 3/4	1 49/64	4 3/4	22220K	SNW-20	SDAF520	SR-20-17	LER75	81
SDAF22522	3 15/16	4 15/16	16 1/2	6 3/4	2 1/8	14 1/2	12 5/8	4	9 7/8	1 7/8	7 1/4	1 61/64	4 7/8	22222K	SNW-22	SDAF522	SR-22-19	LER93	94
SDAF22524	4 3/16	5 1/4	16 1/2	6 7/8	2 1/4	14 1/2	13 1/4	4 1/8	10 1/2	1 15/16	7 3/8	2 3/32	4 7/8	22224K	SNW-24	SDAF524	SR-24-20	LER113	137
SDAF22526	4 7/16	6	18 3/8	7 1/2	2 3/8	16	14 5/8	4 1/2	11 7/8	2 7/16	8	2 17/64	4 1	22226K	SNW-26	SDAF526	SR-26-0	LER117	159
SDAF22528	4 15/16	6	20 1/8	7 1/2	2 3/8	17 1/8	16	4 1/2	12 1/16	2 1/8	7 13/16	2 13/32	4 1 1/8	22228K	SNW-28	SDAF528	SR-28-0	LER122	189
SDAF22530	5 3/16	6 5/16	21 1/4	7 7/8	2 1/2	18 1/4	17	4 3/4	12 13/16	2 3/16	8 3/8	2 37/64	4 1 1/8	22230K	SNW-30	SDAF530	SR-30-0	LER125	225
SDAF22532	5 7/16	6 11/16	22	8 1/4	2 1/2	19 1/4	17 3/8	5	13 11/16	2 3/16	8 3/4	2 49/64	4 1 1/8	22232K	SNW-32	SDAF532	SR-32-0	LER130	300
SDAF22534	5 15/16	7 1/16	24 3/4	9	2 1/2	21 5/8	19 3/8	5 1/2	14 1/4	2 5/16	9 5/8	2 59/64	4 1 1/4	22234K	SNW-34	SDAF534	SR-34-0	LER140	310
SDAF22536	6 7/16	7 1/2	26 3/4	9 3/8	2 3/4	23 5/8	20 7/8	5 7/8	15 3/16	2 9/16	10	2 91/64	4 1 1/4	22236K	SNW-36	SDAF536	SR-36-30	LER148	350
SDAF22538	6 15/16	7 7/8	27 5/8	10	3	23 1/2	21 1/2	6 1/4	16 1/4	2 5/8	10 5/8	3 7/64	4 1 3/8	22238K	SNW-38	SDAF538	SR-38-32	LER224	420
SDAF22540	7 3/16	8 1/4	28 3/4	10 1/2	3 1/4	25	23	6 3/4	17 7/8	2 11/16	11 1/8	3 3/32	4 1 3/8	22240K	SNW-40	SDAF540	SR-40-34	LER228	545
SDAF22544	7 15/16	9 1/2	32	11 1/4	3 1/2	27 7/8	25 5/8	7 1/4	19 1/4	3 3/8	11 7/8	3 11/32	4 1 1/2	22244K	SNW-44	SDAF544	SR-44-36	LER236	665

<b>SERIES SDAF226</b>																			
SDAF22617	2 15/16	4 1/2	15 1/4	6	1 7/8	13 1/8	11 5/8	3 3/8	8 15/16	1 13/16	6 3/4	1 57/64	4 3/4	22317K	SNW-117	SDAF617	SR-20-17	LER59	94
SDAF22618	3 3/16	4 3/4	15 1/2	6 1/8	2	13 1/2	12	3 5/8	9 7/16	2	6 7/8	2 3/64	4 3/4	22318K	SNW-118	SDAF618	SR-21-18	LER69	137
SDAF22620	3 7/16	5 1/4	16 1/2	6 7/8	2 1/4	14 1/2	13 1/4	4 1/8	10 1/2	2 1/8	7 3/8	2 19/64	4 7/8	22320K	SNW-120	SDAF620	SR-24-20	LER75	159
SDAF22622	3 15/16	6	18 3/8	7 1/2	2 3/8	16	14 5/8	4 1/2	11 7/8	2 1/2	8	2 31/64	4 1	22322K	SNW-122	SDAF622	SR-0-22	LER93	189
SDAF22624	4 3/16	6 5/16	21 1/4	7 7/8	2 1/2	18 1/4	17	4 3/4	12 13/16	2 9/16	8 3/8	2 41/64	4 1 1/8	22324K	SNW-124	SDAF624	SR-0-24	LER113	225
SDAF22626	4 7/16	6 11/16	22	8 1/4	2 1/2	19 1/4	17 3/8	5	13 11/16	2 5/8	8 3/4	2 27/64	4 1 1/8	22326K	SNW-126	SDAF626	SR-0-26	LER117	300
SDAF22628	4 15/16	7 1/16	24 3/4	9	2 1/2	21 5/8	19 3/8	5 1/2	14 1/4	2 11/16	9 5/8	3 5/64	4 1 1/8	22328K	SNW-128	SDAF628	SR-0-28	LER122	310
SDAF22630	5 3/16	7 1/2	26 3/4	9 3/8	2 3/4	23 5/8	20 7/8	5 7/8	15 3/16	2 7/8	9 3/4	3 17/64	4 1 1/4	22330K	SNW-130	SDAF630	SR-36-30	LER125	395
SDAF22632	5 7/16	7 7/8	27 5/8	10	3	23 1/2	21 1/2	6 1/4	16 1/4	2 15/16	10 5/8	3 7/16	4 1 3/8	22332K	SNW-132	SDAF632	SR-38-32	LER211	420
SDAF22634	5 15/16	8 1/4	28 3/4	10 1/2	3 1/4	25	23	6 3/4	17 7/8	3 1/16	11 1/8	3 19/32	4 1 3/8	22334K	SNW-134	SDAF634	SR-40-34	LER215	525
SDAF22636	6 7/16	8 7/8	30 1/2	10 3/4	3 1/4	26 3/8	24 1/8	6 7/8	17 15/16	3 7/8	11 3/8	3 47/64	4 1 1/2	22336K	SNW-136	SDAF636	SR-0-36	LER220	645
SDAF22638	6 15/16	9 1/2	32	11 1/4	3 1/2	27 7/8	25 5/8	7 1/4	19 1/4	3 11/16	11 13/16	4 57/64	4 1 1/2	22338K	SNW-138	SDAF638	SR-44-38	LER224	705
SDAF22640	7 3/16	9 7/8	33 1/2	11 3/4	3 1/2	29 1/4	26 5/8	7 5/8	19 15/16	3 3/4	12 1/4	4 5/64	4 1 5/8	22340K	SNW-140	SDAF640	SR-0-40	LER228	825

<sup>(1)</sup> See page B395 for suggested shaft diameter S-1 tolerances.

<sup>(2)</sup> "Housing Only" includes: cap, base, cap bolts, triple ring seals and stabilizing rings as required.

<sup>(3)</sup> Stabilizing ring is used for fixed (FX) block; do not use for float (FL) mounting.

<sup>(4)</sup> Includes sleeve, locknut and lockwasher. Add shaft size to order.

**Note:** Limiting speeds are found in dimension tables in the spherical roller bearing section.

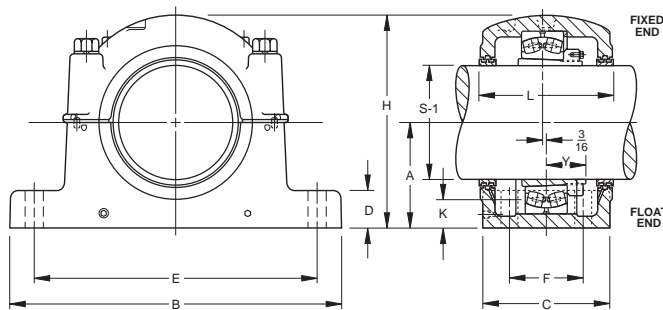




# SPHERICAL ROLLER BEARINGS

## TAPERED BORE MOUNTING SAF230K, SDAF230K SERIES

- Each assembly includes the housing cap and base, cap bolts, bearing, bearing adapter, locknut and washer, stabilizing ring and triple ring seals.
- If only the pillow block is desired, use the numbers listed in column "Housing Only". These units include: cap, base, cap bolts, triple ring seals and stabilizing ring.
- Assembly and pillow blocks as described on this page constitute fixed units.
- To order float units, specify part number plus suffix "Float" or "FL".
- All assemblies shown are furnished in cast iron. If cast steel is desired, add the letter "S" to the alpha prefix (e.g., SAF<sub>S</sub> 23024).
- Please note that for applications SAF23048 and larger, the shaft size must be included in the part description when ordering (e.g., SAF23048-8 <sup>15</sup>/<sub>16</sub>).



Two stabilizing rings are supplied with housings SAF048 through SAF056 and SDAF060K through SDAF076K. For fixed applications **both rings must be used. Do not use stabilizing rings for float mounting.**

Pillow Block Assembly	Standard Shaft <sup>(1)</sup> Dia. S-1	A	B	C	D	E		F	H	K	L	Y	4 Base Bolts Req'd. Size	Bearing Number	Adapter <sup>(4)</sup> Assembly Number	Housing Only <sup>(2)</sup>	Stabilizing Ring <sup>(3)</sup>	Triple Seal 2 Req'd	Ass'y Wt.		
		(Max.)	(Min.)	(Max.)	(Min.)	(Max.)	(Min.)	(Max.)	(Min.)	(Max.)	(Min.)	(Max.)								(Min.)	(Max.)
		in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.								lbs.

### SERIES SAF230K

SAF23024K	4 <sup>3</sup> / <sub>16</sub>	4 1/2	15 1/4	4 3/8	1 3/4	13 1/8	11 5/8	2 3/8	8 11/16	1 9/16	6	1 55/64	3/4	23024K	SNW-3024	SAF024K	SR-20-17	LER113	60
SAF23026K	4 7/16	4 15/16	16 1/2	4 3/4	2	14 1/2	12 5/8	2 3/4	9 9/16	1 11/16	6 3/8	2 1/2	3/4	23026K	SNW-3026	SAF026K	SR-22-19	LER117	76
SAF23028K	4 15/16	5 1/4	16 1/2	4 3/4	2 1/8	14 1/2	13 1/4	2 3/4	10 1/4	1 13/16	7 3/8	2 1/8	3/4	23028K	SNW-3028	SAF028K	SR- 0-20	LER122	90
SAF23030K	5 3/16	6	18 3/8	5 1/8	2 3/8	16	14 5/8	3 1/4	11 3/16	2 5/16	8	2 13/64	7/8	23030K	SNW-3030	SAF030K	SR- 0-21	LER125	125
SAF23032K	5 7/16	6	18 3/8	5 1/8	2 3/8	16	14 5/8	3 1/4	11 3/16	2 1/16	8	2 11/32	7/8	23032K	SNW-3032	SAF032K	SR- 0-22	LER130	132
SAF23034K	5 15/16	6	20 1/8	5 7/8	2 3/8	17 1/8	16	3 3/8	11 3/4	1 3/4	7 3/4	2 33/64	1	23034K	SNW-3034	SAF034K	SR- 0-24	LER140	154
SAF23036K	6 7/16	6 11/16	22	6 1/4	2 5/8	19 1/4	17 3/8	3 3/4	13 5/16	2 3/16	8 3/4	2 11/16	1	23036K	SNW-3036	SAF036K	SR- 0-26	LER148	212
SAF23038K	6 15/16	6 11/16	22	6 1/4	2 5/8	19 1/4	17 3/8	3 3/4	13 5/16	1 15/16	8 3/4	2 47/64	1	23038K	SNW-3038	SAF038K	SR-32- 0	LER155	220
SAF23040K	7 3/16	7 1/16	24 3/4	6 3/4	2 3/4	21 5/8	19 3/8	4 1/4	14 9/16	2 13/16	9 3/8	2 15/16	1	23040K	SNW-3040	SAF040K	SR-34- 0	LER159	295
SAF23044K	7 15/16	7 7/8	28	7 1/2	3 1/8	24 3/8	21 5/8	4 1/2	15 11/16	2 3/8	10 3/4	3 5/32	1 1/4	23044K	SNW-3044	SAF044K	SR-38-32	LER167	370
SAF23048K-8 <sup>7</sup> / <sub>16</sub>	8 7/16	8 1/4	29 1/2	8	3 3/8	25	22 1/2	5	17 3/16	2 1/4	11 1/8	3 17/32	1 1/4	23048K	SNP-3048-8 <sup>7</sup> / <sub>16</sub>	SAF048K-8 <sup>7</sup> / <sub>16</sub>	A8897	LER526	430
SAF23048K-8 1/2	8 1/2	8 1/4	29 1/2	8	3 3/8	25	22 1/2	5	17 3/16	2 1/4	11 1/8	3 17/32	1 1/4	23048K	SNP-3048-8 1/2	SAF048K-8 1/2	A8897	LER527	428
SAF23048K-8 15/16	8 15/16	8 1/4	29 1/2	8	3 3/8	25	22 1/2	5	17 3/16	2 1/4	11 1/8	3 17/32	1 1/4	23048K	SNP-3048-8 15/16	SAF048K-8 15/16	A8897	LER529	422
SAF23048K-9	9	8 1/4	29 1/2	8	3 3/8	25	22 1/2	5	17 3/16	2 1/4	11 1/8	3 17/32	1 1/4	23048K	SNP-3048-9	SAF048K-9	A8897	LER530	420
SAF23052K-9 <sup>7</sup> / <sub>16</sub>	9 7/16	9 1/2	32 3/4	8 3/4	3 3/4	27 7/8	24 3/4	5 1/4	19 7/16	2 15/16	11 7/8	3 53/64	1 1/2	23052K	SNP-3052-9 <sup>7</sup> / <sub>16</sub>	SAF052K-9 <sup>7</sup> / <sub>16</sub>	A8898	LER178-1	587
SAF23052K-9 1/2	9 1/2	9 1/2	32 3/4	8 3/4	3 3/4	27 7/8	24 3/4	5 1/4	19 7/16	2 15/16	11 7/8	3 53/64	1 1/2	23052K	SNP-3052-9 1/2	SAF052K-9 1/2	A8898	LER178	585
SAF23056K-9 15/16	9 15/16	9 7/8	34 1/4	9	4	29 1/2	26 1/4	5 1/2	20 3/16	2 15/16	12 1/16	3 61/64	1 1/2	23056K	SNP-3056-9 15/16	SAF056K-9 15/16	A8819	ER751	640
SAF23056K-10	10	9 7/8	34 1/4	9	4	29 1/2	26 1/4	5 1/2	20 3/16	2 15/16	12 1/16	3 61/64	1 1/2	23056K	SNP-3056-10	SAF056K-10	A8819	ER705	635
SAF23056K-10 <sup>7</sup> / <sub>16</sub>	10 7/16	9 7/8	34 1/4	9	4	29 1/2	26 1/4	5 1/2	20 3/16	2 15/16	12 1/16	3 61/64	1 1/2	23056K	SNP-3056-10 <sup>7</sup> / <sub>16</sub>	SAF056K-10 <sup>7</sup> / <sub>16</sub>	A8819	ER745	625
SAF23056K-10 1/2	10 1/2	9 7/8	34 1/4	9	4	29 1/2	26 1/4	5 1/2	20 3/16	2 15/16	12 1/16	3 61/64	1 1/2	23056K	SNP-3056-10 1/2	SAF056K-10 1/2	A8819	ER710	620

### SERIES SDAF230K

SDAF23060K-10 <sup>15</sup> / <sub>16</sub>	10 15/16	12	38 1/4	14 3/4	3 1/2	33 1/2	32 3/4	9	23 7/16	4 7/16	15 1/2	4 9/32	1 5/8	23060K	SNP-3060-10 <sup>15</sup> / <sub>16</sub>	SDAF060K-10 <sup>15</sup> / <sub>16</sub>	A8967	ER858	1175
SDAF23060K-11	11	12	38 1/4	14 3/4	3 1/2	33 1/2	32 3/4	9	23 7/16	4 7/16	15 1/2	4 9/32	1 5/8	23060K	SNP-3060-11	SDAF060K-11	A8967	ER825	1174
SDAF23064K-11 <sup>7</sup> / <sub>16</sub>	11 7/16	12	38 1/4	14 3/4	3 1/2	33 1/2	32 3/4	9	23 7/16	4 1/16	15 1/2	4 7/16	1 5/8	23064K	SNP-3064-11 <sup>7</sup> / <sub>16</sub>	SDAF064K-11 <sup>7</sup> / <sub>16</sub>	A8968	ER861	1275
SDAF23064K-11 1/2	11 1/2	12	38 1/4	14 3/4	3 1/2	33 1/2	32 3/4	9	23 7/16	4 1/16	15 1/2	4 7/16	1 5/8	23064K	SNP-3064-11 1/2	SDAF064K-11 1/2	A8968	ER832	1274
SDAF23064K-11 <sup>15</sup> / <sub>16</sub>	11 15/16	12	38 1/4	14 3/4	3 1/2	33 1/2	32 3/4	9	23 7/16	4 1/16	15 1/2	4 7/16	1 5/8	23064K	SNP-3064-11 <sup>15</sup> / <sub>16</sub>	SDAF064K-11 <sup>15</sup> / <sub>16</sub>	A8968	ER859	1269
SDAF23064K-12	12	12	38 1/4	14 3/4	3 1/2	33 1/2	32 3/4	9	23 7/16	4 1/16	15 1/2	4 7/16	1 5/8	23064K	SNP-3064-12	SDAF064K-12	A8968	ER818	1268
SDAF23068K-12 <sup>7</sup> / <sub>16</sub>	12 7/16	12	39	15 1/4	4 3/16	33 1/2	32	10	24	3 7/16	15 3/4	4 13/16	1 7/8	23068K	SNP-3068-12 <sup>7</sup> / <sub>16</sub>	SDAF068K-12 <sup>7</sup> / <sub>16</sub>	A8969	ER865	1553
SDAF23068K-12 1/2	12 1/2	12	39	15 1/4	4 3/16	33 1/2	32	10	24	3 7/16	15 3/4	4 13/16	1 7/8	23068K	SNP-3068-12 1/2	SDAF068K-12 1/2	A8969	ER866	1552
SDAF23072K-12 <sup>15</sup> / <sub>16</sub>	12 15/16	12 13/16	41 3/4	15 3/4	4 1/2	36 1/2	35	10 1/2	26	3 7/8	16 1/4	4 53/64	1 7/8	23072K	SNP-3072-12 <sup>15</sup> / <sub>16</sub>	SDAF072K-12 <sup>15</sup> / <sub>16</sub>	A8970	ER869	1632
SDAF23072K-13	13	12 13/16	41 3/4	15 3/4	4 1/2	36 1/2	35	10 1/2	26	3 7/8	16 1/4	4 53/64	1 7/8	23072K	SNP-3072-13	SDAF072K-13	A8970	ER846	1630
SDAF23072K-13 <sup>7</sup> / <sub>16</sub>	13 7/16	12 13/16	41 3/4	15 3/4	4 1/2	36 1/2	35	10 1/2	26	3 7/8	16 1/4	4 53/64	1 7/8	23072K	SNP-3072-13 <sup>7</sup> / <sub>16</sub>	SDAF072K-13 <sup>7</sup> / <sub>16</sub>	A8970	ER872	1614
SDAF23072K-13 1/2	13 1/2	12 13/16	41 3/4	15 3/4	4 1/2	36 1/2	35	10 1/2	26	3 7/8	16 1/4	4 53/64	1 7/8	23072K	SNP-3072-13 1/2	SDAF072K-13 1/2	A8970	ER823	1610
SDAF23076K-13 <sup>15</sup> / <sub>16</sub>	13 15/16	12 13/16	41 3/4	15 3/4	4 1/2	36 1/2	35	10 1/2	26	3 7/16	16 1/4	5 1/16	1 7/8	23076K	SNP-3076-13 <sup>15</sup> / <sub>16</sub>	SDAF076K-13 <sup>15</sup> / <sub>16</sub>	A8971	ER875	1687
SDAF23076K-14	14	12 13/16	41 3/4	15 3/4	4 1/2	36 1/2	35	10 1/2	26	3 7/16	16 1/4	5 1/16	1 7/8	23076K	SNP-3076-14	SDAF076K-14	A8971	ER876	1685
SDAF23080K-15	15	14 1/2	46	17 1/8	5 1/4	40 3/4	39 1/4	11	29	4 7/16	17 5/8	5 17/32	4,2	23080K	SNP-3080-15	SDAF080K-15	1A8974	ER847	2300
SDAF23084K-15 3/4	15 3/4	14 1/2	46	17 1/8	5 1/4	40 3/4	39 1/4	11	29	4 1/16	17 5/8	5 9/16	4,2	23087K	SNP-3084-15 3/4	SDAF084K-15 3/4	1A8978	ER885	2300
SDAF23088K-16 1/2	16 1/2	15 1/2	48 3/4	18 3/4	5 1/2	43 1/2	41 3/4	12 1/4	30 1/2	4 1/2	19 1/4	5 3/4	4,2 1/4	23088AK	SNP-3088-16 1/2	SDAF088K-16 1/2	2A8979	ER958	2550
SDAF23092K-17	17	15 1/2	48 3/4	18 3/4	5 1/2	43 1/2	41 3/4	12 1/4	30 1/2	4	19 1/4	5 7/8	4,2 1/4	23082K	SNP-3092-17	SDAF092K-17	2A8980	ER838	2850
SDAF23096K-18	18	17	53	21	5 1/2	46 1/8	44 3/8	14 1/2	33 3/4	5 1/8	21 3/4	5 29/32	4,2 1/4	23096K	SNP-3096-18	SDAF096K-18	2A8984	ER888	4250
SDAF230/530K-18 1/2	18 1/2	17	53	21	5 1/2	46 1/8	44 3/8	14 1/2	33 3/4	4 3/4	21 3/4	6 1/2	4,2 1/4	230/500K	SNP-30-500-18 1/2	SDAF30-500K-18 1/2	2A8976	ER978	4350
SDAF230/530K-19 1/2	19 1/2	18	54 1/4	21 5/8	5 3/4	48 7/8	47 1/8	15	35 3/4	4 13/16	22 1/4	6 27/32	4,2 1/2	230/530/K	SNP-30-530-19 1/2	SDAF30-530K-19 1/2		ER926	5200

(1) See page B395 for suggested shaft diameter S-1 tolerances.

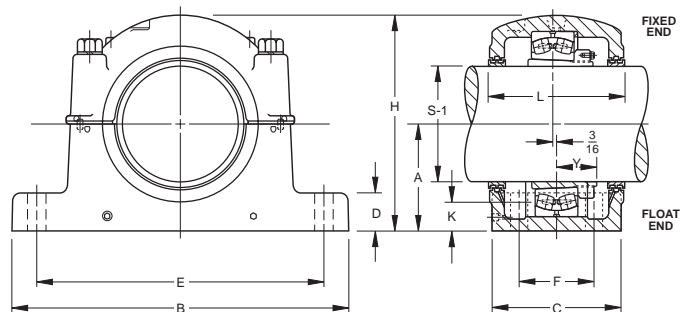
(2) "Housing Only" includes: cap, base, cap bolts, triple ring seals and stabilizing rings as required.

(3) Stabilizing ring is used for fixed (FX) block; do not use for float (FL) mounting.

(4) Includes sleeve, locknut, lockwasher or lockplate. Add shaft size to order.

**TAPERED BORE MOUNTING**  
**SDAF231K AND SDAF232K SERIES**

- Each assembly includes the housing cap and base, cap bolts, bearing, bearing adapter, locknut and washer, stabilizing ring and triple ring seals.
- To order pillow block housing only, use the numbers listed in the "Housing Only" column. These units include: cap, base, cap bolts, triple ring seals and stabilizing ring.
- Assembly and pillow blocks described on this page constitute fixed units.
- To order float units, specify part number plus suffix "Float" or "FL".
- All assemblies shown are furnished in cast iron. If cast steel is desired, add the letter "S" to the alpha prefix (e.g., SDAFS 23152K).



Pillow Block Assembly	Standard Shaft <sup>(1)</sup> Dia. S-1	A	B	C	D	E		F	H	K	L	4 Base Bolts Req'd. Size	Bearing Number	Adapter <sup>(4)</sup> Assembly Number	Housing <sup>(2)</sup> Only	Stabi- lizing <sup>(3)</sup> 2 Req'd	Triple Seal Ring 2 Req'd	Ass'y Wt.
		in.	in.	in.	in.	(Max.)	(Min.)	in.	in.	in.	in.							

**SERIES SDAF231K**

SDAF23152K	9 7/16	10 1/4	35	13 1/8	3 3/4	30 1/2	29	8 3/4	20 7/8	3 3/8	13 3/4	1 5/8	23152K	SNP-3152	SDAF3152K	A5679	ER891	1050
SDAF23156K	10 7/16	12	38 1/4	14 3/4	3 3/8	33 1/2	32 3/4	9	23 7/16	4 3/4	15 3/8	1 5/8	23156K	SNP-3156	SDAF3156K	A8967	ER973	1300
SDAF23160K	10 15/16	12	38 1/4	14 3/4	3 3/8	33 1/2	32 3/4	9	23 7/16	4 1/8	15 3/8	1 5/8	23160K	SNP-3160	SDAF3160K	A8975	ER858	1350
SDAF23164K	11 15/16	12 13/16	41 3/4	15 3/4	4 1/2	36 1/2	35	10 1/2	25 3/4	4 3/8	16 1/4	1 7/8	23164K	SNP-3164	SDAF3164K	A8970	ER942	1900
SDAF23168K	12 7/16	14	43 3/4	17 3/4	5	38 1/4	36 3/4	10 3/4	27 7/8	4 15/16	18 1/4	2	23168K	SNP-3168	SDAF3168K	A8977	ER975	2550
SDAF23172K	13 7/16	14 1/2	46	17 1/8	5 1/4	40 3/4	39 1/4	11	28 7/8	5	17 3/4	2	23172K	SNP-3172	SDAF3172K	A8974	ER872	2600
SDAF23176K	13 15/16	14 1/2	46	17 1/8	5 1/4	40 3/4	39 1/4	11	28 7/8	4 5/8	17 3/4	2	23176K	SNP-3176	SDAF3176K	A8978	ER875	2600
SDAF23180K	15	15 1/2	48 3/4	18 3/4	5 1/2	43 1/2	41 3/4	12 1/4	30 1/2	5 1/8	19 1/4	2 1/4	23180K	SNP-3180	SDAF3180K	A8979	ER847	3000
SDAF23184K	15 3/4	17	52	21	5 1/2	46 1/8	44 3/8	14 1/2	33 3/4	6	21 3/4	2 1/4	23184K	SNP-3184	SDAF3184K	A8984	ER914	4400
SDAF23188K	16 1/2	17	52	21	5 1/2	46 1/8	44 3/8	14 1/2	33 3/4	5 9/16	21 3/4	2 1/4	23188K	SNP-3188	SDAF3188K	A8976	ER947	4600
SDAF23192K	17	18	54 1/4	21 5/8	5 3/4	48 7/8	47 1/8	15	35 3/4	6	22 1/4	2 1/2	23192K	SNP-3192	SDAF3192K	A8990	ER838	5100
SDAF23196K	18	18	54 1/4	21 5/8	5 3/4	48 7/8	47 1/8	15	35 3/4	5 1/2	22 1/4	2 1/2	23196K	SNP-3196	SDAF3196K	A8998	ER954	5200

**SERIES SDAF232K**

SDAF23248K	8 15/16	10 1/4	35	13 1/8	3 3/4	30 1/2	29	8 3/4	20 7/8	3 9/16	13 3/4	1 5/8	23248K	SNP-148	SDAF3248K	A5679	ER939	1100
SDAF23252K	9 7/16	12	38 1/4	14 3/4	3 3/8	33 1/2	32 3/4	9	23 7/16	4 3/4	15 3/8	1 5/8	23252K	SNP-152	SDAF3252K	A8968	ER891	1400
SDAF23256K	10 7/16	12	38 1/4	14 3/4	3 3/8	33 1/2	32 3/4	9	23 7/16	4 3/8	15 3/8	1 5/8	23256K	SNP-3256	SDAF3256K	A8975	ER973	1400
SDAF23260K	10 15/16	12 13/16	41 3/4	15 3/4	4 1/2	36 1/2	35	10 1/2	25 3/4	4 1/2	16 1/4	1 7/8	23260K	SNP-3260	SDAF3260K	A8970	ER941	1900
SDAF23264K	11 15/16	14	43 3/4	17 3/4	5	38 1/4	36 3/4	10 3/4	27 7/8	5 1/8	18 1/4	2	23264K	SNP-3264	SDAF3264K	A8977	ER942	2600
SDAF23268K	12 7/16	14 1/2	46	17 1/8	5 1/4	40 3/4	39 1/4	11	28 7/8	5	17 3/4	2	23268K	SNP-3268	SDAF3268K	A8978	ER944	2700
SDAF23272K	13 7/16	15 1/2	48 3/4	18 3/4	5 1/2	43 1/2	41 3/4	12 1/4	30 1/2	5 1/2	19 1/4	2 1/4	23272K	SNP-3272	SDAF3272K	A8979	ER872	3050
SDAF23276K	13 15/16	15 1/2	48 3/4	18 3/4	5 1/2	43 1/2	41 3/4	12 1/4	30 1/2	4 3/8	19 1/4	2 1/4	23276K	SNP-3276	SDAF3276K	A8980	ER875	3000
SDAF23280K	14 15/16	17	52	21	5 1/2	46 1/8	44 3/8	14 1/2	33 3/4	6	21 3/4	2 1/4	23280K	SNP-3280	SDAF3280K	A8976	ER976	4650
SDAF23284K	15 3/4	18	54 1/4	21 5/8	5 3/4	48 7/8	47 1/8	15	35 3/4	6 3/8	22 1/4	2 1/2	23284K	SNP-3284	SDAF3284K	A8990	ER951	4900
SDAF23288K	16 1/2	18	54 1/4	21 5/8	5 3/4	48 7/8	47 1/8	15	35 3/4	5 7/8	22 1/4	2 1/2	23288K	SNP-3288	SDAF3288K	A8988	ER952	5200

<sup>(1)</sup> See page B395 for suggested shaft diameter S-1 tolerances.

<sup>(2)</sup> "Housing Only" includes: cap, base, cap bolts, triple ring seals and stabilizing rings as required. Add shaft size to order.

<sup>(3)</sup> Stabilizing ring is used for fixed (FX) block; do not use for float (FL) mounting.

<sup>(4)</sup> Includes sleeve, locknut and lockwasher. Add shaft size to order.

**Note:** Limiting speeds are found in dimension tables in the spherical roller bearing section.

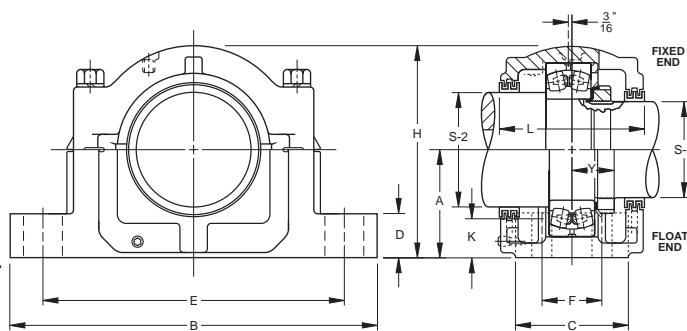






## STRAIGHT BORE MOUNTING SAF222 AND SAF223 SERIES

- Each assembly includes the housing cap and base, cap bolts, bearing, locknut and washer, stabilizing ring and triple ring seals.
- To order pillow block housing only, use the numbers listed in "Housing Only" column. These units include: cap, base, cap bolts, triple ring seals and stabilizing ring.
- Assembly and pillow blocks described on this page constitute fixed units.
- To order float units, specify part number plus suffix "Float" or "FL".
- All assemblies shown are furnished in cast iron. If cast steel is desired, add the letter "S" to the alpha prefix (e.g., SAFS 22217).
- Four-bolt bases are standard on all assemblies, except as noted.



Pillow Block Assembly	Standard Shaft <sup>(1)</sup> Dia.		A	B	C	D	E		F	H	K	L	Y	Base Bolts Required	Bearing Number	Lock Nut	Lock Washer	Housing <sup>(2)</sup> Only Ring	Stabilizing <sup>(3)</sup> 1 Req'd	Triple Seal S-2	Triple Seal S-3	Ass'y Wt.
	S-2	S-3					(Max.)	(Min.)														

### SERIES SAF222

SAF22217	3 15/16	3 3/16	3 3/4	13	3 1/2	1 1/4	11	9 7/8	—	7 1/4	1 7/16	4 15/16	1 27/64	2	3/4	22217	AN17	W17	SAF217	SR-17-14	LER89	LER63	43
FSAF22217	3 15/16	3 3/16	3 3/4	13	3 1/2	1 1/4	11	9 7/8	2 1/8	7 1/4	1 7/16	4 15/16	1 27/64	4	5/8	22217	AN17	W17	FSAF217	SR-17-14	LER89	LER63	43
SAF22218	4 1/8	3 3/8	4	13 3/4	3 7/8	1 1/2	11 5/8	10 3/8	—	7 3/4	1 17/32	6 1/4	1 37/64	2	3/4	22218	AN18	W18	SAF218	SR-18-15	LER96	LER72	50
FSAF22218	4 1/8	3 3/8	4	13 3/4	3 7/8	1 1/2	11 5/8	10 3/8	2 1/8	7 3/4	1 17/32	6 1/4	1 37/64	4	5/8	22218	AN18	W18	FSAF218	SR-18-15	LER96	LER72	50
SAF22220	4 1/2	3 13/16	4 1/2	15 1/4	4 3/8	1 3/4	13 1/8	11 5/8	—	8 11/16	1 3/4	6	1 49/64	2	7/8	22220	AN20	W20	SAF220	SR-20-17	LER118	LER106	71
FSAF22220	4 1/2	3 13/16	4 1/2	15 1/4	4 3/8	1 3/4	13 1/8	11 5/8	2 3/8	8 11/16	1 3/4	6	1 49/64	4	3/4	22220	AN20	W20	FSAF220	SR-20-17	LER118	LER106	71
SAF22222	4 7/8	4 3/16	4 15/16	16 1/2	4 3/4	2	14 1/2	12 5/8	2 3/4	9 9/16	1 7/8	6 3/8	1 61/64	4	3/4	22222	AN22	W22	SAF222	SR-22-19	LER121	LER113	81
SAF22224	5 9/16	4 9/16	5 1/4	16 1/2	4 3/4	2 1/8	14 1/2	13 1/4	2 3/4	10 1/4	1 15/16	7 3/8	2 3/32	4	3/4	22224	AN24	W24	SAF224	SR-24-20	LER127	LER119	90
SAF22226	5 7/8	4 15/16	6	18 3/8	5 1/8	2 3/8	16	14 5/8	3 1/4	11 9/16	2 7/16	8	2 17/64	4	7/8	22226	AN26	W26	SAF226	SR-26-0	LER136	LER122	127
SAF22228	6 1/4	5 5/16	6	20 1/8	5 7/8	2 3/8	17 1/8	16	3 3/8	11 3/4	2 1/8	7 3/4	2 13/32	4	1	22228	AN28	W28	SAF228	SR-28-0	LER144	LER127	149
SAF22230	6 5/8	5 3/4	6 5/16	21 1/4	6 1/4	2 1/2	18 1/4	17	3 3/4	12 1/2	2 3/16	8 3/8	2 37/64	4	1	22230	AN30	W30	SAF230	SR-30-0	LER151	LER134	175
SAF22232	7	6 1/16	6 11/16	22	6 1/4	2 5/8	19 1/4	17 3/8	3 3/4	13 5/16	2 3/16	8 3/4	2 49/64	4	1	22232	AN32	W32	SAF232	SR-32-0	LER156	LER142	210
SAF22234	7 7/16	6 7/16	7 1/16	24 3/4	6 3/4	2 3/4	21 5/8	19 3/8	4 1/4	14 9/16	2 5/16	9 3/8	2 59/64	4	1	22234	AN34	W34	SAF234	SR-34-0	LER161	LER148	280
SAF22236	7 13/16	6 7/8	7 1/16	26 3/4	7 1/8	3	23 5/8	20 7/8	4 5/8	15 1/2	2 9/16	9 11/16	2 61/64	4	1	22236	AN36	W36	SAF236	SR-36-0	LER165	LER154	305
SAF22238	8 3/8	7 1/4	7 7/8	28	7 1/2	3 1/8	24 3/8	21 5/8	4 1/2	15 11/16	2 5/8	10 3/4	3 7/64	4	1 1/4	22238	AN38	W38	SAF238	SR-38-32	LER171	LER160	350
SAF22240	8 3/4	7 5/8	8 1/4	29 1/2	8	3 3/8	25	22 1/2	5	17 3/16	2 11/16	10 13/16	3 9/32	4	1 1/4	22240	AN40	W40	SAF240	SR-40-34	LER175	LER164	420
SAF22244	9 9/16	8 5/16	9 1/2	32 3/4	8 3/4	3 3/4	27 7/8	24 3/4	5 1/4	19 5/8	3 3/8	11 1/2	3 17/32	4	1 1/2	22244	N44	W44	SAF244	SR-44-38	LER179	LER170	590

### SERIES SAF223

SAF22317	3 15/16	3 3/16	4 1/2	15 1/4	4 3/8	1 3/4	13 1/8	11 5/8	—	8 11/16	1 13/16	6	1 57/64	2	7/8	22317	AN17	W17	SAF317	SR-20-17	LER109	LER188	80
FSAF22317	3 15/16	3 3/16	4 1/2	15 1/4	4 3/8	1 3/4	13 1/8	11 5/8	2 3/8	8 11/16	1 13/16	6	1 57/64	4	3/4	22317	AN17	W17	FSAF317	SR-20-17	LER109	LER188	80
SAF22318	4 1/8	3 3/8	4 3/4	15 1/2	4 3/8	2	13 1/2	12	2 1/4	9 9/16	2	7	2 3/64	4	3/4	22318	AN18	W18	FSAF318	SR-21-18	LER112	LER191	92
SAF22320	4 1/2	3 13/16	5 1/4	16 1/2	4 3/4	2 1/8	14 1/2	13 1/4	2 3/4	10 1/4	2 1/8	7 3/8	2 19/64	4	3/4	22320	AN20	W20	SAF320	SR-24-20	LER118	LER106	109
SAF22322	4 7/8	4 3/16	6	18 3/8	5 1/8	2 3/8	16	14 5/8	3 1/4	11 9/16	2 1/2	8	2 31/64	4	7/8	22322	AN22	W22	SAF322	SR-0-22	LER121	LER113	145
SAF22324	5 9/16	4 9/16	6 5/16	21 1/4	6 1/4	2 1/2	18 1/4	17	3 3/4	12 1/2	2 9/16	8 3/8	2 41/64	4	1	22324	AN24	W24	SAF324	SR-0-24	LER127	LER119	195
SAF22326	5 7/8	4 15/16	6 11/16	22	6 1/4	2 5/8	19 1/4	17 3/8	3 3/4	13 15/16	2 5/8	8 3/4	2 27/32	4	1	22326	AN26	W26	SAF326	SR-0-26	LER136	LER122	235
SAF22328	6 1/4	5 9/16	7 1/16	24 3/4	6 3/4	2 3/4	21 5/8	19 3/8	4 1/4	14 9/16	2 11/16	9 3/8	3 5/64	4	1	22328	AN28	W28	SAF328	SR-0-28	LER144	LER127	300
SAF22330	6 5/8	5 3/4	7 1/2	26 3/4	7 1/8	3	23 5/8	20 7/8	4 5/8	15 1/2	2 7/8	9 11/16	3 17/64	4	1	22330	AN30	W30	SAF330	SR-36-30	LER151	LER134	335
SAF22332	7	6 1/16	7 7/8	28	7 1/2	3 1/8	24 3/8	21 5/8	4 1/2	15 11/16	2 15/16	10 3/4	3 7/16	4	1 1/4	22332	AN32	W32	SAF332	SR-38-32	LER156	LER142	405
SAF22334	7 7/16	6 7/16	8 1/4	29 1/2	8	3 3/8	25	22 1/2	5	17 3/16	3 1/16	10 13/16	3 19/32	4	1 1/4	22334	AN34	W34	SAF334	SR-40-34	LER161	LER148	465
SAF22336	7 13/16	6 7/8	8 7/8	31 1/4	8 3/4	3 1/2	26 5/8	24	5 1/4	18 1/2	3 3/8	11 1/4	3 47/64	4	1 1/4	22336	AN36	W36	SAF336	SR-0-36	LER165	LER154	525
SAF22338	8 3/8	7 1/4	9 1/2	32 3/4	8 3/4	3 3/4	27 7/8	24 3/4	5 1/4	19 5/8	3 11/16	11 1/2	3 57/64	4	1 1/2	22338	AN38	W38	SAF338	SR-44-38	LER171	LER160	635
SAF22340	8 3/4	7 5/8	9 7/8	34 1/4	9	4	29 1/2	26 1/4	5 1/2	20 3/16	3 3/4	12 1/4	4 5/64	4	1 1/2	22340	AN40	W40	SAF340	SR-0-40	LER175	LER164	700

(1) See page B395 for suggested shaft diameter S-2, S-3 tolerances.

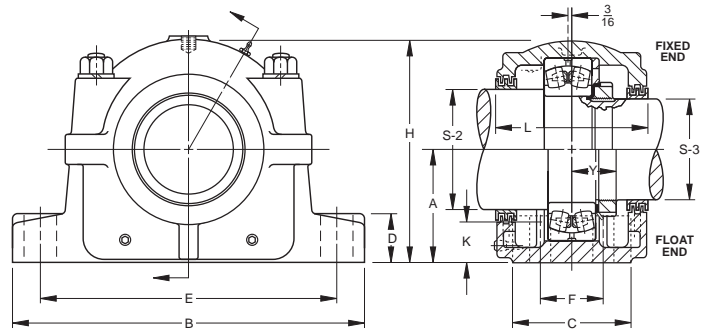
(2) "Housing Only" includes: cap, base, cap bolts, triple ring seals and stabilizing rings as required.

(3) Stabilizing ring is used for fixed (FX) block; do not use for float (FL) mounting.

**Note:** Limiting speeds are found in dimension tables in the spherical roller bearing section.

**STRAIGHT BORE MOUNTING**  
**SDAF222 AND SDAF223 SERIES**

- Each assembly includes the housing cap and base, cap bolts, bearing, locknut and washer, stabilizing ring, and triple ring seals.
- To order pillow block housing only, use the numbers listed in the "Housing Only" column. These units include: cap, base, cap bolts, triple ring seals and stabilizing ring.
- Assembly and pillow blocks described on this page constitute fixed units.
- To order float units, specify part number plus suffix "float" or "FL".
- All assemblies shown are furnished in cast iron. If cast steel is desired, add the letter "S" to the alpha prefix (e.g., SDA<sub>S</sub> 22220).



Pillow Block Assembly	Standard Shaft <sup>(1)</sup> Dia.		A	B	C	D	E		F	H	K	L	Y	Base Bolts Required	Bearing Number	Lock Nut	Lock Washer	Housing <sup>(2)</sup> Only Ring	Stabilizing <sup>(3)</sup> 1 Req'd	Triple Seal 1 Req'd	Triple Seal S-2	Triple Seal S-3	Ass'y Wt.
	S-2	S-3					(Max.)	(Min.)															

**SERIES SDAF222**

SDAF22220	4 1/2	3 13/16	4 1/2	15 1/4	6	1 7/8	13 1/8	11 5/8	3 3/8	8 15/16	1 3/4	6 3/4	1 49/64	4	3/4	22220	AN20	W20	SDAF220	SR-20-17	LER118	LER106	81
SDAF22222	4 7/8	4 3/16	4 15/16	16 1/2	6 3/4	2 1/8	14 1/2	12 5/8	4	9 7/8	1 7/8	7 1/4	1 61/64	4	7/8	22222	AN22	W22	SDAF222	SR-22-19	LER121	LER113	109
SDAF22224	5 5/16	4 9/16	5 1/4	16 1/2	6 7/8	2 1/4	14 1/2	13 1/4	4 1/8	10 1/2	1 15/16	7 3/8	2 3/32	4	7/8	22224	AN24	W24	SDAF224	SR-24-20	LER127	LER119	113
SDAF22226	5 7/8	4 15/16	6	18 3/8	7 1/2	2 3/8	16	14 5/8	4 1/2	11 7/8	2 7/16	8	2 17/64	4	1	22226	AN26	W26	SDAF226	SR-26-0	LER136	LER122	151
SDAF22228	6 1/4	5 5/16	6	20 1/8	7 1/2	2 3/8	17 1/8	16	4 1/2	12 1/16	2 1/8	7 13/16	2 13/32	4	1	22228	AN28	W28	SDAF228	SR-28-0	LER144	LER127	175
SDAF22230	6 5/8	5 3/4	6 5/16	21 1/4	7 7/8	2 1/2	18 1/4	17	4 3/4	12 13/16	2 3/16	8 3/8	2 37/64	4	1 1/8	22230	AN30	W30	SDAF230	SR-30-0	LER151	LER134	201
SDAF22232	7	6 1/16	6 11/16	22	8 1/4	2 1/2	19 1/4	17 3/8	5	13 11/16	2 3/16	8 3/4	2 49/64	4	1 1/8	22232	AN32	W32	SDAF232	SR-32-0	LER156	LER142	245
SDAF22234	7 7/16	6 7/16	7 1/16	24 3/4	9	2 1/2	21 5/8	19 3/8	5 1/2	14 1/4	2 5/16	9 5/8	2 59/64	4	1 1/4	22234	AN34	W34	SDAF234	SR-34-0	LER161	LER148	300
SDAF22236	7 13/16	6 7/8	7 1/2	26 3/4	9 3/8	2 3/4	23 5/8	20 7/8	5 7/8	15 3/16	2 9/16	10	2 61/64	4	1 1/4	22236	AN36	W36	SDAF236	SR-36-30	LER165	LER154	335
SDAF22238	8 3/8	7 1/4	7 7/8	27 5/8	10	3	23 1/2	21 1/2	6 1/4	16 1/4	2 5/8	10 5/8	3 7/64	4	1 3/8	22238	AN38	W38	SDAF238	SR-38-32	LER240	LER229	405
SDAF22240	8 3/4	7 5/8	8 1/4	28 3/4	10 1/2	3 1/4	25	23	6 3/4	17 1/8	2 11/16	11 1/8	3 3/32	4	1 3/8	22240	AN40	W40	SDAF240	SR-40-34	LER244	LER233	465
SDAF22244	9 9/16	8 5/16	9 1/2	32	11 1/4	3 1/2	27 7/8	25 5/8	7 1/4	19 1/4	3 3/8	11 7/8	3 17/32	4	1 1/2	22244	N44	W44	SDAF240	SR-44-38	LER248	LER239	650

**SERIES SDAF223**

SDAF22317	3 15/16	3 3/16	4 1/2	15 1/4	6	1 7/8	13 1/8	11 5/8	3 3/8	8 15/16	1 3/16	6 3/4	1 57/64	4	3/4	22317	AN17	W17	SDAF317	SR-20-17	LER109	LER188	80
SDAF22318	4 1/8	3 3/8	4 3/4	15 1/2	6 1/8	2	13 1/2	12	3 5/8	9 7/16	2	6 7/8	2 3/64	4	3/4	22318	AN18	W18	SDAF318	SR-21-18	LER112	LER191	92
SDAF22320	4 1/2	3 13/16	5 1/4	16 1/2	6 7/8	2 1/4	14 1/2	13 1/4	4 1/8	10 1/2	2 1/8	7 3/8	2 19/64	4	7/8	22320	AN20	W20	SDAF320	SR-24-20	LER118	LER106	109
SDAF22322	4 7/8	4 3/16	6	18 3/8	7 1/2	2 3/8	16	14 5/8	4 1/2	11 7/8	2 1/2	8	2 31/64	4	1	22322	AN22	W22	SDAF322	SR-0-22	LER121	LER113	145
SDAF22324	5 5/16	4 9/16	6 5/16	21 1/4	7 7/8	2 1/2	18 1/4	17	4 3/4	12 13/16	2 9/16	8 3/8	2 41/64	4	1 1/8	22324	AN24	W24	SDAF324	SR-0-24	LER127	LER119	195
SDAF22326	5 7/8	4 15/16	6 11/16	22	8 1/4	2 1/2	19 1/4	17 3/8	5	13 11/16	2 5/8	8 3/4	2 27/64	4	1 1/8	22326	AN26	W26	SDAF326	SR-0-26	LER136	LER122	280
SDAF22328	6 1/4	5 5/16	7 1/16	24 3/4	9	2 1/2	21 5/8	19 3/8	5 1/2	14 1/4	2 11/16	9 5/8	3 5/64	4	1 1/4	22328	AN28	W28	SDAF328	SR-0-28	LER144	LER127	305
SDAF22330	6 5/8	5 3/4	7 1/2	26 3/4	9 3/8	2 3/4	23 5/8	20 7/8	5 7/8	15 3/16	2 7/8	9 3/4	3 17/64	4	1 1/4	22330	AN30	W30	SDAF330	SR-36-30	LER151	LER134	375
SDAF22332	7	6 1/16	7 7/8	27 5/8	10	3	23 1/2	21 1/2	6 1/4	16 1/4	2 15/16	10 5/8	3 7/16	4	1 3/8	22332	AN32	W32	SDAF332	SR-38-32	LER225	LER217	445
SDAF22334	7 7/16	6 7/16	8 1/4	28 3/4	10 1/2	3 1/4	25	23	6 3/4	17 1/8	3 1/16	11 1/8	3 19/32	4	1 3/8	22334	AN34	W34	SDAF334	SR-40-34	LER230	LER220	525
SDAF22336	7 13/16	6 7/8	8 7/8	30 1/2	10 3/4	3 1/4	26 3/8	24 1/8	6 7/8	17 15/16	3 3/8	11 3/8	3 47/64	4	1 1/2	22336	AN36	W36	SDAF336	SR-0-36	LER234	LER223	635
SDAF22338	8 3/8	7 1/4	9 1/2	32	11 1/4	3 1/2	27 7/8	25 5/8	7 1/4	19 1/4	3 11/16	11 13/16	3 57/64	4	1 1/2	22338	AN38	W38	SDAF338	SR-44-38	LER240	LER229	700
SDAF22340	8 3/4	7 5/8	9 7/8	33 1/2	11 3/4	3 1/2	29 1/4	26 5/8	7 5/8	19 15/16	3 3/4	12 1/4	4 5/64	4	1 5/8	22340	AN40	W40	SDAF340	SR-0-40	LER244	LER233	725

(1) See page B395 for suggested shaft diameter S-2, S-3 tolerances.  
 (2) "Housing Only" includes: cap, base, cap bolts, triple ring seals and stabilizing rings as required.  
 (3) Stabilizing ring is used for fixed (FX) block; do not use for float (FL) mounting.

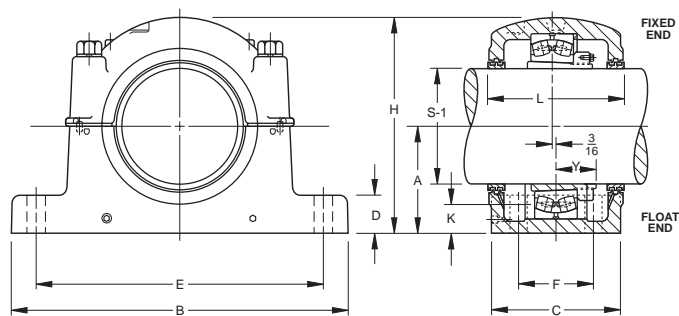
**Note:** Limiting speeds are found in dimension tables in the spherical roller bearing section.





## STRAIGHT BORE MOUNTING SDAF231 AND SDAF232 SERIES

- Each assembly includes the housing cap and base, cap bolts, bearing, locknut and washer, stabilizing ring and triple ring seals.
- To order pillow block housing only, use the numbers listed in the "Housing Only" column. These units include: cap, base, cap bolts, triple ring seals, and stabilizing ring.
- Assembly and pillow blocks described on this page constitute fixed units.
- To order float units, specify part number plus suffix "Float" or "FL".
- All assemblies shown are furnished in cast iron. If cast steel is desired, add the letter "S" to the alpha prefix (e.g., SDAFS 23152).
- For fixed applications, both stabilizing rings must be used. Do not use stabilizing rings for "float" mounting.



Pillow Block Assembly	Standard Shaft <sup>(1)</sup> Dia.		A	B	C	D	E		F	H	K	L	4 Base Bolts Req'd	Bearing Number	Lock Nut	Lock Washer	Housing <sup>(2)</sup> Only	Stabilizing <sup>(3)</sup> Ring 2 Req'd	Triple Seal 1 Req'd S-2	Triple Seal 1 Req'd S-3	Ass'y Wt.
	S-2	S-3					(Max.)	(Min.)													

### SERIES SDAF231

SDAF23152	11 1/2	9 15/16	10 1/4	35	13 1/8	3 3/4	30 1/2	29	8 3/4	20 7/8	3 3/8	14 1/4	1 5/8	23152	N052	P52	SDAF3152	A5679	ER832	ER845	1050
SDAF23156	12 1/2	10 3/4	12	38 1/4	14 3/4	3 3/8	33 1/2	32 3/4	9	23 7/16	4 3/4	15 7/8	1 5/8	23156	N056	P56	SDAF3156	A8967	ER866	ER826	1250
SDAF23160	13	11 1/2	12	38 1/4	14 3/4	3 3/8	33 1/2	32 3/4	9	23 7/16	4 1/8	15 7/8	1 5/8	23160	N060	P60	SDAF3160	A8975	ER824	ER832	1350
SDAF23164	14	12 1/4	12 13/16	41 3/4	15 3/4	4 1/2	36 1/2	35	10 1/2	25 3/4	4 3/8	16 3/4	1 7/8	23164	N064	P64	SDAF3164	A8970	ER876	ER983	1850
SDAF23168	15	13	14	43 3/4	17 3/4	5	38 1/4	36 3/4	10 3/4	27 7/8	4 15/16	18 3/4	2	23168	N068	P68	SDAF3168	A8977	ER847	ER846	2450
SDAF23172	16	13 13/16	14 1/2	46	17 1/8	5 1/4	40 3/4	39 1/4	11	28 7/8	5	18	2	23172	N072	P72	SDAF3172	A8974	ER809	ER874	2500
SDAF23176	17	14 5/8	14 1/2	46	17 1/8	5 1/4	40 3/4	39 1/4	11	28 7/8	4 5/8	18	2	23176	N076	P76	SDAF3176	A8978	ER811	ER946	2500
SDAF23180	17 1/2	15 1/4	15 1/2	48 3/4	18 3/4	5 1/2	43 1/2	41 3/4	12 1/4	30 1/2	5 1/8	19 3/4	2 1/4	23180	N080	P80	SDAF3180	A8979	ER948	ER895	2800
SDAF23184	18 1/2	16 3/16	17	52	21	5 1/2	46 1/8	44 3/8	14 1/2	33 3/4	6	22 1/4	2 1/4	23184	N084	P84	SDAF3184	A8984	ER949	ER914	4300
SDAF23188	19 1/2	17	17	52	21	5 1/2	46 1/8	44 3/8	14 1/2	33 3/4	5 9/16	22 1/4	2 1/4	23188	N088	P88	SDAF3188	A8976	ER950	ER811	4300
SDAF23192	20	17 3/4	18	54 1/4	21 5/8	5 3/4	48 7/8	47 1/8	15	35 3/4	6	22 3/4	2 1/2	23192	N092	P92	SDAF3192	A8990	ER808	ER953	5000

### SERIES SDAF232

SDAF23248	10 1/2	9 3/16	10 1/4	35	13 1/8	3 3/4	30 1/2	29	8 3/4	20 7/8	3 9/16	14 1/4	1 5/8	23248	N048	P48	SDAF3248	A5679	ER840	ER945	1100
SDAF23252	11 1/2	9 15/16	12	38 1/4	14 3/4	3 3/8	33 1/2	32 3/4	9	23 7/16	4 3/4	15 7/8	1 5/8	23252	N052	P52	SDAF3252	A8968	ER832	ER845	1350
SDAF23256	12 1/2	10 3/4	12	38 1/4	14 3/4	3 3/8	33 1/2	32 3/4	9	23 7/16	4 3/8	15 7/8	1 5/8	23256	N056	P56	SDAF3256	A8975	ER866	ER826	1400
SDAF23260	13	11 1/2	12 13/16	41 3/4	15 3/4	4 1/2	36 1/2	35	10 1/2	25 3/4	4 1/2	16 3/4	1 7/8	23260	N060	P60	SDAF3260	A8970	ER846	ER856	1900
SDAF23264	14	12 1/4	14	43 3/4	17 3/4	5	38 1/4	36 3/4	10 3/4	27 7/8	5 1/8	18 3/4	2	23264	N064	P64	SDAF3264	A8977	ER876	ER983	2500
SDAF23268	15	13	14 1/2	46	17 1/8	5 1/4	40 3/4	39 1/4	11	28 7/8	5	18	2	23268	N068	P68	SDAF3268	A8978	ER847	ER846	2650
SDAF23272	16	13 13/16	15 1/2	48 3/4	18 3/4	5 1/2	43 1/2	41 3/4	12 1/4	30 1/2	5 1/2	19 3/4	2 1/4	23272	N072	P72	SDAF3272	A8979	ER809	ER874	2950
SDAF23276	17	14 5/8	15 1/2	48 3/4	18 3/4	5 1/2	43 1/2	41 3/4	12 1/4	30 1/2	4 3/8	19 3/4	2 1/4	23276	N076	P76	SDAF3276	A8980	ER811	ER946	3050
SDAF23280	17 1/2	15 1/4	17	52	21	5 1/2	46 1/8	44 3/8	14 1/2	33 3/4	6	22 1/4	2 1/4	23280	N080	P80	SDAF3280	A8976	ER948	ER895	4500
SDAF23284	18 1/2	16 3/16	18	54 1/2	21 5/8	5 3/4	48 7/8	47 1/8	15	35 3/4	6 3/8	22 3/4	2 1/2	23284	N084	P84	SDAF3284	A8990	ER955	ER951	5000
SDAF23288	19 1/2	17	18	54 1/2	21 5/8	5 3/4	48 7/8	47 1/8	15	35 3/4	5 7/8	22 3/4	2 1/2	23288	N088	P88	SDAF3288	A8988	ER956	ER838	5050

<sup>(1)</sup> See page B395 for suggested shaft diameter S-2, S-3 tolerances.

<sup>(2)</sup> "Housing Only" includes: cap, base, cap bolts, triple ring seals and stabilizing rings as required.

<sup>(3)</sup> Stabilizing ring is used for fixed (FX) block; do not use for float (FL) mounting.

**Note:** Limiting speeds are found in dimension tables in the spherical roller bearing section.

## SHAFT DIAMETERS

### SUGGESTED S-1, S-2, S-3 SHAFT DIAMETERS (INCHES)

	max.	min.
1 7/16	1.4375	1.4345
1 11/16	1.6875	1.6845
1 7/8	1.8750	1.8720
1 15/16	1.9375	1.9345
2 1/16	2.0625	2.0585
2 1/8	2.1250	2.1210
2 3/16	2.1875	2.1835
2 1/4	2.2500	2.2460
2 3/8	2.3750	2.3710
2 7/16	2.4375	2.4335
2 9/16	2.5625	2.5585
2 5/8	2.6250	2.6210
2 11/16	2.6875	2.6835
2 13/16	2.8125	2.8085
2 7/8	2.8750	2.8710
2 15/16	2.9375	2.9335
3	3.0000	2.9960
3 1/16	3.0625	3.0585
3 3/16	3.1875	3.1835
3 1/4	3.2500	3.2460
3 3/8	3.3750	3.3710
3 7/16	3.4375	3.4335
3 5/8	3.6250	3.6210
3 15/16	3.9375	3.9335
4 1/8	4.1250	4.1200
4 3/16	4.1875	4.1825
4 7/16	4.4375	4.4325
4 1/2	4.5000	4.4950
4 9/16	4.5625	4.5575
4 7/8	4.8750	4.8700
4 15/16	4.9375	4.9325
5 3/16	5.1875	5.1825
5 5/16	5.3125	5.3075
5 7/16	5.4375	5.4325
5 3/4	5.7500	5.7450
5 7/8	5.8750	5.8700
5 15/16	5.9375	5.9325
6 1/16	6.0625	6.0575
6 1/4	6.2500	6.2450
6 7/16	6.4375	6.4325
6 5/8	6.6250	6.6200
6 7/8	6.8750	6.8700
6 15/16	6.9375	6.9325
7	7.0000	6.9950
7 3/16	7.1875	7.1825

	max.	min.
7 1/4	7.2500	7.2450
7 7/16	7.4375	7.4325
7 9/8	7.6250	7.6200
7 13/16	7.8125	7.8075
7 15/16	7.9375	7.9325
8 5/16	8.3125	8.3065
8 3/8	8.3750	8.3690
8 7/16	8.4375	8.4315
8 1/2	8.5000	8.4940
8 3/4	8.7500	8.7440
8 15/16	8.9375	8.9315
9	9.0000	8.9940
9 7/16	9.4375	9.4315
9 1/2	9.5000	9.4940
9 9/16	9.5625	9.5565
9 15/16	9.9375	9.9315
10	10.0000	9.9940
10 7/16	10.4375	10.4305
10 1/2	10.5000	10.4930
10 15/16	10.9375	10.9305
11	11.0000	10.9930
11 7/16	11.4375	11.4305
11 1/2	11.5000	11.4930
11 15/16	11.9375	11.9305
12	12.0000	11.9930
12 7/16	12.4375	12.4295
12 1/2	12.5000	12.4920
12 15/16	12.9375	12.9295
13	13.0000	12.9920
13 7/16	13.4375	13.4295
13 1/2	13.5000	13.4920
13 15/16	13.9375	13.9295
14	14.0000	13.9920
15	15.0000	14.9920
16	16.0000	15.9920
17	17.0000	16.9920
17 1/2	17.5000	17.4920
18 1/2	18.5000	18.4920
19 1/2	19.5000	19.4920
20	20.0000	19.9920

Triple lip seals for other shaft diameters are available upon special order.

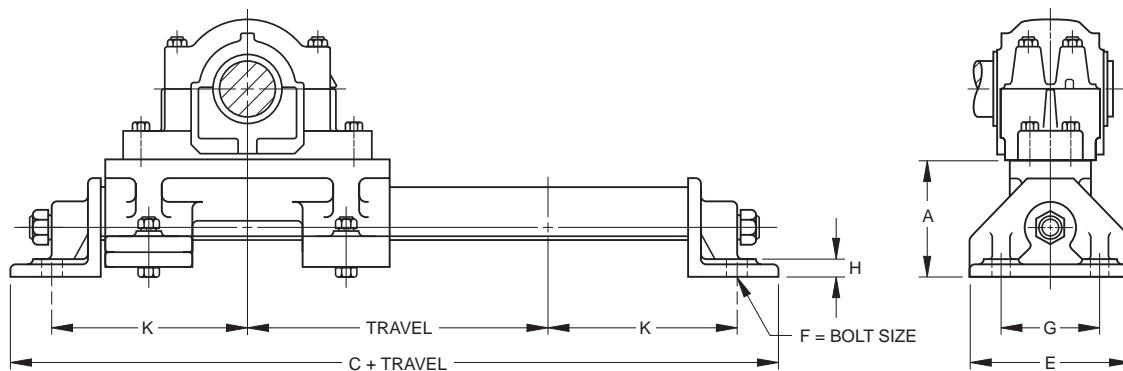
B





## TU TAKE-UP UNITS

- The same care taken in the selection of stationary pillow blocks must be applied to selecting the proper take-up unit.
- Load requirements should be carefully evaluated before specifying a particular Timken take-up assembly.
- The pedestal is made of stress-relieved cast iron. End bases are made of ductile iron. The guide rail and screw are steel.
- Units are available with travel lengths from 12 to 36 inches, in 6-inch increments.
- Catalog numbers shown here are for the TU take-up unit only; pillow block assemblies must be ordered separately.
- Both two- and four-bolt pedestals are available and must be specified.



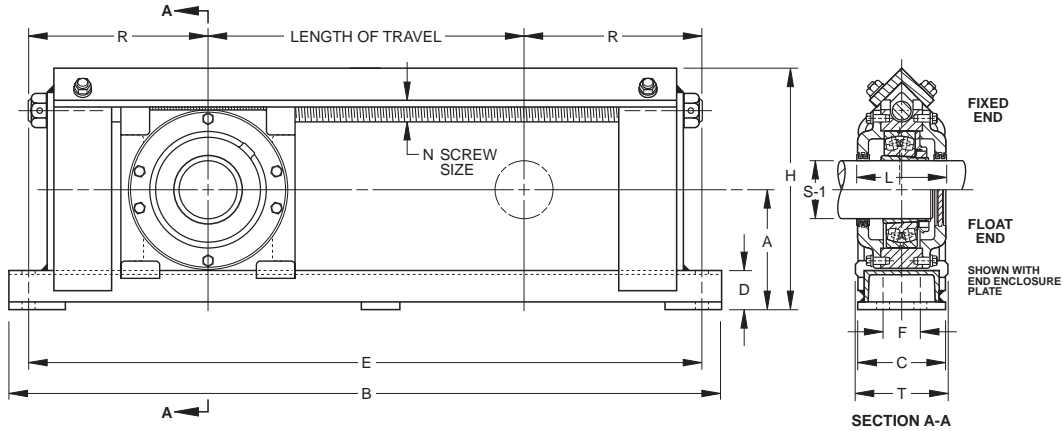
TU Take-Up Unit Catalog Number	Pillow Block Housing Number (SAF or SDAF)			A	C	E	F Bolt Size	G	H	K
				in.	in.	in.	in.	in	in.	in.
TU-3x*	515L	—	—	4 7/8	20	6 1/2	5/8	4	3/4	8 1/4
TU-4x*	516L	—	517L	5	21 3/4	6 1/2	3/4	4	3/4	9 1/8
TU-5x*	518L	—	615L	5 1/4	23	7 1/2	3/4	5	3/4	9 3/4
TU-6x*	520L	—	617L	5 1/2	24 3/4	7 1/2	3/4	5	7/8	10 3/4
TU-7x*	522L	524L	620L	6	26	9	3/4	6 1/2	1	11 1/2
TU-8x*	526L	—	622L	6	28	9	3/4	6 1/2	1	12 1/2
TU-8-1x*	528L	—	—	6	29 1/2	9	3/4	6 1/2	1	13 1/4

\* Enter 12, 18, 24, 30 or 36 to indicate travel in inches.



## TTU TAKE-UP UNITS

- The same care taken in the selection of stationary pillow blocks must be applied to selecting the proper take-up unit.
- Load requirements should be carefully evaluated before specifying a particular take-up assembly.
- Frame assembly and adjusting screw of TTU units are made of steel.
- The bearing housing is cast iron. Steel or ductile iron housings are additional options.
- Units include housing for adapter mounted bearings only, for either fixed or float position (be sure to specify).
- One stabilizing ring is included for fixed position assemblies.
- Sealing is triple ring labyrinth or end closures.
- For extremely contaminated environments, the DUSTAC seal is suggested. (See the next page for more information on DUSTAC.)



Take-Up Unit and Frame Number (Travel in Bold)	Standard Shaft <sup>(1)</sup> Dia. S-1	A	B	C	D	E	F	G Bolt Size	H	L	N	R	T	Bearing Number	Adapter <sup>(3)</sup> Assembly Number	Stabilizing <sup>(2)</sup> Ring 1 Req'd	Triple Seal 2 Req'd	Approx. Wt.
		in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.					
TTU-55-12	1 15/16	4 5/8	28 1/2	3 1/2	1 3/4	26 1/2	-	5/8	9	4	3/4	7 1/4	4	22211K	SNW-11	SR-11-0	LER24	55
TTU-55-18	1 15/16	4 5/8	34 1/2	3 1/2	1 3/4	32 1/2	-	5/8	9	4	3/4	7 1/4	4	22211K	SNW-11	SR-11-0	LER24	60
TTU-55-24	1 15/16	4 5/8	40 1/2	3 1/2	1 3/4	38 1/2	-	5/8	9	4	3/4	7 1/4	4	22211K	SNW-11	SR-11-0	LER24	65
TTU-65-12	2 3/16	5	29 1/2	3 1/2	1 3/4	27 1/2	-	5/8	10	4 1/2	3/4	7 3/4	4	22213K	SNW-13	SR-13-0	LER29	60
TTU-65-18	2 3/16	5	35 1/2	3 1/2	1 3/4	33 1/2	-	5/8	10	4 1/2	3/4	7 3/4	4	22213K	SNW-13	SR-13-0	LER29	65
TTU-65-24	2 3/16	5	41 1/2	3 1/2	1 3/4	39 1/2	-	5/8	10	4 1/2	3/4	7 3/4	4	22213K	SNW-13	SR-13-0	LER29	70
TTU-75-6	2 7/16	5 3/16	24 1/2	3 1/2	1 3/4	22 1/2	-	3/4	10 1/2	4 1/2	7/8	8 1/4	4	22215K	SNW-15	SR-15-0	LER37	65
TTU-75-12	2 7/16	5 3/16	30 1/2	3 1/2	1 3/4	28 1/2	-	3/4	10 1/2	4 1/2	7/8	8 1/4	4	22215K	SNW-15	SR-15-0	LER37	70
TTU-75-18	2 7/16	5 3/16	36 1/2	3 1/2	1 3/4	34 1/2	-	3/4	10 1/2	4 1/2	7/8	8 1/4	4	22215K	SNW-15	SR-15-0	LER37	75
TTU-75-24	2 7/16	5 3/16	42 1/2	3 1/2	1 3/4	40 1/2	-	3/4	10 1/2	4 1/2	7/8	8 1/4	4	22215K	SNW-15	SR-15-0	LER37	80
TTU-75-30	2 7/16	5 3/16	48 1/2	3 1/2	1 3/4	46 1/2	-	3/4	10 1/2	4 1/2	7/8	8 1/4	4	22215K	SNW-15	SR-15-0	LER37	85
TTU-85-6	2 15/16	6	26 1/2	4 5/8	2	24 1/2	2	5/8	12 1/4	4 3/4	1	9 1/4	5	22217K	SNW-17	SR-17-14	LER53	95
TTU-85-12	2 15/16	6	32 1/2	4 5/8	2	30 1/2	2	5/8	12 1/4	4 3/4	1	9 1/4	5	22217K	SNW-17	SR-17-14	LER53	100
TTU-85-18	2 15/16	6	38 1/2	4 5/8	2	36 1/2	2	5/8	12 1/4	4 3/4	1	9 1/4	5	22217K	SNW-17	SR-17-14	LER53	105
TTU-85-24	2 15/16	6	44 1/2	4 5/8	2	42 1/2	2	5/8	12 1/4	4 3/4	1	9 1/4	5	22217K	SNW-17	SR-17-14	LER53	110
TTU-85-30	2 15/16	6	50 1/2	4 5/8	2	48 1/2	2	5/8	12 1/4	4 3/4	1	9 1/4	5	22217K	SNW-17	SR-17-14	LER53	115
TTU-100-12	3 7/16	6 5/8	34 1/4	4 5/8	2	32	2	3/4	13 7/8	6	1 1/8	10	5 1/2	22220K	SNW-20	SR-20-17	LER102	140
TTU-100-18	3 7/16	6 5/8	40 1/4	4 5/8	2	38	2	3/4	13 7/8	6	1 1/8	10	5 1/2	22220K	SNW-20	SR-20-17	LER102	145
TTU-100-24	3 7/16	6 5/8	46 1/4	4 5/8	2	44	2	3/4	13 7/8	6	1 1/8	10	5 1/2	22220K	SNW-20	SR-20-17	LER102	150
TTU-100-30	3 7/16	6 5/8	52 1/4	4 5/8	2	50	2	3/4	13 7/8	6	1 1/8	10	5 1/2	22220K	SNW-20	SR-20-17	LER102	155
TTU-110-12	3 15/16	7 3/4	38 1/2	5 5/8	2 1/4	36	2 1/2	3/4	16 1/4	6 1/2	1 1/4	12	7	22222K	SNW-22	SR-22-19	LER109	200
TTU-110-18	3 15/16	7 3/4	44 1/2	5 5/8	2 1/4	42	2 1/2	3/4	16 1/4	6 1/2	1 1/4	12	7	22222K	SNW-22	SR-22-19	LER109	210
TTU-110-24	3 15/16	7 3/4	50 1/2	5 5/8	2 1/4	48	2 1/2	3/4	16 1/4	6 1/2	1 1/4	12	7	22222K	SNW-22	SR-22-19	LER109	220
TTU-110-30	3 15/16	7 3/4	56 1/2	5 5/8	2 1/4	54	2 1/2	3/4	16 1/4	6 1/2	1 1/4	12	7	22222K	SNW-22	SR-22-19	LER109	230
TTU-110-36	3 15/16	7 3/4	62 1/2	5 5/8	2 1/4	60	2 1/2	3/4	16 1/4	6 1/2	1 1/4	12	7	22222K	SNW-22	SR-22-19	LER109	240
TTU-130-12	4 7/16	8 5/8	45 3/4	8 3/4	2 3/4	40 3/4	5	1 1/8	18 7/8	7 1/4	2	14 3/8	10	22226K	SNW-26	SR-26-0	LER117	360
TTU-130-18	4 7/16	8 5/8	51 3/4	8 3/4	2 3/4	46 3/4	5	1 1/8	18 7/8	7 1/4	2	14 3/8	10	22226K	SNW-26	SR-26-0	LER117	380
TTU-130-24	4 7/16	8 5/8	57 3/4	8 3/4	2 3/4	52 3/4	5	1 1/8	18 7/8	7 1/4	2	14 3/8	10	22226K	SNW-26	SR-26-0	LER117	400
TTU-130-30	4 7/16	8 5/8	63 3/4	8 3/4	2 3/4	58 3/4	5	1 1/8	18 7/8	7 1/4	2	14 3/8	10	22226K	SNW-26	SR-26-0	LER117	420
TTU-140-12	4 15/16	9 1/2	49 1/2	9 3/4	3	44 1/2	5 1/2	1 1/4	20 3/8	7 1/2	2 1/4	16 1/4	11	22228K	SNW-28	SR-28-0	LER122	460
TTU-140-18	4 15/16	9 1/2	55 1/2	9 3/4	3	50 1/2	5 1/2	1 1/4	20 3/8	7 1/2	2 1/4	16 1/4	11	22228K	SNW-28	SR-28-0	LER122	480
TTU-140-24	4 15/16	9 1/2	61 1/2	9 3/4	3	56 1/2	5 1/2	1 1/4	20 3/8	7 1/2	2 1/4	16 1/4	11	22228K	SNW-28	SR-28-0	LER122	510
TTU-140-30	4 15/16	9 1/2	67 1/2	9 3/4	3	62 1/2	5 1/2	1 1/4	20 3/8	7 1/2	2 1/4	16 1/4	11	22228K	SNW-28	SR-28-0	LER122	530

(1) See page B395 for suggested shaft diameter S-1 tolerances.

**Note:** Limiting speeds are found in dimension tables in the spherical roller bearing section.

(2) Stabilizing ring is used for fixed (FX) block; do not use for float (FL) mounting.

(3) Includes sleeve, locknut and lockwasher. Add shaft size to order.







## DUSTAC™ SHAFT SEAL

- Suggested for pillow blocks used in extremely contaminated environments, such as taconite mines.
- Provides protection against residual and airborne contaminants that exceeds the triple labyrinth shaft seal.
- Contributes significantly to extending bearing life; reduces costs by helping prevent premature bearing damage.
- Because of its unique design, no special finish is required on the shaft. DUSTAC is a patented device utilizing a V-shaped nitrile ring, which rotates with the shaft and applies pressure to the cartridge face to exclude contaminants.

B

Pillow Block Housing Number		Shaft Diameter S-1	Assembly Standout B	DUSTAC™ Seal Assembly	V-Ring Seal	O-Ring	End Plug
500	600						
515	615	2 7/16	59/64	DV-37	V-60-A	2-228	EPS-4
516	616	2 11/16	59/64	DV-44	V-65-A	2-231	EPS-5
517	—	2 15/16	1	DV-53	V-75-A	2-230	EPS-6
518	—	3 3/16	1	DV-69	V-80-A	2-235	EPS-9
520	620	3 7/16	1	DV-102	V-85-A	2-234	EPS-11
522	622	3 15/16	1	DV-109	V-100-A	2-239	EPS-13
524	624	4 3/16	1 1/16	DV-113	V-110-A	2-238	EPS-14
526	626	4 7/16	1 1/16	DV-117	V-110-A	2-242	EPS-15
528	628	4 15/16	1 1/16	DV-122	V-130-A	2-244	EPS-16
530	630	5 3/16	1 1/16	DV-125	V-130-A	2-247	EPS-17
532	632	5 7/16	1 1/16	DV-130	V-140-A	2-249	EPS-18
534	634	5 15/16	1 1/16	DV-140	V-150-A	2-253	EPS-20
536	636	6 7/16	1 9/64	DV-148	V-160-A	2-259	EPS-21
538	638	6 15/16	1 9/64	DV-155	V-180-A	2-259	EPS-22
540	640	7 3/16	1 9/64	DV-159	V-180-A	2-259	EPS-23
544	—	7 15/16	1 15/32	DV-167	V-200-A	2-262	EPS-25

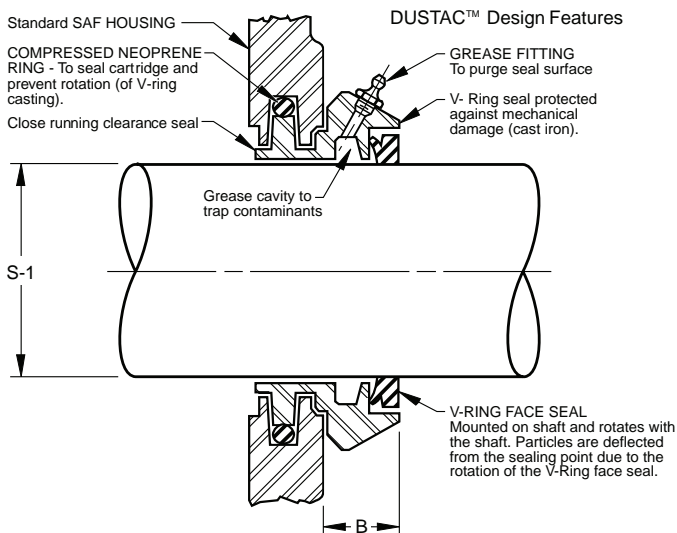
### ORDER INSTRUCTIONS

- Shaft seal may be ordered in place of the standard LER triple ring seals supplied with the pillow blocks listed. They also are available to retrofit existing installations.
- To order any pillow block housings with DUSTAC shaft seal on both sides, add the suffix "DV" to the number (e.g., SAF2522DV).
- To order pillow block housings with DUSTAC shaft seal and one end closed, add the suffix "DC" to the number (e.g., SAF2252DC).
- Standard sizes of DUSTAC shaft seals are shown in the table. Other sizes are available upon request.

### INSTALLATION PROCEDURE

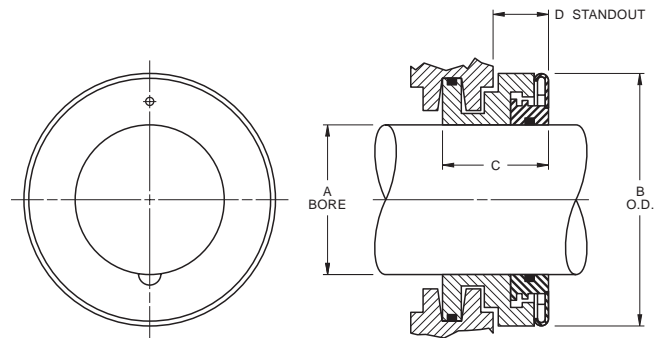
1. Check shaft diameters to print specification. Remove any burrs or sharp edges. Be sure shaft surface is clean and dry beyond the area of seal location.
2. Expand the V-ring seal over the shaft to the approximate inboard position (reference dimension "B" in the tables). *Make sure the lip of the seal faces the bearing.*
3. Slide the seal cartridge onto the shaft until the V-ring fits into its cavity.
4. Mount the bearing, sleeve, lockwasher and locknut in normal manner and adjust for internal clearance.
5. If both ends have seals, repeat steps 2 and 3 with the V-ring going on last with its lip facing the bearing.
6. Thoroughly clean the housing base and remove any paint or burrs from the mating surfaces of the housing cap.
7. Lower shaft, bearing and seals into the housing base, taking care to guide the seals into the seal grooves.

8. On each shaft there must be only one fixed bearing. If bearing is to be fixed, the stabilizing ring can be inserted between the bearing outer ring and the housing shoulder on the locknut side of the bearing. All other bearings on this shaft should be centered in the housing.
9. The upper half of the housing or cap should be thoroughly cleaned and checked for burrs. Place it over the bearing and seals. The dowel pins will align the cap to the base. NOTE: housing caps and bases are not interchangeable.
10. After cap bolts are tightened, it is most important to position the V-ring seal to its proper fitted width. This is accomplished by moving the seal until it is flush with the outside face of the cavity. This provides proper compression of the lip against the cartridge face.



## TORR-GARD SEALS

- Using the TORR-GARD greatly increases the operating time between maintenance intervals of rotating equipment.
- Used in split pillow blocks.
- Endures extreme environments such as pulp and paper, chemical and mining because of its exceptional design.
- Two-piece labyrinth seal of Teflon® PTFE fluoropolymer resin. The assembly inhibits the passage of contaminants or lubricants and prevents the components from coming apart during installation and service.
- Installation is simple compared to many other lip-contact type seals and is more effective in reducing lubricant loss, improving plant safety. It is also environmentally friendly.



B

### OTHER BENEFITS INCLUDE:

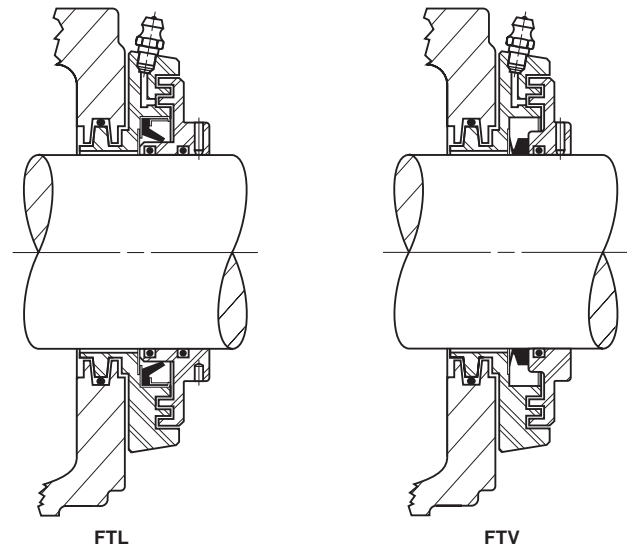
- Drop-in style eliminates machining or modification to housing.
- Interchangeable with LER or Taconite seals.
- Available for standard SAF and SNH pillow blocks (1 3/4 in. to 8 in. shaft diameter).
- Minimizes lubricant leakage.
- Accommodates greater shaft misalignment or eccentricity.
- Reduced number of components over conventional seals.

## TACONITE SEALS

### FTV SERIES

#### FLINGER TACONITE SEAL WITH V RING

- Combines the qualities of the face labyrinth seal and the DUSTAC seal to improve the sealing efficiency for extremely contaminated environments.
- The rotating flinger, added to the basic design, incorporates face labyrinth grooves and compressing the O-ring in the bore. This protects against incursion of foreign matters and ensures regular pressure of the V-ring to the cartridge face.



### FTL SERIES

#### FLINGER TACONITE SEAL WITH LIP SEAL

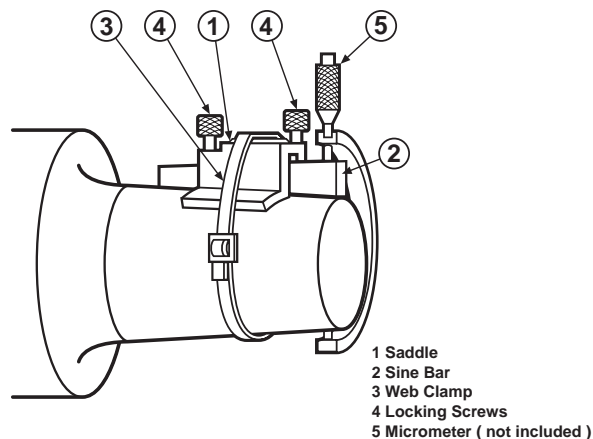
- The FTL seal has the same property as the FTV Series, but above the V-ring is substituted to a lip seal working directly on the Flinger Lip to prevent the shaft of any grooving.
- The FTV and FTL Taconite seals can be substituted in either ER or LER ring SAF pillow block series and do not require modifications to the standard housings.
- **NOTE:** Flinger Taconite seals can be substituted to "ER" or "LER" seal. Add the suffix "L" to the number when it is for a housing using LER Seals (e.g., TFV-515L for SAF-515L pillow block).



## SINE BAR GAGES

B

- Tapered bore, anti-friction bearings are mounted either on adapter sleeves or on tapered shaft seats.
- In cases where tapered bore bearings are mounted directly on the shaft, the shaft must conform to the tapered bore of the bearing to assure proper fit. If proper fit is not achieved, the results could be:
  1. Turning of the bearing inner race on the shaft.
  2. Uneven loading of the bearing.
  3. Severe inner race hoop stress.
  4. Insufficient support (back-up) of the inner race on the shaft.
- All of these conditions could lead to premature bearing damage. Therefore, the manufacture, maintenance and measurement of accurate shaft tapers is important.
- There are two accepted ways of measuring tapered shafts: ring gages and sine bar gages.
- Precision measurement of tapered shafts is difficult with ring gages and may be impossible in the case of large shafts, where gages are large, cumbersome and heavy.
- Sine bar gages provide an accurate and easy method of measurement.
- Lightweight and easy to handle and learn, sine bar gages achieve precise gaging of the shaft size and taper.



- A complete set for measurement of 1:12 shaft tapers consists of 3 in., 4 in., 5 1/2 in., 7 in., 10 in. and 14 in. sine bar gages, sine bar saddle no. T-5491-C, web clamp no. T-5489-A and a wooden box no. T-5224-C. A complete set for 1:30 shaft tapers consists of 4 in., 6 in., 8 in. and 12 in. sine bar gages.
- Sine bars can be purchased individually, or in any combination of sizes to meet your individual needs.
- All sine bars require a sine bar saddle and web clamp. A wooden box is optional.
- For information on the use of sine bars, prices and delivery, consult your Timken representative.

PART NUMBER	SIZE INCH	FOR BEARINGS
T-3071-C	3.0000	22232K to 22240K
T-3071-C	3.0000	22322K to 22328K
T-3071-C	3.0000	23040K to 23048K
T-3071-C	3.0000	23130K to 23136K
T-3071-C	3.0000	23226K to 23230K
T-3071-C	3.0000	23960K to 23972K
<hr/>		
T-3072-C	4.0000	22248K to 22256K
T-3072-C	4.0000	22330K to 22340K
T-3072-C	4.0000	23052K to 23076K
T-3072-C	4.0000	23138K to 23148K
T-3072-C	4.0000	23232K to 23240K
T-3072-C	4.0000	23976K to 239/560K
<hr/>		
T-3073-C	5.5000	22260K to 22264K
T-3073-C	5.5000	22344K to 22356K
T-3073-C	5.5000	23080K to 230/500K
T-3073-C	5.5000	23152K to 23164K
T-3073-C	5.5000	23244K to 23256K
T-3073-C	5.5000	239/600K to 239/710K

Note: All sine bars require a sine bar saddle, T-5491-C and a web clamp T-5489-A.

PART NUMBER	SIZE INCH	FOR BEARINGS
T-3074-C	7.0000	230/530K to 230/750K
T-3074-C	7.0000	23168K to 23196K
T-3074-C	7.0000	23260K to 23276K
T-3074-C	7.0000	239/750K to 239/1120K
<hr/>		
T-3075-C	10.0000	230/800K to 230/1180
T-3075-C	10.0000	231/500K to 231/710K
T-3075-C	10.0000	23280K to 232/530K
T-3075-C	10.0000	230/1250 and up
<hr/>		
T-3076-C	14.0000	231/750K and up
T-3076-C	14.0000	232/560K and up
T-3076-C	14.0000	239/118K and up
<hr/>		
T-5476-C	4.0000	24040K to 24056K
T-5476-C	4.0000	24132K to 24144K
<hr/>		
T-5477-C	6.0000	24060K to 24084K
T-5477-C	6.0000	24148K to 24160K
<hr/>		
T-5478-C	8.0000	24089K to 240/630K
T-5478-C	8.0000	24164K to 24192K
<hr/>		
T-5479-C	12.0000	240/670K and up
T-5479-C	12.0000	24196K and up

The table above represents the sine bar sizes developed for a full range of tapered bore bearings with 1:12 and a 1:30 taper. Additional sizes are available to fit a variety of width and taper combinations. Consult your local Timken representative for availability.

## HYDRAULIC NUTS

### INTRODUCTION

- Designed to install and remove tapered bore bearings with minimal effort.
- Allow better control of the bearing internal clearance reduction without damaging the bearing or other components.
- Substantially reduces downtime during installation or removal of tapered bore bearings.

### DESCRIPTION

- Consist of a female threaded ring and a male ring with two O-ring seals.
- All hydraulic nuts are supplied with:
  - Quick connection fittings (male ¼ in. B.S.P. and female 3/8 in. N.P.T.).
  - Two pipe plugs ¼" B.S.P.
  - One set of spare O-rings.

### ORDERING COMPONENTS:

- To order spare components for the hydraulic nuts, order part numbers as listed below:
  - O-ring Seal Kits:  
Use the hydraulic nut part number plus the number 132.  
Example: **HMVC 40/132**
  - Pipe Plug ¼ in. B.S.P.:  
Use the hydraulic nut part number plus the number 647.  
Example: **HMVC 40/647**
  - Quick Connection Fittings (male ¼ in. B.S.P. and female 3/8 in. N.P.T.):  
Use the hydraulic nut part number plus the number 849.  
Example: **HMVC 40/849**

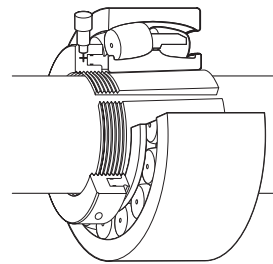
### ENGINEERING SERVICES

- Special applications should be referred to a Timken representative for review.

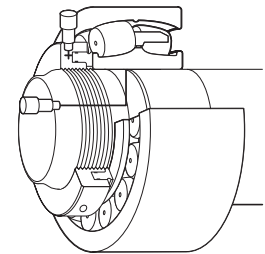
## INSTRUCTIONS

- When the hydraulic nut is used, the piston must be in the innermost position.
- For this operation, please ensure that the valve of the hydraulic hose is disconnected from the nut so that the nut is not under pressure.
- To contract the piston inside the female threaded ring, insert a rod or bar in one of the four drilled holes located on the outside diameter of the female threaded ring.
- Screw the hydraulic nut on the thread with the piston in contact with the surface, until the groove machined on the outside diameter of the piston near the outboard face is level with the face of the female threaded ring.
- One of the two threaded holes must be plugged with the ¼" B.S.P. pipe plug before the hydraulic nut is pressurized.
- The maximum pressure permissible in the hydraulic nut is 14,000 psi (110 Kpa).
- The oil viscosity suggested is 1400 SUS (300cst) at operating temperature (SAE 90 oil).
- To avoid overextension of the piston, a second groove has been machined on the outside diameter of the piston inboard of the one used to judge contraction.
- When this second groove is level with the face of the female threaded ring, the piston has reached its length of travel as shown in the illustration. If the second groove of the piston travels past the face of the female threaded ring the hydraulic nut can be damaged.
- Should the oil start to leak from the piston area, it is certain that the O-ring seals are damaged or worn and need to be replaced.
- When the hydraulic nut is not in use, ensure that the threaded holes are plugged to prevent entry of contaminants in the piston cavity.
- To help prevent against corrosion during storage, apply a coat of light oil on the hydraulic nut surfaces.
- Contact your Timken representative to receive special warnings against reasonably unforeseen dangers.

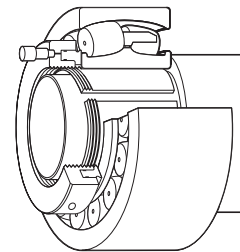
### INSTALLATION



Hydraulic nut used to mount the bearing on a pull type sleeve.

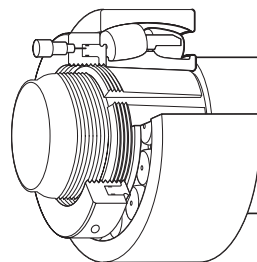


Hydraulic nut used to mount the bearing on tapered journal.



Hydraulic nut used to mount the bearing on a push type adapter sleeve.

### REMOVAL



Hydraulic nut used to withdraw a push type adapter sleeve.

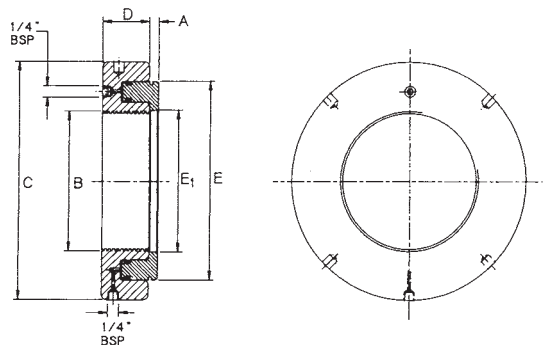


**HYDRAULIC NUTS – METRIC**

Part Number	Threads B	C	Dimensions				Piston Length of Travel	Piston Area	Assembly weight
			D	E	E <sub>1</sub>	A			
	mm	mm	mm	mm	mm	mm	mm <sup>2</sup>	kg.	
HMV - 10	M 50X1.5	114	38	86	51	4	5	2900	2.5
HMV - 12	M 60X2	125	38	94	61	5	5	3200	2.8
HMV - 13	M 65X2	135	38	101	66	5	5	3500	3.0
HMV - 14	M 70X2	140	38	107	71	5	5	3900	3.3
HMV - 15	M 75X2	145	38	112	76	5	5	4100	3.5
HMV - 16	M 80X2	150	38	117	81	5	5	4200	3.8
HMV - 17	M 85X2	155	38	122	86	5	5	4400	3.9
HMV - 18	M 90X2	160	38	127	91	5	5	4800	4.1
HMV - 19	M 95X2	165	38	133	96	5	5	5000	4.4
HMV - 20	M 100X2	170	38	138	101	6	5	5200	4.5
HMV - 21	M 105X2	175	38	143	106	6	5	5400	5.4
HMV - 22	M 110X2	180	38	149	111	6	5	5700	5.7
HMV - 23	M 115X2	185	38	154	116	6	5	5900	5.1
HMV - 24	M 120X2	190	38	159	121	6	5	6100	5.3
HMV - 25	M 125X2	195	38	164	126	6	5	6300	5.4
HMV - 26	M 130X2	200	38	170	131	6	5	6500	5.7
HMV - 27	M 135X2	205	38	175	136	6	5	6700	5.9
HMV - 28	M 140X2	210	38	180	141	7	5	6900	6.1
HMV - 29	M 145X2	215	39	186	146	7	5	7300	6.5
HMV - 30	M 150X2	220	39	190	151	7	5	7500	6.6
HMV - 31	M 155X3	225	39	198	156	7	5	8100	6.9
HMV - 32	M 160X3	235	40	206	161	7	6	8600	7.7
HMV - 33	M 165X3	240	40	209	166	7	6	9000	8.0
HMV - 34	M 170X3	245	41	215	171	7	6	9500	8.4
HMV - 36	M 180X3	255	41	227	181	7	6	10300	9.1
HMV - 38	M 190X3	270	42	239	191	8	7	11500	10.8
HMV - 40	M 200X3	280	43	251	201	8	8	12500	11.4
HMV - 41	Tr 205X4	290	43	256	207	8	8	12900	12.2
HMV - 42	Tr 210X4	295	44	262	212	8	9	13500	12.5
HMV - 43	Tr 215X4	300	44	267	217	8	9	13800	13.0
HMV - 44	Tr 220X4	305	44	273	222	8	9	14400	13.4
HMV - 45	Tr 225X4	315	45	280	227	8	9	15200	14.6
HMV - 46	Tr 230X4	320	45	285	232	8	9	15600	14.8
HMV - 47	Tr 235X4	325	46	291	237	8	10	16200	16.0
HMV - 48	Tr 240X4	330	46	296	242	9	10	16500	16.3
HMV - 50	Tr 250X4	345	46	307	252	9	10	17800	17.6
HMV - 52	Tr 260X4	355	47	319	262	9	11	18800	19.0
HMV - 54	Tr 270X4	370	48	330	272	9	12	19700	20.4
HMV - 56	Tr 280X4	380	49	341	282	9	12	21100	22.0
HMV - 58	Tr 290X4	390	49	353	292	9	13	22600	22.5
HMV - 60	Tr 300X4	405	51	364	302	10	14	23600	25.6
HMV - 62	Tr 310X5	415	52	375	312	10	14	24900	27.0
HMV - 64	Tr 320X5	430	53	387	322	10	14	26300	29.6
HMV - 66	Tr 330X5	440	53	397	332	10	14	27000	31.0
HMV - 68	Tr 340X5	450	53	408	342	10	14	28400	32.5
HMV - 69	Tr 345X5	455	54	414	347	10	14	29400	33.6
HMV - 70	Tr 350X5	465	56	420	352	10	14	30000	35.0
HMV - 72	Tr 360X5	475	56	431	362	10	15	31300	37.0
HMV - 73	Tr 365X5	482	57	436	367	11	15	31700	38.5
HMV - 74	Tr 370X5	490	57	442	372	11	16	32800	39.2
HMV - 76	Tr 380X5	500	58	452	382	11	16	33600	41.0
HMV - 77	Tr 385X5	505	58	459	387	11	16	34700	42.0
HMV - 80	Tr 400X5	525	60	475	402	11	17	36700	46.0
HMV - 82	Tr 410X5	535	61	486	412	11	17	38300	48.2
HMV - 84	Tr 420X5	545	61	498	422	11	17	40000	50.4
HMV - 86	Tr 430X5	555	62	508	432	11	17	40800	53.0
HMV - 88	Tr 440X5	565	62	519	442	12	17	42500	55.0
HMV - 90	Tr 450X5	580	64	530	452	12	17	44100	58.2
HMV - 92	Tr 460X5	590	64	541	462	12	17	45000	61.0
HMV - 94	Tr 470X5	600	65	552	472	12	18	46900	63.7
HMV - 96	Tr 480X5	612	65	563	482	12	19	48500	65.0
HMV - 98	Tr 490X5	625	66	573	492	12	19	49800	69.0
HMV - 100	Tr 500X5	635	67	585	502	12	19	52000	71.5
HMV - 102	Tr 510X6	645	68	596	512	12	20	53300	75.0
HMV - 104	Tr 520X6	657	68	606	522	13	20	54200	77.0
HMV - 106	Tr 530X6	670	69	617	532	13	21	56200	80.0
HMV - 108	Tr 540X6	680	69	629	542	13	21	58200	83.0
HMV - 110	Tr 550X6	692	70	639	552	13	21	59200	86.0
HMV - 112	Tr 560X6	705	71	650	562	13	22	61200	90.0
HMV - 114	Tr 570X6	715	72	661	572	13	23	63200	93.0
HMV - 116	Tr 580X6	725	72	671	582	13	23	64200	96.0
HMV - 120	Tr 600X6	750	73	693	602	13	23	67400	100.0
HMV - 126	Tr 630X6	780	74	726	632	14	23	72900	110.0
HMV - 130	Tr 650X6	805	75	747	652	14	23	76200	116.0
HMV - 134	Tr 670X6	825	76	768	672	14	24	79500	123.0
HMV - 138	Tr 690X6	850	77	791	692	14	25	84200	130.0
HMV - 142	Tr 710X7	870	78	812	712	15	25	87700	137.0
HMV - 150	Tr 750X7	915	79	855	752	15	25	97000	150.0
HMV - 160	Tr 800X7	970	80	908	802	16	25	104000	173.0
HMV - 170	Tr 850X7	1020	83	962	852	16	26	114600	190.0
HMV - 180	Tr 900X7	1070	86	1015	902	17	30	124000	210.0
HMV - 190	Tr 950X8	1125	86	1069	952	17	30	135600	238.0
HMV - 200	Tr 1000X8	1180	88	1122	1002	17	34	145600	263.0
HMV - 212	Tr 1060X8	1255	95	1184	1063	18	34	161200	325.0
HMV - 216	Tr 1080X8	1280	100	1206	1083	18	34	167400	345.0
HMV - 224	Tr 1120X8	1340	106	1250	1123	19	36	178200	410.0
HMV - 236	Tr 1180X8	1420	115	1320	1183	22	40	189200	530.0

HMV - 10 through HMV - 40 have a Metric ISO fine thread profile.  
 HMV - 41 through HMV-236 have a Metric ISO trapezoidal thread.

HYDRAULIC NUTS – ENGLISH



Part Number	B Maj. Dia.	Threads no. per inch	Dimensions				Piston Length of Travel	Piston Area	Assembly weight	
			C inch	D inch	E inch	E <sub>1</sub> inch				A inch
HMVC - 10	1.967	18	4.488	1.496	3.386	2.008	0.157	0.197	4.5	5.5
HMVC - 12	2.360	18	4.921	1.496	3.701	2.402	0.197	0.197	5.0	6.2
HMVC - 13	2.548	18	5.315	1.496	3.976	2.598	0.197	0.197	5.4	6.6
HMVC - 14	2.751	18	5.512	1.496	4.213	2.795	0.197	0.197	6.0	7.3
HMVC - 15	2.933	12	5.709	1.496	4.409	2.992	0.197	0.197	6.3	7.7
HMVC - 16	3.137	12	5.906	1.496	4.606	3.189	0.197	0.197	6.5	8.4
HMVC - 17	3.340	12	6.102	1.496	4.803	3.386	0.197	0.197	6.8	8.6
HMVC - 18	3.527	12	6.299	1.496	5.000	3.583	0.197	0.197	7.4	9.0
HMVC - 19	3.730	12	6.496	1.496	5.236	3.780	0.197	0.197	7.7	9.7
HMVC - 20	3.918	12	6.693	1.496	5.433	3.976	0.236	0.197	8.1	10.0
HMVC - 22	4.325	12	7.087	1.496	5.866	4.370	0.236	0.197	8.8	12.5
HMVC - 24	4.716	12	7.480	1.496	6.260	4.764	0.236	0.197	9.5	11.7
HMVC - 26	5.106	12	7.874	1.496	6.693	5.157	0.236	0.197	10.1	12.5
HMVC - 28	5.497	12	8.268	1.496	7.087	5.551	0.276	0.197	10.7	13.4
HMVC - 30	5.888	12	8.661	1.535	7.480	5.945	0.276	0.197	11.6	14.5
HMVC - 32	6.284	8	9.252	1.575	8.110	6.339	0.276	0.236	13.3	17.0
HMVC - 34	6.659	8	9.645	1.614	8.465	6.732	0.276	0.236	14.7	18.5
HMVC - 36	7.066	8	10.039	1.615	8.858	7.126	0.276	0.236	16.0	20.0
HMVC - 38	7.472	8	10.630	1.653	9.409	7.520	0.315	0.276	17.8	23.1
HMVC - 40	7.847	8	11.024	1.693	9.882	7.913	0.315	0.276	19.4	25.1
HMVC - 44	8.628	8	12.008	1.732	10.748	8.740	0.315	0.354	22.3	29.5
HMVC - 48	9.442	6	12.992	1.811	11.654	9.528	0.354	0.394	25.6	35.9
HMVC - 52	10.192	6	13.976	1.850	12.559	10.315	0.354	0.433	29.1	41.8
HMVC - 56	11.004	6	14.961	1.929	13.425	11.102	0.354	0.472	32.7	48.4
HMVC - 60	11.785	6	15.945	2.008	14.331	11.890	0.394	0.551	36.6	56.3
HMVC - 64	12.562	6	16.929	2.087	15.236	12.677	0.394	0.551	40.8	65.1
HMVC - 68	13.334	5	17.717	2.087	16.063	13.465	0.394	0.551	44.0	71.5
HMVC - 72	14.170	5	18.701	2.205	16.969	14.252	0.394	0.590	48.5	81.4
HMVC - 76	14.957	5	19.685	2.283	17.795	15.039	0.433	0.630	52.1	90.2
HMVC - 80	15.745	5	20.669	2.362	18.701	15.827	0.433	0.669	56.9	101.2
HMVC - 84	16.532	5	21.457	2.401	19.606	16.614	0.433	0.669	62.0	110.9
HMVC - 88	17.319	5	22.244	2.441	20.433	17.402	0.472	0.669	65.9	121.0
HMVC - 92	18.107	5	23.228	2.520	21.299	18.189	0.472	0.669	69.8	134.2
HMVC - 96	18.894	5	24.094	2.559	22.165	18.976	0.472	0.748	75.2	143.0
HMVC - 100	19.682	5	25.000	2.598	23.031	19.764	0.472	0.748	80.6	157.3
HMVC - 106	20.867	4	26.378	2.716	24.291	20.945	0.512	0.827	87.1	176.0
HMVC - 112	21.923	4	27.756	2.795	25.591	22.126	0.512	0.866	94.9	198.0
HMVC - 120	23.623	4	29.528	2.874	27.283	23.701	0.512	0.905	104.5	220.0
HMVC - 126	24.804	4	30.709	2.913	28.583	24.882	0.551	0.905	113.0	242.0
HMVC - 134	26.379	4	32.480	2.992	30.236	26.457	0.551	0.945	123.2	270.6
HMVC - 142	27.961	3	34.252	3.071	31.969	28.031	0.590	0.984	135.9	301.4
HMVC - 150	29.536	3	36.024	3.110	33.661	29.606	0.590	0.984	150.4	330.0
HMVC - 160	31.504	3	38.189	3.150	35.748	31.575	0.630	0.984	161.2	380.6
HMVC - 170	33.473	3	40.157	3.268	37.874	33.543	0.630	1.024	177.6	418.0
HMVC - 180	35.441	3	42.126	3.386	39.960	35.511	0.669	1.181	192.2	462.0
HMVC - 190	37.410	3	44.291	3.386	42.087	37.480	0.669	1.181	210.2	523.6

HMVC - 10 through HMVC - 64 have American National Threads Class 3.  
 HMVC - 68 through HMVC-190 have Acme General Purpose Threads Class 3G.



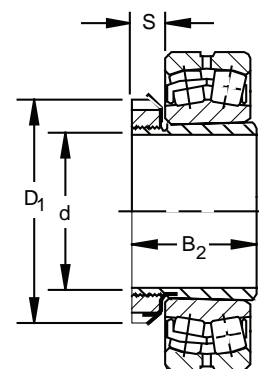




**SHAFT ADAPTER ACCESSORIES FOR TAPERED BORE BEARINGS**

**SNW/SNP - PULL TYPE SLEEVE, LOCKNUT, LOCKWASHER/LOCKPLATE ASSEMBLIES**

- The table below shows dimensions for adapter assemblies and components used in the mounting of tapered bore bearings on shafts.
- SNW assembly consists of a sleeve, locknut and lockwasher.
- SNP assembly consists of a sleeve, locknut and lockplate.



Tapered bore bearing plus SNW.

Bearing Number	Accessory Numbers				Shaft Dimensions		Adapter Dimensions			SNW/SNP Assembly Weight
	Assembly	Sleeve	Locknut	Lockwasher Lockplate	d Diameter	Tolerance +.000" 0	B <sub>2</sub>	S	D <sub>1</sub>	
					in.	in.	in.	in.	in.	lbs.

**SERIES 222K**

22209K	SNW-09	S-09	N-09	W-09	1 7/16	-.003	1 37/64	1/2	2 17/32	0.6
22210K	SNW-10	S-10	N-10	W-10	1 11/16	-.003	1 49/64	9/16	2 11/16	0.7
22211K	SNW-11	S-11	N-11	W-11	1 15/16	-.003	1 27/32	9/16	2 31/32	0.8
22212K	SNW-12	S-12	N-12	W-12	2 1/16	-.004	1 63/64	19/32	3 5/32	1.1
22213K	SNW-13	S-13	N-13	W-13	2 3/16	-.004	2 3/32	5/8	3 3/8	1.4
22214K	SNW-14	S-14	N-14	W-14	2 5/16	-.004	2 11/64	5/8	3 5/8	1.8
22215K	SNW-15	S-15	AN-15	W-15	2 7/16	-.004	2 19/64	43/64	3 7/8	2.0
22216K	SNW-16	S-16	AN-16	W-16	2 11/16	-.004	2 3/8	43/64	4 5/32	2.4
22217K	SNW-17	S-17	AN-17	W-17	2 15/16	-.004	2 31/64	45/64	4 13/32	3.0
22218K	SNW-18	S-18	AN-18	W-18	3 3/16	-.004	2 41/64	25/32	4 21/32	3.0
22219K	SNW-19	S-19	AN-19	W-19	3 5/16	-.004	2 49/64	13/16	4 15/16	3.3
22220K	SNW-20	S-20	AN-20	W-20	3 7/16	-.004	2 7/8	27/32	5 3/16	4.4
22222K	SNW-22	S-22	AN-22	W-22	3 15/16	-.004	3 13/64	29/32	5 23/32	5.0
22224K	SNW-24	S-24	AN-24	W-24	4 3/16	-.005	3 15/32	15/16	6 1/8	6.7
22226K	SNW-26	S-26	AN-26	W-26	4 7/16	-.005	3 49/64	1	6 3/4	8.6
22228K	SNW-28	S-28	AN-28	W-28	4 15/16	-.005	3 63/64	1 1/16	7 3/32	10.3
22230K	SNW-30	S-30	AN-30	W-30	5 3/16	-.005	4 15/64	1 1/8	7 11/16	13.5
22232K	SNW-32	S-32	AN-32	W-32	5 7/16	-.005	4 37/64	1 3/16	8 1/16	15.6
22234K	SNW-34	S-34	AN-34	W-34	5 15/16	-.005	4 27/32	1 7/32	8 21/32	19.4
22236K	SNW-36	S-36	AN-36	W-36	6 7/16	-.005	5 1/32	1 1/4	9 1/16	20.5
22238K	SNW-38	S-38	AN-38	W-38	6 15/16	-.005	5 17/64	1 9/32	9 15/32	23.4
22240K	SNW-40	S-40	AN-40	W-40	7 3/16	-.005	5 31/64	1 11/32	9 27/32	30.5
22244K	SNW-44	S-44	N-044	W-44	7 15/16	-.005	5 29/32	1 3/8	11	33.0

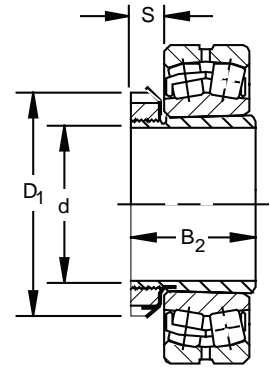
**SERIES 230K**

23024K	SNW-3024	S-3024	N-024	W-024	4 3/16	-.005	2 61/64	13/16	5 11/16	6.1
23026K	SNW-3026	S-3026	N-026	W-026	4 7/16	-.005	3 15/64	7/8	6 1/8	7.5
23028K	SNW-3028	S-3028	N-028	W-028	4 15/16	-.005	3 11/32	15/16	6 1/2	8.4
23030K	SNW-3030	S-3030	N-030	W-030	5 3/16	-.005	3 31/64	31/32	7 1/8	9.8
23032K	SNW-3032	S-3032	N-032	W-032	5 7/16	-.005	3 23/32	1 1/32	7 1/2	11.8
23034K	SNW-3034	S-3034	N-034	W-034	5 15/16	-.005	4 1/64	1 1/16	7 7/8	13.3
23036K	SNW-3036	S-3036	N-036	W-036	6 7/16	-.005	4 11/32	1 3/32	8 1/4	15.2
23038K	SNW-3038	S-3038	N-038	W-038	6 15/16	-.005	4 13/32	1 1/8	8 11/16	16.7
23040K	SNW-3040	S-3040	N-040	W-040	7 3/16	-.005	4 3/4	1 3/16	9 7/16	19.7
23044K	SNW-3044	S-3044	N-044	W-044	7 15/16	-.005	5 1/8	1 1/4	10 1/4	24.4
23048K	SNP-3048	S-3048	N-048	P-48	8 15/16	-.006	5 7/16	1 11/32	11 7/16	32.2
23052K	SNP-3052	S-3052	N-052	P-52	9 7/16	-.006	6 1/64	1 13/32	12 3/16	41.1
23056K	SNP-3056	S-3056	N-056	P-56	10 7/16	-.007	6 3/16	1 1/2	13	45.4
23060K	SNP-3060	S-3060	N-060	P-60	10 15/16	-.007	6 47/64	1 9/16	14 3/16	58.9
23064K	SNP-3064	S-3064	N-064	P-64	11 15/16	-.007	6 61/64	1 21/32	15	65.7
23068K	SNP-3068	S-3068	N-068	P-68	12 7/16	-.008	7 35/64	1 25/32	15 3/4	77.8
23072K	SNP-3072	S-3072	N-072	P-72	13 7/16	-.008	7 37/64	1 25/32	16 1/2	86.2
23076K	SNP-3076	S-3076	N-076	P-76	13 15/16	-.008	7 3/4	1 57/64	17 3/4	94.3
23080K	SNP-3080	S-3080	N-080	P-80	15	-.008	8 13/32	2 1/16	18 1/2	100.0

## SHAFT ADAPTER ACCESSORIES FOR TAPERED BORE BEARINGS

### SNW/SNP - PULL TYPE SLEEVE, LOCKNUT, LOCKWASHER/LOCKPLATE ASSEMBLIES

- The table below shows dimensions for adapter assemblies and components used in the mounting of tapered bore bearings on shafts.
- SNW assembly consists of a sleeve, locknut and lockwasher.
- SNP assembly consists of a sleeve, locknut and lockplate.



Tapered bore bearing plus SNW.

Bearing Number	Accessory Numbers				Shaft Dimensions		Adapter Dimensions			SNW/SNP Assembly Weight
	Assembly	Sleeve	Locknut	Lockwasher Lockplate	d Diameter	Tolerance +.000" 0	B <sub>2</sub>	S	D <sub>1</sub>	
					in.	in.	in.	in.	in.	lbs.

#### SERIES 223K AND 232K

22308K	SNW-108	S-108	N-08	W-08	1 5/16	-.003	2 1/64	1/2	2 1/4	0.8
22309K	SNW-109	S-109	N-09	W-09	1 7/16	-.003	2 3/64	1/2	2 17/32	0.8
22310K	SNW-110	S-110	N-10	W-10	1 11/16	-.003	2 25/64	9/16	2 11/16	0.9
22311K	SNW-111	S-111	N-11	W-11	1 15/16	-.003	2 33/64	9/16	2 31/32	0.9
22312K	SNW-112	S-112	N-12	W-12	2 1/16	-.004	2 21/32	19/32	3 5/32	1.2
22313K	SNW-113	S-113	N-13	W-13	2 3/16	-.004	2 49/64	5/8	3 3/8	1.7
22314K	SNW-114	S-114	N-14	W-14	2 5/16	-.004	2 61/64	5/8	3 5/8	2.3
22315K	SNW-115	S-115	AN-15	W-15	2 7/16	-.004	3 5/64	43/64	3 7/8	3.0
22316K	SNW-116	S-116	AN-16	W-16	2 11/16	-.004	3 13/64	43/64	4 5/32	3.2
22317K	SNW-117	S-117	AN-17	W-17	2 15/16	-.004	3 5/16	45/64	4 13/32	3.5
22318K	SNW-118	S-118	AN-18	W-18	3 3/16	-.004	3 35/64	25/32	4 21/32	4.0
22319K	SNW-119	S-119	AN-19	W-19	3 5/16	-.004	3 45/64	13/16	4 15/16	5.0
22320K	23220K	SNW-120	S-120	AN-20	W-20	3 7/16	3 31/32	27/32	5 3/16	6.2
22322K	23222K	SNW-122	S-122	AN-22	W-22	3 15/16	4 11/32	29/32	5 23/32	6.5
22324K	23224K	SNW-124	S-124	AN-24	W-24	4 3/16	4 41/64	15/16	6 1/8	8.0
22326K	23226K	SNW-126	S-126	AN-26	W-26	4 7/16	4 63/64	1	6 3/4	12.4
22328K	23228K	SNW-128	S-128	AN-28	W-28	4 15/16	5 21/64	1 1/16	7 3/32	13.0
22330K	23230K	SNW-130	S-130	AN-30	W-30	5 3/16	5 5/8	1 1/8	7 11/16	17.6
22332K	23232K	SNW-132	S-132	AN-32	W-32	5 7/16	5 59/64	1 3/16	8 1/16	18.5
22334K	23234K	SNW-134	S-134	AN-34	W-34	5 15/16	6 3/16	1 7/32	8 21/32	21.0
22336K	23236K	SNW-136	S-136	AN-36	W-36	6 7/16	6 23/64	1 1/4	9 1/16	22.5
22338K	23238K	SNW-138	S-138	AN-38	W-38	6 15/16	6 3/4	1 9/32	9 15/32	28.0
22340K	23240K	SNW-140	S-140	AN-40	W-40	7 3/16	7 7/32	1 11/32	9 27/32	36.0
22344K	23244K	SNW-144	S-144	N-044	W-44	7 15/16	7 3/32	1 3/8	11	47.0
22348K	23248K	SNP-148	S-148	N-048	P-48	8 15/16	8 7/64	1 11/32	11 7/16	38.3
22352K	23252K	SNP-152	S-152	N-052	P-52	9 7/16	8 49/64	1 13/32	12 13/16	53.4
22356K	23256K	SNP-3256	S-3256	N-056	P-56	10 7/16	8 15/16	1 1/2	13	61.3

#### SERIES 231K

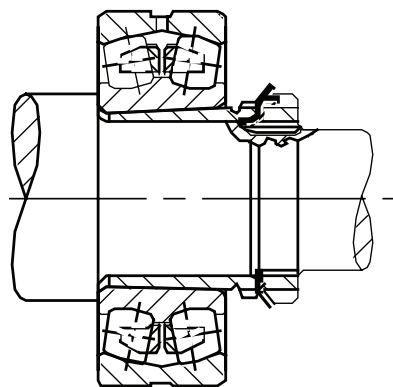
23122K	SNW-3122	S-22	N-022	W-022	3 15/16	-.004	3 13/64	25/32	5 5/32	4.2
23124K	SNW-3124	S-24	N-024	W-024	4 3/16	-.005	3 19/32	13/16	5 11/16	5.8
23126K	SNW-3126	S-26	N-026	W-026	4 7/16	-.005	3 49/64	7/8	6 1/8	8.3
23128K	SNW-3128	S-28	N-028	W-028	4 15/16	-.005	3 63/64	15/16	6 1/2	8.8
23130K	SNW-3130	S-30	N-030	W-030	5 3/16	-.005	4 15/64	31/32	7 1/8	13.7
23132K	SNW-3132	S-32	N-032	W-032	5 7/16	-.005	4 37/64	1 1/32	7 1/2	13.3
23134K	SNW-3134	S-34	N-034	W-034	5 15/16	-.005	4 27/32	1 1/16	7 7/8	16.1
23136K	SNW-3136	S-36	N-036	W-036	6 7/16	-.005	5 1/32	1 3/32	8 1/4	17.1
23138K	SNW-3138	S-38	N-038	W-038	6 15/16	-.005	5 17/64	1 1/8	8 11/16	19.7
23140K	SNW-3140	S-40	N-040	W-040	7 3/16	-.005	5 31/64	1 3/16	9 7/16	28.4
23144K	SNW-3144	S-44	N-044	W-044	7 15/16	-.005	5 29/32	1 1/4	10 1/4	28.1
23148K	SNP-3148	S-48	N-048	P-48	8 15/16	-.006	6 41/64	1 11/32	11 7/16	36.0
23152K	SNP-3152	S-52	N-052	P-52	9 7/16	-.006	7 19/32	1 13/32	12 3/16	39.0
23156K	SNP-3156	S-3156	N-056	P-56	10 7/16	-.007	7 49/64	1 1/2	13	60.0
23160K	SNP-3160	S-3160	N-060	P-60	10 15/16	-.007	8 3/8	1 9/16	14 3/16	65.0
23164K	SNP-3164	S-3164	N-064	P-64	11 15/16	-.007	9 7/64	1 21/32	15	70.0



## SHAFT ADAPTER ACCESSORIES FOR TAPERED BORE BEARINGS

### PUSH TYPE REMOVABLE SLEEVE, LOCKNUT AND LOCKWASHER

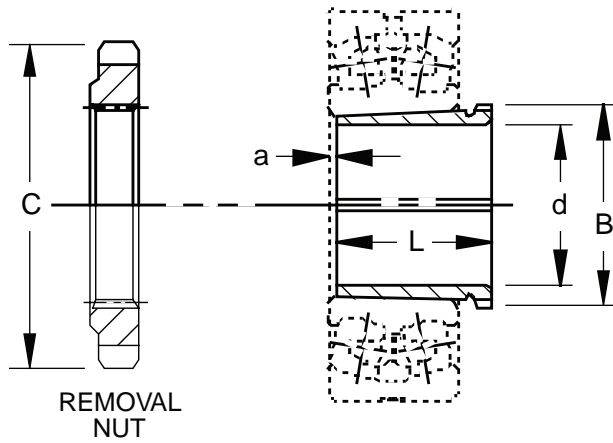
- The chart below shows dimensions for adapter assemblies and components used in the tapered bore bearings on shafts.



Bearing Number	Accessory Numbers				Shaft Dimensions		Adapter Dimensions			C Removal Nut O.D.	Sleeve Weight
	Sleeve	Locknut	Lockwasher Lockplate	Removal Nut	d Diameter	Tolerance +.000* 0	B Pitch Diameter	L	a		
					mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	kg. lbs.

#### SERIES 222K

22216K	SK-8022	N-14	W-14	AN-18	70 2.7559	-.10 -.004	88.19 3.472	50 1.969	3.50 0.138	118.39 4.661	0.5 1.2
22217K	SK-8522	AN-15	W-15	AN-19	75 2.9528	-.10 -.004	93.35 3.675	52 2.047	3.50 0.138	125.55 4.943	0.6 1.4
22218K	SK-9022	AN-16	W-16	AN-20	80 3.1496	-.10 -.004	98.12 3.863	53 2.087	3.50 0.138	131.90 5.193	0.6 1.5
22219K	SK-9522	AN-17	W-17	AN-21	85 3.3465	-.10 -.004	103.28 4.066	57 2.244	4.00 0.157	138.25 5.443	0.8 1.8
22220K	SK-10022	AN-18	W-18	AN-22	90 3.5433	-.10 -.004	109.12 4.269	59 2.323	4.00 0.157	145.39 5.724	0.9 2.0
22222K	SK-11022	AN-20	W-20	ARN-22	100 3.9370	-.10 -.004	119.94 4.722	65 2.559	4.00 0.157	158.75 6.250	1.1 2.4
22224K	SK-12022	AN-22	W-22	ARN-24	110 4.3307	-.13 -.005	130.28 5.129	72 2.835	4.00 0.157	174.63 6.875	1.4 3.1
22226K	SK-13022	AN-22	W-22	ARN-26	115 4.5276	-.13 -.005	141.38 5.566	78 3.071	4.00 0.157	184.15 7.250	2.2 5.0
22228K	SK-14022	AN-24	W-24	RN-28	125 4.9213	-.13 -.005	152.73 6.013	82 3.228	5.00 0.197	200.03 7.875	2.6 5.8
22230K	SK-15022	AN-26	W-26	RN-30	135 5.3150	-.13 -.005	163.04 6.419	88 3.465	5.00 0.197	209.55 8.250	3.0 6.8
22232K	SK-16022	AN-28	W-28	RN-32	140 5.5118	-.13 -.005	173.76 6.841	96 3.780	5.00 0.197	225.43 8.875	4.5 9.9
22234K	SK-17022	AN-30	W-30	RN-34	150 5.9055	-.13 -.005	184.07 7.247	104 4.095	5.00 0.197	234.95 9.250	5.2 11.5
22236K	SK-18022	AN-32	W-32	RN-36	160 6.2992	-.13 -.005	194.79 7.669	104 4.095	5.00 0.197	247.65 9.750	5.6 12.5
22238K	SK-19022	AN-34	W-34	RN-38	170 6.6929	-.13 -.005	205.92 8.107	112 4.409	5.00 0.197	269.88 10.625	6.5 14.5
22240K	SK-20022	AN-36	W-36	N-044	180 7.0866	-.13 -.005	217.02 8.544	118 4.646	5.00 0.197	279.53 11.005	7.4 16.3
22244K	SK-22022	AN-40	W-40	N-048	200 7.8740	-.13 -.005	236.98 9.330	130 5.118	6.00 0.236	290.65 11.443	8.8 19.6
22248K	SK-24022	N-44	W-44	N-052	220 8.6614	-.15 -.006	256.03 10.080	144 5.669	6.00 0.236	309.70 12.193	11.0 24.3
22252K	SK-26022	N-048	P-48	N-056	240 9.4488	-.15 -.006	276.66 10.892	155 6.102	6.00 0.236	330.33 13.005	14.0 30.9
22256K	SK-28022	N-052	P-52	RN-56	260 10.2362	-.15 -.006	301.27 11.861	155 6.102	8.00 0.315	425.45 16.750	15.0 33.1
22260K	SK-30022	N-056	P-56	RN-60	280 11.0236	-.15 -.006	325.88 12.830	170 6.693	8.00 0.315	416.10 16.382	17.7 39.2
22264K	SK-32022	N-060	P-60	RN-64	300 11.8110	-.15 -.006	345.72 13.611	180 7.087	10.00 0.394	431.8 17.000	21.0 46.3



Tapered bore bearing mounted with push type removable sleeve.



Bearing Number	Accessory Numbers				Shaft Dimensions		Adapter Dimensions			C Removal Nut O.D.	Sleeve Weight
	Sleeve	Locknut	Lockwasher Lockplate	Removal Nut	d Diameter	Tolerance +.000" 0	B Pitch Diameter	L	a		
					mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	kg lbs.

**SERIES 223K**

22308K	SK-4023	N-07	W-07	N-09	35 1.3780	-.08 -.003	43.94 1.730	40 1.575	3.00 0.118	64.41 2.536	0.1 0.2
22309K	SK-4523	N-08	W-08	N-10	40 1.5748	-.08 -.003	49.02 1.930	44 1.732	3.00 0.118	68.40 2.693	0.1 0.3
22310K	SK-5023	N-09	W-09	RN-10	45 1.7717	-.08 -.003	55.04 2.167	50 1.969	3.00 0.118	76.20 3.000	0.2 0.4
22311K	SK-5523	N-10	W-10	RN-11	50 1.9685	-.08 -.003	60.20 2.370	54 2.126	3.00 0.118	81.76 3.219	0.2 0.5
22312K	SK-6023	N-11	W-11	RN-12	55 2.1654	-.10 -.004	65.76 2.589	57 2.244	3.50 0.138	87.33 3.438	0.3 0.6
22313K	SK-6523	N-12	W-12	AN-15	60 2.3622	-.10 -.004	73.10 2.878	61 2.402	3.50 0.138	98.55 3.880	0.3 0.8
22314K	SK-7023	N-12	W-12	AN-16	60 2.3622	-.10 -.004	78.28 3.082	65 2.559	3.50 0.138	105.69 4.161	0.6 1.5
22315K	SK-7523	N-13	W-13	AN-17	65 2.5591	-.10 -.004	83.44 3.285	69 2.717	3.50 0.138	112.04 4.411	0.8 1.7
22316K	SK-8023	N-14	W-14	AN-18	70 2.7559	-.10 -.004	88.19 3.472	72 2.835	3.50 0.138	118.39 4.661	0.9 2.0
22317K	SK-8523	AN-15	W-15	AN-19	75 2.9528	-.10 -.004	93.35 3.675	75 2.953	3.50 0.138	125.55 4.943	1.0 2.2
22318K	SK-9023	AN-16	W-16	AN-20	80 3.1496	-.10 -.004	98.12 3.863	80 3.150	3.50 0.138	131.90 5.193	1.1 2.5
22319K	SK-9523	AN-17	W-17	AN-21	85 3.3465	-.10 -.004	103.28 4.066	85 3.346	4.00 0.157	138.25 5.443	1.3 2.9
22320K	SK-10023	AN-18	W-18	AN-22	90 3.5433	-.10 -.004	109.12 4.269	90 3.543	4.00 0.157	145.39 5.724	1.5 3.3
22322K	SK-11023	AN-20	W-20	ARN-22	100 3.9370	-.10 -.004	119.94 4.722	98 3.858	4.00 0.157	158.75 6.250	1.9 4.2
22324K	SK-12023	AN-22	W-22	ARN-24	110 4.3307	-.13 -.005	130.28 5.129	105 4.134	4.00 0.157	174.63 6.875	2.2 5.0
22326K	SK-13023	AN-22	W-22	ARN-26	115 4.5276	-.13 -.005	141.38 5.566	115 4.528	4.00 0.157	184.15 7.250	3.6 8.0
22328K	SK-14023	AN-24	W-24	RN-28	125 4.9213	-.13 -.005	152.73 6.013	125 4.921	5.00 0.197	200.03 7.875	4.3 9.5
22330K	SK-15023	AN-26	W-26	RN-30	135 5.3150	-.13 -.005	163.04 6.419	135 5.315	5.00 0.197	209.55 8.250	5.1 11.4
22332K	SK-16023	AN-28	W-28	RN-32	140 5.5118	-.13 -.005	173.76 6.841	140 5.512	6.00 0.236	225.43 8.875	7.0 15.5
22334K	SK-17023	AN-30	W-30	RN-34	150 5.9055	-.13 -.005	184.07 7.247	146 5.748	6.00 0.236	234.95 9.250	7.8 17.2
22336K	SK-18023	AN-32	W-32	RN-36	160 6.2992	-.13 -.005	194.79 7.669	154 6.063	6.00 0.236	247.65 9.750	9.1 20.2
22338K	SK-19023	AN-34	W-34	RN-38	170 6.6929	-.13 -.005	205.92 8.107	160 6.299	7.00 0.276	269.88 10.625	10.0 22.1
22340K	SK-20023	AN-36	W-36	N-044	180 7.0866	-.13 -.005	217.02 8.544	170 6.693	7.00 0.276	279.53 11.005	11.4 25.2
22344K	SK-22023	AN-40	W-40	N-048	200 7.8740	-.13 -.005	236.98 9.330	181 7.126	8.00 0.315	290.65 11.443	13.3 29.5
22348K	SK-24023	N-44	W-44	N-052	220 8.6614	-.15 -.006	256.03 10.080	189 7.441	8.00 0.315	309.70 12.193	15.5 34.2
22352K	SK-26023	N-048	P-48	N-056	240 9.4488	-.15 -.006	276.66 10.892	200 7.874	8.00 0.315	330.33 13.005	18.2 40.2
22356K	SK-28023	N-052	P-52	RN-56	260 10.2362	-.15 -.006	301.27 11.861	210 8.268	10.00 0.394	425.45 16.75	22.0 48.5

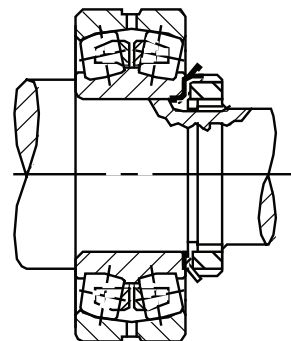




**SHAFT ADAPTER ACCESSORIES FOR STRAIGHT BORE BEARINGS**

**LOCKNUT AND LOCKWASHER**

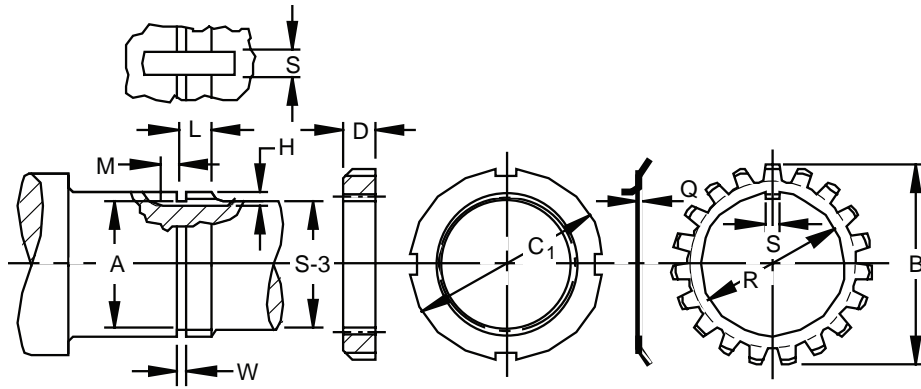
- The chart below shows dimensions for locknuts and lockwashers used in the mounting of straight bore bearings on shafts.
- Other dimensions and tolerances related to shaft configurations are also shown.
- Dimensions are presented according to bearing bore size and are applicable to bearings in the various series (e.g., 222 and 223 etc.).



B

Bearing Bore	Locknut	Lockwasher	Threads Per Inch	Threads					
				Major Diameter		Pitch Diameter		Minor Dia.	A Relief Dia.
mm				Min.	Max.	Min.	Max.	mm inch	mm inch
35	N 07	W 07	18	34.740 1.3678	34.950 1.3760	33.930 1.3359	34.030 1.3399	33.220 1.3078	32.820 1.2922
40	N 08	W 08	18	39.490 1.5548	39.700 1.5630	38.670 1.5224	38.780 1.5269	37.970 1.4948	37.570 1.4792
45	N 09	W 09	18	44.670 1.7588	44.880 1.7670	43.850 1.7264	43.960 1.7309	43.150 1.6988	42.750 1.6832
50	N 10	W 10	18	49.750 1.9588	49.960 1.9670	48.930 1.9264	49.050 1.9309	48.230 1.8988	47.830 1.8832
55	N 11	W 11	18	54.580 2.1488	54.790 2.1570	53.740 2.1158	53.870 2.1209	53.060 2.0888	52.660 2.0732
60	N 12	W 12	18	59.740 2.3518	59.940 2.3600	58.900 2.3188	59.030 2.3239	58.210 2.2918	57.820 2.2762
65	N 13	W 13	18	64.510 2.5398	64.720 2.5480	63.670 2.5068	63.800 2.5119	62.990 2.4798	62.590 2.4642
70	N 14	W 14	18	69.670 2.7428	69.880 2.7510	68.830 2.7098	68.960 2.7149	68.140 2.6828	67.750 2.6672
75	AN 15	W 15	12	74.210 2.9218	74.500 2.9330	72.990 2.8735	73.120 2.8789	71.900 2.8308	71.110 2.7995
80	AN 16	W 16	12	79.400 3.1258	79.680 3.1370	78.160 3.0770	78.310 3.0829	77.080 3.0348	76.290 3.0035
85	AN 17	W 17	12	84.550 3.3288	84.840 3.3400	83.310 3.2800	83.460 3.2859	82.240 3.2378	81.450 3.2065
90	AN 18	W 18	12	89.300 3.5158	89.590 3.5270	88.020 3.4655	88.210 3.4729	86.990 3.4248	86.200 3.3935
95	AN 19	W 19	12	94.460 3.7188	94.740 3.7300	93.180 3.6685	93.370 3.6759	92.150 3.6278	91.350 3.5965
100	AN 20	W 20	12	99.230 3.9068	99.520 3.9180	97.960 3.8565	98.140 3.8639	96.920 3.8158	96.130 3.7845
105	AN 21	W 21	12	104.410 4.1108	104.700 4.1220	103.110 4.0596	103.320 4.0679	102.100 4.0198	101.310 3.9885
110	AN 22	W 22	12	109.570 4.3138	109.860 4.3250	108.270 4.2626	108.480 4.2709	107.260 4.2228	106.460 4.1915
120	AN 24	W 24	12	119.500 4.7048	119.790 4.7160	118.200 4.6536	118.410 4.6619	117.190 4.6138	116.400 4.5825
130	AN 26	W 26	12	129.410 5.0948	129.690 5.1060	128.110 5.0436	128.320 5.0519	127.100 5.0038	126.300 4.9725
140	AN 28	W 28	12	139.340 5.4858	139.620 5.4970	138.040 5.4346	138.250 5.4429	137.030 5.3948	136.230 5.3635
150	AN 30	W 30	12	149.270 5.8768	149.560 5.8880	147.970 5.8256	148.180 5.8339	146.960 5.7858	146.160 5.7545
160	AN 32	W 32	8	159.230 6.2688	159.610 6.2840	157.320 6.1937	157.550 6.2028	155.720 6.1306	154.920 6.0993
170	AN 34	W 34	8	168.750 6.6438	169.140 6.6590	166.850 6.5687	167.080 6.5778	165.240 6.5056	164.450 6.4743
180	AN 36	W 36	8	179.090 7.0508	179.480 7.0660	177.180 6.9757	177.410 6.9848	175.580 6.9126	174.790 6.8813
190	AN 38	W 38	8	189.400 7.4568	189.790 7.4720	187.500 7.3817	187.730 7.3908	185.890 7.3186	185.100 7.2873
200	AN 40	W 40	8	198.930 7.8318	199.310 7.8470	196.960 7.7544	197.250 7.7658	195.420 7.6936	194.620 7.6623
220	N 044	W 44	8	218.770 8.6128	219.150 8.6280	216.780 8.5347	217.090 8.5468	215.250 8.4746	214.460 8.4433

(1) See page B395 for suggested S-3 shaft limits.



S-3 <sup>(1)</sup>	Shaft					Locknut		Lockwasher			
	W + 1/64 0	L + 1/64 0	H + 1/64 0	S + 1/64 0	M + 1/64 0	C <sub>1</sub>	D	Q	R	B	S
mm inch	mm inch	mm inch	mm inch	mm inch	mm inch	mm inch	mm inch	mm inch	mm inch	mm inch	mm inch
31.750 1 1/4	2.4 3/32	12.7 1/2	2.4 3/32	4.8 3/16	3.2 1/8	52.39 2 1/16	11.40 0.448	1.30 0.050	36.00 1.416	57.20 2 1/4	4.50 0.176
36.510 1 7/16	3.2 1/8	13.5 17/32	2.4 3/32	7.9 5/16	3.2 1/8	57.15 2 1/4	11.40 0.448	1.50 0.058	40.70 1.603	62.70 2 15/32	7.40 0.290
42.860 1 11/16	3.2 1/8	13.5 17/32	2.4 3/32	7.9 5/16	4.0 5/32	64.30 2 17/32	11.40 0.448	1.50 0.058	46.20 1.817	69.50 2 47/64	7.40 0.290
47.630 1 7/8	3.2 1/8	15.1 19/32	2.4 3/32	7.9 5/16	4.0 5/32	68.30 2 11/16	13.00 0.510	1.50 0.058	51.20 2.017	74.20 2 59/64	7.40 0.290
52.390 2 1/16	3.2 1/8	15.1 19/32	3.2 1/8	7.9 5/16	4.0 5/32	75.40 2 31/32	13.00 0.510	1.60 0.063	56.10 2.207	79.00 3 1/64	7.40 0.290
57.150 2 1/4	3.2 1/8	15.9 5/8	3.2 1/8	7.9 5/16	4.0 5/32	80.20 3 5/32	13.70 0.541	1.60 0.063	61.60 2.425	85.00 3 11/32	7.40 0.290
61.910 2 7/16	3.2 1/8	16.7 21/32	3.2 1/8	7.9 5/16	4.0 5/32	85.70 3 3/8	14.60 0.573	1.60 0.063	66.40 2.613	90.90 3 37/64	7.40 0.290
66.680 2 5/8	3.2 1/8	16.7 21/32	3.2 1/8	7.9 5/16	6.4 1/4	92.10 3 5/8	14.60 0.573	1.60 0.063	71.50 2.816	97.20 3 53/64	7.40 0.290
71.440 2 13/16	4.0 5/32	17.5 11/16	3.2 1/8	7.9 5/16	6.4 1/4	98.40 3 7/8	15.30 0.604	1.60 0.072	76.30 3.003	104.40 4 1/64	7.40 0.290
76.200 3	4.0 5/32	17.5 11/16	3.2 1/8	9.5 3/8	6.4 1/4	105.60 4 5/32	15.30 0.604	1.80 0.072	81.50 3.207	111.10 4 3/8	9.00 0.353
80.960 3 1/16	4.0 5/32	16.7 21/32	3.2 1/8	9.5 3/8	6.4 1/4	111.90 4 13/32	16.10 0.635	1.80 0.072	87.00 3.425	117.50 4 5/8	9.00 0.353
85.730 3 3/8	4.0 5/32	20.6 13/16	4.0 5/32	9.5 3/8	6.4 1/4	118.30 4 21/32	17.70 0.698	2.40 0.094	91.70 3.612	125.40 4 15/16	9.00 0.353
90.490 3 9/16	4.0 5/32	21.4 27/32	4.0 5/32	9.5 3/8	6.4 1/4	125.40 4 15/16	18.50 0.729	2.40 0.094	97.30 3.830	132.60 5 1/32	9.00 0.353
96.840 3 13/16	4.0 5/32	22.2 7/8	4.0 5/32	9.5 3/8	7.9 5/16	131.80 5 3/16	19.30 0.760	2.40 0.094	102.10 4.018	139.70 5 1/2	9.00 0.353
100.010 3 15/16	4.0 5/32	22.2 7/8	4.0 5/32	9.5 3/8	7.9 5/16	138.10 5 7/16	19.30 0.760	2.40 0.094	107.20 4.222	144.90 5 45/64	9.00 0.353
106.360 4 1/16	4.0 5/32	23 29/32	4.8 3/16	9.5 3/8	7.9 5/16	145.30 5 23/32	20.10 0.791	3.20 0.125	112.40 4.425	154.00 6 1/16	9.00 0.353
115.890 4 9/16	4.0 5/32	23.8 15/16	4.8 3/16	9.5 3/8	7.9 5/16	155.60 6 1/8	20.90 0.823	3.20 0.125	122.70 4.831	164.30 6 15/32	9.00 0.353
125.410 4 15/16	4.0 5/32	25.4 1	4.8 3/16	12.7 1/2	7.9 5/16	171.50 6 3/4	22.50 0.885	3.20 0.125	132.70 5.226	178.60 7 1/32	11.10 0.435
134.940 5 1/16	4.0 5/32	27 1 1/16	4.8 3/16	15.9 5/8	7.9 5/16	180.20 7 3/32	24.10 0.948	3.20 0.125	142.70 5.617	188.90 7 7/16	15.00 0.590
146.050 5 3/4	4.0 5/32	28.6 1 1/8	5.6 7/32	15.9 5/8	9.5 3/8	195.30 7 11/16	24.90 0.979	4.00 0.156	152.90 6.018	204.80 8 1/16	15.00 0.590
153.990 6 1/16	6.4 1/4	30.2 1 3/16	6.0 15/64	15.9 5/8	9.5 3/8	204.80 8 1/16	26.40 1.041	4.00 0.156	163.20 6.424	214.30 8 7/16	15.00 0.590
163.510 6 7/16	6.4 1/4	31 1 7/32	6.0 15/64	19.1 3/4	9.5 3/8	219.90 8 21/32	27.30 1.073	4.00 0.156	172.70 6.799	230.20 9 1/16	18.20 0.715
174.630 6 7/8	6.4 1/4	31.8 1 1/4	6.0 15/64	19.1 3/4	9.5 3/8	230.20 9 1/16	28.00 1.104	4.00 0.156	183.00 7.206	239.70 9 7/16	18.20 0.715
184.150 7 1/4	6.4 1/4	32.5 1 9/32	6.0 15/64	19.1 3/4	9.5 3/8	240.50 9 15/32	28.80 1.135	4.00 0.156	193.30 7.612	250.80 9 7/8	18.20 0.715
193.680 7 5/8	6.4 1/4	34.1 1 11/32	6.0 15/64	22.2 7/8	9.5 3/8	250.00 9 27/32	30.40 1.198	4.00 0.156	203.60 8.017	261.90 10 3/16	21.30 0.840
211.140 8 5/16	6.4 1/4	34.9 1 3/8	9.5 3/8	27.0 1 1/16	9.5 3/8	279.40 11	31.80 1.250	3.20 0.125	221.10 8.703	290.50 11 7/16	23.90 0.940

<sup>(1)</sup> See page B395 for suggested S-3 shaft limits.

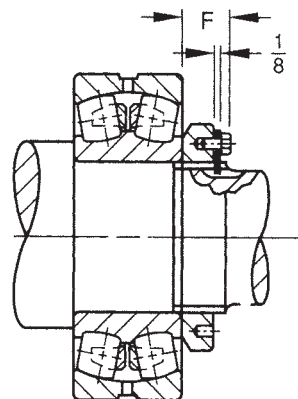




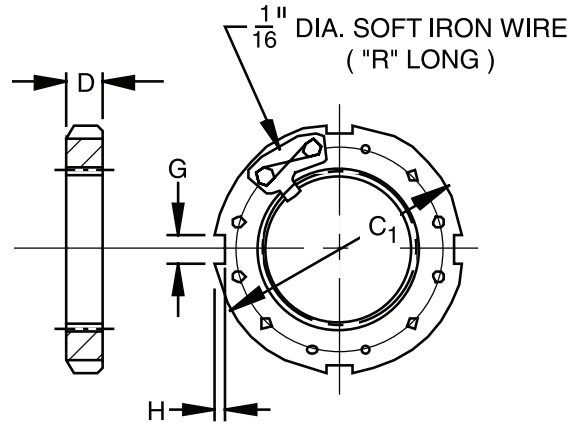
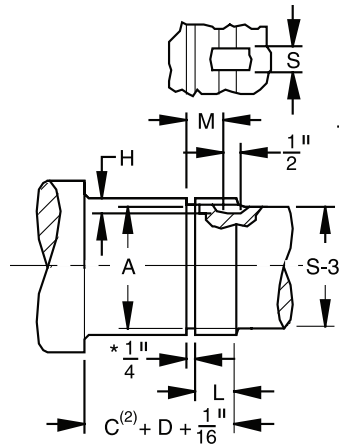
## SHAFT ADAPTER ACCESSORIES FOR STRAIGHT BORE BEARINGS

### LOCKNUT AND LOCKPLATE

- The chart below shows dimensions for locknuts and lockplates used in the mounting of straight bore bearings on shafts.
- Other dimensions and tolerances related to shaft configurations are also shown.
- Dimensions are presented according to bearing bore size and are applicable to bearings in the various series (e.g., 222,223 etc.).



Bearing Bore	Locknut	Lockplate	Threads Per Inch	Threads					
				Major Diameter		Pitch Diameter		Minor Dia.	A Relief Dia.
				Min.	Max.	Min.	Max.		
mm				mm inch	mm inch	mm inch	mm inch	mm inch	mm inch
240	N 048	P 48	6	239.31 9.4218	239.83 9.442	236.76 9.3213	237.08 9.3337	234.63 9.2374	233.44 9.1905
260	N 052	P 52	6	258.36 10.1718	258.88 10.192	255.8 10.0707	256.13 10.0837	253.68 9.9874	252.49 9.9405
280	N 056	P 56	6	278.99 10.9838	279.50 11.004	276.42 10.8827	276.75 10.8957	274.31 10.7994	273.11 10.7525
300	N 060	P 60	6	298.83 11.7648	299.34 11.785	296.26 11.6637	296.59 11.6767	294.14 11.5804	292.95 11.5335
320	N 064	P 64	6	318.56 12.5418	319.08 12.562	315.98 12.4402	316.32 12.4537	313.88 12.3574	312.69 12.3105
340	N 068	P 68	5	337.49 13.287	337.90 13.303	334.95 13.187	335.36 13.203	332.31 13.083	331.11 13.036
360	N 072	P 72	5	358.60 14.118	359.00 14.134	356.06 14.018	356.46 14.034	353.42 13.914	352.22 13.867
380	N 076	P 76	5	378.59 14.905	378.99 14.921	376.05 14.805	376.45 14.821	373.41 14.701	372.21 14.654
400	N 080	P 80	5	398.60 15.693	399.01 15.709	396.06 15.593	396.47 15.609	393.42 15.489	392.23 15.442
420	N 084	P 84	5	418.59 16.480	419.00 16.496	416.05 16.380	416.46 16.396	413.41 16.276	412.22 16.229
440	N 088	P 88	5	438.58 17.267	438.99 17.283	436.05 17.167	436.45 17.183	433.40 17.063	432.21 17.016
460	N 092	P 92	5	458.60 18.055	459.00 18.071	456.06 17.955	456.46 17.971	453.42 17.851	452.22 17.804
480	N 096	P 96	5	478.59 18.842	478.99 18.858	476.05 18.742	476.45 18.758	473.41 18.638	472.21 18.591
500	N 500	P 500	5	498.60 19.630	499.01 19.646	496.06 19.530	496.47 19.546	493.42 19.426	492.23 19.379
530	N 530	P 530	4	528.50 20.807	529.01 20.827	525.32 20.682	525.83 20.702	522.15 20.557	520.55 20.494
560	N 560	P 560	4	558.50 21.988	559.00 22.008	555.32 21.863	555.83 21.883	552.15 21.738	550.55 21.675
600	N 600	P 600	4	598.50 23.563	599.01 23.583	595.33 23.438	595.83 23.458	592.15 23.313	590.55 23.250
630	N 630	P 630	4	628.50 24.744	629.01 24.764	625.32 24.619	625.83 24.639	622.15 24.494	620.55 24.431
670	N 670	P 670	4	668.50 26.319	669.01 26.339	665.33 26.194	665.84 26.214	662.15 26.069	660.55 26.006
710	N 710	P 710	3	708.33 27.887	709.02 27.914	704.09 27.720	704.77 27.747	700.02 27.56	698.42 27.497
750	N 750	P 750	3	748.34 29.462	749.02 29.489	744.09 29.295	744.78 29.322	740.03 29.135	738.43 29.072
800	N 800	P 800	3	798.32 31.430	799.01 31.457	794.08 31.263	794.77 31.290	790.02 31.103	788.42 31.040
850	N 850	P 850	3	848.34 33.399	849.02 33.426	844.09 33.232	844.78 33.259	840.03 33.072	838.43 33.009
900	N 900	P 900	3	898.32 35.367	899.01 35.394	894.08 35.200	894.77 35.227	890.02 35.040	888.42 34.977
950	N 950	P 950	3	948.33 37.336	949.02 37.363	944.09 37.169	944.78 37.196	940.03 37.009	938.43 36.946



\* Sizes N670 and above :  $\frac{3}{8}$ "

Shaft					Locknut / Lockplate					
S-3 <sup>(1)</sup>	L + $\frac{1}{64}$ 0	H + $\frac{1}{64}$ 0	S + $\frac{1}{64}$ 0	M + $\frac{1}{64}$ 0	C <sub>1</sub>	D	G	H ±.010"	R	F
mm inch	mm inch	mm inch	mm inch	mm inch	mm inch	mm inch	mm inch	mm inch	mm inch	mm inch
233.36 9 3/16	42.86 1 11/16	11.1 7/16	28.6 1 1/8	34.9 1 3/8	290.5 11 1/16	34.1 1 11/32	22.48 0.885	9.5 3/8	203.2 8	43.26 1 49/64
252.41 9 15/16	45.24 1 29/32	11.1 7/16	30.2 1 3/16	37.3 1 15/32	309.6 12 3/16	35.7 1 13/32	22.48 0.885	9.5 3/8	228.6 9	44.85 1 49/64
273.05 10 3/4	47.63 1 7/8	11.1 7/16	31.8 1 1/4	39.7 1 9/16	330.2 13	38.1 1 1/2	25.65 1.010	9.5 3/8	228.6 9	47.23 1 59/64
292.1 11 1/2	49.21 1 15/16	11.1 7/16	34.9 1 3/8	41.3 1 5/8	360.4 14 3/16	39.7 1 9/16	25.65 1.010	12.7 1/2	254.0 10	50.01 1 51/32
312.74 12 3/16	51.59 2 1/32	11.1 7/16	36.5 1 7/16	43.7 1 23/32	381.0 15	42.1 1 21/32	25.65 1.010	12.7 1/2	254.0 10	52.39 2 1/16
331.79 13 1/16	56.36 2 1/32	11.1 7/16	38.1 1 1/2	48.4 1 29/32	400.1 15 3/4	45.2 1 29/32	25.65 1.010	12.7 1/2	279.4 11	55.56 2 3/16
350.84 13 13/16	56.36 2 1/32	12.7 1/2	38.1 1 1/2	48.4 1 29/32	419.1 16 1/2	45.2 1 29/32	32.00 1.260	12.7 1/2	279.4 11	55.56 2 3/16
371.48 14 5/8	59.53 2 11/32	12.7 1/2	38.1 1 1/2	51.59 2 1/32	450.9 17 3/4	48.4 1 29/32	32.00 1.260	15.1 19/32	304.8 12	61.12 2 19/32
390.53 15 3/8	63.50 2 1/2	12.7 1/2	41.3 1 5/8	55.6 2 3/16	469.9 18 1/2	52.4 2 1/16	32.00 1.260	15.1 19/32	330.2 13	65.09 2 3/16
411.16 16 3/16	63.50 2 1/2	12.7 1/2	41.3 1 5/8	55.6 2 3/16	490.5 19 9/16	52.4 2 1/16	35.18 1.385	15.1 19/32	330.2 13	65.09 2 3/16
431.80 17	71.44 2 13/16	12.7 1/2	46.0 1 13/16	63.50 2 1/2	520.7 20 1/2	60.3 2 3/8	35.18 1.385	15.1 19/32	355.6 14	75.41 2 31/32
450.85 17 3/4	71.44 2 13/16	12.7 1/2	46.0 1 13/16	63.50 2 1/2	539.8 21 1/4	60.3 2 3/8	35.18 1.385	15.1 19/32	406.4 16	75.41 2 31/32
469.9 18 1/2	71.44 2 13/16	12.7 1/2	46.0 1 13/16	63.50 2 1/2	560.4 22 1/16	60.3 2 3/8	38.35 1.510	15.1 19/32	406.4 16	75.41 2 31/32
489.0 19 1/4	79.4 3 1/8	12.7 1/2	46.0 1 13/16	71.4 2 13/16	579.4 22 13/16	68.3 2 11/16	38.35 1.510	15.1 19/32	406.4 16	83.3 3 3/32
517.5 20 3/8	79.4 3 1/8	12.7 1/2	46.0 1 13/16	71.4 2 13/16	630.2 24 13/16	68.3 2 11/16	41.53 1.635	20.6 13/16	425.5 16 3/4	83.3 3 3/32
549.3 21 5/8	85.7 3 3/8	12.7 1/2	46.0 1 13/16	77.8 3 1/16	649.3 25 9/16	74.6 2 15/16	41.53 1.635	20.6 13/16	476.3 18 3/4	89.7 3 11/32
587.4 23 1/8	85.7 3 3/8	12.7 1/2	46.0 1 13/16	77.8 3 1/16	700.1 27 9/16	74.6 2 15/16	41.53 1.635	20.6 13/16	508.0 20	89.7 3 11/32
619.1 24 3/8	85.7 3 3/8	12.7 1/2	50.8 2	77.8 3 1/16	730.3 28 3/4	74.6 2 15/16	47.88 1.885	20.6 13/16	520.7 20 1/2	92.1 3 5/8
657.2 25 7/8	90.5 3 5/16	12.7 1/2	50.8 2	82.6 3 1/4	779.5 30 11/16	79.4 3 1/8	47.88 1.885	20.6 13/16	546.1 21 1/2	96.8 3 19/16
695.3 27 3/8	101.6 4	15.9 5/8	50.8 2	93.7 3 11/16	830.3 32 11/16	90.5 3 9/16	51.30 2.020	25.4 1	571.5 22 1/2	108.0 4 1/4
736.6 29	101.6 4	15.9 5/8	50.8 2	93.7 3 11/16	870.0 34 1/4	90.5 3 9/16	57.66 2.270	25.4 1	584.2 23	108.0 4 1/4
787.4 31	101.6 4	15.9 5/8	50.8 2	93.7 3 11/16	920.8 36 1/4	90.5 3 9/16	57.66 2.270	25.4 1	616.0 24 1/4	108.0 4 1/4
835.0 32 7/8	101.6 4	15.9 5/8	50.8 2	93.7 3 11/16	979.5 38 9/16	90.5 3 9/16	64.01 2.520	25.4 1	647.7 25 1/2	108.0 4 1/4
885.8 34 7/8	111.1 4 3/8	15.9 5/8	50.8 2	103.2 4 1/16	1030.3 40 9/16	100.0 3 15/16	64.01 2.520	25.4 1	666.8 26 1/4	117.5 4 5/8
933.5 36 3/4	114.3 4 1/2	19.1 3/4	50.8 2	108 4 1/4	1092.2 43	100.0 3 15/16	64.01 2.520	25.4 1	692.2 27 1/4	117.5 4 5/8

(1) See page B395 for suggested S-3 shaft limits.

(2) C is outer ring width that may be obtained from bearing dimension tables.

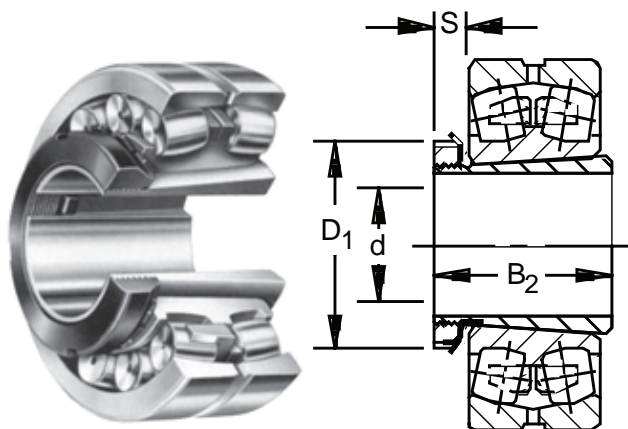




**METRIC ADAPTER ACCESSORIES**

**PULL TYPE SLEEVES, LOCKNUTS AND WASHERS TO METRIC STANDARDS**

- Sleeve numbers with the prefix “H” are listed in the chart below and are for metric standard shafts. Use metric standard locknuts, indicated by the prefix “KM” on nut number and metric standard washer, indicated by prefix “MB” on washer number.
- Metric standard sleeves are also available with bores to English standard shafts by changing letter prefix designation to “HE”.
- Sleeves with bores for American standard shafts are available by using the prefix “HA”.



**EXAMPLES:**

**H 316** complete assembly of sleeve with 70 mm bore, locknut and lockwasher

**HE 316** complete assembly of sleeve with 2 ¾ in. bore, locknut and lockwasher

**HA 316** complete assembly of sleeve with 2 11/16 in. bore, locknut and lockwasher

**Note:** Sleeves are not sold as separate units.

Bearing		Catalog Numbers			Adapter Dimensions							Assembly Weight lbs.
Series 222	Series 231	Sleeve Assembly Number	Assembly Includes		d Standard Shaft Diameter				B <sub>2</sub>	S	D <sub>1</sub>	
			Nut Number	Lockwasher Number	H	HE	HA	ToI. +0.000				
				mm	inch	inch	inch	mm	mm	mm		
22211K	—	H 311	KM11	MB11	50	2	1 5/16	-0.004	45	12	75	0.7
22213K	—	H 313	KM13	MB13	60	2 ¼	2 3/16	-0.004	50	14	85	1.0
22215K	—	H 315	KM15	MB15	65	2 ½	2 7/16	-0.004	55	15	98	1.8
22216K	—	H 316	KM16	MB16	70	2 ¾	2 11/16	-0.004	59	17	105	2.2
22217K	—	H 317	KM17	MB17	75	3	2 15/16	-0.004	63	18	110	2.6
22218K	—	H 318	KM18	MB18	80	3 ¼	3 3/16	-0.004	65	18	120	3.0
22219K	—	H 319	KM19	MB19	85	3 ½	3 5/16	-0.004	68	19	125	3.4
22220K	—	H 320	KM20	MB20	90	3 ½	3 7/16	-0.004	71	20	130	3.7
22222K	23122K	H 322	KM22	MB22	100	4	3 15/16	-0.004	77	21	145	4.8
22224K	23124K	H 3124	KM24	MB24	110	4 ¼	4 3/16	-0.005	88	22	155	5.8
22226K	23126K	H 3126	KM26	MB26	115	4 ½	4 7/16	-0.005	92	23	165	8.0
22228K	23128K	H 3128	KM28	MB28	125	5	4 15/16	-0.005	97	24	180	9.5
22230K	23130K	H 3130	KM30	MB30	135	5 ¼	5 3/16	-0.005	111	26	195	12.2
22232K	23132K	H 3132	KM32	MB32	140	5 ½	5 7/16	-0.005	119	28	210	16.9
22234K	23134K	H 3134	KM34	MB34	150	6	5 15/16	-0.005	122	29	220	18.5
22236K	23136K	H 3136	KM36	MB36	160	6 ½	6 7/16	-0.005	131	30	230	20.9
22238K	23138K	H 3138	KM38	MB38	170	6 ¾	6 15/16	-0.005	141	31	240	23.8
22240K	23140K	H 3140	KM40	MB40	180	7	7 3/16	-0.005	150	32	250	26.7
22244K	23144K	H 3144A	HMS3144	MS44	200	—	7 15/16	-0.005	158	32	280	33.5

# Spherical Roller Bearing Pillow Blocks

Bearing		Catalog Numbers			Adapter Dimensions							Assembly Weight
		Series 223	Series 232	Sleeve Assembly Number	Assembly Includes		d Standard Shaft Diameter				B <sub>2</sub>	
Nut Number	Lockwasher Number				H	HE	HA	Tol. +0.000	mm	mm		mm
					mm	inch	inch	inch	mm	mm	mm	lbs.
22308K	23208K	H 2308	KM8	MB8	35	1 ¼	1 ⅝ <sub>16</sub>	-.003	46	10	58	0.4
22309K	23209K	H 2309	KM9	MB9	40	1 ½	1 ⅞ <sub>16</sub>	-.003	50	11	65	0.6
22310K	23210K	H 2310	KM10	MB10	45	1 ¾	1 11 <sub>16</sub>	-.003	55	12	70	0.8
22311K	23211K	H 2311	KM11	MB11	50	2	1 ⅞ <sub>16</sub>	-.003	59	12	75	0.9
22313K	23213K	H 2313	KM13	MB13	60	2 ¼	2 ⅜ <sub>16</sub>	-.004	65	14	85	1.2
22315K	23215K	H 2315	KM15	MB15	65	2 ½	2 7 <sub>16</sub>	-.004	73	15	98	2.3
22316K	23216K	H 2316	KM16	MB16	70	2 ¾	2 11 <sub>16</sub>	-.004	78	17	105	2.8
22317K	23217K	H 2317	KM17	MB17	75	3	2 15 <sub>16</sub>	-.004	82	18	110	3.2
22318K	23218K	H 2318	KM18	MB18	80	—	3 3 <sub>16</sub>	-.004	86	18	120	3.7
22320K	23220K	H 2320	KM20	MB20	90	3 ½	3 7 <sub>16</sub>	-.004	97	20	130	4.7
22322K	23222K	H 2322	KM22	MB22	100	4	3 15 <sub>16</sub>	-.004	105	21	145	6.0
22324K	23224K	H 2324	KM24	MB24	110	4 ¼	4 3 <sub>16</sub>	-.004	112	22	155	7.0
22326K	23226K	H 2326	KM26	MB26	115	4 ½	4 7 <sub>16</sub>	-.005	121	23	165	10.1
22328K	23228K	H 2328	KM28	MB28	125	5	4 15 <sub>16</sub>	-.005	131	24	180	12.2
22330K	23230K	H 2330	KM30	MB30	135	5 ¼	5 3 <sub>16</sub>	-.005	139	26	195	14.6
22332K	23232K	H 2332	KM32	MB32	140	5 ½	5 7 <sub>16</sub>	-.005	147	28	210	20.2
22334K	23234K	H 2334	KM34	MB34	150	6	5 15 <sub>16</sub>	-.005	154	29	220	22.5
22336K	23236K	H 2336	KM36	MB36	160	6 ½	6 7 <sub>16</sub>	-.005	161	30	230	24.9
22338K	23238K	H 2338	KM38	MB38	170	6 ¾	6 15 <sub>16</sub>	-.005	169	31	240	27.8
22340K	23240K	H 2340	KM40	MB40	180	7	7 3 <sub>16</sub>	-.005	176	32	250	30.6
—	23244K	H 2344A	HM44T	MB44	200	—	—	-.005	186	35	280	37.9
—	23248K	H 2348A	HM48T	MB48	220	—	—	-.006	199	37	300	44.5
—	23252K	H 2352A	HM52T	MB52	240	—	—	-.006	211	39	330	54.9
—	23256K	H 2356A	HM56T	MB56	260	—	—	-.007	224	41	350	63.1
—	23260K	H 3260	HM3160	MS3160	280	—	—	-.007	240	40	380	75.2
—	23264K	H 3264	HM3164	MS3164	300	—	—	-.007	258	42	400	86.7





# SPHERICAL ROLLER BEARINGS



## NOTES

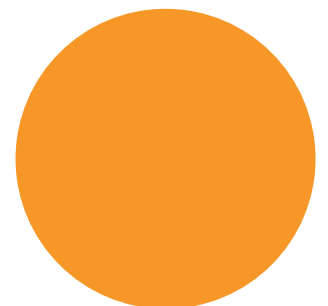
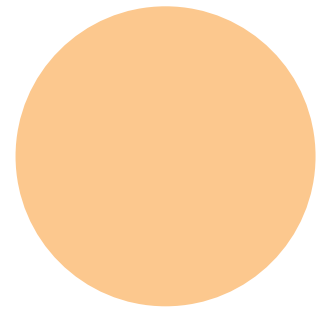
B



## SPHERICAL PLAIN

**Overview:** Timken's spherical plain bearings consist of a spherically ground inner ring housed in a mating outer ring without any rolling elements.

- **Sizes:** 12.7 mm - 600 mm bore (0.5 in. - 23.622 in.).
- **Markets:** Construction, mining, metals, power generation, oils and gas, aggregate, paper and forest products.
- **Applications:** Articulation joints, A-frames, cylinders (steering, lift, tilt, dump), struts, traction bars.
- **Features:** Lubrication grooves and holes, seals to retain lubricant and prevent contamination, special materials available.
- **Benefits:** Can carry radial and axial loads in a small envelope and can accommodate moderate misalignment.



B





## Spherical Plain Bearings

One, two, or three digit "Series" number.  
*For inch series*, the number indicates the nominal bore size (e.g., 10 is 1.00 in.) or an approximate bore size (e.g., 17 is 1.75 in.).  
*For metric series*, the number indicates the exact bore size (e.g., 40 is 40 mm).

7

SF

### Seal Designator:

**TT** reinforced rubber seals  
**SS** synthetic resin seals

12 - SS

**SF** spherical plain type (radial inch);  
single fractured outer ring

**SFH** spherical plain type (radial inch);  
single fractured outer ring, wide inner ring

**SBB** spherical plain type (radial inch);  
double fractured outer ring

**SBT** spherical plain angular contact type (radial inch)

**FS** spherical plain type (radial metric);  
single fractured outer ring

**FSH** spherical plain type (radial metric);  
single fractured outer ring, wide inner ring

One, two, or three digit number.  
*For inch series*, the number indicates the exact bore size in  $\frac{1}{16}$ ths of an inch (e.g., 12 refers to  $\frac{12}{16}$  in. which is a  $\frac{3}{4}$  in. bore).  
*For metric series*, the number indicates the exact outside diameter size (e.g., 62 is 62 mm).

# Spherical Plain Bearings

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## INTRODUCTION

The spherical plain bearing has a spherically shaped inner ring with a ground cylindrical bore for shaft mounting. The cylindrical outer surface of the outer ring permits convenient mounting in a housing.

Spherical plain bearings offer the following advantages:

- High capacity
- Ability to accommodate misalignment
- Superior performance in low frequency oscillating applications
- Simplified housing and shaft design
- Easy installation
- Radial types available with seals

For all types of spherical plain bearings, both the inner and outer rings are manufactured from through-hardened steel and are precision ground.

The dimensional data lists spherical plain bearings successively by larger bore sizes.

Timken also supplies spherical plain bearings made to special designs. These include standard design bearings made with special materials, clearances, and finishes or bearings with special configurations, such as extended inner rings.

B

## GENERAL FEATURES

### METAL ON METAL BEARINGS

Rings are phosphate treated and coated with molybdenum disulfide (MoS<sub>2</sub>) to minimize friction of contacting surfaces.

These bearings are available as radial types (SF Series and FS Series) and angular contact thrust (SBT Series).

SF and FS Series include lubrication holes and grooves in both inner and the outer rings to permit relubrication through either the shaft or housing.

SBT angular contact bearings have lubricating holes and grooves in the outer ring for relubrication through the housing.

SF and FS Series are available with integral seals as SF...TT, SF...SS, FS...TT and FS...SS, and incorporate lip seals designed to retain lubricant and protect the spherical surfaces from external contamination.

## BEARING TYPES

### SF & FS

These bearings are designed primarily to carry radial loads and handle moderate misalignment. The outer ring is usually fractured axially in one place, parallel to its axis, to permit assembly of the bearing rings, which do not have loading slots.

These types can also be supplied with double-fractured outer rings (designation SBB) when this feature is desired for easier assembly in an application.



SF and FS

### SF...TT, SF...SS, FS...TT, FS...SS

These bearings are dimensionally interchangeable with the SF and FS Series, and have the same general characteristics. However, they also incorporate lip seals.

The seals are securely retained in the outer ring and will withstand high grease pressures during relubrication. Positive retention of the seals assures full distribution of the lubricant to all bearing surfaces. SF...TT and FS...TT incorporate two reinforced nitrile rubber seals. SF...SS and FS...SS are assembled with synthetic resin seals; Operating temperatures of the seals should not exceed 212° F (100° C).



SF and FS

### SBT & SBDT

These bearings are designed for single direction thrust loading and some misalignment. Inner and outer rings are separable. The raceways are essentially hemispherical, and the rings are designed to provide maximum spherical raceway contact in the axial direction.

The SBDT style is designed for single direction thrust loading while the SBDT style is designed for thrust loading in two directions



SBT

SBDT

## INTERNAL CLEARANCES

Radial internal clearance is defined as the total possible movement of the inner ring relative to the outer ring in a radial direction. Axial internal clearance is the total possible movement of the inner relative to the outer ring in an axial direction.

Radial internal clearances listed for the SF and FS Series are for finish ground, unmounted bearings prior to fracture of the outer ring. The molybdenum disulfide coating reduces this clearance by a maximum of .05 mm (.002 in.). The maximum interference fits using suggested housing and shaft dimensions will maintain a satisfactory minimum internal clearance in the mounted condition, accommodating coating thickness, outer ring compression, and inner ring expansion.

## LOAD RATINGS

### DYNAMIC LOAD RATINGS

#### SF & FS

The dynamic load rating listed in the tables of dimensions is based on a maximum stress level of 85 megapascals (approximately 12,300 psi) between the sliding contact surfaces. It is the maximum load suggested for bearings subjected to intermittent operation with periodic lubrication.

The dynamic load rating is based on the radially projected area of the inner ring bore under the condition where, with the suggested fitting practice and periodic lubrication, rotation normally takes place.

For intermittent loading and operation, the applied radial load should not exceed the dynamic load rating. For constant loading and continuous operation, the applied radial load should not exceed 75 percent of the dynamic load rating. For dynamic or static thrust loading, use 25 percent of the respective radial load rating value should be used. For combined radial and thrust ratings, consult your Timken representative.

#### SBT

The dynamic load rating is based on the same stress levels as SF shown above and is the maximum thrust load suggested for extended life with periodic lubrication. It is based on the axially projected area of the spherical surfaces in contact. Where the shaft shoulder supports high thrust loads, it is suggested that hardened shafts be employed.

### EQUIVALENT THRUST LOAD

#### SBT

For combined radial and thrust loading under intermittent dynamic conditions, the equivalent thrust load ( $T_e$ ) must not exceed the dynamic load rating. For constant loading and continuous operation, the equivalent load ( $T_e$ ), or the axial load ( $T$ ) when the radial load ( $R$ ) is zero, must not exceed 70 percent of the dynamic load rating:

$$T_e = T + 1.4R$$

$T_e$  = Equivalent thrust load per bearing

$T$  = Applied thrust load and/or preload

$R$  = Applied radial load per bearing

The limit load rating of all spherical plain bearings listed is the maximum static load that can be applied to the bearing. This load should not be exceeded. The ultimate, or static fracture rating of the bearing is at least 1.5 times the limit load rating.

Shaft and housing stresses should be checked when the applied load approaches the limit load rating since the shaft or housing may then become the critical factor.



## MISALIGNMENT

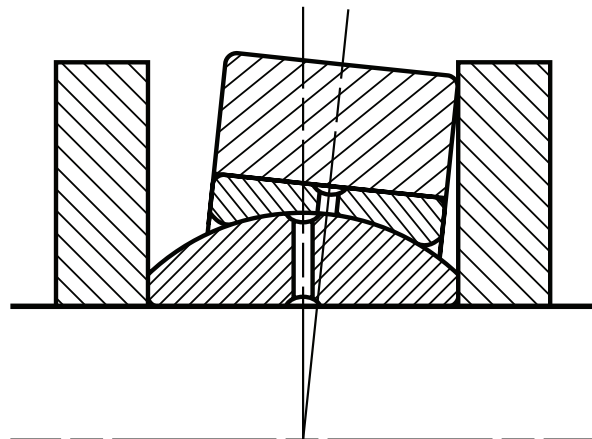
In many applications, the degree of misalignment of the radial types of spherical plain bearings is determined by the side clearance between the yoke and the bearing housing as illustrated.

When the bearing is mounted without such restrictions, a larger misalignment can be accommodated:  $\alpha$  is the maximum angle of misalignment for sealed bearings as illustrated. If  $\alpha$  is exceeded, the seal lips will slide off the spherical surface. Seal effectiveness is then lost and damage to the seal lip will occur if contact is made between the seal lip and shaft shoulder.

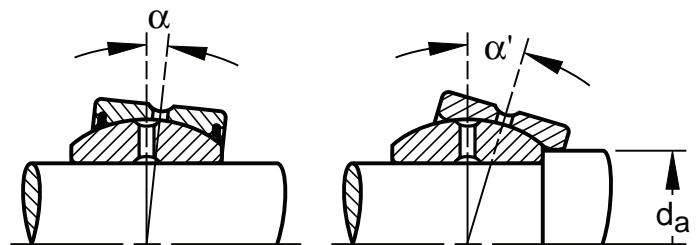
Greater misalignment under light to medium loads is possible with unsealed plain radial bearings as shown by angle  $\alpha'$ . This requires limiting the shaft shoulder diameter to the suggested dimension ( $d_a$ ) and also requires sufficient side clearance for the outer ring and housing.

Misalignment greater than  $\alpha'$  reduces the load carrying ability of the radial plain spherical bearings. When extreme misalignment is present, the strength of the shaft in shear and bending should be carefully checked, since the shaft support may be some distance away from the bearing.

Type SBT angular contact bearing permits a tilting angle  $\alpha$  provided the housing shoulder clears the shaft. Such misalignment is limited by the bore of the outer ring touching the through shaft, as shown. A larger angle of misalignment is possible where a stub shaft is used. If the tilting angle exceeds  $\alpha$ , your Timken representative should be consulted for suggestions.

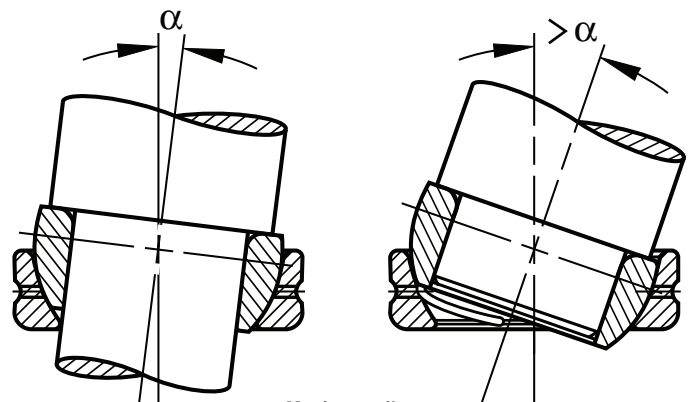


Side clearance between yoke and bearing housing



Maximum tilt sealed bearing

Maximum tilt unsealed bearing



Maximum tilt (provided housing shoulder clears shaft)

B

## HOUSING DESIGN

The housing should be strong enough to support the loads applied to the bearings without distortion or risk of fatigue damage.

When using a housing of the type illustrated, with a load applied in directions "X" or "Y", the compressive yield strength of the housing material should be greater than the applied load divided by ( $B_a \cdot D$ ).

When the load is applied in direction "Y", the yield strength of the housing in tension should be greater than the applied load times  $K/B_a(D_a-D)$ , where K is a stress concentration factor from Table 1.

The suggested housing bore tolerances closely approximate N7 tolerances. This produces an interference fit that ensures proper rounding of the outer ring. Light metal housings or housings with thin cross sections may require a tighter fit. An interference fit in the housing is also necessary to prevent creeping by the outer ring with resultant wear of the housing bore and shoulder. Split housings should be avoided.

To resist thrust loads, the bearing should be mounted as shown in the mounting details above the table dimensions.

When plain angular contact bearings (SBT) are axially loaded, the housing expands. For proper and safe bearing function, it is vital to provide a substantial section for the housing. If the thrust limit load ratings are applied for these bearings, not only should the section of the housing be generous, but the housing bore diameter ( $d_b$ ) must not be exceeded. This not only supports the thrust load, but strengthens the housing in the radial direction as well.

The suggested housing bore for the Type SBT angular contact bearing produces a tight transition fit.

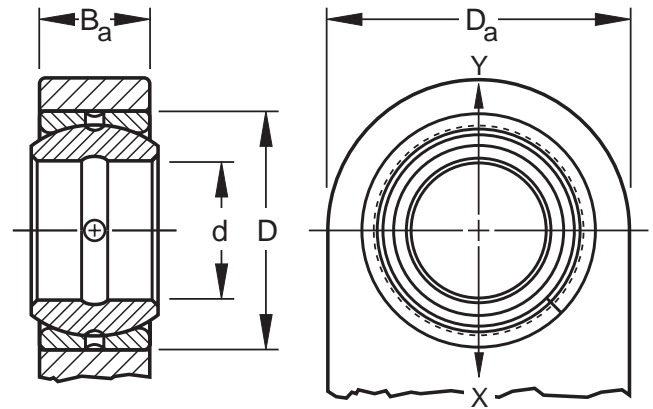
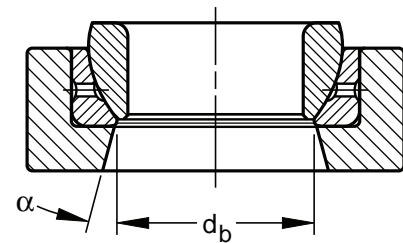


TABLE 1 – STRESS CONCENTRATION FACTOR

$D_a/D$	K	$D_a/D$	K	$D_a/D$	K
1.2	1.8	1.8	2.4	3	3.7
1.4	2	2	2.7	4	4.7
1.6	2.2	2.5	3.2	5	5.5



Housing section - angular contact bearing

## SHAFT DESIGN

In applications with heavy radial loads, although alignment takes place at the spherical bearing surface, rotation or oscillation normally occurs between the bore of the inner ring and the shaft even though an interference fit may have been used. For this reason, and to facilitate assembly, the shaft dimensions listed in the tables should be used.

To obtain satisfactory performance with heavy loads or under abrasive conditions, the shaft should be hardened to 655 VPN or 58 HRC minimum. Additionally, the shaft should have sufficient strength to withstand the applied loads in both shear and bending. The surface finish of the bearing seat should not exceed 0.8 micrometers or 32 microinches (on the Ra scale). The shaft should always be supported as close to the inner ring as possible to minimize bending.

When the loads are light, it is possible to prevent rotation between the inner ring and shaft by using an ISO m6 shaft tolerance or by clamping across the inner ring. Under these conditions, a fully hardened shaft is not necessary.

When the bearing is loaded axially, the load is transmitted between the end face of the inner ring and the adjacent shaft shoulder. The shoulder surface must be of sufficient strength and hardness not to deform permanently under load. If the inner ring is to rotate, the finish of this surface should not exceed 0.8 micrometers or 32 microinches (on the Ra scale).





# SPHERICAL PLAIN BEARINGS

## LUBRICATION (SF, FS, SBT)

The dry film lubricant (MoS<sub>2</sub>) is sufficient for static applications and for relatively short periods of dynamic operation.

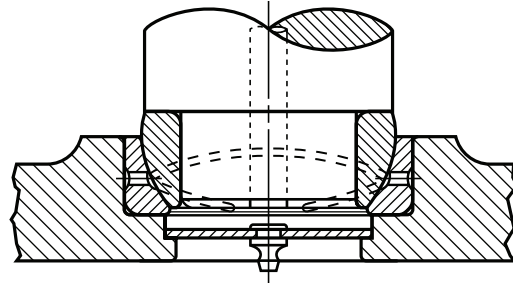
The bonds between the rings and MoS<sub>2</sub> coating may be destroyed by any fluid including oils, greases and water. Any abrasive material present on the dynamic bearing surfaces will ruin the MoS<sub>2</sub> coating. If the bearing is subjected to such operating or environmental conditions, it is necessary to relubricate frequently.

The radial bearings, both with and without seals, have lubricating holes and grooves in both the inner and outer rings, permitting relubrication through either the shaft or the housing.

The angular contact bearings have lubricating holes and grooves in the outer ring for relubrication through the bearing housing. The lubrication grooves in the spherical bore of the outer ring traverse a pattern designed to provide effective lubrication. These grooves extend into the small bore of the ring, permitting relubrication through the end of the housing as illustrated.

The relubrication cycle will depend on the magnitude of the load, frequency and amplitude of oscillation, environmental conditions and the effectiveness of the sealing used to exclude foreign materials from the bearing surfaces.

If bearings are relubricated, the dynamic load rating depends on the film strength of the added lubricant. High quality EP greases are suggested for best results.



SBT – Relubricatable mounting

## TEMPERATURE

Spherical plain bearings without seals will operate satisfactorily up to temperatures of 392° F (200° C). For operation at greater temperatures, special materials and lubricants will be required. Operating temperatures for sealed bearings should not exceed 212° F (100° C).

## SHAFT FITS

- The shaft diameters listed in the dimension tables show the suggested fits for normal service.
- The table below is to be used only for applications where a shaft interference fit is required. Consult your Timken representative for suggestions.

(SF, SFH, FS, FSH, SBT) BEARINGS,

Shaft Diameter Tolerance for Interference Fit for Inch and Metric Series

Bore Diameter, d				Shaft Tolerance m6			
mm		inch		mm		inch	
over	incl.	over	incl.	high	low	high	low
10	18	0.3937	0.7087	+0.018	+0.007	+0.0007	+0.0003
18	30	0.7087	1.1811	+0.021	+0.008	+0.0008	+0.0003
30	50	1.1811	1.9685	+0.025	+0.009	+0.0010	+0.0004
50	80	1.9685	3.1496	+0.030	+0.011	+0.0012	+0.0005
80	120	3.1496	4.7244	+0.035	+0.013	+0.0014	+0.0005
120	180	4.7244	7.0866	+0.040	+0.015	+0.0016	+0.0006
180	250	7.0866	9.8425	+0.046	+0.017	+0.0018	+0.0007

## TOLERANCES

- Tolerances on pages B412-B420 list the nominal bearing dimensions.
- Tolerances for these dimensions are listed in Tables 1 through 4. They are expressed as variances from nominal.
- Metric-inch conversions are shown in the following tables.

TABLE 1 INNER RING (FS, FSH) BEARINGS, METRIC SERIES

Bore Diameter, d				Single Mean Bore Diameter, $d_{mp}^{(1)}$				Width, B1			
mm		inch		mm		inch		mm		in.	
over	incl.	over	incl.	high	low	high	low	high	low	high	low
10	18	0.3937	0.7087	+0	-0.008	+0	-0.0003	+0	-0.12	+0	-0.005
18	30	0.7087	1.1811	+0	-0.010	+0	-0.0004	+0	-0.12	+0	-0.005
30	50	1.1811	1.9685	+0	-0.012	+0	-0.0005	+0	-0.12	+0	-0.005
50	80	1.9685	3.1496	+0	-0.015	+0	-0.0006	+0	-0.15	+0	-0.006
80	120	3.1496	4.7244	+0	-0.020	+0	-0.0008	+0	-0.20	+0	-0.008
120	180	4.7244	7.0866	+0	-0.025	+0	-0.0010	+0	-0.25	+0	-0.010
180	250	7.0866	9.8425	+0	-0.030	+0	-0.0012	+0	-0.30	+0	-0.012
250	315	9.8425	12.4015	+0	-0.035	+0	-0.0014	+0	-0.35	+0	-0.014

<sup>(1)</sup> "Single Mean Diameter" is defined as the mean diameter in a single radial plane.

TABLE 2 OUTER RING (FS, FSH) BEARINGS, METRIC SERIES

Outside Diameter, D				Single Mean Outside Diameter, $D_{mp}^{(2)}$				Width, B			
mm		inch		mm		inch		mm		in.	
over	incl.	over	incl.	high	low	high	low	high	low	high	low
18	30	0.7087	1.1811	+0	-0.009	+0	-0.0004	+0	-0.24	+0	-0.009
30	50	1.1811	1.9685	+0	-0.011	+0	-0.0004	+0	-0.24	+0	-0.009
50	80	1.9685	3.1496	+0	-0.013	+0	-0.0005	+0	-0.30	+0	-0.012
80	120	3.1496	4.7244	+0	-0.015	+0	-0.0006	+0	-0.40	+0	-0.016
120	150	4.7244	5.9055	+0	-0.018	+0	-0.0007	+0	-0.50	+0	-0.020
150	180	5.9055	7.0866	+0	-0.025	+0	-0.0010	+0	-0.50	+0	-0.020
180	250	7.0866	9.8425	+0	-0.030	+0	-0.0012	+0	-0.60	+0	-0.024
250	315	9.8425	12.4015	+0	-0.035	+0	-0.0014	+0	-0.70	+0	-0.028
315	400	12.4015	15.7480	+0	-0.040	+0	-0.0016	+0	-0.80	+0	-0.031
400	500	15.7480	19.6850	+0	-0.045	+0	-0.0018	+0	-0.90	+0	-0.035

<sup>(2)</sup> Tolerances apply before coating with MoS<sub>2</sub> and fracturing outer ring.

"Single Mean Diameter" is defined as the mean diameter in a single radial plane.

TABLE 3 INNER RING (SF, SFH, SBT, SBDT) BEARINGS, INCH SERIES

Bore Diameter, d				Single Mean Bore Diameter, $d_{mp}^{(1)}$				Width, B1			
mm		inch		mm		inch		mm		in.	
over	incl.	over	incl.	high	low	high	low	high	low	high	low
11.112	50.800	0.4375	2.0000	+0	-0.013	+0	-0.0005	+0	-0.13	+0	-0.005
50.800	76.200	2.0000	3.0000	+0	-0.015	+0	-0.0006	+0	-0.13	+0	-0.005
76.200	120.650	3.0000	4.7500	+0	-0.020	+0	-0.0008	+0	-0.13	+0	-0.005
120.6500	152.400	4.7500	6.0000	+0	-0.025	+0	-0.0010	+0	-0.13	+0	-0.005

<sup>(1)</sup> "Single Mean Diameter" is defined as the mean diameter in a single radial plane.

TABLE 4 OUTER RING (SF, SFH, SBT, SBDT) BEARINGS, INCH SERIES

Outside Diameter, D				Single Mean Outside Diameter, $D_{mp}^{(2)}$				Width, B			
mm		inch		mm		inch		mm		in.	
over	incl.	over	incl.	high	low	high	low	high	low	high	low
20.638	50.800	0.8125	2.0000	+0	-0.013	+0	-0.0005	+0	-0.13	0	-0.005
50.800	80.962	2.0000	3.1875	+0	-0.015	+0	-0.0006	+0	-0.13	0	-0.005
80.962	120.650	3.1875	4.7500	+0	-0.020	+0	-0.0008	+0	-0.13	0	-0.005
120.650	177.800	4.7500	7.0000	+0	-0.025	+0	-0.0010	+0	-0.13	0	-0.005
177.800	222.250	7.0000	8.7500	+0	-0.030	+0	-0.0012	+0	-0.13	0	-0.005

<sup>(2)</sup> Tolerances apply before coating with MoS<sub>2</sub> and fracturing outer ring.

"Single Mean Diameter" is defined as the mean diameter in a single radial plane.



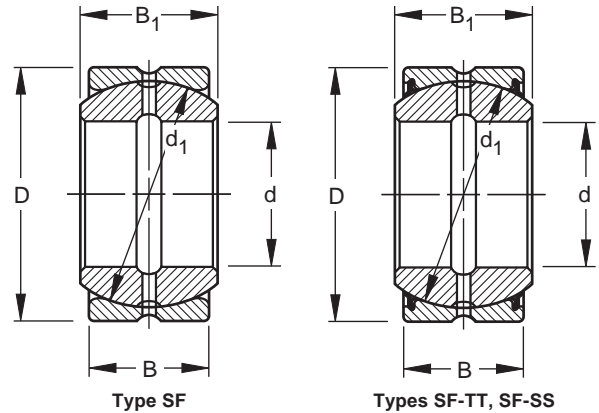
# SPHERICAL PLAIN BEARINGS

## RADIAL BEARINGS TYPE SF

B

- Unit assembly consisting of a solid, spherical O.D. inner ring and a spherical I.D. outer ring.
- Outer ring has a single fracture to permit assembly.
- Both inner and outer rings are phosphate treated and then coated with molybdenum disulphide (MoS<sub>2</sub>).
- Bearings 7SF12 through 50SBB80 are available with reinforced rubber seals. To order, add suffix "-TT" to bearing designation – Example: 25SF40-TT.
- Bearings 27SF44 through 608BB96 are available with synthetic resin seals. To order, add suffix "-SS" to bearing designation – Example: 27SF44-SS.
- Before ordering any bearing, check for availability.
- Metric-inch conversions have been included. The controlling dimensions are in inches.
- For tolerances, see Tables 3 and 4. Dimensions listed are after the bearing has been coated with molybdenum disulphide.

- The axial internal clearance is approximately three times the radial internal clearance.
- $\alpha$  is the maximum tilting angle for sealed radial bearings. To utilize the maximum tilting angle  $\alpha$  for unsealed radial bearings, the suggested shaft shoulder diameter,  $d_a$ , shown in the drawing on the facing page, must not be exceeded.
- Dimensions and locations of lubrication holes and grooves may be obtained from your Timken representative.



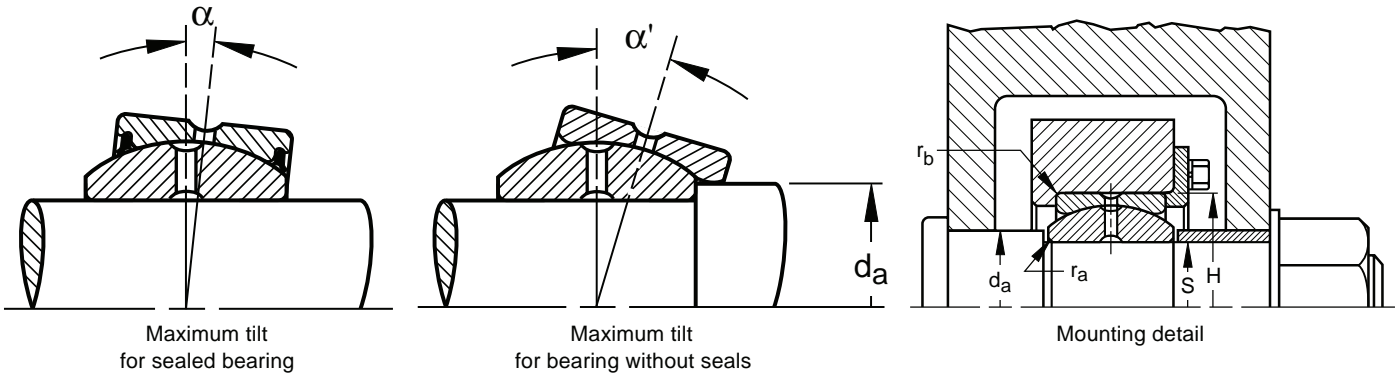
### DIMENSIONS - LOAD RATINGS

Bearing Number	Bore d		Outside Diameter D		Inner Ring Width B <sub>1</sub>		Outer ring Width B		Spherical Diameter d <sub>1</sub>		Radial Clearance* (unmounted)				Load Ratings	
	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm		in.		Radial Limit Load Rating lbf.	Dynamic Radial Load Rating lbf.
											min.	max.	min.	max.		
5SF8	12.700	0.5000	22.225	0.8750	11.10	0.437	9.52	0.375	18.26	0.719	0.004	0.008	0.10	0.20	8330	2690
6SF10	15.875	0.6250	26.988	1.0625	13.89	0.547	11.91	0.469	22.83	0.899	0.004	0.008	0.10	0.20	13000	4200
7SF12	19.050	0.7500	31.750	1.2500	16.66	0.656	14.27	0.562	27.43	1.080	0.005	0.009	0.13	0.23	18700	6070
8SF14	22.225	0.8750	36.512	1.4375	19.43	0.765	16.66	0.656	31.95	1.258	0.005	0.009	0.13	0.23	25500	8250
10SF16	25.400	1.0000	41.275	1.6250	22.22	0.875	19.05	0.750	36.50	1.437	0.005	0.009	0.13	0.23	33300	10800
12SF20	31.750	1.2500	50.800	2.0000	27.76	1.093	23.80	0.937	45.59	1.795	0.005	0.009	0.13	0.23	52000	16800
13SF22	34.925	1.3750	55.562	2.1875	30.15	1.187	26.19	1.031	49.20	1.937	0.005	0.009	0.13	0.23	61300	20100
15SF24	38.100	1.5000	61.912	2.4375	33.32	1.312	28.58	1.125	54.74	2.155	0.005	0.009	0.13	0.23	75000	24300
17SF28	44.450	1.7500	71.438	2.8125	38.89	1.531	33.32	1.312	63.88	2.515	0.005	0.009	0.13	0.23	102000	33000
20SF32	50.800	2.0000	80.962	3.1875	44.45	1.750	38.10	1.500	73.02	2.875	0.005	0.009	0.13	0.23	133000	43200
22SF36	57.150	2.2500	90.488	3.5625	50.01	1.969	42.85	1.687	82.17	3.235	0.006	0.010	0.15	0.25	169000	54600
25SF40	63.500	2.5000	100.012	3.9375	55.55	2.187	47.62	1.875	91.19	3.590	0.006	0.010	0.15	0.25	208000	67400
27SF44	69.850	2.7500	111.125	4.3750	61.11	2.406	52.37	2.062	100.33	3.950	0.006	0.010	0.15	0.25	252000	81600
30SF48	76.200	3.0000	120.650	4.7500	66.68	2.625	57.15	2.250	109.52	4.312	0.006	0.010	0.15	0.25	300000	97100
32SF52	82.550	3.2500	130.175	5.1250	72.24	2.844	61.90	2.437	118.74	4.675	0.007	0.011	0.18	0.28	353000	114000
35SF56	88.900	3.5000	139.700	5.5000	77.77	3.062	66.68	2.625	128.02	5.040	0.007	0.011	0.18	0.28	410000	132000
37SF60	95.250	3.7500	149.225	5.8750	83.34	3.281	71.42	2.812	136.91	5.390	0.007	0.011	0.18	0.28	467000	152000
40SF64	101.600	4.0000	158.750	6.2500	88.90	3.500	76.20	3.000	146.05	5.750	0.007	0.011	0.18	0.28	533000	173000
45SBB72	114.300	4.5000	177.800	7.0000	100.00	3.937	85.72	3.375	164.46	6.475	0.007	0.011	0.18	0.28	673000	218000
50SBB80	127.000	5.0000	196.850	7.7500	111.13	4.375	95.25	3.750	182.63	7.190	0.007	0.011	0.18	0.28	833000	270000
60SBB96	152.400	6.0000	222.250	8.7500	120.65	4.750	104.78	4.125	207.16	8.156	0.007	0.011	0.18	0.28	1050000	351000

\* Prior to coating with MoS<sub>2</sub> and fracturing outer ring.

**MOUNTING**

- Housing bore dimensions listed below are applicable to bearings mounted in steel.
- Because of fracturing, the outer ring may be slightly out-of-round.
- Roundness will be restored when the bearing is mounted in a housing of sufficient cross section.
- Preferred shaft and housing bore dimensions are listed below.
- Refer to the m6 tolerance limits per ANSI B4.1 in the Shaft Diameter Tolerance table on page B410 for a shaft interference fit.



**MOUNTING DIMENSIONS**

Weight (Approx.)		Tilting Angle		Shaft Shoulder Diameter da		Shaft Fillet Radius* ra† (Max.)		Housing Fillet Radius rb‡ (Max.)		Shaft Diameter S				Housing Bore H			
		α	α'							mm		in.		mm		in.	
kg	lbs.	deg.	deg.	mm	in.	mm	in.	mm	in.	max.	min.	max.	min.	max.	min.		
0.020	0.044	5.5	14	14.3	0.56	*	*	0.6	0.022	12.695	12.685	0.4998	0.4994	22.197	22.217	0.8739	0.8747
0.036	0.079	6	14	17.8	0.70	*	*	0.8	0.032	15.870	15.860	0.6248	0.6244	26.960	26.980	1.0614	1.0622
0.057	0.126	6	14.5	21.4	0.84	*	*	0.8	0.032	19.042	19.029	0.7497	0.7492	31.717	31.742	1.2487	1.2497
0.087	0.193	6	14.5	25.0	0.98	*	*	0.8	0.032	22.217	22.204	0.8747	0.8742	36.479	36.504	1.4362	1.4372
0.125	0.276	6	14.5	28.6	1.12	*	*	0.8	0.032	25.392	25.379	0.9997	0.9992	41.242	41.267	1.6237	1.6247
0.234	0.516	6	14.5	35.7	1.41	*	*	0.8	0.032	31.740	31.725	1.2496	1.2490	50.762	50.792	1.9985	1.9997
0.349	0.770	5.5	14	38.9	1.53	*	*	0.8	0.032	34.915	34.900	1.3746	1.3740	55.524	55.554	2.1860	2.1872
0.424	0.934	6	14.5	43.3	1.70	*	*	0.8	0.032	38.090	38.075	1.4996	1.4990	61.874	61.904	2.4360	2.4372
0.649	1.430	6	15.5	50.0	1.97	*	*	0.8	0.032	44.440	44.425	1.7496	1.7490	71.399	71.429	2.8110	2.8122
0.939	2.070	6	15.5	57.2	2.25	*	*	0.8	0.032	50.790	50.772	1.9996	1.9989	80.914	80.950	3.1856	3.1870
1.324	2.920	6	14	65.1	2.56	*	*	0.8	0.032	57.140	57.122	2.2496	2.2489	90.439	90.475	3.5606	3.5620
1.855	4.090	6	14	72.2	2.84	*	*	0.8	0.032	63.490	63.472	2.4996	2.4989	99.964	100.000	3.9356	3.9370
2.440	5.380	6	12	79.4	3.12	0.6	0.022	0.8	0.032	69.840	69.822	2.7496	2.7489	111.077	111.113	4.3731	4.3745
3.116	6.870	6	12	86.5	3.41	0.6	0.022	0.8	0.032	76.190	76.172	2.9996	2.9989	120.594	120.635	4.7478	4.7494
3.914	8.630	6	12	94.1	3.70	0.6	0.022	0.8	0.032	82.537	82.514	3.2495	3.2486	130.119	130.160	5.1228	5.1244
4.853	10.700	6	12	101.0	3.97	0.6	0.022	0.8	0.032	88.887	88.864	3.4995	3.4986	139.644	139.685	5.4978	5.4994
5.897	13.000	6	12	108.0	4.25	0.6	0.022	0.8	0.032	95.237	95.214	3.7495	3.7486	149.169	149.210	5.8728	5.8744
7.076	15.600	6	11.5	116.0	4.56	0.6	0.022	0.8	0.032	101.587	101.564	3.9995	3.9986	158.694	158.735	6.2478	6.2494
9.934	21.900	6	12	130.0	5.12	0.8	0.032	1.1	0.044	114.287	114.264	4.4995	4.4986	177.744	177.785	6.9978	6.9994
13.472	29.700	6	12	144.0	5.69	0.8	0.032	1.1	0.044	126.985	126.960	4.9994	4.9984	196.784	196.830	7.7474	7.7492
17.600	38.800	5	10.5	168.0	6.59	0.8	0.032	1.1	0.044	152.385	152.360	5.9994	5.9984	222.184	222.230	8.7474	8.7492

\* For bearing sizes 5SF8 through 25SF40, shaft and shoulder should be undercut to eliminate fillet.  
 † Equal to minimum inner ring bore chamfer.  
 ‡ Equal to minimum outer ring O.D. chamfer.



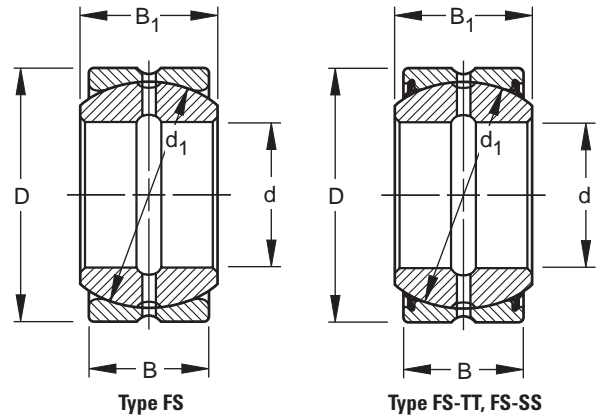
# SPHERICAL PLAIN BEARINGS

## RADIAL BEARINGS TYPE FS

B

- Type FS spherical plain radial bearing is a unit assembly consisting of a solid, spherical O.D. inner ring and a spherical I.D. outer ring.
- The outer ring has a single fracture to permit assembly. Both inner and outer rings are phosphate treated and then coated with molybdenum disulphide (MoS<sub>2</sub>).
- Bearings 16FS30 through 60FS90 are available with reinforced rubber seals. To order, add suffix "TT" to bearing designation - Example: 16FS30-TT.
- Bearings 70FS105 through 300FS430 are available with synthetic resin seals. To order, add suffix "SS" to bearing designation - Example: 70FS105-SS.
- Before ordering any bearing, check for availability.
- Type FS bearings are a metric series which follows proposed International Standards Organization (ISO) standards. Metric-Inch conversions given are for the convenience of the user. The controlling dimensions are in millimeters.

- For tolerances of nominal dimensions see the tables 1 and 2 on page B411. Dimensions listed are before coating with molybdenum disulphide. The axial internal clearance is approximately three times the radial internal clearance.
- $\alpha$  is the maximum tilting angle for sealed radial bearings. To utilize the maximum tilting angle for unsealed radial bearings the suggested shaft shoulder diameter  $d_{a1}$  shown in the drawing on facing page must not be exceeded.
- Dimensions and locations of lubrication holes and grooves may be obtained from your Timken representative.



### DIMENSIONS - LOAD RATINGS

Bearing Number	Bore d		Outside Diameter D		Inner Ring Width B <sub>1</sub>		Outer ring Width B		Spherical Diameter d <sub>1</sub>		Radial Clearance* (unmounted)				Load Ratings	
	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	(mm)		(in.)		Radial Limit Load Rating	Dynamic Radial Load Rating
12FS22	12	.4724	22	0.8661	10	.394	7	.276	19	.748	0.10	0.22	.004	.009	8630	2290
14FS26	14	.5512	26	1.0236	12	.472	9	.354	22	.866	0.10	0.22	.004	.009	11600	3210
16FS30	16	.6300	30	1.1811	14	.551	10	.394	25	.984	0.10	0.22	.004	.009	14400	4280
20FS35	20	.7874	35	1.3780	16	.630	12	.472	30	1.181	0.12	0.24	.005	.010	21500	6110
24FS42	24	.9449	42	1.6142	20	.787	16	.630	36	1.417	0.12	0.24	.005	.010	31000	9170
30FS47	30	1.1811	47	1.8504	22	.866	18	.709	41	1.614	0.12	0.24	.005	.010	40200	12600
35FS55	35	1.3780	55	2.1654	25	.984	20	.787	48	1.890	0.12	0.24	.005	.010	55100	16700
40FS62	40	1.5748	62	2.4409	28	1.102	22	.866	55	2.165	0.12	0.24	.005	.010	72300	21400
45FS68	45	1.7717	68	2.6772	32	1.260	25	.984	60	2.362	0.12	0.24	.005	.010	86100	27500
50FS75	50	1.9685	79	2.9528	35	1.378	28	1.102	67	2.638	0.12	0.24	.005	.010	107000	33400
60FS90	60	2.3622	90	3.5433	44	1.732	36	1.417	81	3.150	0.14	0.26	.006	.011	157000	50400
70FS105	70	2.7559	105	4.1339	49	1.929	40	1.575	94	3.701	0.14	0.26	.006	.011	211000	65500
80FS120	80	3.1496	120	4.7244	55	2.165	45	1.772	107	4.213	0.14	0.26	.006	.011	274000	84100
90FS130	90	3.5433	130	5.1181	60	2.362	50	1.968	117	4.606	0.14	0.26	.006	.011	327000	103000
100FS150	100	3.9370	150	5.9055	70	2.756	55	2.165	134	5.276	0.14	0.26	.006	.011	429000	134000
110FS160	110	4.3307	160	6.2992	70	2.756	55	2.165	143	5.630	0.14	0.26	.006	.011	489000	147000
120FS180	120	4.7244	180	7.0866	85	3.346	70	2.756	160	6.299	0.14	0.26	.006	.011	612000	195000
140FS210	140	5.5118	210	8.2677	90	3.543	70	2.756	187	7.362	0.16	0.28	.006	.011	836000	241000
160FS230	160	6.2992	230	9.0551	105	4.134	80	3.150	206	8.110	0.16	0.28	.006	.011	1020000	321000
180FS260	180	7.0866	260	10.2362	105	4.134	80	3.150	234	9.213	0.16	0.28	.006	.011	1300000	361000
200FS290	200	7.8740	290	11.4173	130	5.118	100	3.937	265	10.433	0.18	0.30	.007	.012	1680000	497000
220FS320	220	8.6614	320	12.5984	135	5.315	100	3.937	286	11.260	0.18	0.30	.007	.012	1960000	568000
240FS340	240	9.4488	340	13.3858	140	5.512	100	3.937	306	12.047	0.18	0.30	.007	.012	2240000	642000
260FS370	260	10.2362	370	14.5669	150	5.906	110	4.331	333	13.110	0.20	0.32	.008	.013	2650000	745000
280FS400	280	11.0236	400	15.7480	155	6.102	120	4.724	360	14.173	0.20	0.32	.008	.013	3100000	829000
300FS430	300	11.8110	430	16.9291	165	6.496	120	4.724	386	15.197	0.20	0.32	.008	.013	3560000	946000

\* Prior to fracturing outer ring.

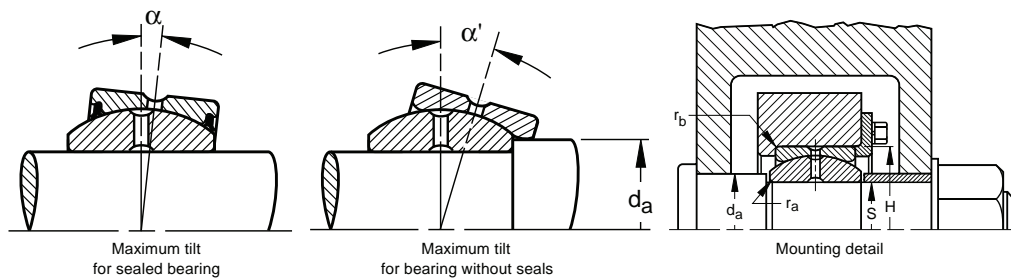
**MOUNTING**

- Due to fracturing, the outer ring may be slightly out-of-round. Roundness will be restored, however, when the bearing is mounted in a housing of sufficient cross section.
- The preferred shaft tolerance is f6 as listed below per ANSI B4.2. To obtain a shaft interference fit, refer to the m6 tolerance limits listed in the Shaft Diameter Tolerance table on page B410.

**LOAD RATING**

- The “dynamic load rating” is the maximum load suggested for extended life with periodic lubrication. It is based upon the radially projected area of the inner ring bore and an allowable stress level of 85 megapascals (approximately 12,300 psi).

- For intermittent loading and intermittent operation, the applied radial load should not exceed the dynamic load rating. For constant loading and continuous operation, the applied radial load should not exceed 75 percent of the dynamic load rating. For dynamic or static thrust loading, use 25 percent of respective radial load values. For combined radial and thrust loading, consult your Timken representative.
- The “limit load rating” is the maximum static load that can be applied to a Timken spherical plain bearing. Shaft and housing stresses should be checked when the load approaches the limit load rating since the shaft or housing may then become the critical member. The ultimate, or static fracture, rating of the bearing is at least 1.5 times the limit load rating.
- Load ratings are given in pounds-force:  
1 lbf = 0.454kgf = 4.448 N.



**MOUNTING DIMENSIONS**

Weight (Approx.)		Tilting Angle		Shaft Shoulder Diameter d <sub>a</sub>		Shaft Fillet Radius* r <sub>a</sub> <sup>†</sup> (Max.)		Housing Fillet Radius r <sub>b</sub> <sup>‡</sup> (Max.)		Shaft Diameter S				Housing Bore H			
kg	lbs.	α deg.	α' deg.	mm	in.	mm	in.	mm	in.	max.	min.	max.	min.	max.	min.	min.	max.
.038		10.0	11.5	16	.63	0.5	.02	0.5	.02	11.984	11.973	.4718	.4714	21.977	21.995	.8650	.8658
.065		8.5	14.5	18	.71	0.5	.02	0.5	.02	13.984	13.973	.5506	.5502	25.972	25.993	1.0225	1.0233
.115		10.0	16.0	20	.79	0.5	.02	0.5	.02	15.984	15.973	.6293	.6289	29.972	29.993	1.1800	1.1808
.149		8.5	14.0	25	.98	0.5	.02	0.6	.02	19.980	19.967	.7866	.7861	34.967	34.992	1.3767	1.3777
.257		7.0	12.5	29	1.14	0.5	.02	0.6	.02	23.980	23.967	.9441	.9436	41.967	41.992	1.6522	1.6532
.337		6.0	10.5	34	1.38	0.5	.02	0.6	.02	29.980	29.967	1.1803	1.1798	46.967	46.992	1.8491	1.8501
.523		6.5	10.5	40	1.61	0.6	.02	0.8	.03	34.975	34.959	1.3770	1.3764	54.961	54.991	2.1638	2.1650
.729		7.0	10.5	47	1.85	0.6	.02	0.8	.03	39.975	39.959	1.5738	1.5732	61.961	61.991	2.4394	2.4406
.948		7.5	10.5	50	2.01	0.6	.02	0.8	.03	44.975	44.959	1.7707	1.7701	67.961	67.991	2.6756	2.6768
1.27		6.5	10.0	56	2.24	0.6	.02	0.8	.03	49.975	49.959	1.9675	1.9669	74.961	74.991	2.9512	2.9524
2.32		6.5	11.0	66	2.64	0.8	.03	1.0	.04	59.970	59.951	2.3610	2.3603	89.955	89.990	3.5415	3.5429
3.53		6.0	9.5	80	3.15	0.8	.03	1.0	.04	69.970	69.951	2.7547	2.7540	104.955	104.990	4.1321	4.1335
5.20		6.0	7.5	92	3.62	0.8	.03	1.0	.04	79.970	79.951	3.1484	3.1477	119.955	119.990	4.7226	4.7240
6.28		5.5	7.5	100	3.94	1.0	.04	1.0	.04	89.964	89.942	3.5419	3.5410	129.948	129.988	5.1161	5.1177
10.1		7.0	8.5	114	4.49	1.0	.04	1.0	.04	99.964	99.942	3.9356	3.9347	149.948	149.988	5.9035	5.9051
10.9		6.0	7.5	125	4.92	1.0	.04	1.0	.04	109.964	109.942	4.3293	4.3284	159.948	159.988	6.2972	6.2988
18.1		6.0	7.5	136	5.35	1.0	.04	1.0	.04	119.964	119.942	4.7230	4.7221	179.948	179.988	7.0846	7.0862
25.6		6.5	7.0	164	6.46	1.0	.04	1.0	.04	139.957	139.932	5.5101	5.5091	209.940	209.986	8.2654	8.2674
32.3		7.5	9.0	177	6.97	1.0	.04	1.0	.04	159.957	159.932	6.2975	6.2965	229.940	229.986	9.0528	9.0548
42.8		6.5	7.0	209	8.23	1.0	.04	1.0	.04	179.957	179.932	7.0849	7.0839	259.934	259.986	10.2336	10.2356
66.5		7.0	7.5	231	9.09	1.0	.04	1.0	.04	199.950	199.921	7.8720	7.8709	289.934	289.986	11.4147	11.4167
82.3		7.5	8.0	252	9.92	1.0	.04	1.0	.04	219.950	219.921	8.6594	8.6583	319.927	319.984	12.5956	12.5978
90.1		8.0	9.0	272	10.70	1.0	.04	1.0	.04	239.950	239.921	9.4468	9.4457	339.927	339.984	13.3830	13.3852
17		7.0	8.5	297	11.69	1.0	.04	1.0	.04	259.944	259.912	10.2340	10.2327	369.927	369.984	14.5641	14.5663
47		6.0	7.0	325	12.80	1.0	.04	1.0	.04	279.944	279.912	11.0214	11.0201	399.927	399.984	15.7452	15.7474
77		7.0	9.0	349	13.74	1.0	.04	1.0	.04	299.944	299.912	11.8088	11.8075	429.920	429.983	16.9260	16.9285

\* For bearing sizes 5SF8 through 25SF40, shaft and shoulder should be undercut to eliminate fillet.

† Equal to minimum inner ring bore chamfer.

‡ Equal to minimum outer ring O.D. chamfer.





# SPHERICAL PLAIN BEARINGS

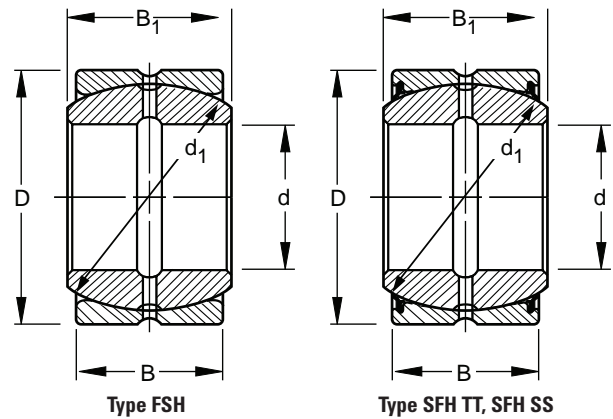
## RADIAL BEARINGS TYPE FSH

- The FSH spherical plain radial bearing is a unit assembly consisting of a solid spherical O.D. inner ring and a spherical I.D. outer ring.
- The outer ring has a single fracture to permit assembly. Both inner and outer rings are phosphate treated and then coated with molybdenum disulphide (MoS<sub>2</sub>). The type FSH bearing is similar to type FS, but the inner ring bore diameter has been reduced and the width made greater to increase the spherical surface. This permits greater misalignment while maintaining full bearing contact.
- Bearings 14FSH30 through 50FSH90 are available with reinforced rubber seals. To order, add suffix "TT" to bearing designation - Example: 14FSH30-TT.
- Bearings 60FSH105 through 280FSH430 are available with synthetic resin seals. To order, add suffix "SS" to bearing designation - Example: 60FSH105-SS.
- Before ordering any bearing, check for availability.

### DIMENSIONS

- Type FSH bearings are a metric series which follows proposed International Standards Organization (ISO) standards. Metric Inch conversions given are for the convenience of the user. The controlling dimensions are in millimeters.

- For tolerances of nominal dimensions, see Tables 1 and 2 on page B411. Dimensions listed are before coating with molybdenum disulphide. The axial internal clearance is approximately three times the radial internal clearance.
- $\alpha$  is the maximum tilting angle for sealed radial bearings. To utilize the maximum tilting angle for unsealed radial bearings, the suggested shaft shoulder diameter  $d_1$  shown in the drawing on facing page must not be exceeded.
- Dimensions and locations of lubrication holes and grooves may be obtained from your Timken representative.



### DIMENSIONS - LOAD RATINGS

Bearing Number	Bore d		Outside Diameter D		Inner Ring Width B <sub>1</sub>		Outer ring Width B		Spherical Diameter d <sub>1</sub>		Radial Clearance* (unmounted)				Load Ratings	
	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm		in.		Radial Limit Load Rating	Dynamic Radial Load Rating
	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	min.	max.	min.	max.	lbf.	lbf.
12FSH26	12	.4724	26	1.0236	15	.591	9	.354	22	.866	0.10	0.22	.004	.009	11600	3440
14FSH30	14	.5512	30	1.1811	16	.630	10	.394	25	.984	0.10	0.22	.004	.009	14400	4280
16FSH35	16	.6300	35	1.3780	20	.787	12	.472	30	1.181	0.12	0.24	.005	.010	21500	6110
20FSH42	20	.7874	42	1.6142	25	.984	16	.630	36	1.417	0.12	0.24	.005	.010	31000	9550
24FSH47	24	.9449	47	1.8504	28	1.102	18	.709	41	1.614	0.12	0.24	.005	.010	40200	12800
30FSH55	30	1.1811	55	2.1654	32	1.260	20	.787	48	1.890	0.12	0.24	.005	.010	55100	18300
35FSH62	35	1.3780	62	2.4409	35	1.378	22	.866	55	2.165	0.12	0.24	.005	.010	72300	23400
40FSH68	40	1.5748	68	2.6772	40	1.575	25	.984	60	2.362	0.12	0.24	.005	.010	86100	30600
45FSH75	45	1.7717	75	2.9528	43	1.693	28	1.102	67	2.638	0.12	0.24	.005	.010	107000	37000
50FSH90	50	1.9685	90	3.5433	56	2.205	36	1.417	81	3.150	0.14	0.26	.006	.011	157000	53500
60FSH105	60	2.3622	105	4.1339	63	2.480	40	1.575	94	3.701	0.14	0.26	.006	.011	211000	72200
70FSH120	70	2.7559	120	4.7244	70	2.756	45	1.772	107	4.213	0.14	0.26	.006	.011	274000	93600
80FSH130	80	3.1496	130	5.1181	75	2.953	50	1.968	117	4.606	0.14	0.26	.006	.011	327000	115000
90FSH150	90	3.5433	150	5.9055	85	3.346	55	2.165	134	5.276	0.14	0.26	.006	.011	429000	146000
100FSH160	100	3.9370	160	6.2992	85	3.346	55	2.165	143	5.630	0.14	0.26	.006	.011	489000	162000
110FSH180	110	4.3307	180	7.0866	100	3.937	70	2.756	160	6.299	0.14	0.26	.006	.011	612000	210000
120FSH210	120	4.7244	210	8.2677	115	4.528	70	2.756	187	7.362	0.16	0.28	.006	.011	836000	264000
140FSH230	140	5.5118	230	9.0551	130	5.118	80	3.150	206	8.110	0.16	0.28	.006	.011	1020000	348000
160FSH260	160	6.2992	260	10.2362	135	5.315	80	3.150	234	9.213	0.16	0.28	.006	.011	1300000	413000
180FSH290	180	7.0866	290	11.4173	155	6.102	100	3.937	265	10.433	0.18	0.30	.007	.012	1680000	533000
200FSH320	200	7.8740	320	12.5984	165	6.496	100	3.937	286	11.260	0.18	0.30	.007	.012	1960000	631000
220FSH340	220	8.6614	340	13.3858	175	6.890	100	3.937	306	12.047	0.18	0.30	.007	.012	2240000	736000
240FSH370	240	9.4488	370	14.5669	190	7.480	110	4.331	333	13.110	0.20	0.32	.008	.013	2650000	871000
260FSH400	260	10.2362	400	15.7480	205	8.071	120	4.724	360	14.173	0.20	0.32	.008	.013	3100000	1020000
280FSH430	280	11.0236	430	16.9291	210	8.268	120	4.724	386	15.197	0.20	0.32	.008	.013	3560000	1120000

\* Prior to fracturing outer ring.

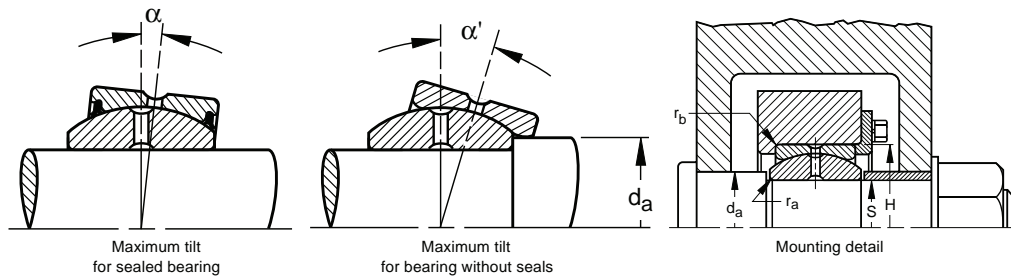
**MOUNTING**

- The housing bore dimensions given below are applicable to bearings mounted in steel.
- Due to fracturing, the outer ring may be slightly out-of-round. Roundness will be restored, however, when the bearing is mounted in a housing of sufficient cross section.
- The preferred shaft tolerance is f6 as listed below per ANSI B4.2. To obtain a shaft interference fit, refer to the m6 tolerance limits listed in the Shaft Diameter Tolerance table on page B410.

- For intermittent loading and intermittent operation, the applied radial load should not exceed the dynamic load rating for constant loading and continuous operation, the applied radial load should not exceed 75 percent of the dynamic load rating. For dynamic or static thrust loading, use 25 percent of respective radial load rating values. For combined radial and thrust loading, consult your Timken representative.
- The “limit load rating” is the maximum static load that can be applied to a Timken spherical plain bearing. Shaft and housing stresses should be checked when the load approaches the limit load rating since the shaft or housing may then become the critical member. The ultimate or static fracture rating of the bearing is at least 1.5 times the limit load rating.
- Load ratings are given in pounds force:  
1 lbf = 0.454 kgf = 4.448N.

**LOAD RATING**

- The “dynamic load rating” is the maximum load suggested for extended life with periodic lubrication. It is based upon the radially projected area of the inner ring bore and allowable stress level of 85 megapascals (approximately 12,300 psi).



**MOUNTING DIMENSIONS**

Weight (Approx.) lbs.	Tilting Angle		Shaft Shoulder Diameter $d_a$		Shaft Fillet Radius* $r_a^\dagger$ (Max.)		Housing Fillet Radius $r_b^\ddagger$ (Max.)		Shaft Diameter S				Housing Bore H			
	$\alpha$	$\alpha'$							mm		in.		mm		in.	
	deg.	deg.	mm	in.	mm	in.	mm	in.	max.	min.	max.	min.	max.	min.	min.	max.
.069	18.5	25.0	16	.63	0.5	.02	0.5	.02	11.984	11.973	.4718	.4714	25.972	25.993	1.0225	1.0233
.130	16.0	22.0	19	.75	0.5	.02	0.5	.02	13.984	13.973	.5506	.5502	29.972	29.993	1.1800	1.1808
.171	18.0	27.0	21	.83	0.5	.02	0.6	.02	15.984	15.973	.6293	.6289	34.967	34.992	1.3767	1.3777
.298	17.5	26.5	24	.94	0.5	.02	0.6	.02	19.980	19.967	.7866	.7861	41.967	41.992	1.6522	1.6532
.397	17.0	23.0	29	1.14	0.5	.02	0.6	.02	23.980	23.963	.9441	.9436	46.967	46.992	1.8491	1.8501
.574	17.0	24.0	34	1.34	0.5	.02	0.8	.03	29.980	29.967	1.1803	1.1798	54.961	54.991	2.1638	2.1650
.794	15.5	24.5	39	1.54	0.6	.02	0.8	.03	34.975	34.959	1.3770	1.3764	61.961	61.991	2.4394	2.4406
.982	17.0	21.0	44	1.73	0.6	.02	0.8	.03	39.975	39.959	1.5738	1.5732	67.961	67.991	2.6756	2.6768
1.31	15.0	20.0	50	1.97	0.6	.02	0.8	.03	44.975	44.959	1.7707	1.7701	74.961	74.991	2.9512	2.9524
2.63	17.0	23.5	57	2.24	0.6	.02	1.0	.04	49.975	49.959	1.9675	1.9669	89.955	89.990	3.5415	3.5429
3.91	16.5	22.5	67	2.64	0.8	.03	1.0	.04	59.970	59.951	2.3610	2.3603	104.955	104.990	4.1321	4.1335
5.62	15.5	20.5	77	3.03	0.8	.03	1.0	.04	69.970	69.951	2.7547	2.7540	119.955	119.990	4.7226	4.7240
6.66	14.5	18.5	87	3.43	0.8	.03	1.0	.04	79.970	79.951	3.1484	3.1477	129.948	129.988	5.1161	5.1177
10.4	15.0	19.5	98	3.86	1.0	.04	1.0	.04	89.964	89.942	3.5419	3.5410	149.948	149.988	5.9035	5.9051
11.5	13.5	18.0	110	4.33	1.0	.04	1.0	.04	99.964	99.942	3.9356	3.9347	159.948	159.988	6.2972	6.2988
17.9	12.5	15.5	122	4.80	1.0	.04	1.0	.04	109.964	109.942	4.3293	4.3284	179.948	179.988	7.0846	7.0862
29.7	15.5	23.5	132	5.20	1.0	.04	1.0	.04	119.964	119.942	4.7230	4.7221	209.940	209.986	8.2654	8.2674
35.8	16.0	20.5	152	5.98	1.0	.04	1.0	.04	139.957	139.932	5.5101	5.5091	229.940	229.986	9.0528	9.0548
48.9	15.0	21.0	176	6.93	1.0	.04	1.0	.04	159.957	159.932	6.2975	6.2965	259.934	259.986	10.2336	10.2356
71.5	13.0	20.5	196	7.72	1.0	.04	1.0	.04	179.957	179.932	7.0849	7.0839	289.934	289.986	11.4147	11.4167
88.2	14.5	19.5	220	8.66	1.0	.04	1.0	.04	199.950	199.921	7.8720	7.8709	319.927	319.984	12.5956	12.5978
96.4	15.5	19.0	243	9.57	1.0	.04	1.0	.04	219.950	219.921	8.6594	8.6583	339.927	339.984	13.3830	13.3852
124	15.5	19.5	263	10.35	1.0	.04	1.0	.04	239.950	239.921	9.4468	9.4457	369.927	369.984	14.5641	14.5663
157	15.0	19.5	283	11.14	1.0	.04	1.0	.04	259.944	259.912	10.2340	10.2327	399.927	399.984	15.7452	15.7474
188	14.5	20.0	310	12.20	1.0	.04	1.0	.04	279.944	279.912	11.0214	11.0201	429.920	429.983	16.9260	16.9285

\* For bearing sizes 5SF8 through 25SF40, shaft and shoulder should be undercut to eliminate fillet.

† Equal to minimum inner ring bore chamfer.

‡ Equal to minimum outer ring O.D. chamfer.



# SPHERICAL PLAIN BEARINGS

## RADIAL BEARINGS TYPE SFH

B

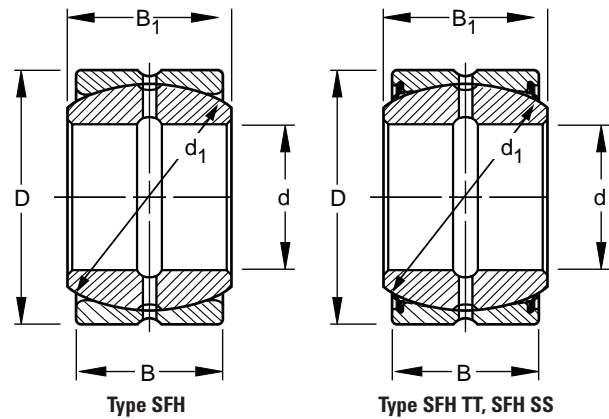
- The SFH spherical plain radial bearing is a unit assembly consisting of a solid spherical O.D. inner ring and a spherical I.D. outer ring. The outer ring has a single fracture to permit assembly. Both inner and outer rings are phosphate treated and then coated with molybdenum disulphide (MoS<sub>2</sub>).
- The type SFH bearing is similar to type SF, but the inner ring bore diameter has been reduced and the width made greater to increase the spherical surface. This permits greater misalignment yet maintains full bearing contact.
- Bearings 12SFH24 through 22SFH40 are available with reinforced rubber seals. To order, add suffix "TT" to bearing designation - Example: 22SFH40-TT.
- Bearings 25SFH44 through 55SFH96 are available with synthetic resin seals. To order, add suffix "SS" to bearing designation - Example: 25SFH44-SS.
- Before ordering any bearing, check for availability.

### DIMENSIONS

- Inch-metric conversions given are for the convenience of the user. The controlling dimensions are in inches.
- For tolerances of nominal dimensions, see Tables 2 and 2A on page B411. Dimensions listed are after coating with

MoS<sub>2</sub> except outer ring O.D. and internal clearance are before coating and fracturing. The axial internal clearance is approximately three times the radial internal clearance.

- $\alpha$  is the maximum tilting angle for sealed radial bearings. To utilize the maximum tilting angle for unsealed radial bearings, the suggested shaft shoulder diameter  $d_a$ , shown in the drawing on facing page must not be exceeded.
- Dimensions and locations of lubrication holes and grooves may be obtained from your Timken representative.



### DIMENSIONS - LOAD RATINGS

Bearing Number	Bore $d$		Outside Diameter $D$		Inner Ring Width $B_1$		Outer ring Width $B$		Spherical Diameter $d_1$ (Ref.)	Radial Clearance* (unmounted)				Load Ratings		
	mm	in.	mm	in.	mm	in.	mm	in.		mm		in.		Radial Load Rating	Dynamic Radial Load Rating	
										min.	max.	min.	max.	lbf.	lbf.	
12SFH24	31.750	1.2500	61.912	2.4375	35.31	1.390	28.58	1.125	54.74	2.155	0.13	0.23	.005	.009	75000	21400
15SFH28	38.100	1.5000	71.438	2.8125	40.13	1.580	33.32	1.312	63.88	2.515	0.13	0.23	.005	.009	102000	29200
17SFH32	44.450	1.7500	80.962	3.1875	46.23	1.820	38.10	1.500	73.02	2.875	0.13	0.23	.005	.009	133000	39300
20SFH36	50.800	2.0000	90.488	3.5625	52.58	2.070	42.85	1.687	82.17	3.235	0.15	0.25	.006	.010	169000	51000
22SFH40	57.150	2.2500	100.012	3.9375	58.88	2.318	47.62	1.875	91.19	3.590	0.15	0.25	.006	.010	208000	64000
25SFH44	63.500	2.5000	111.125	4.3750	64.64	2.545	52.37	2.062	100.33	3.950	0.15	0.25	.006	.010	252000	78400
27SFH48	69.850	2.7500	120.650	4.7500	70.87	2.790	57.15	2.250	109.52	4.312	0.15	0.25	.006	.010	300000	94600
30SFH52	76.200	3.0000	130.175	5.1250	76.76	3.022	61.90	2.437	118.74	4.675	0.18	0.28	.007	.011	353000	112000
32SFH56	82.550	3.2500	139.700	5.5000	82.93	3.265	66.68	2.625	128.02	5.040	0.18	0.28	.007	.011	410000	131000
35SFH60	88.900	3.5000	149.225	5.8750	90.42	3.560	71.42	2.812	136.91	5.390	0.18	0.28	.007	.011	467000	154000
37SFH64	95.250	3.7500	158.750	6.2500	94.95	3.738	76.20	3.000	146.05	5.750	0.18	0.28	.007	.011	533000	173000
40SFH72	101.600	4.0000	177.800	7.0000	107.32	4.225	85.72	3.375	164.46	6.475	0.18	0.28	.007	.011	673000	208000
45SFH80	114.300	4.5000	196.850	7.7500	119.13	4.690	95.25	3.750	182.63	7.190	0.18	0.28	.007	.011	833000	260000
55SFH96	139.700	5.5000	222.250	8.7500	125.73	4.950	104.78	4.125	207.16	8.156	0.18	0.28	.007	.011	1050000	336000

\* Prior to fracturing outer ring.

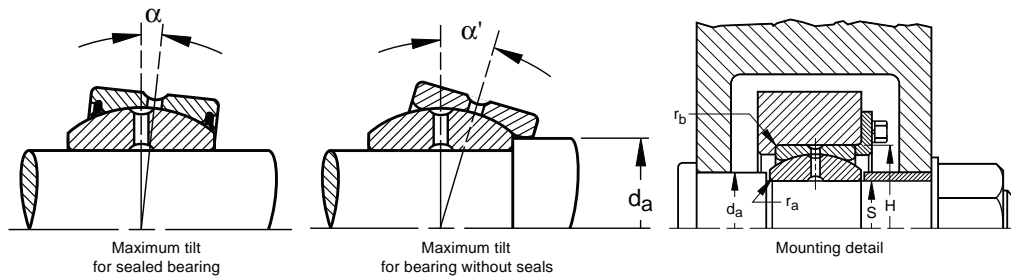
**MOUNTING**

- The housing bore dimensions given below are applicable to bearings mounted in steel.
- Due to fracturing, the outer ring may be slightly out-of-round. Roundness will be restored, however, when the bearing is mounted in a housing of sufficient cross section.
- The preferred shaft tolerance is g6 as listed below per ANSI B4.1. To obtain a shaft interference fit, refer to the m6 tolerance limits listed in the Shaft Diameter Tolerance table on page B410.

**LOAD RATING**

- The “dynamic load rating” is the maximum load suggested for extended life with periodic lubrication. It is based upon the radially projected area of the inner ring bore and an allowable stress level of 85 megapascals (approximately 12,300 psi).

- For intermittent loading and intermittent operation, the applied radial load should not exceed the dynamic load rating. For constant loading and continuous operation, the applied radial load should not exceed 75 percent of the dynamic load rating. For dynamic or static thrust loading, use 25 percent of respective radial load rating values. For combined radial and thrust loading, consult your Timken representative.
- The “limit load rating” is the maximum static load that can be applied to a Timken spherical plain bearing. Shaft and housing stresses should be checked when the load approaches the limit load rating since the shaft or housing may then become the critical member. The ultimate, or static fracture, rating of the bearing is at least 1.5 times the limit load rating.
- Load ratings are given in pounds force:  
 $1\text{ lbf} = 0.454\text{ kgf} = 4.448\text{ N}$ .



**MOUNTING DIMENSIONS**

Weight (Approx.) lbs.	Tilting Angle		Shaft Shoulder Diameter $d_a$		Shaft Fillet Radius* $r_a^\dagger$ (Max.)		Housing Fillet Radius $r_b^\ddagger$ (Max.)		Shaft Diameter S		Housing Bore H					
	$\alpha$	$\alpha'$	mm	in.	mm	in.	mm	in.	max.	min.	max.	min.	max.	min.		
	deg.	deg.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.		
1.00	8.5	16.5	41.9	1.64	1.0	.040	0.8	.032	31.740	31.725	1.2496	1.2490	61.874	61.904	2.4360	2.4372
1.60	7.0	15.5	49.8	1.95	1.0	.040	0.8	.032	38.090	38.075	1.4996	1.4990	71.399	71.429	2.8110	2.8122
2.50	7.5	16.0	56.6	2.22	1.5	.060	0.8	.032	44.440	44.425	1.7496	1.7490	80.914	80.950	3.1856	3.1870
3.70	8.0	16.0	63.2	2.48	1.5	.060	0.8	.032	50.790	50.772	1.9996	1.9989	90.439	90.475	3.5606	3.5620
4.40	8.5	16.5	69.6	2.74	1.5	.060	0.8	.032	57.140	57.122	2.2496	2.2489	99.964	100.000	3.9356	3.9370
6.50	8.5	14.0	76.7	3.02	2.0	.080	0.8	.032	63.490	63.472	2.4996	2.4989	111.077	111.113	4.3731	4.3745
8.00	8.5	14.0	83.6	3.28	2.0	.080	0.8	.032	69.840	69.822	2.7496	2.7489	120.594	120.635	4.7478	4.7494
9.60	8.5	14.0	90.7	3.56	2.0	.080	0.8	.032	76.190	76.172	2.9996	2.9989	130.119	130.160	5.1228	5.1244
11.7	8.5	14.0	97.5	3.83	2.0	.080	0.8	.032	82.537	82.514	3.2495	3.2486	139.544	139.685	5.4978	5.4994
15.0	9.5	15.0	103	4.04	2.0	.080	0.8	.032	88.887	88.864	3.4995	3.4986	149.169	149.210	5.8728	5.8744
19.5	9.0	14.5	111	4.36	2.0	.080	0.8	.032	95.237	95.214	3.7495	3.7486	158.694	158.735	6.2478	6.2494
22.5	9.0	14.5	125	4.90	2.0	.080	1.1	.044	101.587	101.564	3.9995	3.9986	177.744	177.785	6.9978	6.9994
30.0	9.0	14.5	138	5.44	2.0	.080	1.1	.044	114.287	114.264	4.4995	4.4986	196.784	196.830	7.7474	7.7492
45.0	6.5	12.0	165	6.48	2.0	.080	1.1	.044	139.685	139.660	5.4994	5.4984	222.184	222.230	8.7474	8.7492

\* For bearing sizes 5SF8 through 25SF40, shaft and shoulder should be undercut to eliminate fillet.

† Equal to minimum inner ring bore chamfer.

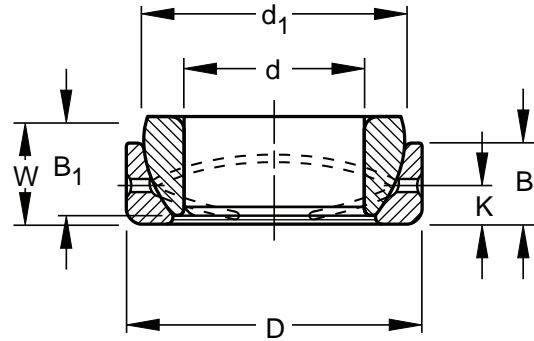
‡ Equal to minimum outer ring O.D. chamfer.



# SPHERICAL PLAIN BEARINGS

## ANGULAR CONTACT BEARINGS TYPE SBT

- Separable assembly consisting of an inner and outer ring with hemispherically shaped surfaces that mate with each other.
- Both inner and outer rings are phosphate-treated and coated with molybdenum disulphide (MoS<sub>2</sub>).
- If a Timken ring is assembled with a ring of another make, consult your Timken representative.
- To order inner and outer rings separately, specify by adding suffix "-OR" for outer ring or "-IR" for inner ring.
- Metric-inch conversions are provided for the convenience of the user. The controlling dimensions are in inches.
- See Table 2 and 3 for tolerances. Dimensions listed are after the bearing has been coated with molybdenum disulphide.
- $\alpha$  is the maximum tilting angle through the shaft. A stub shaft can be used to obtain a larger angle.
- Dimensions and locations of lubrication holes and grooves may be obtained from your Timken representative.

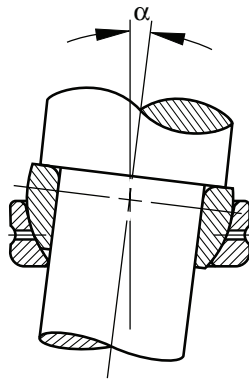


### DIMENSIONS - LOAD RATINGS

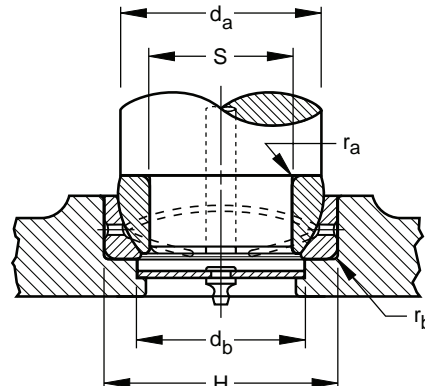
Bearing Number	Bore d		Outside Diameter D		Inner Ring Width B <sub>1</sub>		Outer ring Width B		Spherical Diameter d <sub>1</sub>		Radial Clearance* (unmounted)				Load Ratings	
	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm		in.		Radial Limit Load Rating	Dynamic Radial Load Rating
											min.	max.	min.	max.	lbf.	lbf.
5SBT80	0.5000	12.700	0.8750	22.225	0.270	6.86	0.190	4.83	0.300	7.62	0.094	2.39	0.719	18.26	4600	1860
6SBT10	0.6250	15.875	1.0625	26.988	0.340	8.64	0.250	6.35	0.370	9.40	0.109	2.77	0.899	22.83	7600	3080
7SBT12	0.7500	19.050	1.2500	31.750	0.410	10.41	0.310	7.87	0.440	11.18	0.125	3.18	1.080	27.43	11100	4500
8SBT14	0.8750	22.225	1.4375	36.512	0.480	12.19	0.380	9.65	0.520	13.21	0.172	4.37	1.258	31.95	15400	6210
10SBT16	1.0000	25.400	1.6250	41.275	0.550	13.97	0.440	11.18	0.600	15.24	0.203	5.16	1.437	36.50	19400	7860
12SBT20	1.2500	31.750	2.0000	50.800	0.700	17.78	0.550	13.97	0.740	18.80	0.234	5.94	1.795	45.59	31000	12500
13SBT22	1.3750	34.925	2.1875	55.562	0.770	19.56	0.600	15.24	0.840	21.34	0.281	7.14	1.937	49.20	37000	15100
15SBT24	1.5000	38.100	2.4375	61.912	0.840	21.34	0.660	16.76	0.910	23.11	0.312	7.92	2.155	54.74	44500	18300
17SBT28	1.7500	44.450	2.8125	71.438	0.980	24.89	0.790	20.07	1.070	27.18	0.328	8.33	2.515	63.88	60000	24400
20SBT32	2.0000	50.800	3.1875	80.962	1.130	28.70	0.920	23.37	1.230	31.24	0.375	9.52	2.875	73.02	79000	32300
22SBT36	2.2500	57.150	3.5625	90.488	1.270	32.26	1.050	26.67	1.390	35.31	0.453	11.51	3.235	82.17	100000	40800
25SBT40	2.5000	63.500	3.9375	100.012	1.420	36.07	1.180	29.97	1.540	39.12	0.500	12.70	3.590	91.19	126000	51500
27SBT44	2.7500	69.850	4.3750	111.125	1.560	39.62	1.275	32.38	1.700	43.18	0.515	13.08	3.950	100.33	154000	62150
30SBT48	3.0000	76.200	4.7500	120.650	1.710	43.43	1.405	35.69	1.860	47.24	0.578	14.68	4.312	109.52	186000	75000
32SBT52	3.2500	82.550	5.1250	130.175	1.860	47.24	1.545	39.24	2.030	51.56	0.656	16.66	4.675	118.74	218000	87500
35SBT56	3.5000	88.900	5.5000	139.700	2.000	50.80	1.675	42.54	2.180	55.37	0.703	17.86	5.040	128.02	257000	102400
37SBT60	3.7500	95.250	5.8750	149.225	2.150	54.61	1.805	45.85	2.340	59.44	0.765	19.43	5.390	136.91	295000	118500
40SBT64	4.0000	101.600	6.2500	158.750	2.300	58.42	1.935	49.15	2.500	63.50	0.781	19.84	5.750	146.05	336000	135000
45SBT72	4.5000	114.300	7.0000	177.800	2.590	65.79	2.195	55.75	2.800	71.12	0.875	22.22	6.475	164.46	432000	173500
50SBT80	5.0000	127.000	7.7500	196.850	2.880	73.15	2.455	62.36	3.130	79.50	1.000	25.40	7.190	182.63	524000	211000
60SBT96	6.0000	152.400	8.7500	222.250	3.100	78.74	2.615	66.42	3.375	85.72	1.370	34.80	8.156	207.16	585000	235000

**MOUNTING**

- Housing bore dimensions listed are appropriate for bearings mounted in steel.
- Suggested diameters of shoulder supports should be used to assure proper function of the bearing.
- Preferred shaft and housing bore dimensions are listed below per ANSI B4.1.
- Refer to the m6 tolerance limits listed in the Shaft Diameter Tolerance table on page B410 for shaft interference fit.
- Bearings are to be mounted with sufficient axial preload to ensure contact of the spherical surfaces under all load conditions.



Maximum tilt for bearing



Mounting detail

**MOUNTING DIMENSIONS**

Weight		Tilting Angle (Max.)	Shaft Shoulder Diameter da		Shaft Fillet Radius ra† (Max.)		Housing Shoulder Diameter db		Housing Fillet Radius rb‡ (Max.)		Shaft Diameter S				Housing Bore H			
(Approx.)											mm	in.	mm	in.	mm	in.		
kg	lbs.	deg.	mm	in.	mm	in.	mm	in.	mm	in.	max.	min.	max.	min.	min.	max.	min.	max.
0.013	0.029	7	0.67	17.0	0.020	0.5	0.57	14.5	0.020	0.5	0.4998	0.4994	12.695	12.685	0.8739	0.8747	22.197	22.217
0.025	0.056	6	0.84	21.3	0.030	0.8	0.70	17.8	0.030	0.8	0.6248	0.6244	15.870	15.860	1.0614	1.0622	26.960	26.980
0.038	0.083	6	1.02	25.9	0.040	1.0	0.84	21.3	0.040	1.0	0.7497	0.7492	19.042	19.029	1.2487	1.2497	31.717	31.742
0.050	0.110	5.5	1.23	31.2	0.080	2.0	0.97	24.6	0.080	2.0	0.8747	0.8742	22.217	22.204	1.4362	1.4372	36.479	36.504
0.085	0.188	6	1.40	35.6	0.080	2.0	1.12	28.4	0.080	2.0	0.9997	0.9992	25.392	25.379	1.6237	1.6247	41.242	41.267
0.159	0.351	6	1.71	43.4	0.080	2.0	1.39	35.3	0.080	2.0	1.2496	1.2490	31.740	31.725	1.9985	1.9997	50.762	50.792
0.213	0.470	4	1.89	48.0	0.100	2.5	1.48	37.6	0.100	2.5	1.3746	1.3740	34.915	34.900	2.1860	2.1872	55.524	55.554
0.300	0.662	5.5	2.05	52.1	0.100	2.5	1.66	42.2	0.100	2.5	1.4996	1.4990	38.090	38.075	2.4360	2.4372	61.874	61.904
0.458	1.010	6	2.36	59.9	0.100	2.5	1.95	49.5	0.100	2.5	1.7496	1.7490	44.440	44.425	2.8110	2.8122	71.399	71.429
0.671	1.480	5.5	2.75	69.8	0.140	3.6	2.22	56.4	0.140	3.6	1.9996	1.9989	50.790	50.772	3.1856	3.1870	80.914	80.950
0.948	2.090	5.5	3.06	77.7	0.140	3.6	2.50	63.5	0.140	3.6	2.2496	2.2489	57.140	57.122	3.5606	3.5620	90.439	90.475
1.129	2.490	5	3.37	85.6	0.140	3.6	2.75	69.9	0.140	3.6	2.4996	2.4989	63.490	63.472	3.9356	3.9370	99.964	100.000
1.751	3.860	5	3.71	94.2	0.180	4.6	3.03	77.0	0.180	4.6	2.7496	2.7489	69.840	69.822	4.3731	4.3745	111.077	111.113
2.277	5.020	5	4.07	103.0	0.180	4.6	3.30	83.8	0.180	4.6	2.9996	2.9989	76.190	76.172	4.7478	4.7494	120.594	120.635
2.885	6.360	5	4.42	112.0	0.180	4.6	3.58	90.9	0.180	4.6	3.2495	3.2486	82.537	82.514	5.1228	5.1244	130.119	130.160
3.570	7.870	5	4.77	121.0	0.180	4.6	3.85	97.8	0.180	4.6	3.4995	3.4986	88.887	88.864	5.4978	5.4994	139.644	139.685
4.350	9.590	4.5	5.11	130.0	0.180	4.6	4.10	104.0	0.180	4.6	3.7495	3.7486	95.237	95.214	5.8728	5.8744	149.169	149.210
5.262	11.600	4.5	5.43	138.0	0.180	4.6	4.37	111.0	0.180	4.6	3.9995	3.9986	101.587	101.564	6.2478	6.2494	158.694	158.735
7.756	17.100	4.5	6.14	156.0	0.180	4.6	4.90	125.0	0.180	4.6	4.4995	4.4986	114.287	114.264	6.9978	6.9994	177.744	177.785
11.068	24.400	4.5	6.83	174.0	0.180	4.6	5.47	139.0	0.180	4.6	4.9994	4.9984	126.984	126.959	7.7474	7.7492	196.784	196.830
17.373	38.300	4.5	7.75	197.0	0.180	4.6	6.50	165.0	0.180	4.6	5.9994	5.9984	152.385	152.360	8.7474	8.7492	222.184	222.230

† Equal to minimum inner ring bore chamfer.

‡ Equal to minimum outer ring O.D. chamfer.





# SPHERICAL PLAIN BEARINGS



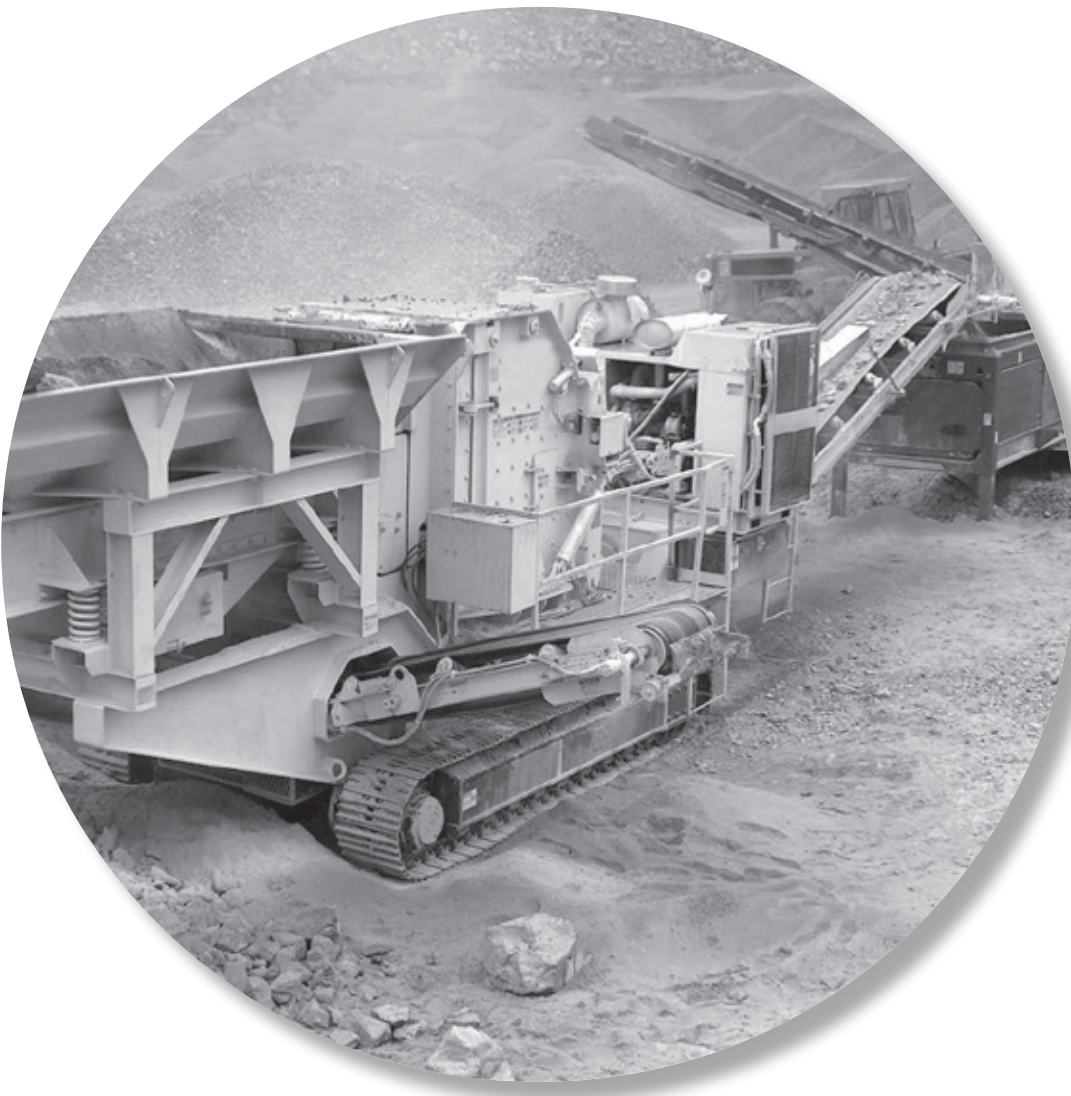
B



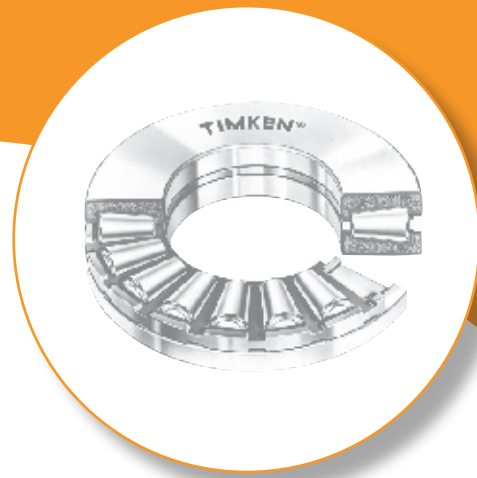
## THRUST BEARINGS

**Overview:** Timken thrust bearings are designed specifically to manage thrust loads and provide high-shock-load resistance in industrial and automotive applications. We manufacture seven basic designs of thrust bearings that include ball, crossed roller, cylindrical, machined tapered (TTHD, V-Flat, screwdow), stamped tapered, spherical and needle.

- **Sizes:** 35 mm - 2940 mm (1375 in. - 115.75 in.).
- **Markets:** Aggregate, Machine Tool, Metals, Oil, Power Generation.
- **Applications:** Cone crushers, crane hooks, oil well swivels, extruders, pulverizer drives, rolling mills, machine tool spindles & tables, drilling rig hydraulic heads, gear boxes, pre-heater fans.
- **Benefits:** High performance and application flexibility. Large range of product offering.



B



## Ball and Roller Thrust Bearings

From the three-digit "Series" number, it is known this is an inch size bearing. "50" is read as "5.0" and represents approximate or actual bore.

The series number (always three numerals) represents a specific size cage assembly.

**50**

**TVB**

**190**

**A**

**A**

**XXX**

**TVB** thrust ball bearings  
**TVL** angular contact thrust ball bearings  
**DTVL** angular contact thrust ball bearings – upper and lower complement of balls  
**TSR** thrust spherical roller bearings  
**TTVF** thrust tapered roller bearings  
**TTVS** thrust tapered roller bearings – with aligning washer  
**TTSV, TTSX** thrust tapered roller bearings – full complement  
**TP** thrust cylindrical roller bearings  
**TPS** thrust cylindrical roller bearings – with aligning washer  
**TTHD** thrust tapered roller bearings

modification to inner ring

modification to outer ring

descriptive of modification code

# Ball and Roller Thrust Bearings

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Ball and Roller Thrust Bearing Types .....	B438

## *DIMENSIONS – LOAD RATINGS*

Ball Thrust Bearing Type TVB .....	B442
Angular Contact Ball Thrust Bearing Type TVL .....	B443
Angular Contact Ball Thrust Bearing Type DTVL .....	B444
Spherical Roller Thrust Bearing Type TSR .....	B445
Cylindrical Roller Thrust Bearing Type TP .....	B447
Cylindrical Roller Thrust Bearing Type TPS .....	B449
Crossed Roller Thrust Bearing Type XR and JXR .....	B451
Tapered Roller Thrust Bearing Type TTHD .....	B452
Tapered Roller Thrust Bearing Type TTVF .....	B457
Tapered Roller Thrust Bearing Type TTVS .....	B458
Tapered Roller Thrust Bearing Type TTSX .....	B459
Tapered Roller Thrust Bearing Type TTSV .....	B460
Stamped Roller Thrust Bearing Type TTSP .....	B461
Stamped Tapered Roller Thrust Bearing Type TTC, TTCS ..	B463





## INTRODUCTION

Six basic designs of ball and roller thrust bearings are available: ball, cross roller, cylindrical, machine tapered (TTHD, V-Flat, Screwdown), stamped tapered and spherical tapered roller. Dimensional data for all styles are presented in order by bore size.

Engineering data such as tolerances, shaft and housing fits, and life and load rating calculations are found in the engineering section of this catalog.

B

## BEARING TYPES

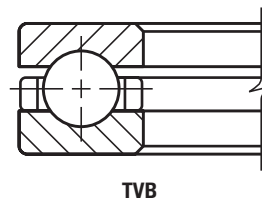
### BALL THRUST BEARINGS

Ball thrust bearings provide optimum performance in high-speed installations, particularly where loads are generally lighter. Two types including axial (TVB), and angular contact (TVL) are available. The DTVL Type is offered with both an upper and lower complement of angular contact balls and three race elements. The standard tolerances for ball thrust bearings (both types) are equivalent to ABEC 1 where applicable. Higher precision tolerances are available. Consult your Timken representative for information on such installations.

#### TVB

TVB Types are separable, consisting of two hardened and ground steel washers. Precision ground and lapped balls run in a grooved raceway separated by a bronze cage. Other materials may be specified for the cage, depending on the application.

Most TVB bearings include washers of the same bore and outside diameter. Housings should be designed to clear the O.D. of rotating races, with shafts stepped to clear the bore of stationary washers. Provides axial rigidity, but are not suggested if radial load is expected. The TVB is exceptionally easy to mount with the rotating washer usually shaft mounted. The stationary washer should be housed with an outside diameter clearance that allows the bearing to assume a normal operating position.



TVB

#### TVL

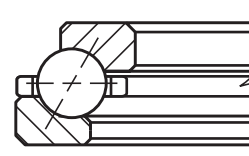
TVL Types provide exceptionally low friction, are cool running and have quiet operation when operated at high speeds. They are also less sensitive to misalignment. Consult your Timken representative for assistance in determining limits of such loading for specific applications.

Although ball thrust bearings have been designed exclusively for thrust loads, the TVL bearing will accommodate some radial loading. Consult your Timken representative for assistance in determining the limits of such loading for specific applications.

Hardened and ground steel races of TVL bearings enclose a complement of precision ground and lapped steel balls, separated by a bronze cage. Other material may be specified as required.

Not strictly an annular ball bearing, the larger ring is identified as the outer ring; the smaller as the inner. Inner ring is usually the rotating element and is shaft mounted. Outer ring is normally stationary and should be mounted with an outside diameter clearance that allows the bearing to assume a normal operating position. If combined loads are expected, the outer ring must be radially located in the housing.

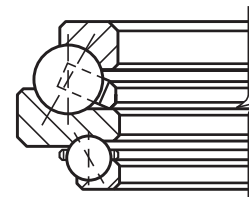
TVL bearings should always be operated under thrust loading. If a constant thrust load is not normally present, it should be imposed by springs or other devices.



TVL

#### DTVL

The DTVL has an upper and lower complement of angular contact balls and three race elements. It is capable of carrying thrust in one direction, comparable to the TVL Series and lighter thrust in the opposite direction.



DTVL

## SPHERICAL ROLLER THRUST BEARINGS

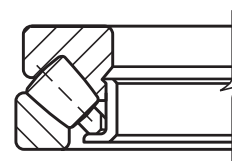
### TSR

A combination radial and thrust bearing designed to operate even if shaft and housing are, or become, misaligned under load. A favored bearing when conditions include heavy loads, difficulties in establishing or maintaining housing alignment or when shaft deflection can be expected.

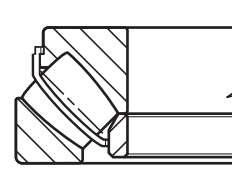
Shaft deflections and housing distortions caused by shock or heavy loads (which lead to misalignment) are compensated for by the internal self-alignment of the bearing elements during operation. Corner loading of rollers, a condition that limits service life on other types of bearings, cannot develop in spherical roller thrust bearings.

The TSR achieves high thrust capacity and allows axial misalignment between the inner ring and the outer ring of up to  $\pm 2.5^\circ$ . Spherically contoured rollers, arranged in a steep angular position, not only accept high axial loads, but also moderate radial loads. "E" styles, (EM-machined bronze cage, EJ- stamped steel cage) have increased capacity. Should extreme conditions of loading and/or speed under misalignment be anticipated, contact your Timken representative before ordering.

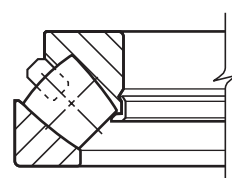
The inherent compensation for misalignment, provided by the spherical roller bearings, offers the designer the opportunity to use weldments for housing frames instead of complex castings. This eliminates high-cost machining operations. When castings are preferred, bore alignment is less critical if spherical roller bearings are specified.



TSR



TSR-EJ



TSR-EM

## CYLINDRICAL ROLLER THRUST BEARINGS

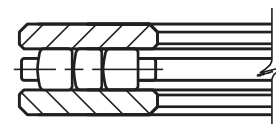
Timken's cylindrical roller thrust bearings are designed to operate under heavy loads at moderate speeds. Standard versions can be operated at peripheral speeds (bearing O.D.) of up to 3000 feet per minute. Special design features are available for both the bearing and mounting permitting even higher rotational speeds for this type of bearing. Two types of cylindrical roller thrust bearings, TP and TPS, are available.

### TP

Type TP bearings include two flat hardened and ground steel washers with a cage retainer holding one or more controlled contour rollers in each pocket. If specifications call for two or more rollers per pocket, they are manufactured to different lengths. The longer rollers are placed in alternate positions in adjacent pockets. Overlapping roller paths prevent "grooving" of the races and prolong bearing life. Due to the simplicity of design, standard TP thrust bearings are among the most economical to buy and install.

Minor radial displacement of the races does not affect the operation of the TP bearing, resulting in manufacturing economies and simplified installation.

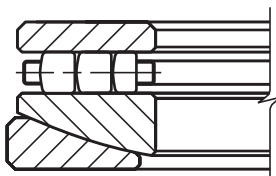
Shaft and housing seats must be square to the axis of rotation to prevent initial misalignment problems.



TP

### TPS

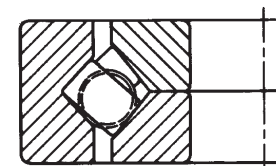
The TPS design is similar to the TP style, except the bottom washer assembly is comprised of two races, with the contacting faces spherically ground. The TPS bearing is self-adjusting to initial misalignment. It is not suggested for installations where alignment may be continuously changing (dynamic misalignment).



TPS

### TXR

The crossed roller bearing is ideal for machine tool applications such as vertical boring mills, vertical grinding machines and other similar applications. A crossed roller bearing is comprised of two sets of bearing races and rollers brought together at right angles to each other – with alternate rollers facing in opposite directions – and within a section height not much greater than that of a single bearing housing.



TXR

B



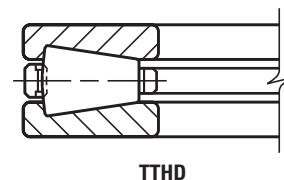


## TAPERED ROLLER THRUST BEARINGS

Timken true rolling tapered roller thrust bearings include rollers that have conical sections. These bearings have been engineered so that the rollers and raceways form a cone in which the vertex is on the center line of the bearing. This bearing geometry assures a true rolling motion. In addition, the large end of each tapered roller is spherically ground so that its curvature conforms with the concave face of the washer rib. Pressure between the rib and roller, under load, guides the rollers accurately. Timken manufactures five types of tapered roller thrust bearings: standard (TTHD), V-Flat (TTVF) self-aligning V-Flat (TTVS), concave washer (TTSV), and convex washer (TTSX).

### TTHD

The TTHD design has an identical pair of hardened and ground steel washers with tapered raceways. Both washers have the same bore and O.D., therefore housings should be designed to clear the O.D. of rotating washers and shafts stepped to clear the bore of stationary washers. Controlled contour tapered rollers are equally spaced by a cage. The TTHD bearing is well-suited for applications where extremely high thrust loads and heavy shock may be encountered as in crane hooks. For very low speed applications with unusually high loading, TTHD bearings can be supplied with a full complement of rollers. These bearings are identified in the tables by suffix 00278 following the bearing number. Applications for full-complement bearings should be reviewed by your Timken representative to ensure selection of the proper bearing.



### TTVF, TTVS, TTSV, TTSX

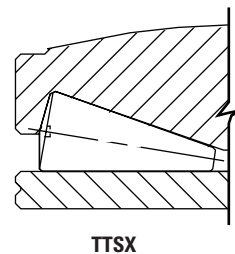
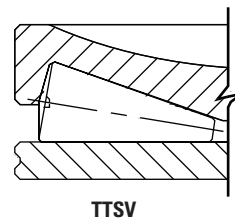
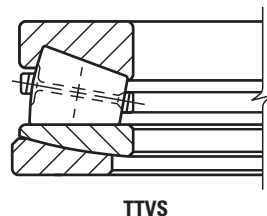
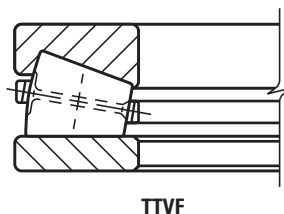
V-Flat Tapered Roller thrust bearings (TTVF and TTVS) combine the outstanding features of tapered thrust and cylindrical roller bearings, offering the highest possible capacity of any thrust bearing of its size. The V-Flat design includes one flat washer and one with a tapered raceway matching the rollers. The design was originally developed for screwdown applications in metal rolling mills where thrust loads exceeding one million pounds are common. The V-Flat bearings have exceptional dynamic capacity within a given envelope and provides static capacity. They have been highly successful in heavily loaded extruders, in cone crushers and other applications where a wide range of operating conditions are found. Most sizes utilize cages with hardened pins through the center of the rollers, allowing closer spacing of the rollers to maximize capacity.

Smaller sizes have brass cages, designed for unidirectional retention of rollers.

Both the pin type and brass cage are designed to permit a full flow of lubricant to all critical surfaces, providing cooler operation.

Self-aligning V-Flat bearings (TTVS) employ the same basic roller and raceway design, except the lower washer is in two pieces, with the contacting faces spherically ground permitting self-alignment under conditions of initial misalignment. TTVS bearings should not be used if dynamic misalignment (changing under load) is expected.

- The contact surface of each roller of the V-Flat bearings has a controlled contour wherein the ends are slightly relieved. This optimizes stress distribution by avoiding concentration of stress in the raceways at the ends of the rollers.
- Conformity between roller end and the rib is controlled to enhance the flow of lubricant between these surfaces, allowing the development of a hydrodynamic oil film between the end of the roller and the guiding surface of the rib.
- Full roller complement designs (TTSV and TTSX) do not have conventional bores, but are provided with center inserts for attachment purposes as well as for lifting.
- The TTSV and TTSX designs offer the highest capacity but at a somewhat reduced speed capability as compared with other V-Flat types.
- The TTSV and TTSX bearings encompass tapered rollers between two raceways. One raceway is flat and the other raceway forms the surface of a cone. The conical raceway has a washer with a rib to resist the radial component of the thrust force caused by the inclined plane and to guide the rollers.



- Lines extended from the TTSV and TTSX roller-to-raceway contact surfaces converge to form a cone. The vertex of this cone is common with the centerline of the bearing and the plane of the raceway surface of the flat washer.
- The TTSV and TTSX design achieves true rolling motion between the tapered rollers and both raceways with no sliding or skidding at any point on the rolling surfaces. The flat raceway permits radial displacement without affecting the operation of the bearing.

**TTSP**

The types TTSP and TTSPS (not shown) thrust bearings are made up of two tapered thrust races, rollers, cage and outside retainer which holds the components together during shipping and installation. The types TTSP and TTSPS thrust bearings are employed extensively in the steering pivot positions of automotive and industrial applications.

**TTC, TTCS**

The types TTC, TTCS and TTCL (not shown) thrust bearings consist of two tapered thrust races, rollers and an outside retainer and are cageless. The outside retainer holds the assembly together for shipping and installation. Types TTC, TTCS and TTCL bearings are thrust bearings specifically designed for oscillating applications. These types are identical with the exception of the retainer construction.

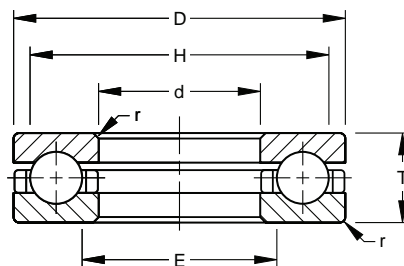




**BALL THRUST BEARINGS**

**TYPE TVB**

- Designed for optimum performance in high speed installations.
- Provide axial rigidity, but are not suggested if radial loading is expected.
- Exceptionally easy to mount, with the rotating washer usually shaft-mounted.



**DIMENSIONS – LOAD RATINGS**

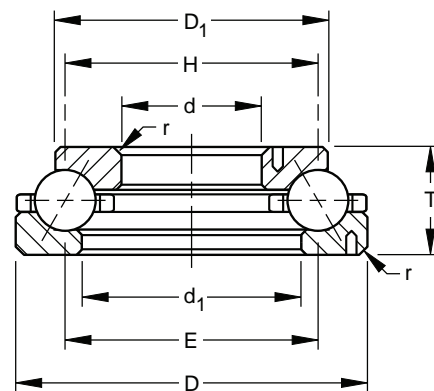
Bearing Number	Bore d	O.D. D	Height T (min.)	Shoulder Diameter		Fillet Radius <sup>(1)</sup> r (max.)	Wt.	Load Rating	
				Shaft H (min.)	Housing E (max.)			Static Load Rating C <sub>0a</sub>	Dynamic Load Rating C <sub>t</sub>
	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	kg lbs.	kN lbs.	kN lbs.
50TVB190	127.000 5.0000	184.150 7.2500	41.275 1.6250	170.7 6.72	140.5 5.53	2.4 0.09	3.4 7.2	583.0 131000	169.0 38000
52TVB253	133.350 5.2500	203.200 8.0000	50.800 2.0000	185.7 7.31	150.8 5.94	2.4 0.09	5.5 12.2	756.0 170000	223.0 50200
55TVB245	139.700 5.5000	209.550 8.2500	47.625 1.8750	192.1 7.56	157.2 6.19	2.4 0.09	5.1 11.3	770.0 173000	231.0 52000
57TVB248	146.050 5.7500	215.900 8.5000	47.625 1.8750	198.4 7.81	163.5 6.44	2.4 0.09	5.3 11.7	810.0 182000	239.0 53800
60TVB252	152.400 6.0000	222.250 8.7500	47.625 1.8750	204.8 8.06	169.9 6.69	2.4 0.09	5.6 12.4	832.0 187000	238.0 53500
62TVB291	158.750 6.2500	228.600 9.0000	47.625 1.8750	215.1 8.47	172.2 6.78	2.4 0.09	5.8 12.8	867.0 195000	245.0 55100
65TVB293	165.100 6.5000	241.300 9.5000	57.150 2.2500	224.6 8.84	181.8 7.16	3.2 0.12	7.7 17.0	1060.0 238000	317.0 71300
67TVB296	171.450 6.7500	247.650 9.7500	57.150 2.2500	229.4 9.03	189.7 7.47	3.2 0.12	7.9 17.5	1110.0 251000	328.0 73800
70TVB298	177.800 7.0000	254.000 10.0000	57.150 2.2500	235.7 9.28	196.1 7.72	3.2 0.12	8.2 18.1	1170.0 263000	339.0 76300
75TVB343	190.500 7.5000	266.700 10.5000	57.150 2.2500	250 9.84	207.2 8.16	3.2 0.12	9.1 20.0	1140.0 255000	321.0 72300
75TVB344	190.500 7.5000	276.225 10.8750	69.850 2.7500	258.8 10.19	208 8.19	3.2 0.12	12.7 27.9	1390.0 313000	407.0 91400
80TVB346	203.200 8.0000	279.400 11.0000	57.150 2.2500	262.7 10.34	219.9 8.66	3.2 0.12	8.8 19.3	1370.0 309000	395.0 88900
80TVB347	203.200 8.0000	295.275 11.6250	76.200 3.0000	273.1 10.75	222.2 8.75	6.4 0.25	15.6 34.5	1700.0 382000	504.0 113000
85TVB391	215.900 8.5000	292.100 11.5000	57.150 2.2500	275.4 10.84	232.6 9.16	3.2 0.12	10.1 22.2	1280.0 289000	349.0 78400
90TVB393	228.600 9.0000	304.800 12.0000	57.150 2.2500	288.1 11.34	245.3 9.66	3.2 0.12	9.7 21.3	1620.0 365000	442.0 99400
95TVB431	241.300 9.5000	317.500 12.5000	57.150 2.2500	300.8 11.84	258 10.16	3.2 0.12	11.1 24.4	1380.0 311000	366.0 82400
100TVB433	254.000 10.0000	342.900 13.5000	57.150 2.2500	324.6 12.78	272.3 10.72	6.4 0.25	13.4 29.5	1560.0 351000	431.0 96800
105TVB471	266.700 10.5000	355.600 14.0000	57.150 2.2500	337.3 13.28	285.0 11.22	6.4 0.25	13.9 30.7	1810.0 407000	476.0 107000
110TVB472	279.400 11.0000	368.300 14.5000	57.150 2.2500	350 13.78	297.7 11.72	6.4 0.25	14.5 31.9	1870.0 421000	486.0 109000
120TVB511	304.800 12.0000	393.700 15.5000	57.150 2.2500	375.4 14.78	323.1 12.72	6.4 0.25	15.6 34.5	2000.0 450000	507.0 114000
130TVB551	330.200 13.0000	419.100 16.5000	63.500 2.5000	400.8 15.78	348.5 13.72	6.4 0.25	18 39.6	2470.0 555000	627.0 141000
140TVB581	355.600 14.0000	444.500 17.5000	63.500 2.5000	426.2 16.78	373.9 14.72	6.4 0.25	19.2 42.3	2620.0 590000	649.0 146000
150TVB610	381.000 15.0000	482.600 19.0000	63.500 2.5000	460.4 18.12	403.6 15.89	6.4 0.25	24.8 54.7	2620.0 590000	649.0 146000
160TVB640	406.400 16.0000	508.000 20.0000	63.500 2.5000	482.6 19.00	431.8 17.00	6.4 0.25	26.3 57.9	2780.0 624000	677.0 152000

<sup>(1)</sup> Maximum shaft or housing fillet radius that bearing corners will clear.

## ANGULAR CONTACT BALL THRUST BEARINGS

### TYPE TVL

- Provides exceptionally low friction, cool running and quiet operation when run at high speeds.
- Although designed exclusively for thrust loads, will accommodate some radial loading.



### DIMENSIONS – LOAD RATINGS<sup>(2)</sup>

Bearing Number	Bore d	O.D. D	Height T	Washers		Shoulder Diam.		Dowel Pin (one per Washer)			Fillet <sup>(1)</sup> Radius r	Weight	Load Rating		
				Small Diameter O.D. D <sub>1</sub>	Large Bore I.D. d <sub>1</sub>	Shaft H (Min.)	Housing E (Max.)	Pin Diameter	Hole Location from Centerline				kg. lbs.	Static Load Rating C <sub>0a</sub>	Dynamic Load Rating C <sub>1</sub>
									Small Bore Washer	Large Bore Washer					
	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	kg. lbs.	kN lbs.	kN lbs.	
90TVL710	228.600 9.0000	295.275 11.6250	38.100 1.5000	277.81 10.938	246.06 9.688	261.9 10.31	261.9 10.31	—	—	—	3.2 0.12	6.2 13.6	636.0 143000	164.0 36900	
120TVL700	304.800 12.0000	406.400 16.0000	57.150 2.2500	368.30 14.500	342.90 13.500	355.6 14.00	355.6 14.00	9.52 0.375	165.1 6.50	190.5 7.50	3.2 0.12	18.5 40.8	1600.0 359000	429.0 96400	
150TVL701	381.000 15.0000	520.700 20.5000	84.125 3.3120	482.60 19.000	419.10 16.500	450.8 17.75	450.8 17.75	12.70 0.500	206.4 8.12	244.5 9.62	4.8 0.19	50.2 110.7	2700.0 606000	721.0 162000	
170TVL500	431.800 17.0000	635.000 25.0000	88.900 3.5000	565.15 22.250	488.95 19.250	533.4 21.00	533.4 21.00	12.70 0.500	235 9.25	298.4 11.75	7.9 0.31	89.6 197.5	4390.0 986000	1130.0 254000	
180TVL605	457.200 18.0000	625.475 24.6250	92.075 3.6250	549.28 21.625	508 20.000	541.3 21.31	541.3 21.31	15.88 0.625	247.6 9.75	285.8 11.25	3.2 0.12	78.4 172.9	4790.0 1076000	1280.0 288000	
195TVL470	495.300 19.5000	584.200 23.0000	57.150 2.2500	571.50 22.500	508 20.000	539.8 21.25	539.8 21.25	9.52 0.375	258.8 10.19	281 11.06	3.2 0.12	28.4 62.7	2600.0 585000	596.0 134000	
200TVL850	508.000 20.0000	704.850 27.7500	117.475 4.6250	628.68 24.750	565.15 22.250	606.4 23.88	606.4 23.88	15.88 0.625	276.2 10.88	330.2 13.00	6.4 0.25	127.3 280.7	5160.0 1160000	1350.0 303000	
201TVL615	511.175 20.1250	628.650 24.7500	66.675 2.6250	590.55 23.250	549.28 21.625	569.9 22.44	569.9 22.44	12.70 0.500	268.3 10.56	300 11.81	3.2 0.12	41.9 92.3	3320.0 746000	787.0 177000	
202TVL620	514.350 20.5000	704.850 27.7500	114.300 4.5000	622.30 24.500	571.50 22.500	609.6 24.00	609.6 24.00	20.64 0.812	279.4 11.00	327 12.88	6.4 0.25	122.3 269.7	5910.0 1330000	1560.0 351000	
227TVL302	577.850 22.7500	774.700 30.5000	117.475 4.6250	704.85 27.750	622.30 24.500	676.3 26.62	676.3 26.62	20.64 0.812	311.2 12.25	365.1 14.38	6.4 0.25	149.8 330.2	6620.0 1490000	1690.0 379000	
233TVL303	593.725 23.3750	790.575 31.1250	117.475 4.6250	720.72 28.375	650.88 25.625	692.2 27.25	692.2 27.25	22.22 0.875	320.7 12.62	369.9 14.56	6.4 0.25	150.7 332.2	6850.0 1540000	1730.0 388000	
238TVL304	606.425 23.8750	847.725 35.3950	133.350 5.2500	739.78 29.125	688.98 27.125	727.1 28.62	727.1 28.62	22.22 0.875	327 12.88	396.9 15.62	6.4 0.25	212.6 468.7	8510.0 1910000	2200.0 494000	
245TVL716	622.300 24.5000	768.350 30.2500	82.550 3.2500	733.42 28.875	680.47 26.790	695.3 27.38	695.3 27.38	12.70 0.500	323.8 12.75	371.5 14.62	3.2 0.12	76.2 168.0	3830.0 861000	863.0 194000	
245TVL612	622.300 24.5000	831.850 32.7500	117.475 4.6250	742.95 29.250	679.45 26.750	727.1 28.62	727.1 28.62	15.88 0.625	330.2 13.00	396.9 15.62	6.4 0.25	164.5 362.7	7070.0 1590000	1770.0 397000	
252TVL505	341.350 25.2500	793.750 31.2500	88.900 3.5000	746.12 29.375	708.02 27.875	717.6 28.25	717.6 28.25	12.70 0.500	342.9 13.50	376.2 14.81	6.4 0.25	89.3 197.0	5430.0 1220000	1300.0 293000	
260TVL635	660.400 26.0000	893.350 35.2500	133.350 5.2500	790.58 31.125	727.08 28.625	777.9 30.62	777.9 30.62	20.64 0.812	355.6 14.00	422.3 16.62	6.4 0.25	226.9 500.4	9520.0 2140000	2370.0 533000	
302TVL510	768.350 30.2500	920.750 36.2500	88.900 3.5000	873.12 34.375	835.02 32.875	844.6 33.25	844.6 33.25	12.70 0.500	408 16.06	439.7 17.31	6.4 0.25	105.2 231.9	6360.0 1430000	1450.0 325000	
302TVL624	768.350 30.2500	1006.475 39.6250	139.700 5.5000	901.7 35.500	838.2 33.000	887.4 34.94	887.4 34.94	22.22 0.875	409.6 16.12	476.2 18.75	6.4 0.25	271.1 597.8	10600.0 2370000	2540.0 570000	
303TVL706	771.525 30.3750	898.525 35.3750	63.500 2.5000	860.42 33.875	809.62 31.875	835 32.88	835 32.88	12.70 0.500	403.2 15.88	431.8 17.00	6.4 0.25	58 128.0	3900.0 877000	778.0 175000	
309TVL707	785.812 30.9375	952.500 37.5000	95.250 3.7500	882.65 34.750	857.25 33.750	870 34.25	870 34.25	15.88 0.625	415.9 16.38	454 17.88	6.4 0.25	117.9 260.0	4230.0 952000	1100.0 248000	
310TVL625	787.400 31.0000	1025.525 40.3750	139.700 5.5000	917.58 36.125	893.76 35.188	906.5 35.69	906.5 35.69	22.22 0.875	422.3 16.62	485.8 19.12	6.4 0.25	263.5 581.0	10900.0 2450000	2590.0 582000	
317TVL307	806.450 31.7500	1025.525 40.3750	127.000 5.0000	933.45 36.750	873.12 34.375	914.4 36.00	914.4 36.00	22.22 0.875	427 16.81	476.2 18.75	6.4 0.25	240.6 530.6	10900.0 2450000	2590.0 582000	
402TVL717	1022.350 40.2500	1181.100 46.5000	88.900 3.5000	1133.48 44.625	1069.98 42.125	1101.7 43.38	1101.7 43.38	19.05 0.750	530.2 20.88	571.5 22.50	6.4 0.25	147.8 326.0	8180.0 1840000	1710.0 384000	
410TVL718	1041.400 41.0000	1260.475 49.6250	127.000 5.0000	1189.04 46.812	1112.84 43.812	1150.9 45.31	1150.9 45.31	19.05 0.750	544.5 21.44	606.4 23.88	6.4 0.25	308.8 681.0	14000.0 3140000	3060.0 687000	
420TVL721	1066.800 42.0000	1285.875 50.6250	127.000 5.0000	1214.44 47.812	1138.24 44.812	1176.3 46.31	1176.3 46.31	22.22 0.875	560.4 22.06	616 24.25	6.4 0.25	315.2 695.0	14000.0 3140000	3060.0 687000	
530TVL719	1346.200 53.0000	1517.650 59.7500	104.775 4.1250	1457.32 57.375	1406.52 55.375	1431.9 56.38	1431.9 56.38	22.22 0.875	695.3 27.38	733.4 28.88	6.4 0.25	229.99 507.0	9080.0 2040000	1830.0 412000	
540TVL720	1371.600 54.0000	1619.250 63.7500	139.700 5.5000	1533.52 60.375	1457.32 57.375	1495.4 58.88	1495.4 58.88	22.22 0.875	714.4 28.12	781 30.75	6.4 0.25	480.3 1059.0	18000.0 4060000	3630.0 815000	

<sup>(1)</sup> Maximum shaft or housing fillet radius that bearing corners will clear.

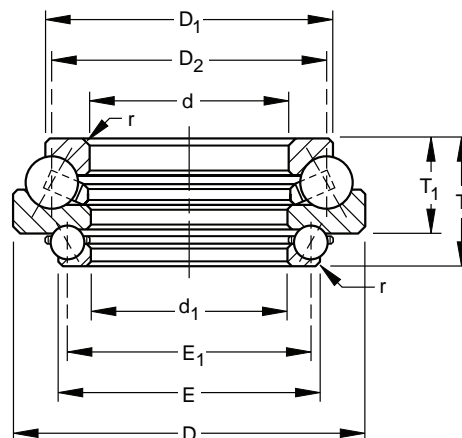
<sup>(2)</sup> See engineering section for application of Equivalent Thrust Load Factors:  $X = 0.76, Y = 1.00, \frac{T}{R} (\text{min}) = 1.56$ .  $\left[ \frac{T}{R} \right]$  is Thrust Load ÷ Radial Load



## ANGULAR CONTACT BALL THRUST BEARINGS

### TYPE DTVL

- Capable of carrying thrust in one direction, plus a lighter thrust in the opposite direction.
- Designed with an upper and lower complement of angular contact balls and three race elements.



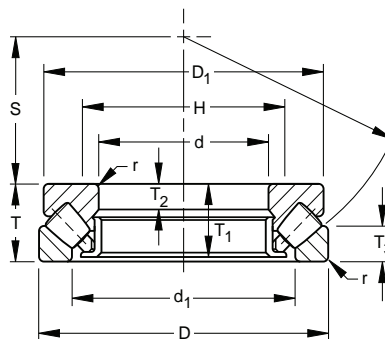
### DIMENSIONS – LOAD RATINGS<sup>(2)</sup>

Bearing Number	Bore		O.D. D	Height T	Upper Race		Lower Race		T <sub>1</sub>	Fillet <sup>(1)</sup> Radius r (Max.)	Weight	Load Rating		
	Upper d	Lower d <sub>1</sub>			O.D. D <sub>1</sub>	Shoulder D <sub>2</sub>	O.D. E	Shoulder E <sub>1</sub>				Upper		Lower
	mm in.	mm in.			mm in.	mm in.	mm in.	mm in.				Static Load Rating C <sub>0a</sub>	Dynamic Load Rating C <sub>1</sub>	Static Load Rating C <sub>0a</sub>
200DTVL722	508.000 20.0000	508.000 20.0000	742.95 29.2500	171.45 6.7500	679.45 26.750	616 24.250	587.38 23.125	558.8 22.00	127.000 5.000	6.4 0.25	177.3 391.0	5340 1200000	1560 351000	2310 519000
202DTVL723	514.350 20.2500	511.175 20.1250	704.85 27.7500	158.75 6.2500	622.30 24.500	609.60 24.000	590.55 23.250	569.9 22.44	114.3 4.50	6.4 0.25	133.3 294.0	5430 1220000	1480 332000	3750 844000
235DTVL724	596.900 23.5000	590.550 23.2500	838.2 33.0000	184.15 7.2500	774.70 30.500	711.20 28.000	676.28 26.625	647.7 25.50	139.7 5.50	6.4 0.25	246.2 543.0	7560 1700000	1970 443000	3660 822000
245DTVL725	622.300 24.5000	619.125 24.3750	815.975 32.1250	158.75 6.2500	730.25 28.750	717.60 28.250	698.50 27.500	677.9 26.68	114.3 4.50	6.4 0.25	157.4 347.0	6410 1440000	1640 369000	4430 995000
266DTVL726	676.275 26.6250	673.100 26.5000	914.4 36.0000	193.675 7.6250	876.30 34.500	787.40 31.000	787.4 31.00	743 29.25	142.88 5.625	6.4 0.25	296.6 654.0	8510 1910000	2480 558000	6320 1420000
305DTVL727	774.700 30.5000	768.35 30.2500	971.55 38.2500	158.75 6.2500	885.82 34.875	873.10 34.380	847.72 33.38	827.1 32.56	114.3 4.50	6.4 0.25	194.6 429.0	7780 1750000	1880 423000	5390 1210000
312DTVL728	793.750 31.2500	787.400 31.0000	1006.475 39.6250	200.025 7.8750	1000.12 39.375	895.40 35.250	901.7 35.50	863.6 34.00	139.7 5.50	6.4 0.25	325.2 717.0	10200 2300000	2480 557000	7200 1620000
405DTVL729	1028.700 40.5000	1025.525 40.3750	1231.9 48.5000	158.75 6.2500	1143 45.000	1130.30 44.500	1104.9 43.50	1084.3 42.69	114.3 4.50	6.4 0.25	254.4 561.0	10200 2280000	2240 504000	6540 1470000
412DTVL730	1047.750 41.2500	1041.400 41.0000	1260.475 49.6250	200.025 7.8750	1254.12 49.375	1149.40 45.250	1155.7 45.50	1117.6 44.00	139.7 5.50	6.4 0.25	417.2 920.0	12300 2760000	2780 625000	8230 1850000
541DTVL731	1374.775 54.1250	1371.600 54.0000	1597.025 62.8750	247.65 9.7500	1536.70 60.500	1481.10 58.310	1489.08 58.625	1447.8 57.00	168.28 6.625	6.4 0.25	654.4 1443.0	17700 3980000	3580 804000	11100 2500000

<sup>(1)</sup> Maximum shaft or housing fillet radius that bearing corners will clear.

<sup>(2)</sup> See engineering section for application of Equivalent Thrust Load Factors: X = 0.76, Y = 1.00,  $\frac{T}{R}$  (min) = 1.56.  $\left[\frac{T}{R}\right]$  is Thrust Load ÷ Radial Load

## SPHERICAL ROLLER THRUST BEARINGS



### TYPE TSR

- Design achieves a high thrust capacity with low friction and continuous roller alignment.
- Spherically contoured rollers, arranged in steep angular position, not only accommodates high thrust loads, but supports moderate radial loads as well.
- Low friction of the bearing results from a combination of bearing geometry and manufacturing technology.

### TYPE TSR-EM

- Utilize bronze retainers and enhanced internal geometry allowing for higher dynamic load ratings and improved lubrication characteristics.
- Utilizes spherically contoured rollers arranged in a steep angular configuration to accommodate high thrust load alone or in combination with moderate radial loads.
- Possesses inherent dynamic misalignment capabilities.

### DIMENSIONS – LOAD RATINGS

Bearing Number	Bore d	O.D. D	Height T	Shoulder Diameter		Inner Ring			Outer Ring Height T <sub>3</sub>	S	Fillet Radius r (Max.)	Wt.	Load Rating		Approx. Limiting Speed (for Oil Bath Only)	k <sup>(2)</sup>
				d <sub>1</sub> Housing (Min.)	H Shaft (Max.)	O.D. D <sub>1</sub>	Assembly Height T <sub>1</sub>	Pilot Height T <sub>2</sub>					Static Load Rating C <sub>0a</sub>	Dynamic Load Rating C <sub>1</sub>		
	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	kg. lbs.	kN lbs.	kN lbs.	RPM	
29422	110 4.3307	230 9.0551	73 2.8740	162 6.378	165 6.496	220 8.661	69 2.717	26 1.024	35 1.378	69 2.717	2.5 0.10	33.4 33.4	1150 260000	800 176000	1500	30
29424	120 4.7244	250 9.8425	78 3.0709	174 6.850	180 7.087	236 9.291	74 2.913	29 1.142	37 1.476	74 2.933	3.0 0.12	18.5 40.7	1180 256000	965 216000	1350	40
29326	130 5.1181	225 8.8583	58 2.2835	171 6.744	177 6.963	215 8.465	55 2.165	19 0.748	29 1.130	75 2.972	2.0 0.08	9.8 21.6	880 197000	600 132000	1700	22
29426	130 5.1181	270 10.6299	85 3.3464	187 7.375	195 7.677	255 10.039	81 3.189	31 1.22	42 1.669	81 3.189	3.0 0.12	23.9 52.6	1730 388000	1120 253000	1250	60
29330	150 5.9055	250 9.8425	60 2.3622	194 7.638	195 7.677	240 9.449	57 2.244	20 0.787	29 1.142	87 3.425	2.0 0.08	12.5 27.5	1140 255000	670 150000	1550	30
29430	150 5.9055	300 11.8110	90 3.5433	213 8.405	220 8.661	285 11.220	86 3.386	32 1.260	44 1.732	92 3.622	3.0 0.12	29.3 64.5	1930 440000	1220 275000	1100	80
29334	170 6.6929	280 11.0236	67 2.6378	216 8.504	220 8.661	270 10.630	64 2.520	23 0.906	32 1.280	96 3.780	2.5 0.10	16.5 36.3	1500 340000	880 196000	1350	50
29434	170 6.6929	340 13.3858	103 4.0551	243 9.567	245 9.646	324 12.756	99 3.898	37 1.457	50 1.968	104 4.094	4.0 0.16	42.4 93.5	2650 600000	1630 365000	950	140
29338EJ	190 7.4803	320 12.5984	78 3.0709	246 9.685	250 9.843	308 12.126	74 2.913	27 1.063	38 1.496	110 4.331	3.0 0.12	25.6 56.5	2442 549000	1481 333000	1150	80
29438EJ	190 7.4803	380 14.9606	115 4.5276	271 10.669	275 10.827	360 14.173	111 4.370	41 1.614	55 2.185	117 4.606	4.0 0.16	60.3 133.0	4168 937000	2482 558000	850	210
29340	200 7.8740	340 13.3858	85 3.3465	264 10.3937	265 10.4331	325 12.7953	81 3.2452	29 1.1417	40 1.5748	114 4.4882	3.0 0.12	29 63	2157 485000	1236 278000	950	100
29440	200 7.8740	400 15.7480	122 4.8031	286 11.254	290 11.417	380 14.961	117 4.606	43 1.693	59 2.323	122 4.803	4.0 0.16	69.8 154.0	3625 815000	2135 480000	800	260
29344	220 8.6614	360 14.1732	85 3.3464	280 11.024	285 11.220	345 13.583	81 3.189	29 1.142	41 1.614	125 4.921	3.0 0.12	33.9 74.8	2500 550000	1340 300000	1000	120
29444	220 8.6614	420 16.5354	122 4.8031	307 12.106	310 12.205	400 15.748	117 4.606	43 1.693	59 2.323	133 5.236	5.1 0.20	73.9 163.0	3800 865000	2200 500000	750	300
29348	240 9.4488	380 14.9606	85 3.3464	300 11.811	300 11.811	365 14.370	81 3.189	29 1.142	41 1.614	135 5.315	3.0 0.12	41.9 92.4	2650 600000	1400 315000	950	140
29448EM	240 9.4488	440 17.3228	122 4.8031	315 12.4016	322 12.6772	385 15.1575	87 3.4252	46 1.8110	61 2.4016	142 5.5906	6.1 0.24	78 171	4884 1098000	2736 615000	750	350

<sup>(1)</sup> Maximum shaft or housing fillet radius that bearing corners will clear.

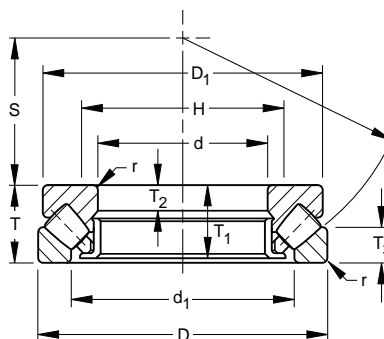
<sup>(2)</sup> Centrifugal force constant. See engineering section for calculations using this factor.





**SPHERICAL ROLLER THRUST BEARINGS**

TYPE TSR, TSR-EM – *continued*



**DIMENSIONS – LOAD RATINGS - *continued***

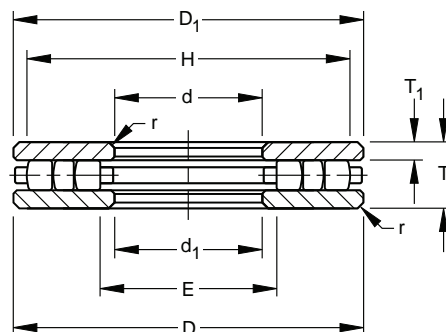
Bearing Number	Bore d	O.D. D	Height T	Shoulder Diameter		Inner Ring			Outer Ring Height T <sub>3</sub>	S	Fillet <sup>(1)</sup> r	Wt.	Load Rating		Approx. Limiting Speed (for Oil Bath Only)	k <sup>(2)</sup>
				d <sub>1</sub> Housing (Min.)	H Shaft (Max.)	O.D. D <sub>1</sub>	Assembly Height T <sub>1</sub>	Pilot Height T <sub>2</sub>					Static Load Rating C <sub>0a</sub>	Dynamic Load Rating C <sub>i</sub>		
	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	kg lbs.	kN lbs.	kN lbs.	RPM	
29352	260 10.2362	420 16.5354	95 3.7402	329 12.953	330 12.992	405 15.945	91 3.583	32 1.260	45 1.791	148 5.827	4.0 0.16	51.2 113.0	3350 750000	1800 400000	850	230
29452	260 10.2362	480 18.8976	132 5.1968	357 14.055	360 14.173	460 18.110	127 5.000	48 1.890	64 2.520	154 6.063	5.1 0.20	103 227.0	4900 1120000	1800 620000	650	500
29360	300 11.8110	480 18.8976	109 4.2913	379 14.921	380 14.961	460 18.110	105 4.134	37 1.457	50 1.988	168 6.614	4.0 0.16	76.6 169.0	4150 930000	2160 490000	700	350
29460	300 11.8110	540 21.2598	145 5.7086	402 15.827	410 16.142	515 20.276	140 5.512	52 2.047	70 2.776	175 6.890	5.1 0.20	136 301.0	6400 1430000	3450 770000	550	780
29364	320 12.5984	500 19.6850	109 4.2913	399 15.709	400 15.748	482 18.976	105 4.134	37 1.457	53 2.087	180 7.087	4.0 0.16	79.8 176.0	4300 980000	2240 500000	650	380
29468	340 13.3858	620 24.4094	170 6.6929	462 18.189	465 18.307	590 23.228	164 6.457	61 2.402	82 3.248	201 7.913	6.1 0.24	220 486.0	8500 1900000	4500 1020000	450	1350
29372	360 14.1732	560 22.0472	122 4.8031	448 17.638	450 17.717	540 21.260	117 4.606	41 1.614	59 2.343	202 7.953	4.0 0.16	113 249.0	5600 1250000	2800 620000	550	640
29476	380 14.9606	670 26.3780	175 6.8898	504 19.842	510 20.079	640 25.197	168 6.614	63 2.480	85 3.331	220 8.740	6.1 0.24	261 575.0	9000 2040000	4750 1060000	410	1700
29576	380 14.9606	820 32.2835	265 10.4330	570 22.441	578 22.756	780 30.709	226 10.078	100 3.927	128 5.062	241 9.488	9.1 0.36	824 1816.0	17300 3900000	9500 2120000	280	5550
29380	400 15.748	620 24.4094	132 5.1968	494 19.449	500 19.685	596 23.465	127 5.000	44 1.732	64 2.520	225 8.858	5.1 0.20	165 363.0	7100 1600000	3450 780000	500	970
29284EM	420 16.5354	580 22.8346	95 3.7402	479 18.8583	500 19.685	542 21.339	70 2.7559	41 1.6142	50 1.9685	228 8.9764	5.1 0.20	70 154.0	5329 1198000	2624 590000	630	300
29388	440 17.3228	680 26.7717	145 5.7089	548 21.5748	563 22.1654	657 25.866	140 5.5118	49 1.9291	69 2.7165	246 9.6850	5.1 0.20	180 397.0	7588 1706000	3647 820000	480	1400
29488	440 17.3228	780 30.7087	206 8.1102	588 23.150	595 23.425	745 29.331	199 7.835	74 2.913	99 3.917	257 10.118	7.1 0.28	411 906.0	13200 2900000	6700 1500000	320	3400
29392	460 18.1102	710 27.9528	150 5.9055	566 22.293	575 22.638	685 26.969	144 5.669	51 2.008	72 2.857	257 10.118	5.1 0.20	220 486.0	9300 2100000	4400 1000000	400	1700
29496EM	480 18.8976	850 33.4646	224 8.8189	626 24.6457	658 25.9055	770 30.315	159 6.2598	93 3.6614	110 4.3307	279 10.9843	9.7 0.38	550 1212.0	22458 5049000	11342 2550000	290	4700
294/500	500 19.6850	870 34.2520	224 8.8189	661 26.024	670 26.378	830 32.677	216 8.504	81 3.189	107 4.213	290 11.417	7.1 0.28	560 1235.0	16000 3600000	8000 1800000	270	4800
293/530	530 20.8661	800 31.4961	160 6.2992	648 25.512	650 25.591	772 30.394	154 6.063	54 2.126	76 2.992	295 11.614	6.1 0.24	288 634.0	11000 2450000	5100 1140000	350	2500
293/600	600 23.6220	900 35.4331	180 7.0866	727 28.6220	730 28.7402	868 34.173	173 6.8110	61 2.4016	87 3.4252	333 13.1102	5.1 0.20	635 1400.0	16770 3770000	7619 1713000	320	4200
294/630	630 24.8031	1090 42.9134	280 11.0236	831 32.707	850 33.465	1044 41.102	271 10.669	101 3.976	133 5.236	365 14.393	9.1 0.36	1170 2580.0	23000 5200000	11400 2550000	250	12200

(1) Maximum shaft or housing fillet radius that bearing corners will clear.  
 (2) Centrifugal force constant. See engineering section for calculations using this factor.

## CYLINDRICAL ROLLER THRUST BEARINGS

### TYPE TP

- Most economical to buy and install because of design simplicity.
- Minor radial displacement of the races does not affect its operation, resulting in manufacturing economies and simplified installation.



### DIMENSIONS – LOAD RATINGS

Bearing Number	Bore d	O.D. D	Height T	Washers			Shoulder Diameter		Fillet <sup>(1)</sup> Radius r (Max.)	Wt.	Load Rating	
				Thickness T <sub>1</sub>	Small Diameter O.D. D <sub>1</sub>	Large Bore I.D. d <sub>1</sub>	Shaft H (Min.)	Housing E (Max.)			Static Load Rating C <sub>0a</sub>	Dynamic Load Rating C <sub>t</sub>
	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	kg lbs.	kN lbs.	kN lbs.	
20TP103	50.800 2.0000	152.400 6.0000	34.925 1.3750	9.52 0.375	150.81 5.938	52.39 2.062	141.3 5.56	61.9 2.44	1.6 0.06	3.7 8.1	814 183000	331 74500
20TP104	50.800 2.0000	177.800 7.0000	34.925 1.3750	9.52 0.375	176.21 6.938	52.39 2.062	163.5 6.44	65.1 2.56	1.6 0.06	5.1 11.3	1010 227000	398 89500
30TP106	76.200 3.0000	152.400 6.0000	34.925 1.3750	9.52 0.375	150.81 5.938	77.79 3.062	142.9 5.62	85.7 3.38	1.6 0.06	3.2 7.0	747 168000	340 76500
30TP107	76.200 3.0000	177.800 7.0000	34.925 1.3750	9.52 0.375	176.21 6.938	77.79 3.062	166.7 6.56	87.3 3.44	1.6 0.06	4.6 10.2	1040 234000	414 93200
30TP108	76.200 3.0000	203.200 8.0000	34.925 1.3750	9.52 0.375	201.61 7.938	77.79 3.062	188.9 7.44	90.5 3.56	1.6 0.06	6.3 13.9	1380 311000	520 117000
30TP109	76.200 3.0000	228.600 9.0000	34.925 1.3750	9.52 0.375	227.01 8.938	77.79 3.062	212.7 8.38	92.1 3.62	1.6 0.06	8.2 18.1	1800 405000	636 143000
35TP113	88.900 3.5000	132.558 5.2188	25.400 1.0000	7.14 0.281	130.97 5.156	90.49 3.562	123.8 4.88	97.6 3.84	1.6 0.06	1.4 3.0	381 85600	180 40400
40TP114	101.600 4.0000	177.800 7.0000	44.450 1.7500	12.7 0.500	176.21 6.938	103.19 4.062	168.3 6.62	111.1 4.38	1.6 0.06	5 11.0	1030 231000	503 113000
40TP115	101.600 4.0000	203.200 8.0000	44.450 1.7500	12.7 0.500	201.61 7.938	103.19 4.062	190.5 7.50	114.3 4.50	1.6 0.06	7.1 15.6	1370 308000	589 132000
40TP116	101.600 4.0000	228.600 9.0000	44.450 1.7500	12.7 0.500	227.01 8.938	103.19 4.062	214.3 8.44	115.9 4.56	1.6 0.06	9.5 21.0	1770 397000	676 152000
40TP117	101.600 4.0000	254 10.0000	44.450 1.7500	12.7 0.500	252.41 9.938	103.19 4.062	238.1 9.38	117.5 4.62	1.6 0.06	11.6 25.6	2220 498000	896 202000
50TP119	127 5.0000	203.200 8.0000	44.450 1.7500	12.7 0.500	201.61 7.938	128.59 5.062	190.5 7.50	139.7 5.50	1.6 0.06	5.9 13.1	1280 288000	593 133000
50TP120	127 5.0000	228.600 9.0000	44.450 1.7500	12.7 0.500	227.01 8.938	128.59 5.062	215.9 8.50	139.7 5.50	1.6 0.06	8.3 18.4	1710 385000	716 161000
50TP121	127 5.0000	254 10.0000	50.800 2.0000	14.29 0.562	252.41 9.938	128.59 5.062	239.7 9.44	141.3 5.56	3.2 0.12	12.4 27.4	2180 491000	841 189000
50TP122	127 5.0000	279.400 11.0000	50.800 2.0000	14.29 0.562	277.81 10.938	128.59 5.062	261.9 10.31	144.5 5.69	3.2 0.12	15.8 34.8	2760 620000	996 224000
50TP123	127 5.0000	304.800 12.0000	50.800 2.0000	14.29 0.562	303.21 11.938	128.59 5.062	288.9 11.38	146 5.75	3.2 0.12	19.4 42.8	3290 789000	1170 262000
60TP124	152.400 6.0000	228.600 9.0000	50.800 2.0000	14.29 0.562	227.01 8.938	153.99 6.062	217.5 8.56	163.5 6.44	3.2 0.12	7.6 16.8	1410 317000	600 135000
60TP125	152.400 6.0000	254 10.0000	50.800 2.0000	14.29 0.562	252.41 9.938	153.99 6.062	241.3 9.50	165.1 6.50	3.2 0.12	10.7 23.7	2000 449000	845 190000
60TP126	152.400 6.0000	279.400 11.0000	50.800 2.0000	14.29 0.562	277.81 10.938	153.99 6.062	265.1 10.44	166.7 6.56	3.2 0.12	14.2 31.4	2700 608000	1000 226000
60TP127	152.400 6.0000	304.800 12.0000	50.800 2.0000	14.29 0.562	303.31 11.938	153.99 6.062	287.3 11.31	169.9 6.69	3.2 0.12	17.7 39.4	3220 725000	1110 250000
70TP129	177.800 7.0000	254 10.0000	50.800 2.0000	14.29 0.562	251.62 9.906	180.18 7.094	242.9 9.56	188.9 7.44	3.2 0.12	9.2 20.2	1620 365000	663 149000
70TP130	177.800 7.0000	279.400 11.0000	50.800 2.0000	14.29 0.562	277.02 10.906	180.18 7.094	266.7 10.50	190.5 7.50	3.2 0.12	12.8 28.3	2400 540000	930 209000
70TP131	177.800 7.0000	304.800 12.0000	50.800 2.0000	14.29 0.562	302.42 11.906	180.18 7.094	288.9 11.38	193.7 7.62	3.2 0.12	16.8 37.0	3090 695000	1080 242000
70TP132	177.800 7.0000	355.600 14.0000	76.200 3.0000	20.64 0.812	353.22 13.906	180.18 7.094	335 13.19	198.4 7.81	6.4 0.25	36.3 80.1	4490 1010000	1750 394000

<sup>(1)</sup> Maximum shaft or housing fillet radius that bearing corners will clear.



## CYLINDRICAL ROLLER THRUST BEARINGS

TYPE TP – continued

B

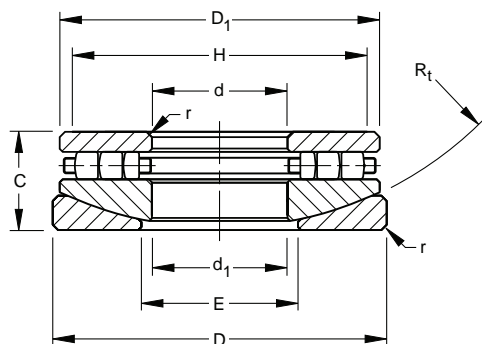
Bearing Number	Bore d	O.D. D	Height T	Washers			Shoulder Diameter		Filler <sup>(1)</sup> Radius r (Max.)	Wt.	Load Rating	
				Thickness T <sub>1</sub>	Small Diameter O.D. D <sub>1</sub>	Large Bore I.D. d <sub>1</sub>	Shaft H (Min.)	Housing E (Max.)			Static Load Rating C <sub>0a</sub>	Dynamic Load Rating C <sub>t</sub>
	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	kg lbs.	kN lbs.	kN lbs.	
80TP134	203.2 8.0000	304.8 12.0000	76.2 3.0000	20.64 0.812	302.42 11.906	205.58 8.094	292.1 11.50	215.9 8.50	6.4 0.25	20.5 45.1	2660 599000	1150 258000
80TP135	203.2 8.0000	355.6 14.0000	76.2 3.0000	20.64 0.812	353.22 13.906	205.58 8.094	336.6 13.25	222.2 8.75	6.4 0.25	33 72.8	4230 950000	1730 389000
80TP136	203.2 8.0000	406.4 16.0000	76.2 3.0000	20.64 0.812	404.02 15.906	205.58 8.094	382.6 15.06	227.0 8.94	6.4 0.25	44.5 98.1	5740 1290000	2310 520000
90TP139	228.6 9.0000	355.6 14.0000	76.2 3.0000	20.64 0.812	353.22 13.906	230.98 9.094	339.7 13.38	244.5 9.62	6.4 0.25	29.3 64.5	3910 879000	1460 328000
90TP140	228.6 9.0000	406.4 16.0000	76.2 3.0000	20.64 0.812	404.02 15.906	230.98 9.094	385.8 15.19	249.2 9.81	6.4 0.25	43.6 96.2	5560 1250000	2140 482000
100TP143	254 10.0000	406.4 16.0000	76.2 3.0000	20.64 0.812	404.02 15.906	256.38 10.094	387.4 15.25	273.0 10.75	6.4 0.25	39.5 86.6	5160 1160000	1750 394000
100TP144	254 10.0000	457.2 18.0000	95.25 3.7500	26.19 1.031	454.82 17.906	256.38 10.094	435.0 17.12	276.2 10.88	6.4 0.25	68.8 151.8	7210 1620000	2690 604000
100TP145	254 10.0000	508 20.0000	95.25 3.7500	26.19 1.031	505.62 19.906	256.38 10.094	481.0 18.94	281.0 11.06	6.4 0.25	91.7 202.2	9560 2150000	3670 825000
120TP151	304.8 12.0000	457.2 18.0000	95.25 3.7500	26.19 1.031	454.82 17.906	307.18 12.094	438.2 17.25	323.8 12.75	6.4 0.25	56.7 125.1	6340 1420000	2300 518000
120TP152	304.8 12.0000	508 20.0000	114.3 4.5000	31.75 1.250	505.62 19.906	307.18 12.094	484.2 19.06	328.6 12.94	6.4 0.25	104.5 230.5	7900 1780000	3300 743000
120TP153	304.8 12.0000	609.6 24.0000	114.3 4.5000	31.75 1.250	607.22 23.906	307.18 12.094	584.2 23.00	330.2 13.00	6.4 0.25	168.5 371.5	12900 2900000	4680 1050000
140TP158	355.6 14.0000	508 20.0000	95.25 3.7500	26.19 1.031	504.82 19.875	358.78 14.125	489.0 19.25	374.6 14.75	6.4 0.25	62.6 138.1	7200 1620000	2610 588000
140TP159	355.6 14.0000	558.8 22.0000	95.25 3.7500	26.19 1.031	555.62 21.875	358.78 14.125	535.0 21.06	379.4 14.94	6.4 0.25	89.6 197.5	10000 2250000	3750 802000
140TP160	355.6 14.0000	609.6 24.0000	95.25 3.7500	26.19 1.031	606.4 23.875	358.78 14.125	581.0 22.88	384.2 15.12	6.4 0.25	125.3 276.2	12600 2840000	4040 908000
160TP164	406.4 16.0000	558.8 22.0000	114.3 4.5000	31.75 1.250	555.62 21.875	409.6 16.125	539.8 21.25	425.4 16.75	6.4 0.25	85.9 189.4	7860 1770000	3090 695000
160TP165	406.4 16.0000	609.6 24.0000	114.3 4.5000	31.75 1.250	606.4 23.875	409.6 16.125	585.8 23.06	430.2 16.94	6.4 0.25	121.4 267.7	11200 2510000	4170 937000
160TP166	406.4 16.0000	660.4 26.0000	114.3 4.5000	31.75 1.250	657.2 25.875	409.6 16.125	633.4 24.94	433.4 17.06	6.4 0.25	168.8 372.1	13800 3090000	4710 1060000
180TP168	457.2 18.0000	660.4 26.0000	127 5.0000	34.92 1.375	657.2 25.875	460.4 18.125	635 25.00	482.6 19.00	6.4 0.25	148.8 328.1	11800 2650000	4090 919000
180TP169	457.2 18.0000	711.2 28.0000	127 5.0000	34.92 1.375	708.0 27.875	460.4 18.125	684.2 26.94	484.2 19.06	6.4 0.25	195.3 430.7	15500 3480000	5480 1230000
180TP170	457.2 18.0000	762 30.0000	139.7 5.5000	38.10 1.500	758.8 29.875	460.4 18.125	735.0 28.94	484.2 19.06	6.4 0.25	280.7 618.9	19700 4430000	6840 1540000
200TP171	508 20.0000	711.2 28.0000	139.7 5.5000	38.10 1.500	708.0 27.875	511.2 20.125	685.8 27.00	533.4 21.00	6.4 0.25	178 392.5	13100 2940000	4710 1060000
200TP172	508 20.0000	762 30.0000	139.7 5.5000	38.10 1.500	758.8 29.875	511.2 20.125	736.6 29.00	533.4 21.00	6.4 0.25	232.2 512.0	17500 3930000	6370 1430000
200TP173	508 20.0000	812.8 32.0000	152.4 6.0000	42.07 1.656	809.6 31.875	511.2 20.125	787.4 31.00	533.4 21.00	6.4 0.25	317 698.9	22400 5050000	7610 1700000
220TP174	558.8 22.0000	762 30.0000	139.7 5.5000	38.10 1.500	758.8 29.875	562 22.125	736.6 29.00	584.2 23.00	6.4 0.25	192.7 425.0	14200 3200000	5070 1140000
220TP175	558.8 22.0000	812.8 32.0000	139.7 5.5000	38.10 1.500	809.6 31.875	562.0 22.125	782.6 30.81	589.0 23.19	6.4 0.25	250.6 552.6	19000 4270000	6570 1480000
220TP176	558.8 22.0000	863.6 34.0000	152.4 6.0000	42.07 1.656	860.4 33.875	562.0 22.125	838.2 33.00	584.2 23.00	6.4 0.25	340.9 751.6	24500 5500000	8200 1840000
240TP177	609.6 24.0000	812.8 32.0000	139.7 5.5000	38.10 1.500	809.6 31.875	612.8 24.125	790.6 31.12	631.8 24.88	9.5 0.38	206.5 455.4	16000 3600000	5650 1270000
240TP178	609.6 24.0000	863.6 34.0000	139.7 5.5000	38.10 1.500	860.4 33.875	612.8 24.125	838.2 33.00	635.0 25.00	9.5 0.38	269 593.2	20500 4610000	6880 1550000
240TP179	609.6 24.0000	914.4 36.0000	152.4 6.0000	42.07 1.656	911.2 35.875	612.8 24.125	889.0 35.00	635.0 25.00	9.5 0.38	364.7 804.2	25200 5670000	8450 1900000

<sup>(1)</sup> Maximum shaft or housing fillet radius that bearing corners will clear.

## CYLINDRICAL ROLLER THRUST BEARINGS

### TYPE TPS

- Similar to Type TP except one washer is spherically ground to seat against an aligning washer. This makes it adaptable to initial misalignment.
- Not suggested for operating conditions where alignment is constantly changing.



### DIMENSIONS – LOAD RATINGS

Bearing Number	Bore d	O.D. D	Height C	Aligning Washer radius Rt	Washers		Shoulder Diameter		Fillet <sup>(1)</sup> Radius r (Max.)	Wt.	Load Rating	
					Small Diameter O.D. D1	Large Bore I.D. d1	Shaft H (Min.)	Housing E (Max.)			Static Load Rating Coa	Dynamic Load Rating Ct
	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	kg lbs.	kN lbs.	kN lbs.
20TPS103	50.800 2.0000	160.325 6.3120	46.038 1.8125	190.50 7.500	150.81 5.938	52.39 2.062	141.3 5.56	85.7 3.38	1.6 0.06	5.2 11.4	814 183000	331 74500
20TPS104	50.800 2.0000	185.725 7.3120	46.038 1.8125	241.30 9.500	176.21 6.938	52.39 2.062	163.5 6.44	108.0 4.25	1.6 0.06	7.12 15.7	1010 227000	398 89500
30TPS106	76.200 3.0000	160.325 6.3120	46.038 1.8125	152.40 6.000	150.81 5.938	77.79 3.062	142.9 5.62	101.6 4.00	1.6 0.06	4.5 9.9	747 168000	340 76500
30TPS107	76.200 3.0000	185.725 7.3120	46.038 1.8125	241.30 9.500	176.21 6.938	77.79 3.062	166.7 6.56	111.1 4.38	1.6 0.06	6.4 14.2	1040 234000	414 93200
30TPS108	76.200 3.0000	211.125 8.3120	46.038 1.8125	304.80 12.000	201.61 7.938	77.79 3.062	188.9 7.44	133.4 5.25	1.6 0.06	8.7 19.2	1380 311000	520 117000
35TPS113	88.900 3.5000	138.908 5.4688	33.338 1.3125	127.00 5.000	130.97 5.156	91.28 3.594	123.8 4.88	103.2 4.06	1.6 0.06	1.9 4.1	381 85600	180 40400
40TPS114	101.600 4.0000	187.327 7.3750	58.738 2.3125	161.93 6.375	176.21 6.938	103.98 4.094	168.3 6.62	127 5.00	1.6 0.06	7.0 15.4	1030 231000	503 113000
40TPS115	101.600 4.0000	212.725 8.3750	58.738 2.3125	215.90 8.500	201.61 7.938	103.98 4.094	190.5 7.50	133.4 5.25	1.6 0.06	10.0 22.1	1370 308000	589 132000
40TPS116	101.600 4.0000	238.125 9.3750	58.738 2.3125	254.00 10.000	227.01 8.938	103.98 4.094	214.3 8.44	149.2 5.88	1.6 0.06	13.4 29.5	1770 397000	676 152000
40TPS117	101.600 4.0000	266.7 10.5000	58.738 2.3125	355.60 14.000	252.41 9.938	103.98 4.094	238.1 9.38	165.1 6.50	1.6 0.06	17.1 37.7	2220 498000	896 202000
50TPS119	127 5.0000	215.9 8.5000	58.738 2.3125	187.33 7.375	201.61 7.938	130.18 5.125	190.5 7.50	152.4 6.00	1.6 0.06	8.4 18.5	1280 288000	592 133000
50TPS120	127 5.0000	241.3 9.5000	58.738 2.3125	266.70 10.500	227.01 8.938	130.18 5.125	215.9 8.50	155.6 6.12	1.6 0.06	11.8 26.1	1710 385000	716 161000
50TPS121	127 5.0000	266.7 10.5000	66.675 2.6250	323.85 12.750	252.41 9.938	130.18 5.125	239.7 9.44	158.8 6.25	3.2 0.12	17.6 38.7	2180 491000	841 189000
50TPS122	127 5.0000	292.1 11.5000	66.675 2.6250	406.40 16.000	277.81 10.938	130.18 5.125	261.9 10.31	177.8 7.00	3.2 0.12	22.1 48.8	2760 620000	996 224000
50TPS123	127.000 5.0000	317.5 12.5000	66.675 2.6250	501.65 19.750	303.21 11.938	130.18 5.125	288.9 11.38	184.1 7.25	3.2 0.12	27.2 60.0	3290 739000	1170 262000
60TPS124	152.400 6.0000	241.3 9.5000	66.675 2.6250	171.45 6.750	227.01 8.938	155.58 6.125	217.5 8.56	184.1 7.25	3.2 0.12	10.8 23.8	1410 317000	600 135000
60TPS125	152.400 6.0000	266.7 10.5000	66.675 2.6250	241.30 9.500	252.46 9.938	155.58 6.125	241.3 9.50	187.3 7.38	3.2 0.12	15.2 33.5	2000 449000	845 190000
60TPS126	152.400 6.0000	292.1 11.5000	66.675 2.6250	342.90 13.500	277.81 10.938	155.58 6.125	265.1 10.44	187.3 7.38	3.2 0.12	20.1 44.3	2700 607000	1000 225000
60TPS127	152.400 6.0000	317.5 12.5000	66.675 2.6250	431.80 17.000	303.21 11.938	155.58 6.125	287.3 11.31	190.5 7.50	3.2 0.12	25.2 55.6	3220 725000	1110 250000
70TPS129	177.800 7.0000	266.7 10.5000	66.675 2.6250	206.38 8.125	251.62 9.906	180.8 7.125	242.9 9.56	206.4 8.12	3.2 0.12	12.7 27.9	1620 365000	663 149000
70TPS130	177.800 7.0000	292.100 11.5000	66.675 2.6250	292.10 11.500	277.02 10.906	180.98 7.125	266.7 10.50	209.6 8.25	3.2 0.12	17.7 39.1	2400 540000	930 209000
70TPS131	177.800 7.0000	317.500 12.5000	66.675 2.6250	390.53 15.375	302.42 11.906	180.98 7.125	288.9 11.38	209.6 8.25	3.2 0.12	23.3 51.3	3090 695000	1080 242000

<sup>(1)</sup> Maximum shaft or housing fillet radius that bearing corners will clear.



## CYLINDRICAL ROLLER THRUST BEARINGS

TYPE TPS – *continued*

B

### DIMENSIONS – LOAD RATINGS - *continued*

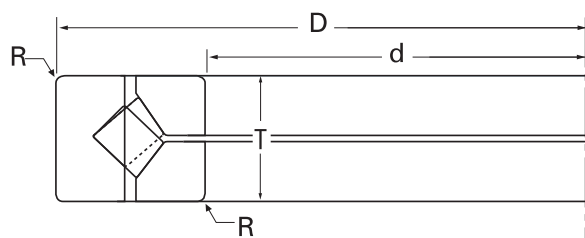
Bearing Number	Bore d	O.D. D	Height C	Aligning Washer radius R <sub>t</sub>	Washers		Shoulder Diameter		Fillet <sup>(1)</sup> Radius r (Max.)	Wt.	Load Rating	
					Small Diameter O.D. D <sub>1</sub>	Large Bore I.D. d <sub>1</sub>	Shaft H (Min.)	Housing E (Max.)			Static Load Rating C <sub>0a</sub>	Dynamic Load Rating C <sub>t</sub>
	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	kg lbs.	kN lbs.	kN lbs.
70TPS132	177.800 7.0000	374.650 14.7500	101.600 4.0000	390.53 15.375	353.22 13.906	180.98 7.125	335.0 13.19	228.6 9.00	6.4 0.25	52.6 115.9	4490 1010000	1750 394000
80TPS134	203.200 8.0000	323.850 12.7500	101.600 4.0000	215.90 8.500	302.42 11.906	207.96 8.188	292.1 11.50	238.1 9.38	6.4 0.25	29.8 65.8	2660 599000	1150 258000
80TPS135	203.200 8.0000	374.650 14.7500	101.600 4.0000	304.80 12.000	353.22 13.906	207.96 8.188	336.6 13.25	263.5 10.38	6.4 0.25	47.7 105.2	4230 950000	1730 389000
80TPS136	203.200 8.0000	428.625 16.8750	101.600 4.0000	495.30 19.500	404.02 15.906	209.55 8.250	382.6 15.06	266.7 10.50	6.4 0.25	68.2 150.4	5740 1290000	2310 520000
90TPS139	228.600 9.0000	374.650 14.7500	101.600 4.0000	304.80 12.000	353.22 13.906	234.95 9.250	339.7 13.38	263.5 10.38	6.4 0.25	42.2 93.1	3910 879000	1460 328000
90TPS140	228.600 9.0000	428.625 16.8750	101.600 4.0000	495.30 19.500	404.02 15.906	234.95 9.250	385.8 15.19	266.7 10.50	6.4 0.25	63.3 139.5	5560 1250000	2140 482000
100TPS143	254.000 10.0000	428.625 16.8750	101.600 4.0000	425.45 16.750	404.02 15.906	260.36 10.250	387.4 15.25	292.1 11.50	6.4 0.25	56.2 124.0	5160 1160000	1750 394000
100TPS144	254.000 10.0000	479.425 18.8750	127.000 5.0000	508.00 20.000	454.82 17.906	260.36 10.250	435.0 17.12	304.8 12.00	6.4 0.25	99.5 219.5	7210 1620000	2690 604000
100TPS145	254.000 10.0000	530.225 20.8750	127.000 5.0000	609.6 24.000	505.62 19.906	260.36 10.250	481.0 18.94	336.6 13.25	6.4 0.25	131.8 290.6	9560 2150000	3670 825000
120TPS151	304.800 12.0000	479.425 18.8750	127.000 5.0000	390.53 15.375	454.82 17.906	311.15 12.250	438.2 17.25	346.1 13.62	6.4 0.25	82.1 181.0	6340 1420000	2300 518000
120TPS152	304.800 12.0000	530.225 20.8750	152.400 6.0000	619.13 24.375	505.62 19.906	311.15 12.250	484.2 19.06	352.4 13.88	6.4 0.25	139.4 307.4	7900 1780000	3300 743000
120TPS153	304.800 12.0000	631.825 24.8750	152.400 6.0000	723.90 28.500	607.22 23.906	311.15 12.250	584.2 23.00	406.4 16.00	6.4 0.25	236.9 522.4	12900 2900000	4680 1050000
140TPS158	355.600 14.0000	530.225 20.8750	123.825 4.8750	495.30 19.500	504.82 19.875	361.95 14.250	489.0 19.25	393.7 15.50	6.4 0.25	89.2 196.6	7200 1620000	2610 588000
140TPS159	355.600 14.0000	581.025 22.8750	123.825 4.8750	723.90 28.500	555.62 21.875	361.95 14.250	535.0 21.06	393.7 15.50	6.4 0.25	125.0 275.6	10000 2250000	3570 802000
140TPS160	355.600 14.0000	631.825 24.8750	123.825 4.8750	917.58 36.125	606.62 23.875	361.95 14.250	581.0 22.88	415.9 16.38	6.4 0.25	170.9 376.9	12600 2840000	4040 908000
160TPS164	406.400 16.0000	581.025 22.8750	152.400 6.0000	444.50 17.500	555.62 21.875	412.75 16.250	539.8 21.25	444.5 17.50	6.4 0.25	123.9 273.2	7860 1770000	3090 695000
160TPS165	406.400 16.0000	635.000 25.0000	152.400 6.0000	596.90 23.500	606.42 23.875	412.75 16.250	585.8 23.06	457.2 18.00	6.4 0.25	174.4 384.6	11200 2510000	4170 937000
160TPS166	406.400 16.0000	685.800 27.0000	152.400 6.0000	752.48 29.625	657.22 25.875	412.75 16.250	633.4 24.94	469.9 18.50	6.4 0.25	229.8 506.7	13800 3090000	4710 1060000

<sup>(1)</sup> Maximum shaft or housing fillet radius that bearing corners will clear.

## CROSSED ROLLER THRUST BEARINGS

### TYPE XR AND JXR

- Withstands high overturning moments.
- Applications include machine tool table bearing for vertical boring and grinding machines. Other applications include various pivot and pedestal applications.
- Dimensions given in the following table relate to bearing type TXRDO, which is the most common form of crossed roller bearing.
- TXRDO bearing has a double outer race and two inner races with rollers spaced by separators.
- Other mounting configurations and sizes of crossed roller bearing can be supplied to meet particular assembly or setting requirements.
- Contact your Timken representative for more information.



### DIMENSIONS – LOAD RATINGS

Bearing Number	Dimensions				Load Ratings		Factor $k^{(2)}$
	Bore d	O.D. D	Height T	Radius <sup>(1)</sup> R	Two-Row radial	Thrust	
	mm in.	mm in.	mm in.	mm in.	kN lbs.	kN lbs.	
XR496051	203.200 8.0000	279.400 11.0000	31.750 1.2500	1.5 0.06	51300 11500	61600 13800	0.48
JXR637050	300.000 11.8110	400.000 15.7480	37.000 1.4567	1.5 0.06	63000 14200	80100 18000	0.45
JXR652050	310.000 12.2047	425.000 16.7323	45.000 1.7717	2.5 0.10	82200 18500	102000 23000	0.46
XR678052	330.200 13.0000	457.200 18.0000	63.500 2.50000	3.3 0.13	100000 22500	123000 27600	0.47
JXR699050	370.000 14.5669	495.000 19.4882	50.000 1.9685	3.0 0.12	93600 21000	119000 26700	0.45
XR766051	457.200 18.0000	609.600 24.0000	63.500 2.5000	3.3 0.13	141000 31600	178000 40100	0.45
XR820060	580.000 22.8346	760.000 29.9213	80.000 3.1496	6.4 0.25	240000 53900	299000 67200	0.46
XR855053	685.800 27.0000	914.400 36.0000	79.375 3.1250	3.3 0.13	270000 60700	344000 77200	0.45
XR882055	901.700 35.50000	1117.600 44.0000	82.550 3.2500	3.3 0.13	300000 67400	396000 88900	0.44
XR889058	1028.700 40.5000	1327.150 52.2500	114.300 4.5000	3.3 0.13	405000 91000	534000 120000	0.44
XR897051	1549.400 61.0000	1828.800 72.0000	101.600 4.0000	3.3 0.13	518000 116000	699000 157000	0.43

<sup>(1)</sup> Maximum shaft or housing fillet radius that bearing corners will clear.

<sup>(2)</sup> Centrifugal force constant. See engineering section for calculations using this factor.



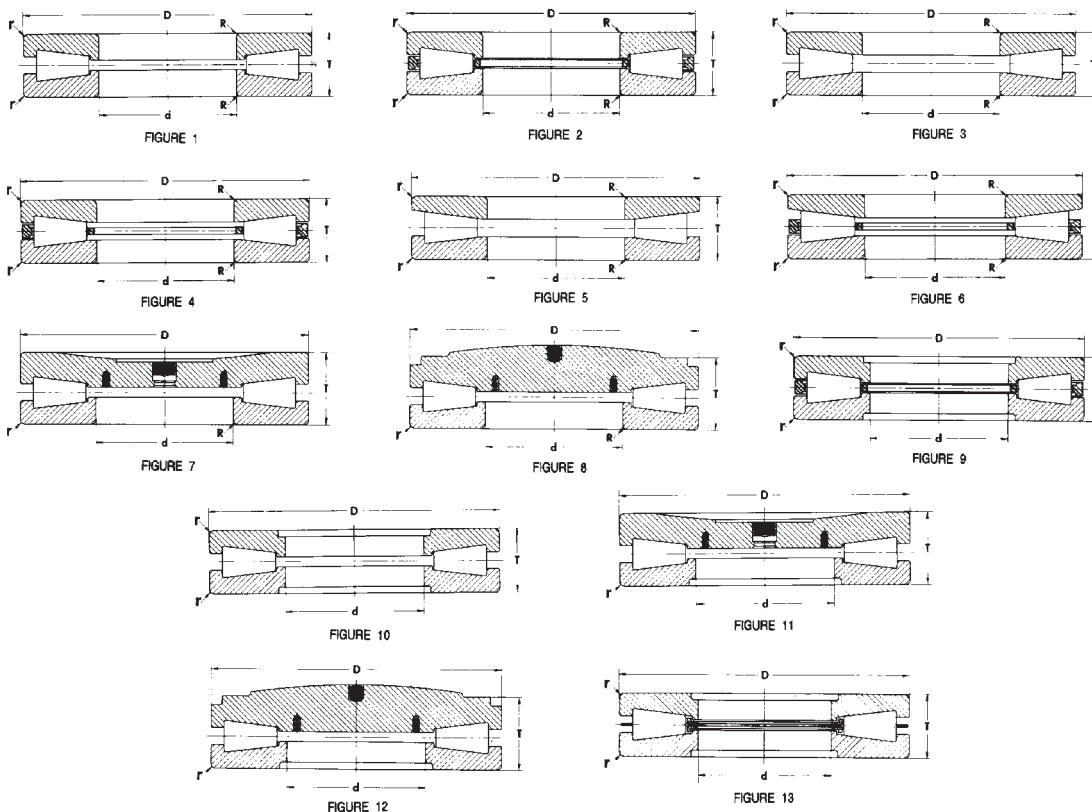




## TAPERED ROLLER THRUST BEARINGS

### TYPE TTHD

- Consists of two tapered thrust races, rollers and cage.
- All components are separable.
- Generally a heavy-duty bearing and can operate at a relatively high speed.
- Extensively used in numerous applications including oil well swivels, pulp refiners, extruders and piercing mill thrust blocks.



Bearing Number	Fig No.	Bore		Outside Diameter		Width		Shaft Fillet Radius		Housing Fillet Radius		Mass	Remarks
		d	D	d	D	T	R	r	r				
		mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	kg lbs.		
T135	2	34.925	76.200	15.875	1.5	1.5	0.4	1.5	1.5	0.4	0.88		
	2	1.3750	3.0000	0.6250	0.06	0.06	0.88						
T135F	1	34.925	76.200	15.875	1.5	1.5	0.4	1.5	1.5	0.4	0.88		
	1	1.3750	3.0000	0.6250	0.06	0.06	0.88						
T200A	2	50.800	109.538	22.225	2.3	2.3	1.1	2.3	2.3	1.1	2.40		
	2	2.0000	4.3125	0.8750	0.09	0.09	2.40						
T311	2	76.200	161.925	33.338	3.3	3.3	3.6	3.3	3.3	3.6	8.02		
	2	3.0000	6.3750	1.3215	0.13	0.13	8.02						
T311F	1	76.200	161.925	33.338	3.3	3.3	3.6	3.3	3.3	3.6	8.02		
	1	3.0000	6.3750	1.3215	0.13	0.13	8.02						
*T311FS - T311S	8	76.200	161.925	49.212	3.3	3.3	-	3.3	3.3	-	-	T311FS - T311S, SPHERICAL RADIUS = 457.200 mm (18")	
	8	3.0000	6.3750	1.9375	0.13	0.13	-	0.13	0.13	-	-		
T411	2	101.600	215.900	46.038	3.3	3.3	8.9	3.3	3.3	8.9	19.60		
	2	4.0000	8.5000	1.8125	0.13	0.13	19.60						

Bearing Number	Fig No.	Bore	Outside Diameter	Width	Shaft Fillet Radius	Housing Fillet Radius	Mass	Remarks
		d	D	T	R	r		
		mm in.	mm in.	mm in.	mm in.	mm in.	kg lbs.	
T411F	1 1	101.600 4.0000	215.900 8.5000	46.038 1.8125	3.3 0.13	3.3 0.13	8.9 19.60	
*T411FAS - T411S	8 8	76.200 3.0000	215.900 8.5000	65.088 2.5625	3.3 0.13	3.3 0.13	– –	T411FAS - T411S, SPHERICAL RADIUS = 508.000 mm (20")
T441	2 2	111.760 4.4000	223.520 8.8000	55.880 2.2000	3.3 0.13	3.3 0.13	11.4 25.13	
T441F	1 1	111.760 4.4000	223.520 8.8000	55.880 2.2000	3.3 0.13	3.3 0.13	11.4 25.13	
T451	2 2	114.300 4.5000	250.825 9.8750	53.975 2.1250	4.0 0.16	4.0 0.16	15.0 33.07	
T511	2 2	127.000 5.0000	266.700 10.5000	58.738 2.3125	4.8 0.19	4.8 0.19	17.8 39.24	
T511A	2 2	128.588 5.0625	266.700 10.5000	58.738 2.3125	4.8 0.19	4.8 0.19	17.8 39.24	
T511F	1 1	127.000 5.0000	266.700 10.5000	58.738 2.3125	4.8 0.19	4.8 0.19	17.8 39.24	
*T511FS - T511S	8 8	127.000 5.0000	266.700 10.5000	79.375 3.1250	4.8 0.19	4.8 0.19	– –	T511FS - T511S, SPHERICAL RADIUS = 609.600 mm (24")
*T511FSA - T511S	8 8	101.600 4.0000	266.700 10.5000	79.375 3.1250	4.8 0.19	4.8 0.19	– –	T511FSA - T511S, SPHERICAL RADIUS = 609.600 mm (24")
*T511FSA - T511SA	7 7	101.600 4.0000	266.700 10.5000	79.375 3.1250	4.8 0.19	4.8 0.19	– –	T511FSA - T511SA, SPHERICAL RADIUS = 609.600 mm (24")
T520	2 2	127.000 5.0000	250.825 9.8750	55.563 2.1875	4.8 0.19	4.8 0.19	13.9 30.64	
T611	2 2	152.400 6.0000	317.500 12.5000	69.850 2.7500	6.4 0.25	6.4 0.25	29.3 64.60	
T611F	1 1	152.400 6.0000	317.500 12.5000	69.850 2.7500	6.4 0.25	6.4 0.25	29.3 64.60	
*T611FS - T611S	8 8	152.400 6.0000	317.500 12.5000	87.313 3.4375	6.4 0.25	6.4 0.25	– –	T611FS - T611S, SPHERICAL RADIUS = 711.200 mm (28")
*T611FS - T611SA	8 8	152.400 6.0000	317.500 12.5000	87.313 3.4375	6.4 0.25	6.4 0.25	– –	T611FS - T611SA, SPHERICAL RADIUS = 762.000 mm (30")
*T611FSA - T611SA	7 7	SOLID	317.500 12.5000	87.313 3.4375	N/A N/A	6.4 0.25	– –	T611FSA - T611SA, SPHERICAL RADIUS = 762.000 mm (30")
*T611FS - T611SB	8 8	152.400 6.0000	317.500 12.5000	87.313 3.4375	6.4 0.25	6.4 0.25	– –	T611FS - T611SB, SPHERICAL RADIUS = 755.700 mm (29.75")
T651	2 2	165.100 6.5000	311.150 12.2500	88.900 3.5000	6.4 0.25	6.4 0.25	38.3 84.44	
T661	2 2	168.275 6.6250	304.800 12.0000	69.850 2.7500	6.4 0.25	6.4 0.25	27.8 61.29	
T691	2 2	174.625 6.8750	358.775 14.1250	82.550 3.2500	6.4 0.25	6.4 0.25	45.3 99.87	
T709	4 4	177.800 7.0000	431.800 17.0000	101.600 4.0000	6.4 0.25	6.4 0.25	86.3 190.26	
T711	2 2	177.800 7.0000	368.300 14.5000	82.550 3.2500	8.0 0.31	8.0 0.31	48.4 106.70	
T711F	1 1	177.800 7.0000	368.300 14.5000	82.550 3.2500	8.0 0.31	8.0 0.31	48.4 106.70	
T711FS - T711S	7 7	177.800 7.0000	368.300 14.5000	104.775 4.1250	8.0 0.31	8.0 0.31	– –	
*T711FS - T711SA	8 8	177.800 7.0000	368.300 14.5000	101.600 4.0000	8.0 0.31	8.0 0.31	– –	T711FS - T711SA, SPHERICAL RADIUS = 762.000 mm (30")
*T711FSS - T711S	7 7	SOLID	368.300 14.5000	104.775 4.1250	N/A N/A	8.0 0.31	– –	T711FSS - T711S, SPHERICAL RADIUS = 622.300 mm (24.5")
T811	2 2	203.200 8.0000	419.100 16.5000	92.075 3.6250	9.7 0.38	9.7 0.38	69.3 152.78	
T811F	1 1	203.200 8.0000	419.100 16.5000	92.075 3.6250	9.7 0.38	9.7 0.38	69.3 152.78	
*T811FS - T811S	7 7	203.200 8.0000	419.100 16.5000	123.825 4.8750	9.7 0.38	9.7 0.38	– –	T811FS - T811S, SPHERICAL RADIUS = 508.000 mm (20")
*T811FS - T811SA	8 8	203.200 8.0000	422.275 16.6250	115.880 4.5625	9.7 0.38	9.7 0.38	– –	T811FS - T811SA, SPHERICAL RADIUS = 838.200 mm (33"), LOWER RACE OD = 419.100 mm (16.5000")

B

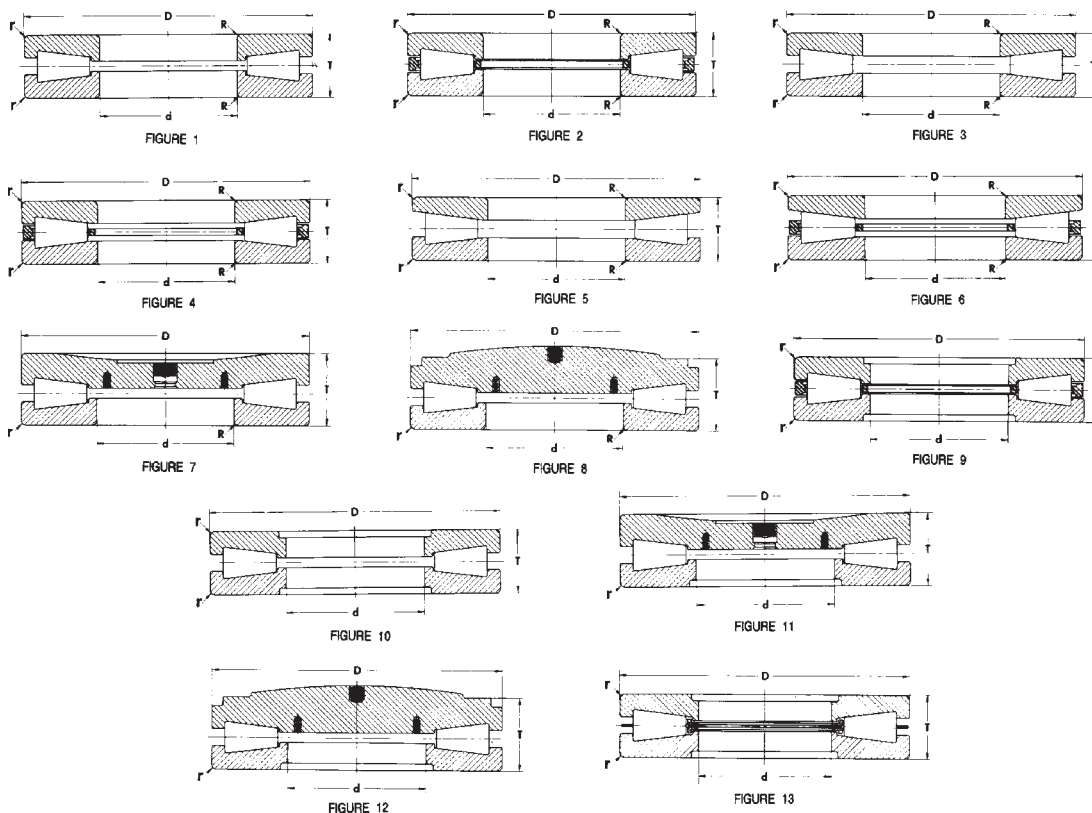




**THRUST BEARINGS**

**TYPE TTHD - continued**

B



Bearing Number	Fig No.	Bore	Outside Diameter	Width	Shaft Fillet Radius	Housing Fillet Radius	Mass	Remarks
		d	D	T	R	r		
		mm in.	mm in.	mm in.	mm in.	mm in.	kg lbs.	
*T811FSA - T811SB	7 7	SOLID	422.275 16.6250	120.650 4.7500	N/A N/A	9.7 0.38	- -	T811FSA - T811SB, SPHERICAL RADIUS = 506.000 mm (20"), LOWER RACE OD = 419.100 mm (16.5000")
T811X	2 2	203.200 8.0000	419.100 16.5000	120.650 4.7500	9.7 0.38	9.7 0.38	92.7 204.37	
*T811 - T811XA	2 2	203.200 8.0000	419.100 16.5000	106.363 4.1875	9.7 0.38	9.7 0.38	- -	T811 - T811XA, 2 BORES, OTHER BORE = 201.613 mm (7.9375")
T911	9 9	228.600 9.0000	482.600 19.0000	104.775 4.1250	N/A N/A	11.2 0.44	105.0 231.49	
T911A	9 9	234.950 9.2500	482.600 19.0000	104.775 4.1250	N/A N/A	11.2 0.44	103.0 227.08	
T911F	10 10	228.600 9.0000	482.600 19.0000	104.775 4.1250	N/A N/A	11.2 0.44	- -	
*T911 - T911A	9 9	228.600 9.0000	482.600 19.0000	104.775 4.1250	N/A N/A	11.2 0.44	- -	T911 - T911A, 2 BORES, OTHER BORE = 234.950 mm (9.2500")
*T911FS - T911S	11 11	228.600 9.0000	482.600 19.0000	146.050 5.7500	N/A N/A	11.2 0.44	- -	T911FS - T911S, SPHERICAL RADIUS = 635.000 mm (25")
*T911FS - T911SA	12 12	228.600 9.0000	482.600 19.0000	131.763 5.1875	N/A N/A	11.2 0.44	- -	T911FS - T911SA, SPHERICAL RADIUS = 1295.400 mm (51")
*T911FS - T911SB	12 12	228.600 9.0000	482.600 19.0000	114.300 4.5000	N/A N/A	11.2 0.44	- -	T911FS - T911SB, SPHERICAL RADIUS = 895.350 mm (35.25")
T921	9 9	234.950 9.2500	546.100 21.5000	127.000 5.0000	N/A N/A	16.0 0.63	171.0 376.99	

Bearing Number	Fig No.	Bore	Outside Diameter	Width	Shaft Fillet Radius	Housing Fillet Radius	Mass	Remarks
		d	D	T	R	r		
		mm in.	mm in.	mm in.	mm in.	mm in.	kg lbs.	
T921F	10 10	234.950 9.2500	546.100 21.5000	127.000 5.0000	N/A N/A	16.0 0.63	171.0 376.99	
T1011	9 9	254.000 10.0000	539.750 21.2500	117.475 4.6250	N/A N/A	11.2 0.44	147.0 324.08	
*T1011FS - T1011S	12 12	254.000 10.0000	539.750 21.2500	149.225 5.8750	N/A N/A	11.2 0.44	– –	T1011FS - T1011S, SPHERICAL RADIUS = 1066.8 mm (42")
*T1011FS - T1011SA	11 11	254.000 10.0000	539.750 21.2500	158.750 6.2500	N/A N/A	11.2 0.44	– –	T1011FS - T1011SA, SPHERICAL RADIUS = 635.000 mm (25")
*T1011FS - T1011SC	11 11	254.000 10.0000	539.750 21.2500	158.750 6.2500	N/A N/A	11.2 0.44	– –	T1011FS - T1011SC, SPHERICAL RADIUS = 635.000 mm (25")
T1115	9 9	279.400 11.0000	495.300 19.5000	133.350 5.2500	N/A N/A	6.4 0.25	125.0 275.58	
T1120	9 9	279.400 11.0000	603.250 23.7500	136.525 5.3750	N/A N/A	11.2 0.44	212.0 467.38	
T1120F	10 10	279.400 11.0000	603.250 23.7500	136.525 5.3750	N/A N/A	11.2 0.44	212.0 467.38	
*T1120FS - T1120S	12 12	279.400 11.0000	603.250 23.7500	136.525 5.3750	N/A N/A	11.2 0.44	– –	T1120FS - T1120S, SPHERICAL RADIUS = 1308.1 mm (51.5")
T1421	9 9	355.600 14.0000	533.400 21.0000	101.600 4.0000	N/A N/A	6.4 0.25	84.1 185.41	
T1421F	10 10	355.600 14.0000	533.400 21.0000	101.600 4.0000	N/A N/A	6.4 0.25	84.1 185.41	
T1750	2 2	44.450 1.7500	84.734 3.3360	18.258 0.7188	2.3 0.09	2.3 0.09	0.5 1.08	
T2520	2 2	63.500 2.5000	117.475 4.6250	25.400 1.0000	2.3 0.09	2.3 0.09	1.3 2.95	
*T3004W	1 1	76.454 3.0100	167.081 6.5780	44.450 1.7500	3.3 0.13	N/A N/A	– –	T3004W, RETAINER ON OD
T7519	2 2	190.000 7.4803	355.600 14.0000	74.219 2.9220	6.4 0.25	6.4 0.25	35.9 79.15	
*T8920FA - T8920FB	11 11	168.275 6.6250	638.175 25.1250	152.400 6.0000	N/A N/A	11.0 0.43	– –	NO SPHERICAL RADIUS
T9020	9 9	228.600 9.0000	431.800 17.0000	88.773 3.4950	N/A N/A	9.7 0.38	65.7 144.84	
*T9030FS - T9030S	7 7	SOLID	482.600 19.0000	165.000 6.5354	N/A N/A	11.2 0.44	– –	T9030FS - T9030S, SPHERICAL RADIUS = 635.000 mm (25")
*T9030FS - T9030SA	8 8	SOLID	482.600 19.0000	150.622 5.9300	N/A N/A	11.2 0.44	– –	T9030FS - T9030SA, SPHERICAL RADIUS = 1295.400 mm (51")
*T9030FSA - T9030SA	12 12	168.275 6.6250	482.600 19.0000	131.763 5.1875	N/A N/A	11.2 0.44	– –	T9030FSA - T9030SA, SPHERICAL RADIUS = 1295.400 mm (51")
*T9030FSA - T9030SB	12 12	168.275 6.6250	482.600 19.0000	131.763 5.1875	N/A N/A	11.2 0.44	– –	T9030FSA - T9030SB, SPHERICAL RADIUS = 1066.800 mm (42")
T9250F	10 10	234.950 9.2500	546.100 21.5000	127.000 5.0000	N/A N/A	16.0 0.63	– –	
T9250FA	10 10	139.700 5.5000	546.100 21.5000	127.000 5.0000	N/A N/A	16.0 0.63	– –	
*T9250FAS - T9250SA	12 12	139.700 5.5000	549.275 21.6250	155.575 6.1250	N/A N/A	16.0 0.63	– –	T9250FAS - T9250SA, SPHERICAL RADIUS = 1295.400 mm (51")
*T9250FAS - T9250SC	12 12	139.700 5.5000	549.275 21.6250	155.575 6.1250	N/A N/A	16.0 0.63	– –	T9250FAS - T9250SC, SPHERICAL RADIUS = 1295.400 mm (51")
*T9250FS - T9250S	11 11	234.950 9.2500	546.100 21.5000	168.275 6.6250	N/A N/A	16.0 0.63	– –	T9250FS - T9250S, SPHERICAL RADIUS = 641.350 mm (25.25")
*T9250FS - T9250SA	12 12	234.950 9.2500	549.275 21.6250	155.575 6.1250	N/A N/A	16.0 0.63	– –	T9250FS - T9250SA, SPHERICAL RADIUS = 1295.400 mm (51")
*T9250FS - T9250SB	11 11	234.950 9.2500	546.100 21.5000	171.450 6.7500	N/A N/A	16.0 0.63	– –	T9250FS - T9250SB, SPHERICAL RADIUS = 558.800 mm (22")
*T12040FS - T12040S	12 12	304.800 12.0000	1146.175 45.1250	317.500 12.5000	N/A N/A	19.0 0.75	– –	T12040FS - T12040S, SPHERICAL RADIUS = 2000.250 mm (78.75"), LOWER RACE OD = 1143.000 mm (45.0000")
*T14214	13 13	355.600 14.0000	533.400 21.0000	101.600 4.0000	N/A N/A	6.4 0.25	– –	T14214, 2 BORES, OTHER BORE = 355.961 mm (14.0150")
T14520	9 9	368.300 14.5000	603.300 23.7500	120.650 4.7500	N/A N/A	9.7 0.38	144.0 317.47	

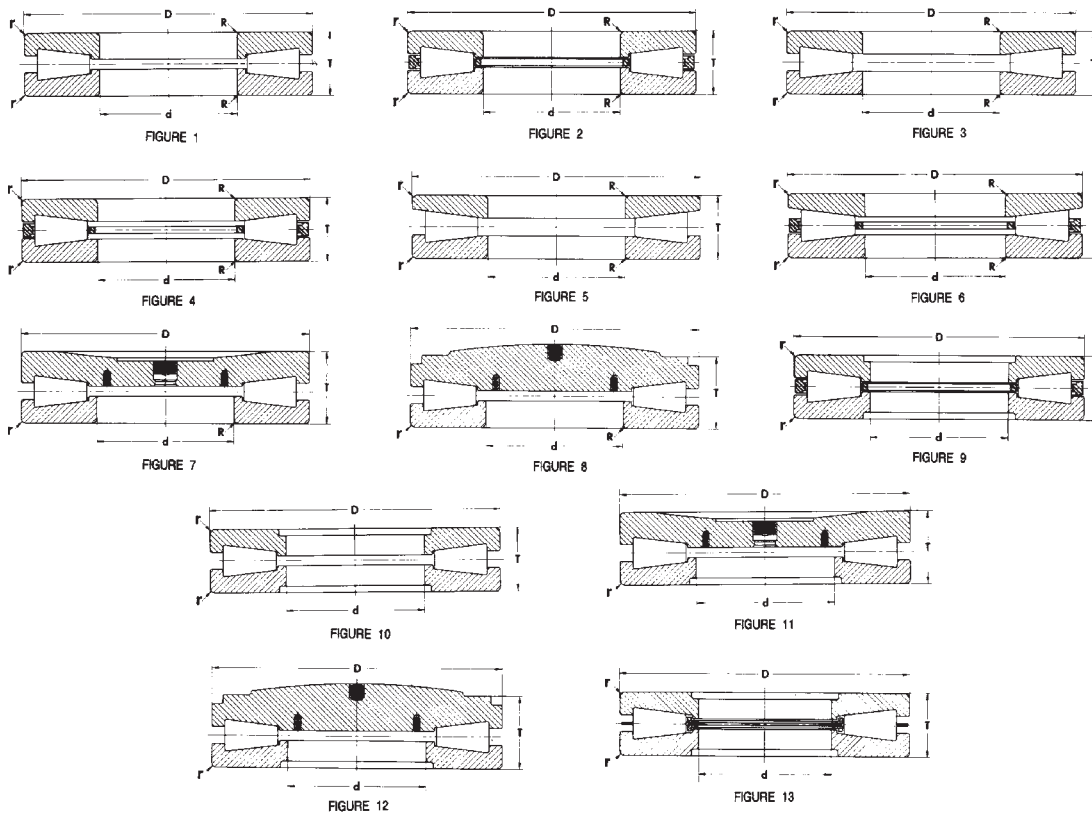




**THRUST BEARINGS**

TYPE TTHD - *continued*

B

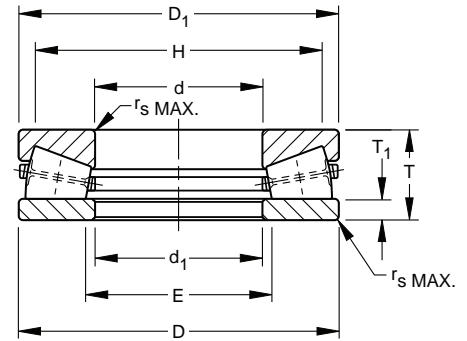


Bearing Number	Fig No.	Bore	Outside Diameter	Width	Shaft Fillet Radius	Housing Fillet Radius	Mass	Remarks
		d	D	T	R	r		
		mm in.	mm in.	mm in.	mm in.	mm in.	kg lbs.	
T16021	9	406.400	711.200	146.050	N/A	9.7	264.0	
	9	16.0000	28.0000	5.7500	N/A	0.38	582.02	
T16021F	10	406.400	711.200	146.050	N/A	9.7	264.0	
	10	16.0000	28.0000	5.7500	N/A	0.38	582.02	
T16050	9	406.400	838.200	177.800	N/A	12.7	517.0	
	9	16.0000	33.0000	7.0000	N/A	0.5	1139.79	
T17010FS - T17020S	12	431.800	942.975	260.350	N/A	12.7	-	
	12	17.0000	37.1250	10.2500	N/A	0.5	-	
T48000	9	1219.200	1524.000	136.525	N/A	9.7	596.0	
	9	48.0000	60.0000	5.3750	N/A	0.38	1313.95	

## TAPERED ROLLER THRUST BEARINGS

### TYPE TTVF

- Combines the outstanding features of tapered thrust and cylindrical roller bearings to offer the highest possible capacity of any thrust bearing of its size.
- One washer is perfectly flat, while the second includes a tapered raceway matching the rollers.
- Originally developed for screwdown applications in metal rolling mills where thrust loads exceeding one million pounds are common.



### DIMENSIONS – LOAD RATINGS

Bearing Number	Bore d	O.D. D	Height T	Washers			Shoulder Diameter		Fillet <sup>(1)</sup> Radius r	Wt.	Load Rating		Approx. Limiting Speed (for Oil Bath Only)
				Thickness T <sub>1</sub>	Small Diameter O.D. D <sub>1</sub>	Large Bore I.D. d <sub>1</sub>	Shaft H (Min.)	Housing E (Max.)			Static Load Rating C <sub>0a</sub>	Dynamic Load Rating C <sub>t</sub>	
	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	kg lbs.	kN lbs.	kN lbs.	RPM
F-3167-B	101.575 3.9990	215.875 8.4990	46.038 1.8125	9.53 0.375	215.14 8.470	102.59 4.039	193.7 7.62	108 4.25	2.5 0.10	9.3 20.5	1570.0 353000	880.0 198000	1350
W-3217-B	127.000 5.0000	266.700 10.5000	58.738 2.3125	12.70 0.500	265.94 10.470	127.51 5.020	238.1 9.38	149.2 5.88	3.6 0.14	18.6 41.0	2570.0 578000	1350.0 304000	1090
S-4055-C	149.974 5.9045	299.720 11.8000	89.692 3.5312	25.40 1.000	298.45 11.750	154 6.063	267.5 10.53	174.6 6.88	3 0.12	35.8 79.0	3350.0 754000	1850.0 416000	970
G-3304-B	168.275 6.6250	304.800 12.0000	69.850 2.7500	14.29 0.562	303.21 11.938	171.45 6.750	277.8 10.94	188.9 7.44	6.4 0.25	25.9 57.0	3730.0 839000	1910.0 429000	950
W-3218-B	177.800 7.0000	368.300 14.5000	82.550 3.2500	17.46 0.688	366.71 14.438	180.98 7.125	336.6 13.25	203.2 8.00	6.1 0.24	49.4 109.0	6270.0 1410000	2940.0 660000	790
F-3094-C	228.575 8.9990	431.749 16.9980	88.900 3.5000	15.88 0.625	430.99 16.968	231.78 9.125	396.9 15.62	257.2 10.12	5.1 0.20	71.7 158.0	7120.0 1600000	3420.0 769000	670
I-2077-C	253.975 9.9990	508.000 20.0000	95.250 3.7500	19.05 0.750	507.19 19.968	256.38 10.094	468.3 18.44	282.6 11.12	6.4 0.25	110.2 243.0	10000.0 2260000	4530.0 1020000	570
R-2927-C	254.000 10.0000	508.000 20.0000	107.950 4.2500	21.43 0.844	506.41 19.938	257.18 10.125	466.7 18.38	285.8 11.25	4.8 0.19	123.4 272.0	12100.0 2720000	5550.0 1250000	570
G-3224-C	256.540 10.1000	546.100 21.5000	165.100 6.5000	34.92 1.375	542.92 21.375	258.76 10.188	515.9 20.31	301.6 11.88	6.1 0.24	227.2 501.0	14900.0 3350000	7900.0 1780000	530
S-4077-C	259.999 10.2362	479.948 18.8956	132.080 5.2000	26.99 1.062	478.36 18.833	263.17 10.361	427 16.81	300 11.81	4.8 0.19	126.5 279.0	8980.0 2020000	4720.0 1060000	610
C-8091-C	279.400 11.0000	603.250 23.7500	136.525 5.3750	30.16 1.188	601.66 23.688	282.58 11.125	552.4 21.75	317.5 12.50	4.8 0.19	230.4 508.0	1770.0 3980000	7890.0 1770000	480
G-3272-C	304.775 11.9990	609.600 24.0000	114.300 4.5000	28.58 1.125	606.81 23.890	307.18 12.094	565.2 22.25	342.9 13.50	6.4 0.25	190.9 421.0	17800.0 3990000	7380.0 1660000	480
E-1994-C	304.800 12.0000	673.100 26.5000	171.450 6.7500	37.31 1.469	671.51 26.438	307.98 12.125	608 23.94	352.4 13.88	7.6 0.30	347.8 767.0	22700.0 5100000	11000.0 2470000	430
F-3090-A	304.800 12.0000	736.600 29.0000	279.400 11.0000	44.45 1.750	735.01 28.938	307.98 12.125	614.4 24.19	385.8 15.19	9.1 0.36	732 1614.0	28000.0 6300000	17100.0 3850000	400
I-2060-C	368.541 14.5095	609.156 23.9825	120.650 4.7500	25.40 1.000	604.84 23.812	371.48 14.625	565.2 22.25	401.6 15.81	9.7 0.38	176 388.0	11800.0 2640000	5840.0 1310000	480
B-8350-C	406.400 16.0000	711.200 28.0000	167.084 6.5781	36.91 1.453	709.61 27.938	409.58 16.125	654 25.75	450.8 17.75	9.1 0.36	356.5 786.0	19900.0 4480000	10300.0 2310000	410
F-3163-C	406.400 16.0000	712.394 28.0470	146.050 5.7500	30.96 1.219	711.28 28.003	409.58 16.125	650.9 25.62	455.6 17.94	7.6 0.30	303.4 669.0	19300.0 4350000	9190.0 2070000	410
F-3131-G	431.800 17.0000	863.600 34.0000	228.600 9.0000	44.45 1.750	862.01 33.938	434.98 17.125	787.4 31.00	489 19.25	10.2 0.40	774.6 1708.0	37700.0 8480000	18800.0 4230000	340
A-6096-C	508.000 20.0000	990.600 39.0000	196.850 7.7500	67.47 2.656	990.60 39.000	508.58 20.062	927.1 36.50	563.6 22.19	12.7 0.50	882.5 1946.0	41500.0 9320000	16700.0 3760000	290
F-3093-A	558.800 22.0000	1066.800 42.0000	285.750 11.2500	57.15 2.250	1065.21 41.938	561.98 22.125	952.5 37.50	639.8 25.19	10.2 0.40	1401.4 3090.0	49400.0 11100000	28000.0 6300000	270
F-3172-C	711.200 28.0000	965.200 38.0000	127.000 5.0000	30.16 1.188	963.61 37.938	714.38 28.125	917.6 36.12	762 30.00	4.8 0.19	354.2 781.0	19600.0 4400000	8670.0 1950000	300
H-2054-G	711.200 28.0000	990.600 39.0000	190.500 7.5000	44.45 1.750	989.01 38.938	712.79 28.062	936.6 36.88	755.6 29.75	10.2 0.40	572.3 1262.0	28000.0 6300000	14200.0 3200000	290
D-2864-C	825.424 32.4970	1168.400 46.0000	127.000 5.0000	31.75 1.250	1168.40 46.000	825.50 32.500	1130.3 44.50	860.4 33.88	14.2 0.56	549.7 1212.0	44100.0 9920000	15600.0 3500000	250
F-3067-C	1219.998 48.0314	1574.869 62.0027	177.800 7.0000	44.45 1.750	1575 62.008	1219.99 48.031	1498.6 59.00	1266.8 49.88	6.4 0.25	1173.2 2587.0	49900.0 11200000	21900.0 4930000	180

<sup>(1)</sup> Maximum shaft or housing fillet radius that bearing corners will clear.

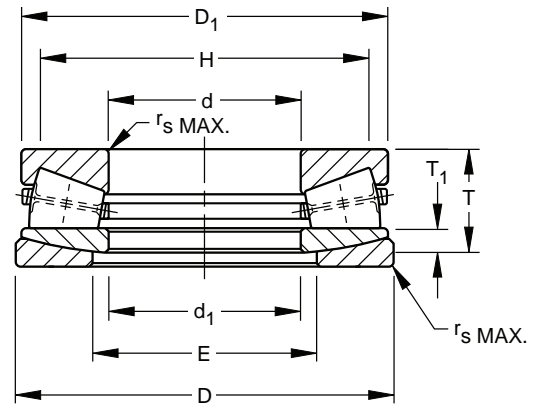




**TAPERED ROLLER THRUST BEARINGS**

**TYPE TTVS**

- Same basic roller and raceway design as the TTVF except that the lower washer is two pieces to permit self-alignment under conditions of initial misalignment.



**DIMENSIONS – LOAD RATINGS**

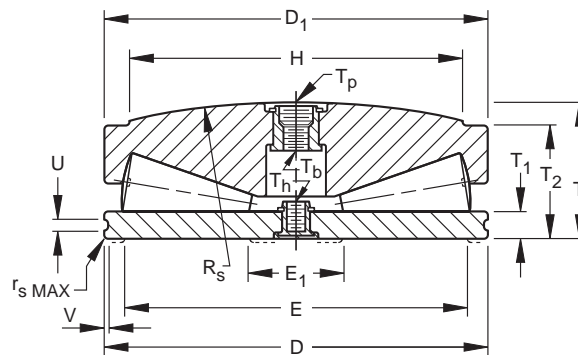
Bearing Number	Bore d	O.D. D	Height T	Washers			Shoulder Diameter		Fillet <sup>(1)</sup> Radius r <sub>s</sub> (Max.)	Wt.	Load Rating		Approx. Limiting Speed (for Oil Bath Only) RPM
				Thickness T <sub>1</sub>	Small Diameter O.D. D <sub>1</sub>	Large Bore I.D. d <sub>1</sub>	Shaft H (Min.)	Housing E (Max.)			Static Load Rating C <sub>0a</sub>	Dynamic Load Rating C <sub>t</sub>	
	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	kg lbs.	kN lbs.	kN lbs.	
B-7976-C	184.15 7.2500	406.4 16.0000	203.2 8.0000	66.68 2.625	404.81 15.938	187.32 7.375	346.1 13.62	228.6 9.00	6.1 0.24	157.4 347.0	7650.0 1720000	4540.0 1020000	720
B-8824-C	199.374 7.8730	399.948 15.7460	121.841 4.7969	36.4 1.433	396.88 15.625	203.2 8.000	358.8 14.12	240.5 9.47	4.1 0.16	86.2 190.0	7020.0 1580000	3590.0 807000	730
E-2004-C	228.6 9.0000	482.549 18.9980	158.75 6.2500	44.91 1.768	479.55 18.880	231.78 9.125	419.1 16.50	282.6 11.12	4.8 0.19	170.1 375.0	10900.0 2440000	5870.0 1320000	600
H-1685-C	241.3 9.5000	488.899 19.2480	152.4 6.0000	57.15 2.250	482.6 19.000	242.09 9.531	431.8 17.00	279.4 11.00	6.1 0.24	162.8 359.0	9940.0 2240000	4980.0 1120000	600
W-3120-C	253.975 9.9990	508 20.0000	215.9 8.5000	61.91 2.437	504.82 19.875	285.75 11.250	425.4 16.75	317.5 12.50	10.2 0.40	250.8 553.0	9770.0 2200000	6020.0 1350000	580
P-1739-C	304.8 12.0000	609.6 24.0000	215.9 8.5000	61.91 2.437	608.01 23.938	307.98 12.125	536.6 21.12	349.2 13.75	7.6 0.30	359.6 793.0	17800.0 4010000	10000.0 2260000	480
N-2827-G	355.6 14.0000	660.4 26.0000	254 10.0000	76.2 3.000	657.22 25.875	358.78 14.125	577.8 22.75	412.8 16.25	10.2 0.40	483 1065.0	18600.0 4180000	11100.0 2490000	440
B-8424-C	406.4 16.0000	869.95 34.2500	241.3 9.5000	82.55 3.250	887.41 34.938	438.15 17.250	803.3 31.62	463.6 18.25	16.5 0.65	858 1892.0	39000.0 8770000	17700.0 3980000	330

<sup>(1)</sup> Maximum shaft or housing fillet radius that bearing corners will clear.

## TAPERED ROLLER THRUST BEARINGS

### TYPE TTSX

- A full roller complement design without a conventional bore.
- Supplied with center inserts for attachment purposes as well as for lifting.
- Offers the highest capacity but at a somewhat reduced speed capability, as compared with other V-Flat types.



Bearing Number	Screw Extension Dia. min. H	O.D. D	Overall Height T	Height T <sub>2</sub>	Spherical Radius R <sub>s</sub>	Washer Thickness T <sub>1</sub>	max. r <sub>s</sub>	Top Washer O.D. D <sub>1</sub>	Hsg. Shldr. Dia. E	Hsg. Shldr. Dia. E <sub>1</sub>	Groove		Eyebolt Threads		T <sub>p</sub> Taper Pipe Plug Thread	Basic Static Thrust Capacity BSTC
											Width U	Depth V	T <sub>b</sub>	T <sub>h</sub>		
58 TTSX 908	5.000	5.875	2.164	1.875	18.000	0.500	1/16	5.782	5 3/8	2	0.187	0.046	1/2-13	3/8-16	3/8	299000
68 TTSX 910	6.000	6.875	2.417	2.062	18.000	0.500	1/16	6.782	6 3/8	2 7/8	0.187	0.046	1/2-13	3/8-16	3/8	400000
80 TTSX 914	7.000	8.000	2.977	2.562	20.000	0.625	1/16	7.907	7 3/8	2 7/8	0.250	0.046	1/2-13	3/8-16	3/8	565000
105 TTSX 918	9.000	10.500	3.717	3.187	24.000	0.750	1/16	10.407	9 3/8	3 1/8	0.312	0.078	3/4-10	1/2-13	3/4	985000
126 TTSX 922	11.000	12.625	4.369	3.750	30.000	0.875	1/16	12.532	11 1/2	3 5/8	0.406	0.094	3/4-10	1/2-13	3/4	1515000
148 TTSX 926	13.000	14.875	5.079	4.375	36.000	1.000	1/16	14.782	13 5/8	4 5/8	0.406	0.094	1 1/4-7	1/2-13	1 1/4	2050000
172 TTSX 934 0G778	13.500	17.252	6.495	5.500	33.000	1.250	5/32	17.152	15 9/8	4 9/16	0.531	0.125	1 1/4-7	1 - 8	1 1/4	2815000
161 TTSX 930	14.000	16.125	5.542	4.812	40.000	1.125	1/8	16.032	14 5/8	4 9/16	0.406	0.094	1 1/4-7	1/2-13	1 1/4	2430000
161 TTSX 930 AA678	14.000	16.125	6.730	5.616	54.000	1.750	1/16	16.032	14 9/8	4 9/16	—	—	1 1/4-7	1 - 8	1 1/4	2430000
172 TTSX 934	15.000	17.250	5.932	5.125	40.000	1.250	1/8	17.157	15 5/8	4 9/16	0.531	0.125	1 1/4-7	1 - 8	1 1/4	2800000
202 TTSX 942 EE2000	15.875	20.250	7.430	6.125	25.000	1.375	1/16	20.532	19	5	—	—	1 1/4-7	1 - 8	1 1/4	4190000
190 TTSX 940	16.500	19.000	5.730	5.125	75.000	1.500	1/16	18.906	18 1/4	7 3/16	0.531	0.125	1 1/4-7	1 - 8	1 1/4	3460000
190 TTSX 940 OA617	16.500	19.000	6.015	5.125	42.000	1.500	1/16	18.905	18 1/4	5 3/16	0.531	0.125	1 1/4-7	1 - 8	1 1/4	3620000
190 TTSX 938 B0563	17.000	19.250	6.717	5.750	42.000	1.375	1/8	19.407	17 5/8	4 5/8	—	—	1 1/4-7	1 - 8	1 1/4	3680000
195 TTSX 938 OD452	17.000	19.500	6.635	5.750	46.500	1.375	1/8	12.407	17 5/8	4 5/8	0.531	0.125	1 1/4-7	1 - 8	1 1/4	3680000
195 TTSX 938	17.000	19.500	6.717	5.750	42.000	1.375	1/8	19.407	17 5/8	4 5/8	0.531	0.125	1 1/4-7	1 - 8	1 1/4	3680000
195 TTSX 938 D0574	17.000	19.560	6.717	5.750	42.000	1.375	1/8	19.407	17 5/8	4 5/8	—	—	1 1/4-7	1 - 8	1 1/4	3680000
206 TTSX 942	18.000	20.625	6.920	6.000	50.000	1.375	1/8	20.532	19	5 1/8	0.531	0.125	1 1/4-7	1 - 8	1 1/4	4190000
206 TTSX 942 AB551	18.000	20.625	7.937	6.878	42.000	2.238	1/8	20.532	19	5	0.531	0.125	1 1/4-7	1 - 8	1 1/4	4190000
210 TTSX 944 A0574	18.000	21.000	7.000	6.375	78.000	1.250	—	20.906	19 1/2	5	—	—	1 1/4-7	1 - 8	1 1/4	4232000
210 TTSX 944	18.000	21.000	7.000	6.375	78.000	1.250	1/16	20.906	19 1/2	5	0.375	0.375	1 1/4-7	1 - 8	1 1/4	4232000
210 TTSX 944 BA1479	18.000	21.000	7.023	—	78.000	1.250	—	21.000	19 1/2	5	—	—	1 1/4-7	1 - 8	1 1/4	4232000
218 TTSX 946	19.000	21.875	7.514	6.500	50.000	1.500	1/8	21.782	19 7/8	6	0.531	0.125	1 1/4-7	1 - 8	1 1/4	4550000
228 TTSX 950	20.000	22.875	7.629	6.625	56.000	1.500	1/8	22.782	20 3/4	5 1/4	0.531	0.125	1 1/4-7	1 - 8	1 1/4	5130000
228 TTSX 950 A02017	20.000	22.875	7.629	6.625	56.000	1.500	1/8	22.782	20 3/4	5 1/4	0.531	0.125	1 1/4-7	1 - 8	1 1/4	5130000
228 TTSX 950 OA452	20.000	22.875	7.708	6.625	51.500	1.500	1/8	22.782	20 3/4	5 1/4	0.531	0.125	1 1/4-7	1 - 8	1 1/4	5130000
240 TTSX 954 0C1185	21.000	24.000	8.032	7.000	60.000	1.500	1/8	23.907	22	4 5/8	0.531	0.125	1 1/4-7	1 - 8	1 1/4	5700000
240 TTSX 954	21.000	24.000	8.032	7.000	60.000	1.500	1/8	23.907	22	5 5/8	0.531	0.125	1 1/4-7	1 - 8	1 1/4	5700000
252 TTSX 958 00149	22.000	25.250	8.373	7.250	60.000	1.500	1/8	25.157	23 1/8	5 3/8	0.531	0.125	1 1/4-7	1 - 8	1 1/4	6290000
252 TTSX 958	22.000	25.250	8.373	7.250	60.000	1.500	1/8	25.157	23 1/8	5 3/8	0.531	0.125	1 1/4-7	1 - 8	1 1/4	6290000

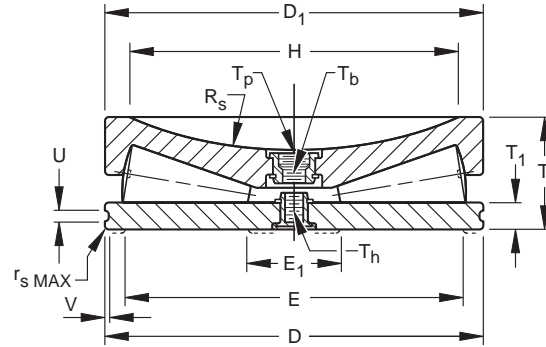




**TAPERED ROLLER THRUST BEARINGS**

**TYPE TTSV**

- Designed with a full complement of controlled contour rollers without a conventional bore.
- Supplied with center inserts for attachment purposes as well as for lifting.
- Offers the highest capacity but at a somewhat reduced speed capability, as compared with other V-Flat types.



Bearing Number	Screw Extension Dia. min. H	O.D. D	Height T	Spherical Radius Rs	Washer Thickness T1	max. rs	Top Washer O.D. D1	Hsg. Shldr. Dia. E	Hsg. Shldr. Dia. E1	Groove		Eyebolt Threads		Tp Taper Pipe Plug Thread	Basic Thrust Capacity BSTC lbs.
										Width U	Depth V	Tb	Th		
58 TTSV 908	5.000	5.875	1.875	9.000	0.500	1/16	5.782	5 3/8	2	0.187	0.046	5/8-11	3/8-16	—	299000
80 TTSV 914 AA508	5.500	8.000	2.563	24.000	0.625	—	7.907	7 3/8	2 7/8	—	—	5/8-11	3/8-16	—	565000
68 TTSV 910	6.000	6.875	2.062	9.000	0.500	1/16	6.782	6 3/8	2 7/8	0.187	0.046	5/8-11	3/8-16	—	400000
80 TTSV 914	7.000	8.000	2.562	10.000	0.625	1/16	7.907	7 3/8	2 7/8	0.250	0.046	5/8-11	3/8-16	—	565000
105 TTSV 918	9.000	10.500	3.187	12.000	0.750	1/16	10.407	9 3/8	3 3/8	0.312	0.078	3/4-10	1/2-13	—	985000
105 TTSV 918 OC1150	9.000	10.500	3.187	14.000	0.750	1/16	10.407	9 3/8	3 1/8	0.312	0.078	3/4-10	1/2-13	—	985000
126 TTSV 922	11.000	12.625	3.750	15.000	0.875	1/16	12.532	11 1/2	3 5/8	0.406	0.094	3/4-10	1/2-13	—	1515000
148 TTSV 926	13.000	14.875	4.375	18.000	1.000	1/16	14.782	13 5/8	4 5/8	0.406	0.094	3/4-10	1/2-13	3/4	2050000
148 TTSV 926 AO529	13.000	14.875	4.375	18.000	1.000	1/16	14.782	13 5/8	4 5/8	0.406	0.094	3/4-10	1/2-13	—	2050000
161 TTSV 930 OA534	13.000	16.125	5.500	20.000	1.125	1/8	16.032	14 5/8	4 9/16	0.406	0.094	3/4-10	1/2-13	3/4	2430000
161 TTSV 930	14.000	16.125	4.812	20.000	1.125	1/8	16.032	14 5/8	4 9/16	0.406	0.094	3/4-10	1/2-13	3/4	2430000
172 TTSV 934	15.000	17.250	5.125	20.000	1.250	1/8	17.157	15 5/8	4 9/16	0.531	0.125	1 1/4-7	1 - 8	1 1/4	2800000
172 TTSV 934 BA528	15.000	17.250	5.875	50.000	2.000	—	17.157	15 5/8	4 9/16	—	—	1 1/4-7	1 - 8	1 1/4	2800000
195 TTSV 938 OA452	17.000	19.500	5.750	25.000	1.375	1/8	19.407	17 5/8	4 5/8	0.531	0.125	1 1/4-7	1 - 8	1 1/4	3680000
195 TTSV 938	17.000	19.500	5.750	22.000	1.375	1/8	19.407	17 5/8	4 5/8	0.531	0.125	1 1/4-7	1 - 8	1 1/4	3680000
195 TTSV 938 OC902	17.000	19.500	5.750	25.000	1.375	1/8	19.250	17 5/8	4 5/8	0.531	0.125	1 1/4-7	1 - 8	1 1/4	3610000
195 TTSV 938 LE1722	17.000	19.500	5.750	36.000	1.375	1/4	19.407	17 5/8	4 5/8	0.953	0.130	1 1/4-7	1 - 8	1 1/4	3680000
195 TTSV 938 DB508	17.000	19.500	5.750	50.000	1.383	—	19.407	17 5/8	4 5/8	—	—	1 1/4-7	1 - 8	1 1/4	3680000
206 TTSV 942	18.000	20.625	6.000	25.000	1.375	1/8	20.532	19	5 1/8	0.531	0.125	1 1/4-7	1 - 8	1 1/4	4190000
210 TTSV 944 CA1481	18.000	21.000	7.000	50.000	1.125	—	21.000	19 1/2	5	—	—	1 1/4-7	1 - 8	1 1/4	4232000
210 TTSV 944 DA 1708	18.000	21.000	7.500	50.000	1.750	—	21.000	19 1/2	5	—	—	1 1/4-7	1 - 8	1 1/4	4232000
212 TTSV 942 EA1740	18.000	21.250	6.250	25.000	1.625	7/16	21.250	19	5	0.531	0.125	1 1/4-7	1 - 8	1 1/4	4190000
218 TTSV 946	19.000	21.875	6.500	25.000	1.500	1/8	21.782	19 7/8	6	0.531	0.125	1 1/4-7	1 - 8	1 1/4	4550000
228 TTSV 950	20.000	22.875	6.625	28.000	1.500	1/8	22.782	20 3/4	5 1/4	0.531	0.125	1 1/4-7	1 - 8	1 1/4	5130000
240 TTSV 954	21.000	24.000	7.000	30.000	1.500	1/8	23.907	22	5 3/8	0.531	0.125	1 1/4-7	1 - 8	1 1/4	5700000
252 TTSV 958	22.000	25.250	7.250	30.000	1.500	1/8	25.157	23 1/8	5 3/8	0.531	0.125	1 1/4-7	1 - 8	1 1/4	6290000

## TAPERED ROLLER THRUST BEARINGS

### TYPE TTSP

- The types TTSP and TTSPS (not shown) thrust bearings are made up of two tapered thrust races, rollers, cage and outside retainer which holds the components together during shipping and installation.
- These bearings are employed extensively in the steering pivot positions of automotive and industrial applications.

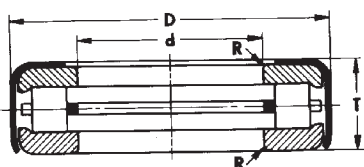


FIGURE 1

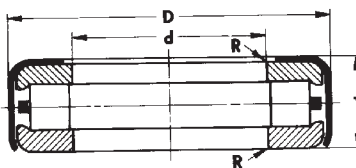


FIGURE 2

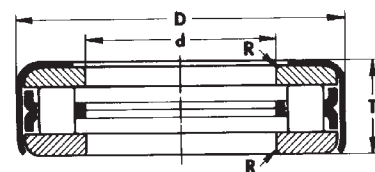


FIGURE 3

Bearing Number		Fig No.	Bore d	Outside Diameter D	Width T	Shaft Fillet Radius R	Mass	Remarks
No Oil Holes In Retainer	Oil Holes In Retainer							
			mm in.	mm in.	mm in.	mm in.	kg lbs.	
T63	T63W	1 1	16.129 0.6350	41.275 1.6250	12.700 0.5000	0.8 0.03	0.08 0.18	
T76	T76W	1 1	19.304 0.7600	41.275 1.6250	13.487 0.5310	0.8 0.03	0.08 0.18	
T77	T77W	1 1	19.304 0.7600	41.275 1.6250	12.700 0.5000	0.8 0.03	0.07 0.15	
T82	T82W	1 1	20.879 0.8220	41.275 1.6250	13.487 0.5310	0.8 0.03	0.07 0.15	
T86		1 1	20.257 0.7975	39.688 1.5625	14.288 0.5625	1.3 0.05	0.07 0.15	
T88	T88W	1 1	22.479 0.8850	48.021 1.8906	15.088 0.5940	0.8 0.03	0.11 0.24	
T89		1 1	22.479 0.8850	48.021 1.8906	15.875 0.6250	0.8 0.03	0.12 0.26	
*T92		2 2	23.825 0.9380	44.958 1.7700	13.487 0.5310	0.8 0.03	– –	T92 HAS 2 BORES, OTHER BORE =24.054 mm (.9470"), R = .08 mm (.03").
T93		2 2	24.054 0.9470	44.958 1.7700	13.487 0.5310	0.8 0.03	0.09 0.20	
T94	T94W	1 1	24.054 0.9470	48.021 1.8906	15.088 0.5940	0.8 0.03	0.11 0.24	
T95	T95W	1 1	24.130 0.9500	50.800 2.0000	15.875 0.6250	0.8 0.03	0.13 0.29	
T101	T101W	1 1	25.654 1.0100	50.800 2.0000	15.875 0.6250	0.8 0.03	0.13 0.29	
*T101X		1 1	25.146 0.9900	50.800 2.0000	15.875 0.6250	0.8 0.03	– –	T101X HAS 2 BORES, OTHER BORE =24.654 mm (1.0100").
*T102		1 1	25.654 1.0100	50.800 2.0000	16.916 0.6660	0.8 0.03	– –	T102 HAS EXTENDED RETAINER, RETAINER "C" DIMENSION - 20.384 mm (.8025"). EXTENSION INSIDE DIAMETER = 35.052 mm (1.3800")
T104	T104W	1 1	26.289 1.0350	50.800 2.0000	15.875 0.6250	0.8 0.03	0.13 0.29	
*T105		1 1	25.654 1.0100	50.800 2.0000	15.875 0.6250	0.8 0.03	– –	T105 HAS 2 BORES, OTHER BORE = 27.299 mm (1.0720").
T107	T107W	1 1	27.299 1.0720	50.800 2.0000	15.875 0.6250	0.8 0.03	0.12 0.26	
T110	T110W	1 1	28.829 1.1350	53.188 2.0940	15.875 0.6250	0.8 0.03	0.14 0.31	
T113	T113W	1 1	28.829 1.1350	55.562 2.1875	15.875 0.6250	0.8 0.03	0.15 0.33	

\* See remarks column.





**TAPERED ROLLER THRUST BEARINGS**

**TYPE TTSP – continued**

**B**

Bearing Number		Fig No.	Bore d	Outside Diameter D	Width T	Shaft Fillet Radius R	Mass	Remarks
No Oil Holes In Retainer	Oil Holes In Retainer							
			mm in.	mm in.	mm in.	mm in.	kg lbs.	
*T114	*T114W	1 1	25.654 1.0100	55.562 2.1875	15.875 0.6250	0.8 0.03	– –	<b>T114 AND T114W HAVE 2 BORES, OTHER BORE = 28.829 mm (1.1350").</b>
*T114X		2 2	28.829 1.1350	50.800 2.0000	15.875 0.6250	0.8 0.03	– –	<b>T114X HAS 2 CAGES AND 2 BORES, OTHER BORE = 29.261 mm (1.1520").</b>
T119	T119W	1 1	30.416 1.1975	55.562 2.1875	15.875 0.6250	0.8 0.03	0.15 0.33	
T120		2 2	30.416 1.1975	54.745 2.1553	11.430 0.4500	0.8 0.03	0.11 0.24	
T121		1 1	30.716 1.2093	55.562 2.1875	15.875 0.6250	0.8 0.03	0.16 0.35	
T126	T126W	1 1	32.004 1.2600	55.562 2.1875	15.875 0.6250	0.8 0.03	0.14 0.31	
*T126A	T126AW	1 1	32.004 1.2600	55.562 2.1875	15.875 0.6250	0.8 0.03	0.14 0.31	<b>T126A - 2 CAGES</b>
T139	T139W	1 1	35.179 1.3850	58.738 2.3125	15.875 0.6250	0.8 0.03	0.15 0.33	
*T139KP		1 1	35.179 1.3850	58.738 2.3125	15.875 0.6250	0.8 0.03	0.15 0.33	<b>RACES ARE CADMIUM PLATED.</b>
T142	T142W	1 1	35.179 1.3850	62.708 2.4688	19.431 0.7650	0.8 0.03	0.23 0.51	
T149	T149W	1 1	38.303 1.5080	65.883 2.5938	19.431 0.7650	0.8 0.03	0.24 0.53	
T158		1 1	40.234 1.5840	65.883 2.5938	19.431 0.7650	0.8 0.03	0.23 0.51	
T199	T199W	1 1	51.054 2.0100	74.612 2.9375	15.875 0.6250	0.8 0.03	0.20 0.44	
T309	T309W	1 1	78.583 3.0938	102.395 4.0313	15.875 0.6250	0.8 0.03	0.29 0.64	
T387	T387W	1 1	96.425 3.8750	127.000 5.0000	17.463 0.7650	0.8 0.03	0.50 1.10	
T484		1 1	123.012 4.8430	152.400 6.0000	17.463 0.6875	0.8 0.03	0.63 1.39	
T581		1 1	147.638 5.8125	177.800 7.0000	17.463 0.6875	0.8 0.03	0.89 1.96	
T1760		3 3	44.623 1.7568	76.200 3.0000	10.922 0.4300	0.8 0.03	0.18 0.4	

\* See remarks column.

## TAPERED ROLLER THRUST BEARINGS

### TYPE TTC-TTCS

- The types TTC, TTCS and TTCL (not shown) thrust bearings consist of two tapered thrust races, rollers and an outside retainer and are cageless.
- The outside retainer holds the assembly together for shipping and installation.
- These thrust bearings are specifically designed for oscillating applications.
- These types are identical with the exception of the retainer construction.



TTC



TTCS



FIGURE 1

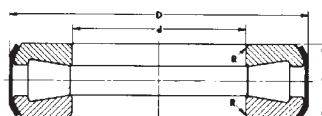


FIGURE 2



FIGURE 3

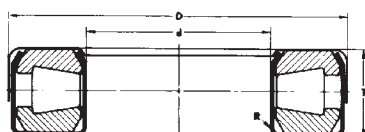


FIGURE 4

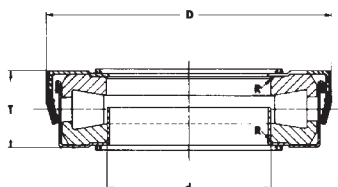


FIGURE 5

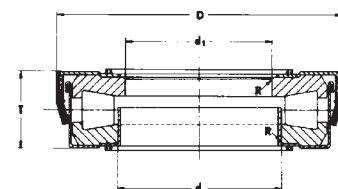


FIGURE 6

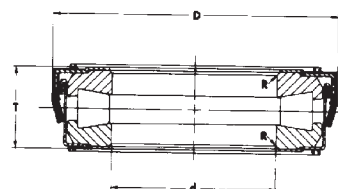


FIGURE 7

Bearing Number		Fig No.	Bore d	Outside Diameter D	Width T	Shaft Fillet Radius R	Mass	Remarks
No Oil Holes In Retainer	Oil Holes In Retainer							
			mm in.	mm in.	mm in.	mm in.	kg lbs.	
T127	T127W	1 1	32.004 1.2600	66.675 2.6250	19.446 0.7656	0.8 0.03	0.31 0.68	
T128		2 2	32.004 1.2600	66.675 2.6250	18.654 0.7344	0.8 0.03	0.29 0.64	
T130		1 1	27.102 1.0670	66.675 2.6250	19.446 0.7656	0.8 0.03	0.34 0.75	
T136		2 2	35.179 1.3850	66.675 2.6250	18.654 0.7344	0.8 0.03	0.28 0.62	
T138	T138W	1 1	35.179 1.3850	66.675 2.6250	19.446 0.7656	0.8 0.03	0.30 0.66	
*T138XS		SPCL	35.179 1.3850	66.675 2.6250	19.446 0.7656	0.8 0.03	– –	T138XS HAS 2 BORES, OTHER BORE = 35.387 mm (1.3972")
T144	T144W	1 1	36.754 1.4470	66.675 2.6250	19.446 0.7656	1.5 0.06	0.29 0.64	
*T144XA		SPCL	36.754 1.4470	66.675 2.6250	19.446 0.7656	1.5 0.06	– –	T144XA HAS 2 BORES, OTHER BORE = 37.137 mm (1.4621")
T151	T151W	1 1	38.354 1.5100	72.619 2.8590	21.433 0.8438	0.8 0.03	0.37 0.82	
T151X		1 1	38.354 1.5100	69.444 2.7340	20.726 0.8160	0.8 0.03	0.37 0.82	

\* See remarks column.





**TAPERED ROLLER THRUST BEARINGS**

TYPE TTC-TTCS – *continued*

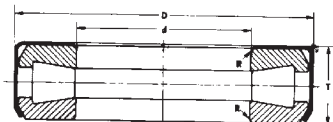


FIGURE 1

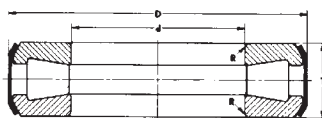


FIGURE 2



FIGURE 3



FIGURE 4

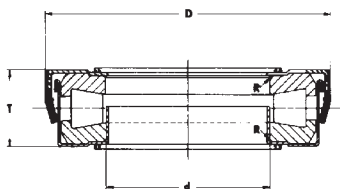


FIGURE 5

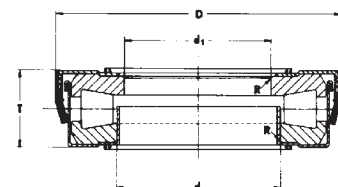


FIGURE 6

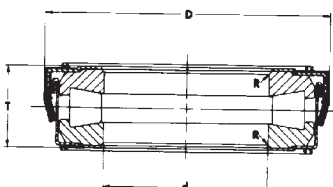


FIGURE 7

Bearing Number		Fig No.	Bore d	Outside Diameter D	Width T	Shaft Fillet Radius R	Mass	Remarks
No Oil Holes In Retainer	Oil Holes In Retainer							
			mm in.	mm in.	mm in.	mm in.	kg lbs.	
T152		2 2	38.354 1.5100	72.619 2.8590	20.638 0.8125	0.8 0.03	0.35 0.77	
T157	T157W	1 1	39.954 1.5730	72.619 2.8590	21.433 0.8438	0.8 0.03	0.37 0.82	
T163	T163W	1 1	41.529 1.6350	72.619 2.8590	21.433 0.8438	0.8 0.03	0.35 0.77	
T163X	T163XW	1 1	41.529 1.6350	72.619 2.8590	21.433 0.8438	2.0 0.80	0.35 0.77	
T169	T169W	1 1	43.104 1.6970	82.956 3.2660	23.812 0.9375	0.8 0.03	0.55 1.21	
T176	T176W	1 1	44.704 1.7600	82.956 3.2660	23.812 0.9375	0.8 0.03	0.54 1.19	
T177		1 1	45.000 1.7717	73.000 2.8740	20.000 0.7874	0.8 0.03	0.32 0.71	
T177A		1 1	45.484 1.7907	73.000 2.8740	20.000 0.7874	0.8 0.03	0.33 0.73	
*T177XA		SPCL	45.000 1.7717	73.127 2.8790	20.000 0.7874	0.8 0.03	– –	T177XA HAS 2 BORES, OTHER BORE = 45.484mm (1.7907")
T177S		5 5	45.000 1.7717	74.500 2.9331	20.221 0.7961	0.8 0.03	0.35 0.77	
T178		1 1	40.401 1.5906	73.000 2.8740	19.000 0.7480	0.8 0.03	– –	
T182	T182W	1 1	46.279 1.8220	82.956 3.2660	23.812 0.9375	0.8 0.03	0.52 1.15	
T188	T188W	1 1	47.879 1.8850	82.956 3.2660	23.812 0.9375	0.8 0.03	0.52 1.15	
T188X		4 4	47.879 1.8850	83.774 3.2970	24.130 0.9500	2.3 0.09	– –	
T189	T189W	2 2	47.879 1.8850	82.956 3.2660	23.020 0.9063	0.8 0.03	0.50 1.10	

\* See remarks column.



Bearing Number		Fig No.	Bore d	Outside Diameter D	Width T	Shaft Fillet Radius R	Mass	Remarks
No Oil Holes In Retainer	Oil Holes In Retainer							
			mm in.	mm in.	mm in.	mm in.	kg lbs.	
T193	T193W	2 2	49.454 1.9470	93.269 3.6720	26.187 1.0310	0.8 0.03	0.80 1.76	
T194	T194W	1 1	49.454 1.9470	93.269 3.6720	26.975 1.0620	0.8 0.03	0.81 1.79	
T201	T201W	2 2	51.054 2.0100	93.269 3.6720	26.187 1.0310	3.3 0.13	0.77 1.70	
T202	T202W	1 1	51.054 2.0100	93.269 3.6720	26.975 1.0620	3.3 0.13	0.80 1.76	
T208	T208W	1 1	52.629 2.0720	93.269 3.6720	26.975 1.0620	0.8 0.03	0.79 1.74	
T209	T209W	2 2	52.629 2.0720	93.269 3.6720	26.187 1.0310	0.8 0.03	0.75 1.65	
T251	T251W	1 1	63.754 2.5100	111.125 4.3750	26.988 1.0625	0.8 0.03	1.07 2.36	
T252	T252W	2 2	63.754 2.5100	111.125 4.3750	25.796 1.0156	0.8 0.03	1.07 2.23	
T301	T301W	2 2	76.454 3.0100	133.350 5.2500	33.338 1.3125	2.3 0.09	1.87 4.12	
	T301X	2 2	76.454 3.0100	133.350 5.2500	33.338 1.3125	2.3 0.09	– –	
T302	T302W	1 1	76.454 3.0100	133.350 5.2500	34.925 1.3750	2.3 0.09	1.99 4.39	
T350		2 2	88.900 3.5000	133.350 5.2500	33.335 1.3124	2.8 0.11	1.41 3.11	
T402	T402W	2 2	102.108 4.0200	179.619 7.0716	44.450 1.7500	1.5 0.06	4.84 10.67	
T600	T600W	1 1	152.400 8.0000	241.300 9.5000	76.200 3.0000	3.3 0.13	14.10 31.09	
T1260	T1260W	1 1	32.004 1.2600	55.562 2.1875	15.875 0.6250	0.8 0.03	0.17 0.37	
*T1380		SPCL SPCL	35.179 1.3850	59.400 2.3386	15.875 0.6250	0.8 0.03	0.35 0.77	2 PIECE SEAL
T1921		1 1	46.279 1.8220	80.010 3.1500	15.977 0.6290	0.8 0.03	0.34 0.75	
T4020		2 2	102.108 4.0200	179.619 7.0716	31.750 1.2500	1.5 0.06	3.7 8.16	

\* See remarks column.





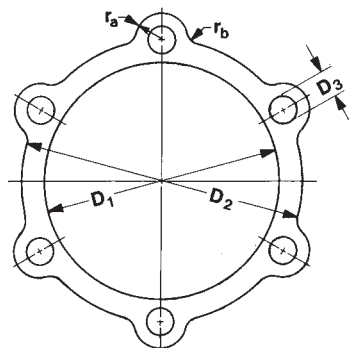
**NOTES**

**B**

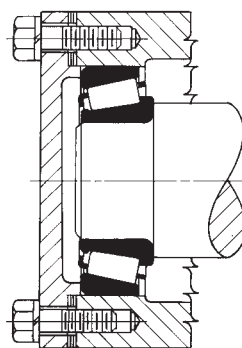


## CUP SHIMS

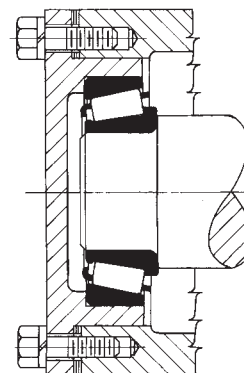
### STANDARD METAL SHIMS FOR CUP ADJUSTMENT BEARINGS



Shims 0.13 mm (0.005 in.), 0.18 mm (0.007 in.) and 0.51 mm (0.020 in.) thick.



Without carrier



With carrier  
Carrier section should be equal to average cup wall section.

Suggested shim sets consist of three 0.13 mm (0.005 in.), three 0.18 mm (0.007 in.), and one 0.51 mm (0.020 in.) thick shims. When ordering, specify the exact quantity for each part number. Shims shown in this table are made from aluminum, brass, or steel shim stock.

Shim	Size	Thickness
K2		
K2 06	05	0.13 mm (0.005 in.)
K2 06	07	0.18 mm (0.007 in.)
K2 06	20	0.51 mm (0.020 in.)

Cup Shims part number identifies the following:  
 size thickness(inches)  
 00 00  
 example  
 covers number 6 shim 0.13 mm (0.005 in.) thick  
 covers number 6 shim 0.18 mm (0.007 in.) thick  
 covers number 6 shim 0.51 mm (0.020 in.) thick

DIMENSIONS ARE IN MILLIMETERS / INCHES

Shim Part Numbers			Cap Screws		D <sub>1</sub>	D <sub>2</sub>	D <sub>3</sub>	r <sub>a</sub>	r <sub>b</sub>
0.13 0.005 Thick	0.18 0.007 Thick	0.51 0.020 Thick	No.	Size					
K20605	K20607	K20620	4	6.4	35.8	47.8	7.1	6.4	3.0
				0.25	1.41	1.88	0.28	0.25	0.12
K20705	K20707	K20720	4	6.4	45.2	57.2	7.1	6.4	3.0
				0.25	1.78	2.25	0.28	0.25	0.12
K20805	K20807	K20820	4	9.7	51.6	69.8	10.4	9.7	4.8
				0.38	2.03	2.75	0.41	0.38	0.19
K20905	K20907	K20920	4	9.7	59.4	76.2	10.4	9.7	4.8
				0.38	2.34	3.00	0.41	0.38	0.19
K21005	K21007	K21020	4	9.7	65.8	82.6	10.4	9.7	4.8
				0.38	2.59	3.25	0.41	0.38	0.19
K21105	K21107	K21120	4	9.7	70.6	88.9	10.4	9.7	4.8
				0.38	2.78	3.50	0.41	0.38	0.19
K21205	K21207	K21220	4	9.7	77.0	95.2	10.4	9.7	4.8
				0.38	3.03	3.75	0.41	0.38	0.19
K21405	K21407	K21420	4	9.7	89.7	108.0	10.4	9.7	4.8
				0.38	3.53	4.25	0.41	0.38	0.19

DIMENSIONS ARE IN MILLIMETERS / INCHES

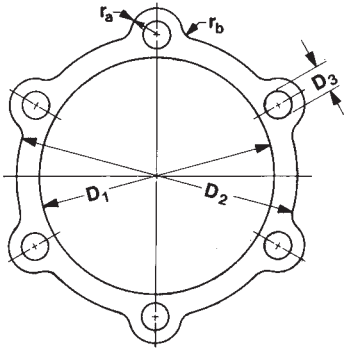
Shim Part Numbers			Cap Screws		D <sub>1</sub>	D <sub>2</sub>	D <sub>3</sub>	r <sub>a</sub>	r <sub>b</sub>
0.13 0.005 Thick	0.18 0.007 Thick	0.51 0.020 Thick	No.	Size					
K21505	K21507	K21520	4	9.7	96.0	114.3	10.4	9.7	4.8
				0.38	3.78	4.50	0.41	0.38	0.19
K21605	K21607	K21620	4	12.7	102.4	127.0	13.5	12.7	6.4
				0.50	4.03	5.00	0.53	0.50	0.25
K21705	K21707	K21720	4	12.7	108.7	133.4	13.5	12.7	6.4
				0.50	4.28	5.25	0.53	0.50	0.25
K21805	K21807	K21820	4	12.7	115.1	139.7	13.5	12.7	6.4
				0.50	4.53	5.50	0.53	0.50	0.25
K21905	K21907	K21920	6	12.7	121.4	146.0	13.5	12.7	6.4
				0.50	4.78	5.75	0.53	0.50	0.25
K22005	K22007	K22020	6	12.7	127.8	152.4	13.5	12.7	6.4
				0.50	5.03	6.00	0.53	0.50	0.25
K22205	K22207	K22220	6	12.7	140.5	165.1	13.5	12.7	6.4
				0.50	5.53	6.50	0.53	0.50	0.25
K22405	K22407	K22420	6	12.7	153.2	177.8	13.5	12.7	6.4
				0.50	6.03	7.00	0.53	0.50	0.25

THESE PARTS HAVE BEEN DESIGNED AND DEVELOPED FOR USE WITH TIMKEN BEARINGS ONLY.

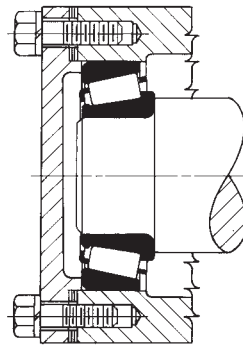
## CUP SHIMS

### STANDARD METAL SHIMS FOR CUP ADJUSTMENT BEARINGS

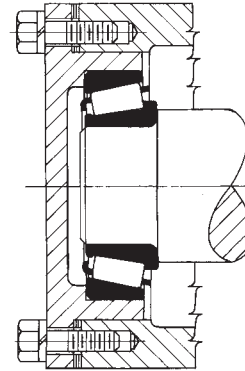
B



Shims 0.13 mm (0.005 in.), 0.18 mm (0.007 in.) and 0.51 mm (0.020 in.) thick.



Without carrier



With carrier  
Carrier section should be equal to average cup wall section.

Suggested shim sets consist of three 0.13 mm (0.005 in.), three 0.18 mm (0.007 in.), and one 0.51 mm (0.020 in.) thick shims. When ordering, specify the exact quantity for each part number. Shims shown in this table are made from aluminum, brass, or steel shim stock.

Cup Shims part number identifies the following:

Shim K2	size	thickness(inches)
	00	00
example		
K2 06 05		covers number 6 shim 0.13 mm (0.005 in.) thick
K2 06 07		covers number 6 shim 0.18 mm (0.007 in.) thick
K2 06 20		covers number 6 shim 0.51 mm (0.020 in.) thick

DIMENSIONS ARE IN MILLIMETERS / INCHES

Shim Part Numbers			Cap Screws		D <sub>1</sub>	D <sub>2</sub>	D <sub>3</sub>	r <sub>a</sub>	r <sub>b</sub>
0.13 0.005 Thick	0.18 0.007 Thick	0.51 0.020 Thick	No.	Size					
K22505	K22507	K22520	6	15.7 0.62	159.5 6.28	190.5 7.50	16.8 0.66	15.7 0.62	7.9 0.31
K22605	K22607	K22620	6	15.7 0.62	165.9 6.53	196.8 7.75	16.8 0.66	15.7 0.62	7.9 0.31
K22705	K22707	K22720	6	15.7 0.62	172.2 6.78	203.2 8.00	16.8 0.66	15.7 0.62	7.9 0.31
K22905	K22907	K22920	6	15.7 0.62	184.9 7.28	215.9 8.50	16.8 0.66	15.7 0.62	7.9 0.31
K23005	K23007	K23020	6	15.7 0.62	191.3 7.53	222.2 8.75	16.8 0.66	15.7 0.62	7.9 0.31
K23205	K23207	K23220	6	15.7 0.62	204.0 8.03	235.0 9.25	16.8 0.66	15.7 0.62	7.9 0.31
K23405	K23407	K23420	6	15.7 0.62	216.7 8.53	247.6 9.75	16.8 0.66	15.7 0.62	7.9 0.31
K23605	K23607	K23620	6	15.7 0.62	229.4 9.03	260.4 10.25	16.8 0.66	15.7 0.62	7.9 0.31

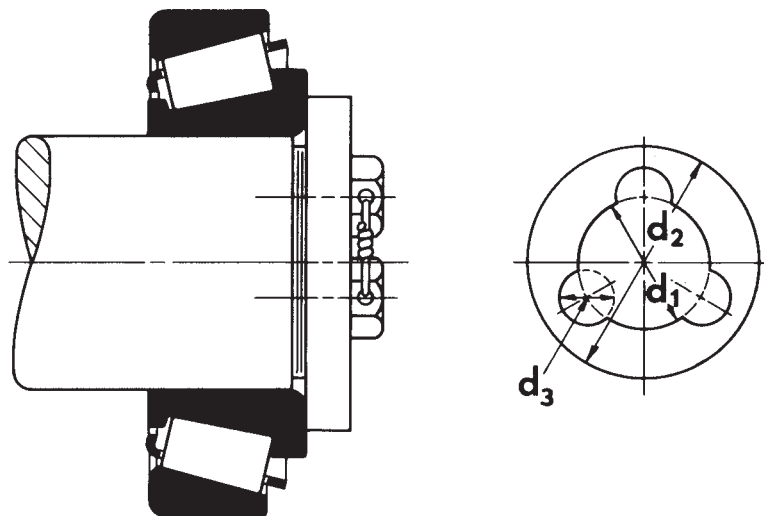
DIMENSIONS ARE IN MILLIMETERS / INCHES

Shim Part Numbers			Cap Screws		D <sub>1</sub>	D <sub>2</sub>	D <sub>3</sub>	r <sub>a</sub>	r <sub>b</sub>
0.13 0.005 Thick	0.18 0.007 Thick	0.51 0.020 Thick	No.	Size					
K23805	K23807	K23820	8	15.7 0.62	242.1 9.53	273.0 10.75	16.8 0.66	15.7 0.62	7.9 0.31
K24005	K24007	K24020	8	19.0 0.75	254.8 10.03	292.1 11.50	19.8 0.78	19.0 0.75	9.7 0.38
K24105	K24107	K24120	8	19.0 0.75	267.5 10.53	304.8 12.00	19.8 0.78	19.0 0.75	9.7 0.38
K24205	K24207	K24220	8	19.0 0.75	296.2 11.66	333.2 13.12	19.8 0.78	19.0 0.75	9.7 0.38
K24405	K24407	K24420	8	19.0 0.75	318.3 12.53	355.6 14.00	19.8 0.78	19.0 0.75	9.7 0.38
K24605	K24607	K24620	8	22.4 0.88	343.7 13.53	387.4 15.25	23.9 0.94	22.4 0.88	11.2 0.44
K24805	K24807	K24820	8	22.4 0.88	369.1 14.53	412.8 16.25	23.9 0.94	22.4 0.88	11.2 0.44
K25005	K25007	K25020	8	25.4 1.00	394.5 15.53	444.5 17.50	26.9 1.06	25.4 1.00	12.7 0.50
K25205	K25207	K25220	8	25.4 1.00	419.9 16.53	469.9 18.50	26.9 1.06	25.4 1.00	12.7 0.50

THESE PARTS HAVE BEEN DESIGNED AND DEVELOPED FOR USE WITH TIMKEN BEARINGS ONLY.

## CONE SHIMS

### STANDARD METAL SHIMS FOR CONE ADJUSTED BEARINGS



Suggested shim sets consist of three 0.13 mm (0.005 in.), three 0.18 mm (0.007 in.), and one 0.51 mm (0.020 in.) thick shims. When ordering, specify the exact quantity for each part number.

Shims shown in this table are made from aluminum, brass, or steel shim stock.

Shims		Shaft	Cap Screws		d <sub>1</sub>	d <sub>2</sub>	d <sub>3</sub>
Part Number	Thickness	Size	No.	Size			
T50605	0.13 0.005	63.5 2.50	3	12.7 0.50	35.1 1.38	60.5 2.38	14.2 0.56
T50606	0.18 0.007	to					
T50607	0.51 0.020	73.2 2.88					
T50608	0.13 0.005	76.2 3.00	3	12.7 0.50	44.4 1.75	73.2 2.88	14.2 0.56
T50609	0.18 0.007	to					
T50610	0.51 0.020	85.9 3.38					
T50611	0.13 0.005	88.9 3.50	3	12.7 0.50	57.2 2.25	85.9 3.38	14.2 0.56
T50612	0.18 0.007	to					
T50613	0.51 0.020	104.6 4.12					
T45882	0.13 0.005	108.0 4.25	3	15.7 0.62	76.2 3.00	103.1 4.06	17.5 0.69
T50633	0.18 0.007	to					
T45884	0.51 0.020	117.3 4.62					
T45885	0.13 0.005	120.6 4.75	3	15.7 0.62	88.9 3.50	117.3 4.62	17.5 0.69
T50634	0.18 0.007	to					
T45887	0.51 0.020	124.0 4.88					
T50614	0.13 0.005	127.0 5.00	4	19.0 0.75	88.9 3.50	124.0 4.88	20.6 0.81
T50615	0.18 0.007	to					
T50616	0.51 0.020	136.7 5.38					
T50617	0.13 0.005	139.7 5.50	4	19.0 0.75	88.9 3.50	136.7 5.38	20.6 0.81
T50618	0.18 0.007	to					
T50619	0.51 0.020	149.4 5.88					
T50620	0.13 0.005	152.4 6.00	6	19.0 0.75	101.6 4.00	149.4 5.88	20.6 0.81
T50621	0.18 0.007	to					
T50622	0.51 0.020	174.8 6.88					
T50623	0.13 0.005	177.8 7.00	6	25.4 1.00	127.0 5.00	174.8 6.88	26.9 1.06
T50624	0.18 0.007	to					
T50625	0.51 0.020	200.2 7.88					
T50626	0.13 0.005	203.2 8.00	6	31.8 1.25	152.4 6.00	200.2 7.88	33.3 1.31
T50627	0.18 0.007	to					
T50628	0.51 0.020	to					

THESE PARTS HAVE BEEN DESIGNED AND DEVELOPED FOR USE WITH TIMKEN BEARINGS ONLY.



## LOCKNUTS, LOCKWASHERS AND TONGUED WASHERS

### STANDARD LOCKNUTS, LOCKWASHERS AND TONGUED WASHER ASSEMBLIES

B

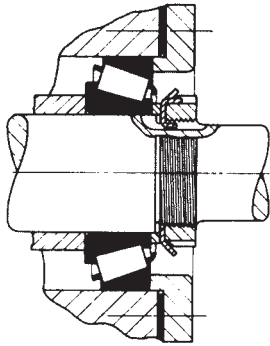


Figure 1

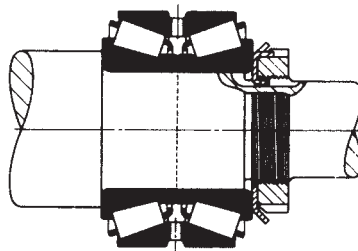


Figure 2

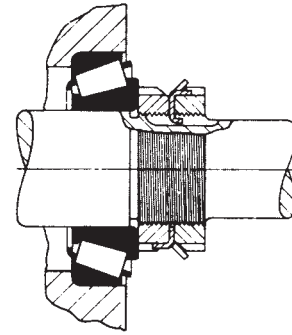


Figure 3

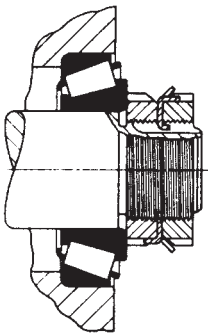


Figure 4

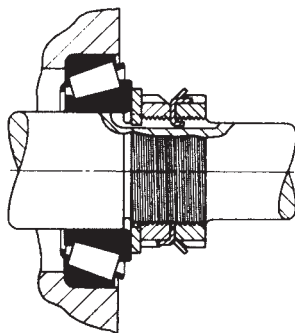


Figure 5

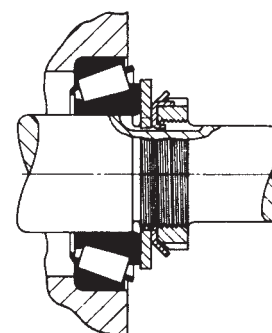


Figure 6

The designs shown in figures 1 to 6 show various methods of using standard locknuts, lockwashers, and tongued washers. A single locknut and lockwasher can be used to clamp the cone against a sleeve, shown in figure 1, or directly against a shaft shoulder. A narrow spacer is applied between the front face of the cone and the lockwasher so that the lockwasher will clear the bearing cage by a minimum of 3 mm (0.12 in.). The spacer outside diameter should be made a minimum of 6 mm (0.24 in.) smaller than the cage inside diameter, but must still provide the suggested cone backing diameter. Figure 2 shows another clamped design using a single locknut and lockwasher with a two-row bearing of either type TDO with cone spacer or type TNA. Since no cage clearance problem is present, the narrow spacer shown in figure 1 is unnecessary.

Figures 3, 4, and 5 indicate an adjustable bearing arrangement using two locknuts and a lockwasher. These may be used with either single or two-row bearing of the types permitting a cone adjusted arrangement. The design in figure 3 allows the maximum shaft extension diameter that can be used with a shaft thread

outside diameter, which will be less than the cone bore. Figure 4 shows an alternate design with smaller thread diameter and corresponding smaller locknuts and lockwasher. The locknut outside diameter, minus 2 times "r", must not be less than the suggested cone backing diameter. Figure 5 indicates the use of a tongued washer located between the inner locknut and cone. This is intended for applications where the cones are applied with loose fits on hardened stationary shafts as found in many automotive applications. The hardened tongued washers are not sold by The Timken Company.

When space does not permit the use of two locknuts and a lockwasher in an adjustable arrangement, and a single locknut and a lockwasher is used, then a tongued washer must be placed between the cone and lockwasher as illustrated in figure 6. This is necessary to provide adequate backing for the cone, in most cases, and to prevent damage to the lockwasher if the cone should creep on the shaft. The tongued washers are available from The Timken Company.

## LOCKNUTS, LOCKWASHERS AND TONGUED WASHERS - METRIC

### STANDARD LOCKNUTS, LOCKWASHERS AND TONGUED WASHERS FOR TAPERED ROLLER BEARINGS

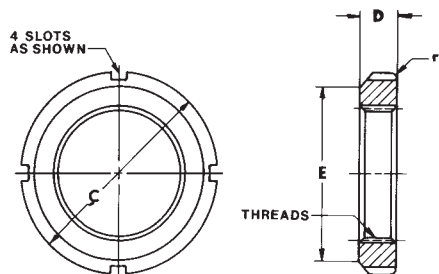


Figure 1 - LOCKNUTS

Threads are ISO 965/1, Class 5H

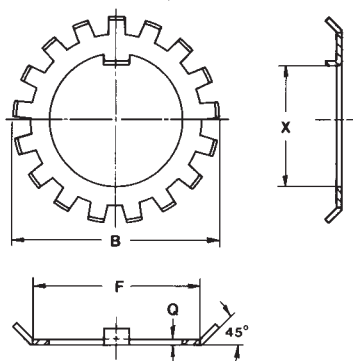


Figure 2 - LOCKWASHERS

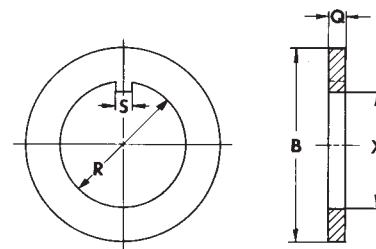


Figure 3 - TONGUED WASHERS

DIMENSIONS ARE IN MILLIMETERS

Locknut Dimensions							Lockwasher Dimensions					Tongued Washer Dimensions						
ABMA Locknut Number	Threads		Outside Diameter C	Thickness D	Face Outside Diameter E	r	ABMA Lockwasher Number	Maximum Diameter Over Tangs B	Face Diameter F	Thickness Q	Number of Tangs	Tongued Washer Number	Bore R		Outside Diameter B	Thickness Q	Key	
	Minimum Value of Major Diameter	Thread Series											Min.	Max.			S Max.	X Min.
KMH2	15.000	M15X1	25.000	8.000	21.000	1.17	MBB2	28.000	21.000	1.41	11	MW2	15.095	15.205	22.000	3.25	4.0	12.195
KMH3	17.000	M17X1	28.000	8.000	24.000	1.17	MBB3	32.000	24.000	1.41	11	MW3	17.095	17.205	24.000	3.25	4.0	14.195
KMH4	20.000	M20X1	32.000	9.000	26.000	1.17	MBB4	36.000	26.000	1.41	11	MW4	20.110	20.240	29.000	3.25	4.0	17.295
KMH4.4	22.000	M22X1	34.000	9.000	28.000	1.17	MBB4.4	38.000	28.000	1.41	11	MW4.4	22.110	22.240	31.000	3.25	4.0	19.710
KMH5	25.000	M25X1.5	38.000	10.000	32.000	1.17	MBB5	42.000	32.000	1.41	13	MW5	25.110	25.240	40.000	3.25	5.0	21.910
KMH5.6	28.000	M28X1.5	42.000	10.000	36.000	1.17	MBB5.6	46.000	36.000	1.41	13	MW5.6	28.110	28.240	40.000	3.25	5.0	24.910
KMH6	30.000	M30X1.5	45.000	10.000	38.000	1.17	MBB6	49.000	38.000	1.41	13	MW6	30.110	30.240	45.000	3.25	5.0	26.910
KMH6.4	32.000	M32X1.5	48.000	11.000	40.000	1.59	MBB6.4	52.000	40.000	1.41	13	MW6.4	32.120	32.280	50.000	3.25	5.0	29.010
KMH7	35.000	M35X1.5	52.000	11.000	44.000	1.59	MBB7	57.000	44.000	1.41	13	MW7	35.120	35.280	52.000	3.25	6.0	31.820
KMH8	40.000	M40X1.5	58.000	11.000	50.000	1.59	MBB8	62.000	50.000	1.78	13	MW8	40.120	40.280	57.000	4.20	6.0	36.520
KMH9	45.000	M45X1.5	65.000	12.000	56.000	1.59	MBB9	69.000	56.000	1.78	13	MW9	45.130	45.290	68.000	4.20	6.0	41.530
KMH10	50.000	M50X1.5	70.000	13.000	61.000	1.59	MBB10	74.000	61.000	1.78	13	MW10	50.130	50.290	76.000	4.20	6.0	46.530
KMH11	55.000	M55X2	75.000	13.000	67.000	1.59	MBB11	81.000	67.000	1.78	17	MW11	55.140	55.330	79.000	4.20	8.0	51.140
KMH12	60.000	M60X2	80.000	14.000	73.000	1.59	MBB12	86.000	73.000	1.78	17	MW12	60.140	60.330	88.000	4.70	8.0	55.940
KMH13	65.000	M65X2	85.000	14.000	79.000	2.38	MBB13	92.000	79.000	1.78	17	MW13	65.140	65.330	90.000	4.70	8.0	60.940
KMH14	70.000	M70X2	92.000	14.000	85.000	2.38	MBB14	98.000	85.000	1.78	17	MW14	70.150	70.340	103.000	4.70	8.0	65.950
KMH15	75.000	M75X2	98.000	15.000	90.000	2.38	MBB15	104.000	90.000	2.24	17	MW15	75.150	75.340	103.000	5.70	8.0	70.550
KM16	80.000	M80X2	105.000	15.000	95.000	2.38	MBB16	112.000	95.000	2.24	17	MW16	80.150	80.340	111.000	5.70	10.0	75.150
KM17	85.000	M85X2	110.000	16.000	102.000	2.38	MBB17	119.000	102.000	2.24	17	MW17	85.170	85.390	116.000	5.70	10.0	80.150
KM18	90.000	M90X2	120.000	16.000	108.000	2.38	MBB18	126.000	108.000	2.73	17	MW18	90.170	90.390	121.000	7.62	10.0	84.670
KM19	95.000	M95X2	125.000	17.000	113.000	3.18	MBB19	133.000	113.000	2.73	17	MW19	95.170	95.390	126.000	7.62	10.0	89.670
KM20	100.000	M100X2	130.000	18.000	120.000	3.18	MBB20	142.000	120.000	2.73	17	MW20	100.170	100.390	131.000	7.62	12.0	94.670
KM21	105.000	M105X2	140.000	18.000	126.000	3.18	MBB21	145.000	126.000	2.73	17	MW21	105.180	105.400	125.000	7.62	12.0	99.670
KM22	110.000	M110X2	145.000	19.000	133.000	3.18	MBB22	154.000	133.000	3.25	17	MW22	110.180	110.400	136.000	7.62	12.0	104.180
KM23	115.000	M115X2	150.000	19.000	137.000	3.18	MBB23	159.000	137.000	3.25	17	MW23	115.180	115.400	144.000	7.62	12.0	109.180
KM24	120.000	M120X2	155.000	20.000	138.000	3.18	MBB24	164.000	138.000	3.72	17	MW24	120.180	120.400	150.000	9.57	14.0	113.180
KM25	125.000	M125X2	160.000	21.000	148.000	3.18	MBB25	170.000	148.000	3.72	17	MW25	125.200	125.450	138.000	9.57	14.0	118.180
KM26	130.000	M130X2	165.000	21.000	149.000	3.18	MBB26	175.000	149.000	3.72	17	MW26	130.200	130.450	166.000	9.57	14.0	123.200

FOR AVAILABILITY OF METRIC LOCKNUTS, LOCKWASHERS, AND TONGUED WASHERS, CONSULT YOUR TIMKEN COMPANY REPRESENTATIVE.



# AUXILIARY PARTS

## LOCKNUTS, LOCKWASHERS AND TONGUED WASHERS - INCHES

### STANDARD LOCKNUTS, LOCKWASHERS AND TONGUED WASHERS FOR TAPERED ROLLER BEARINGS

B

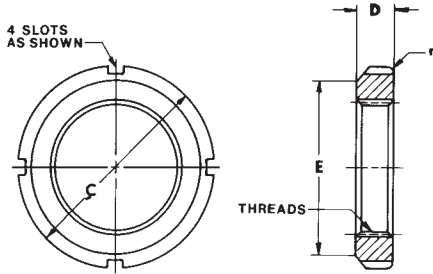


Figure 1 - LOCKNUTS

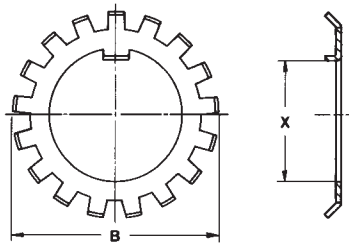


Figure 2 - LOCKWASHERS

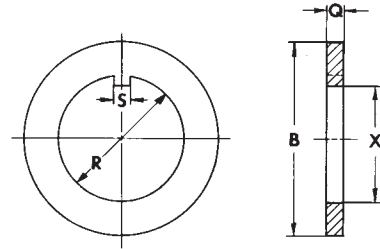


Figure 3 - TONGUED WASHERS

Threads are American National, Form NS, Class 3, with thread length based on 45° chamfer.

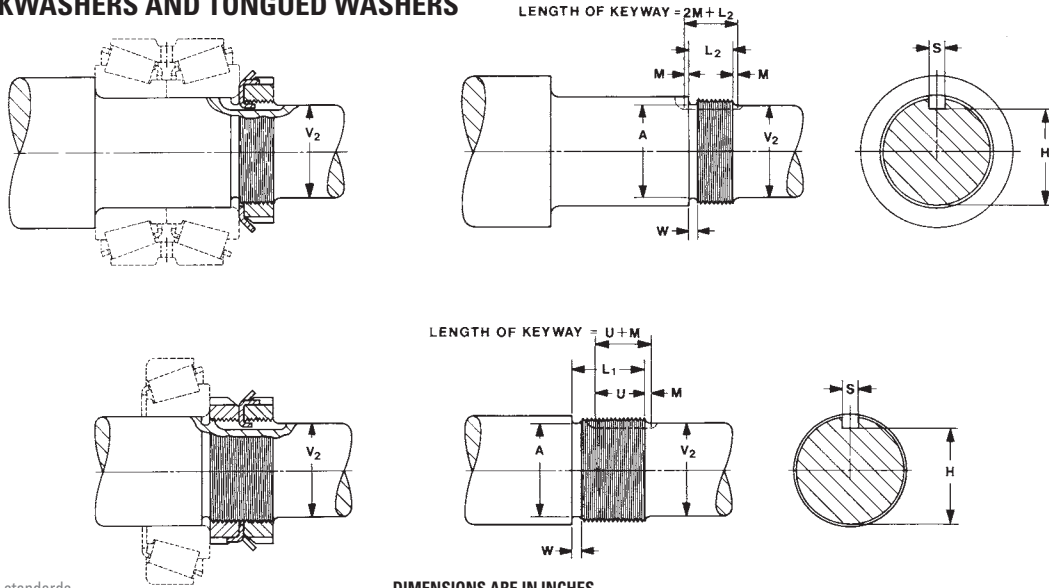
DIMENSIONS ARE IN INCHES

ABMA Locknut Number	Locknut Dimensions						Lockwasher Dimensions					Tongued Washer Number	Tongued Washer Dimensions					
	Threads		Outside Diameter C	Thickness D	Face Outside Diameter E	r	ABMA Lockwasher Number	Maximum Diameter Over Tangs B	Face Diameter F	Thickness Q	Number of Tangs		Bore R		Outside Diameter B	Thickness Q	Key	
	Minimum Value of Major Diameter	Thread Series											Min.	Max.			S Max.	X Min.
N-00	0.391	32	0.755	0.229	0.625	0.047	TW100	0.891	0.625	0.032	9	K91500	0.406	0.421	0.798	0.109	0.120	0.334
N-01	0.469	32	0.880	0.323	0.719	0.047	TW101	1.031	0.719	0.032	9	K91501	0.484	0.499	0.923	0.109	0.120	0.412
N-02	0.586	32	1.005	0.323	0.813	0.047	TW102	1.156	0.813	0.048	11	K91502	0.601	0.616	1.173	0.125	0.120	0.513
N-03	0.664	32	1.130	0.354	0.938	0.047	TW103	1.344	0.938	0.048	11	K91503	0.679	0.694	1.173	0.125	0.120	0.591
N-04	0.781	32	1.380	0.385	1.125	0.047	TW104	1.563	1.125	0.052	11	K91504	0.801	0.816	1.423	0.125	0.176	0.713
N-05	0.969	32	1.568	0.416	1.281	0.047	TW105	1.703	1.281	0.052	13	K91505	0.989	1.009	1.860	0.125	0.176	0.897
N-06	1.173	18	1.755	0.416	1.500	0.047	TW106	1.953	1.500	0.052	13	K91506	1.193	1.213	1.860	0.125	0.176	1.081
TN-065	1.312	18	2.068	0.448	1.813	0.063	TW065	2.234	1.813	0.052	15	K915065	1.333	1.353	2.173	0.125	0.176	1.221
TN-07	1.376	18	2.068	0.448	1.813	0.063	TW107	2.250	1.813	0.052	15	K91507	1.396	1.416	2.173	0.125	0.176	1.284
TN-08	1.563	18	2.255	0.448	2.000	0.063	TW108	2.484	2.000	0.062	15	K91508	1.583	1.603	2.735	0.156	0.290	1.461
TN-09	1.767	18	2.536	0.448	2.281	0.063	TW109	2.719	2.281	0.062	17	K91509	1.792	1.817	2.735	0.156	0.290	1.670
TN-10	1.967	18	2.693	0.510	2.438	0.063	TW110	2.922	2.438	0.062	17	K91510	1.992	2.017	3.235	0.156	0.290	1.870
TN-11	2.157	18	2.974	0.510	2.656	0.063	TW111	3.094	2.656	0.062	17	K91511	2.182	2.207	3.235	0.156	0.290	2.060
TN-12	2.360	18	3.161	0.541	2.844	0.063	TW112	3.328	2.844	0.072	17	K91512	2.400	2.425	3.735	0.187	0.290	2.248
TN-13	2.548	18	3.380	0.573	3.063	0.094	TW113	3.563	3.063	0.072	19	K91513	2.588	2.613	3.735	0.187	0.290	2.436
TN-14	2.751	18	3.360	0.573	3.313	0.094	TW114	3.813	3.313	0.072	19	K91514	2.791	2.816	3.735	0.187	0.290	2.639
TAN-15	2.933	12	3.880	0.604	3.563	0.094	TW115	4.047	3.563	0.085	19	K91515	2.973	3.003	4.173	0.218	0.290	2.808
TAN-16	3.137	12	4.161	0.604	3.844	0.094	TW116	4.391	3.844	0.085	19	K91516	3.177	3.207	4.173	0.218	0.353	3.012
TAN-17	3.340	12	4.411	0.635	4.031	0.094	TW117	4.625	4.031	0.085	19	K91517	3.395	3.425	4.610	0.218	0.353	3.230
TAN-18	3.527	12	4.661	0.698	4.281	0.094	TW118	4.953	4.281	0.115	19	K91518	3.582	3.612	5.110	0.250	0.353	3.387
TAN-19	3.730	12	4.943	0.729	4.563	0.125	TW119	5.234	4.563	0.115	19	K91519	3.800	3.830	5.110	0.250	0.353	3.605
TAN-20	3.918	12	5.193	0.760	4.813	0.125	TW120	5.484	4.813	0.115	19	K91520	3.988	4.018	5.610	0.250	0.353	3.778
TAN-21	4.122	12	5.443	0.760	5.000	0.125	TW121	5.703	5.000	0.115	19	K91521	4.192	4.222	5.610	0.250	0.353	3.982
TAN-22	4.325	12	5.724	0.791	5.281	0.125	TW122	6.000	5.281	0.130	19	K91522	4.395	4.425	6.110	0.281	0.353	4.170
TAN-24	4.716	12	6.130	0.823	5.688	0.125	TW124	6.531	5.688	0.155	19	K91524	4.801	4.831	6.735	0.375	0.353	4.551
TAN-26	5.106	12	6.755	0.885	6.188	0.125	TW126	7.047	6.188	0.155	19	K91526	5.191	5.226	7.485	0.375	0.435	4.921
TAN-128	5.497	12	7.099	1.198	6.531	0.125	TW128	7.438	6.531	0.155	19	K91528	5.582	5.617	7.485	0.375	0.590	5.312
TAN-130	5.888	12	7.693	1.260	7.063	0.125	TW130	8.063	7.063	0.193	19	K91530	5.983	6.018	7.985	0.375	0.590	5.675
TAN-132	6.284	8	8.068	1.291	7.438	0.156	TW132	8.453	7.438	0.193	19	K91532	6.389	6.424	8.485	0.375	0.590	6.081
TAN-134	6.659	8	8.661	1.354	8.031	0.156	TW134	9.078	8.031	0.193	19	K91534	6.764	6.799	8.985	0.375	0.715	6.456
TAN-136	7.066	8	9.068	1.416	8.375	0.156	TW136	9.438	8.375	0.193	19	K91536	7.171	7.206	9.235	0.375	0.715	6.863
TAN-138	7.472	8	9.474	1.416	8.781	0.156	TW138	9.859	8.781	0.193	19	K91538	7.577	7.612	9.735	0.375	0.715	7.269
TAN-140	7.847	8	9.849	1.510	9.156	0.156	TW140	10.406	9.156	0.193	19	K91540	7.982	8.017	10.110	0.375	0.840	7.674

# AUXILIARY PARTS

## LOCKNUTS, LOCKWASHERS AND TONGUED WASHERS

### SHAFT THREAD AND KEYWAY DIMENSIONS FOR STANDARD LOCKNUTS, LOCKWASHERS AND TONGUED WASHERS



These dimensions are ABMA standards.

DIMENSIONS ARE IN INCHES

ABMA Locknut Number	Number Per Inch	threads							Minor Dia.	Relief Diameter A	Relief Width W +0.016 0.000	Shaft Ext. Dia. V2 Max.	Thread Length		Keyway			
		Major Diameter			Pitch Diameter (1)			H Max.					S +0.016 -0.000	M +0.016 0.000	U +0.016 -0.000			
		Max.	Tol.	Min.	Max.	Tol.	Min.									L1 +0.016 -0.000	L2 +0.016 -0.000	
N-00	32	0.391	0.0054	0.3856	0.3707	0.0026	0.3681	0.3257	0.3371 ± 0.005	0.062	0.312	0.593	0.375	0.287	0.125	0.094	0.469	
N-01	32	0.469	0.0054	0.4636	0.4487	0.0026	0.4461	0.4307	0.4151 ± 0.005	0.062	0.406	0.781	0.468	0.366	0.125	0.094	0.562	
N-02	32	0.586	0.0054	0.5806	0.5657	0.0030	0.5627	0.5477	0.5321 ± 0.005	0.062	0.500	0.812	0.500	0.485	0.125	0.094	0.594	
N-03	32	0.664	0.0054	0.6586	0.6437	0.0030	0.6407	0.6257	0.6101 ± 0.005	0.062	0.562	0.875	0.531	0.564	0.125	0.094	0.625	
N-04	32	0.781	0.0054	0.7756	0.7607	0.0034	0.7573	0.7427	0.7271 ± 0.005	0.062	0.703	0.906	0.531	0.676	0.188	0.094	0.625	
N-05	32	0.969	0.0054	0.9636	0.9487	0.0034	0.9453	0.9307	0.9151 ± 0.005	0.062	0.875	1.000	0.593	0.835	0.188	0.125	0.719	
N-06	18	1.173	0.0082	1.1648	1.1369	0.0040	1.1329	1.1048	1.0892 ± 0.005	0.093	1.062	1.000	0.593	1.040	0.188	0.125	0.719	
TN-065	18	1.312	0.0082	1.3043	1.2764	0.0040	1.2724	1.2443	1.2287 ± 0.005	0.093	1.188	1.062	0.625	1.180	0.188	0.125	0.750	
TN-07	18	1.376	0.0082	1.3678	1.3399	0.0040	1.3359	1.3078	1.2922 ± 0.005	0.093	1.250	1.062	0.625	1.244	0.188	0.125	0.750	
TN-08	18	1.563	0.0082	1.5548	1.5269	0.0045	1.5224	1.4948	1.4792 ± 0.005	0.093	1.438	1.062	0.625	1.422	0.312	0.125	0.750	
TN-09	18	1.767	0.0082	1.7588	1.7309	0.0045	1.7264	1.6988	1.6832 ± 0.005	0.125	1.656	1.062	0.625	1.628	0.312	0.156	0.781	
TN-10	18	1.967	0.0082	1.9588	1.9309	0.0045	1.9264	1.8988	1.8832 ± 0.005	0.125	1.859	1.187	0.687	1.830	0.312	0.156	0.844	
TN-11	18	2.157	0.0082	2.1488	2.1209	0.0051	2.1158	2.0888	2.0732 ± 0.005	0.125	2.047	1.187	0.687	2.021	0.312	0.156	0.844	
TN-12	18	2.360	0.0082	2.3518	2.3239	0.0051	2.3188	2.2918	2.2762 ± 0.005	0.125	2.250	1.281	0.750	2.194	0.312	0.156	0.906	
TN-13	18	2.548	0.0082	2.5398	2.5119	0.0051	2.5068	2.4798	2.4642 ± 0.005	0.125	2.422	1.343	0.781	2.382	0.312	0.156	0.938	
TN-14	18	2.751	0.0082	2.7428	2.7149	0.0051	2.7098	2.6828	2.6672 ± 0.005	0.125	2.625	1.343	0.781	2.586	0.312	0.250	1.000	
TAN-15	12	2.933	0.0112	2.9218	2.8789	0.0054	2.8735	2.8308	2.7995 ± 0.010	0.156	2.781	1.406	0.812	2.737	0.312	0.250	1.031	
TAN-16	12	3.137	0.0112	3.1258	3.0829	0.0059	3.0770	3.0348	3.0035 ± 0.010	0.156	3.000	1.406	0.812	2.938	0.375	0.250	1.031	
TAN-17	12	3.340	0.0112	3.3288	3.2859	0.0059	3.2800	3.2378	3.2065 ± 0.010	0.156	3.188	1.468	0.843	3.141	0.375	0.250	1.062	
TAN-18	12	3.527	0.0112	3.5158	3.4729	0.0074	3.4655	3.4248	3.3935 ± 0.010	0.156	3.375	1.625	0.937	3.298	0.375	0.250	1.156	
TAN-19	12	3.730	0.0112	3.7188	3.6759	0.0074	3.6685	3.6278	3.5965 ± 0.010	0.156	3.562	1.687	0.968	3.502	0.375	0.250	1.188	
TAN-20	12	3.918	0.0112	3.9068	3.8639	0.0074	3.8565	3.8158	3.7845 ± 0.010	0.156	3.766	1.750	1.000	3.690	0.375	0.312	1.281	
TAN-21	12	4.122	0.0112	4.1108	4.0679	0.0083	4.0596	4.0198	3.9885 ± 0.010	0.156	3.938	1.750	1.000	3.894	0.375	0.312	1.281	
TAN-22	12	4.325	0.0112	4.3138	4.2709	0.0083	4.2626	4.2228	4.1915 ± 0.010	0.156	4.156	1.812	1.031	4.098	0.375	0.312	1.312	
TAN-24	12	4.716	0.0112	4.7048	4.6619	0.0083	4.6536	4.6138	4.5825 ± 0.010	0.156	4.531	1.906	1.093	4.458	0.375	0.312	1.375	
TAN-26	12	5.106	0.0112	5.0948	5.0519	0.0083	5.0436	5.0038	4.9725 ± 0.010	0.156	4.906	2.031	1.156	4.844	0.500	0.312	1.438	
TAN-128	12	5.497	0.0112	5.4858	5.4429	0.0083	5.4346	5.3948	5.3635 ± 0.010	0.156	5.297	2.656	1.468	5.229	0.625	0.312	1.750	
TAN-130	12	5.888	0.01125	5.8768	5.8339	0.0083	5.8256	5.7858	5.7545 ± 0.010	0.156	5.656	2.812	1.562	5.590	0.625	0.375	1.906	
TAN-132	8	6.284	0.0152	6.2688	6.2028	0.0091	6.1937	6.1306	6.0993 ± 0.010	0.250	6.062	2.875	1.593	5.956	0.625	0.375	1.938	
TAN-134	8	6.659	0.0152	6.6438	6.5778	0.0091	6.5687	6.5056	6.4743 ± 0.010	0.250	6.438	3.000	1.656	6.326	0.750	0.375	2.000	
TAN-136	8	7.066	0.0152	7.0508	6.9848	0.0091	6.9757	6.9126	6.8813 ± 0.010	0.250	6.844	3.125	1.718	6.734	0.750	0.375	2.062	
TAN-138	8	7.472	0.0152	7.4568	7.3908	0.0091	7.3817	7.3186	7.2873 ± 0.010	0.250	7.250	3.125	1.718	7.141	0.750	0.375	2.062	
TAN-140	8	7.847	0.0152	7.8318	7.7658	0.0114	7.7544	7.6936	7.6623 ± 0.010	0.250	7.625	3.312	1.812	7.510	0.875	0.375	2.125	

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