
ROLLWAY T 16050 USA

Thrust

Unmounted bearing assembly consisting of through hardened housing and shaft plate (raceways) with cylindrical or tapered rolling elements separated by a centrifugally cast brass retainer (cage). Thrust bearings are ideal for applications with loads parallel to the shaft.

Bearing Configurations

Single Or Multistage

Rolling Element Styles

Cylindrical Or Tapered

Bore Diameter Size Range

1” To 18” (25.4 mm To 457 mm)

Materials

Bearing Quality Steel

Thrust Selection Guide

	Type	Description	Size Range
	**Txxx**	Cylindrical Roller Thrust	6” - 34”
	**Atxxx**	Aligning Cylindrical Roller Thrust	6” - 35”
	**T-xxx**	Tapered Roller Thrust	8” - 33”
	**T-xxxx-F**	T-flat Tapered Roller Thrust	10.5” - 34”
	**T-xxxx-FS**	Aligning T-Flat Tapered Roller Thrust	19” - 34”
	**CTxxx**	Crane Hook Thrust	3” - 18.5”
	**WCTxxx**	Crane Hook Thrust w/ Fitting	3” - 18.5”

* For estimating purpose only, individually sizes may vary and are subject to change without notification

Design Characteristics						Features		
Static Load	Dynamic Load	Reversing Load	Higher Speed	Horizontal Installation	Relative Base Cost *	Self Aligning	Grease Fitting	Page No.
◒	◒	○	●	◒	$			F-13
◒	◒	○	●	◒	$$	S		F-17
◒	●	○	◒	●	$$			F-27
◒	●	○	◒	●	$$			F-29
◒	●	○	◒	●	$$	S		F-30
◒	◒	○	○	◒	$$		S	F-21
◒	◒	○	○	◒	$$			F-21

Misalignment Capability

External Greasing

O = Optional
S = Standard
○ = Not Recommended

○ ◒ ◒ ◒ ●

Poor ⟷ Best

Thrust Selection Guide

	Type	Description	Size Range
	TAB-xxxx	2 Stage Tandem Thrust	4.3” - 34”
	TAC-xxxx	3 Stage Tandem Thrust	3.5” - 34”
	TAD/TMD-xxxx	4 Stage Tandem Thrust	3.9” - 12”
	TAF/TMF-xxxx	6 Stage Tandem Thrust	3.5” - 6”
	TMH-xxxx	8 Stage Tandem Thrust	3.5” - 14”

* For estimating purpose only, individually sizes may vary and are subject to change without notification

Design Characteristics						Features			
Static Load	Dynamic Load	Reversing Load	Higher Speed	Horizontal Installation	Relative Base Cost *	Self Aligning	Grease Fitting	Oil Holes / Pathway	Page No.
●	●	○	◒	◒	$$$			S	F-35
●	●	○	◒	◒	$$$			S	F-36
●	●	○	◒	◒	$$$			S	F-37
●	●	○	◒	◒	$$$			S	F-38
●	●	○	◒	◒	$$$			S	F-39

Misalignment Capability

External Greasing

Relubrication and Long Bearing Life

O = Optional
S = Standard
○ = Not Recommended

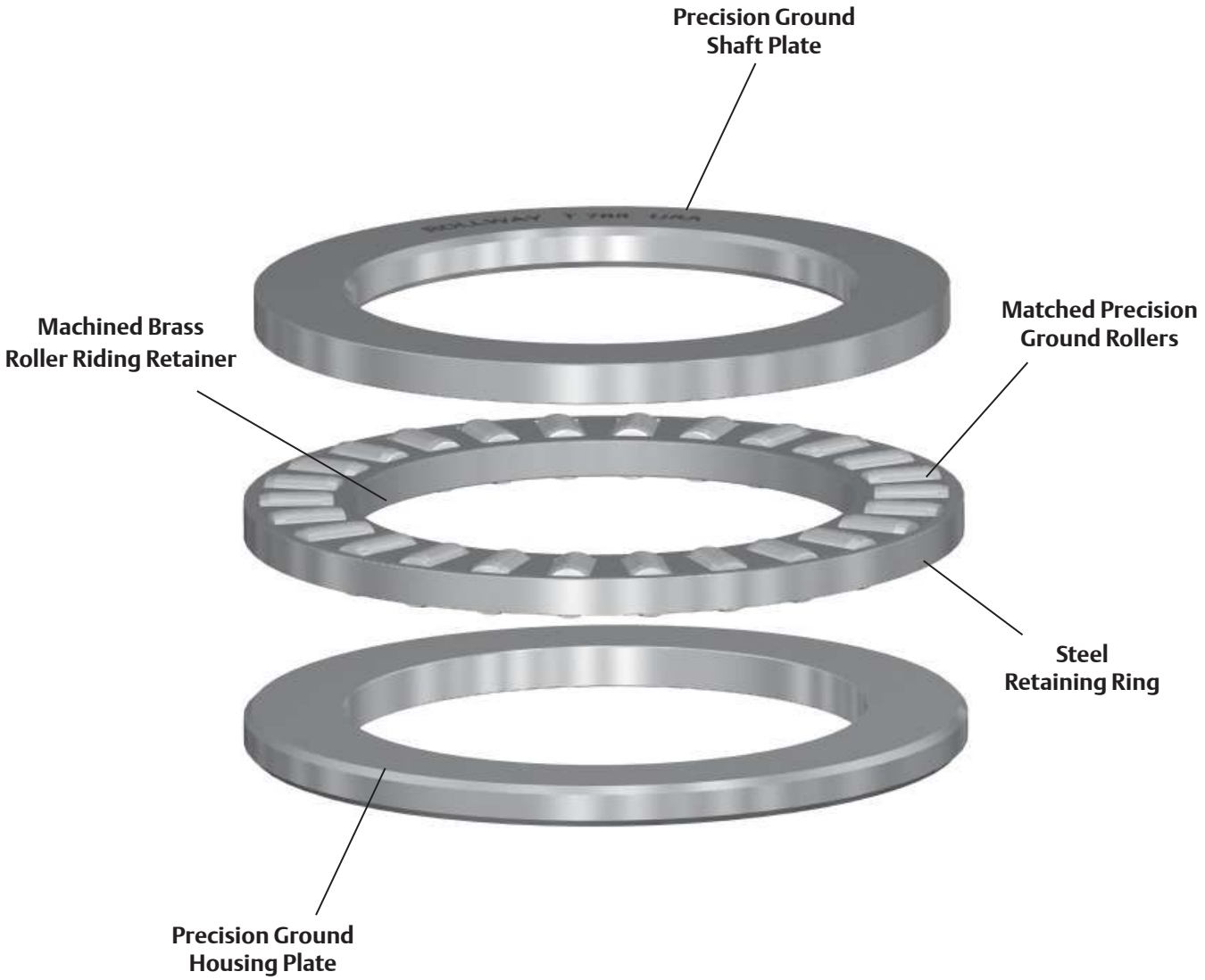
○ ◔ ◒ ● ●

Poor ⟷ Best

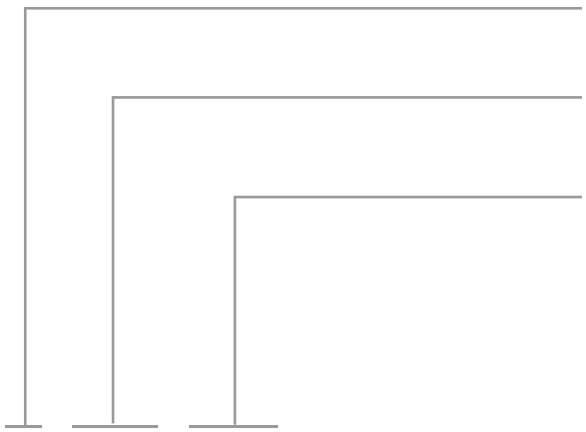
Rollway Cylindrical Thrust Bearings

Rollway Cylindrical Thrust bearings utilize crowned cylindrical rolling elements separated by a machined brass roller riding retainer (cage) contained within precision ground shaft and housing plates. These bearings are intended for axial loads (load parallel to the axis of rotation) and are designed as medium or heavy duty series. Either series is available in three configuration types including double acting, self aligning and the most widely used "single acting" variety. Depending on your preference, these bearings are available in a wide variety of sizes and options as illustrated on the pages to follow.

Cylindrical roller thrust Inch series bearings are divided into two basic classes: medium (600 series) and heavy (700 series). The medium series has a smaller cross section and the retainer typically has only one roller per roller pocket. The heavy series has a larger cross section and the retainer typically has more than one roller per roller pocket.



Cylindrical Thrust Nomenclature



Type Designator
Bearing Configuration Description

Size Designator
Reference Catalog For Sizes.

Variation Code
Variation Codes Are Divided Into Two Categories: Special And Standard.

Type Designator

T - Single acting thrust
AT - Single acting thrust - aligning type.
DT - Double acting thrust
DAT - Double acting thrust - aligning type.
BSDT - Double acting thrust - simplified design
CT - Single acting thrust - special design for crane hook applications with weathershed
WCT - Single acting thrust - special design for crane hook applications with weathershed and grease fitting

Size Designator

Reference catalog for sizes.

Variation Codes

Special variation codes

201 to 215 and 240 to 254 - are numerically assigned codes that designate the variation from standard (example 201 = 1st variation, 202 = 2nd variation, etc.). These bearing code numbers do not in any way reference the modification from standard. Application Engineering must be contacted for information concerning a particular modification.

Standard variation codes

216 to 239 and 255 to 299 - 216 to 239 and 255 to 299 are code numbers representing standard modifications with the most popular listed below:

- **059 -** Brass retainer - this code is obsolete, all standard thrust bearings are supplied with centrifugally cast brass retainers
- **210 -** Roller assembly supplied with hardened steel outer ring
- 216 - Standard bearing supplied without shaft plate
- **219 - T**andem bearing design (typically these have been replaced with TAB to TAC bearings)
- **221 -** Standard bearing with a brass ring pressed in bore for horizontal shaft applications
- **226 -** Standard bearing supplied with two shaft plates
- **229 -** Same as 219.

Features and Benefits

Precision Ground Shaft Plate

Bore is precision ground for a line to loose fit on shaft. The O.D. has a turned finish and is smaller than the housing plate's O.D. Shaft Plates are manufactured to conform to ABMA size and tolerance specifications.

Matched Precision Ground Rollers

Rollers are manufactured from Through Hardened Bearing Grade Steel. The surfaces are ground, superfinished, and matched to .0001". The ends of the rollers have a large machined radius designed to reduce friction between the roller and the retaining ring. The larger diameter bearings use multiple rollers per pocket to minimize slippage. All rolling elements are precision ground to provide even distribution of load over the contact surfaces. The rollers are all crowned thus permitting unmodified use of the ABMA's capacity formula. Roller crowning reduces the edge stresses between the roller and the thrust plates.

Machined Brass Roller Riding Retainer

Rollway thrust bearing retainers are machined from centrifugally cast brass. The retainers for all cylindrical roller thrust bearings are designed to be roller riding. The contoured roller pockets are accurately machined at right angles to the thrust force, which will be applied to the bearing. The rollers are retained in the assembly by a steel ring pinned to the outside diameter of the retainer.

Precision Ground Housing Plate

O.D. is precision ground for a line to loose fit in housing bore. The I.D. has a turned finish and is larger than the shaft plate's I.D. Housing Plates are manufactured to conform to ABMA size and tolerance specifications. All thrust plates are accurately ground for flatness and parallelism of the roller riding and backing surfaces. The contact surfaces of the plates are super-finished to provide for long life. Locating diameters are ground to obtain an accurate fit on the shaft or in the housing.

Options

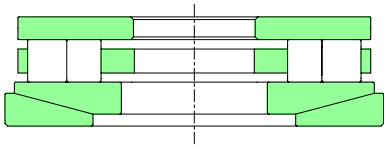
Materials

The plates and rollers are made from either through-hardened or carburizing grade steel with hardness to Rockwell (Rc) 58-63. Upon request we can manufacture these components from CEVM or VIMVAR grades of material and M- 50 tool steel for high temperature applications.

Types and Styles

Inch Series — Single Acting

The single acting bearing is the most popular thrust bearing of the inch series. The bearing is often referred to as a “three piece thrust bearing”. One of the thrust plates is stationary with respect to the shaft and is ground in the bore for an accurate fit on the shaft. The roller assembly is located by the shaft and its inside diameter is machined to provide the correct operating clearance. The second thrust plate is stationary with the housing and is ground on the outside diameter for an accurate fit in the housing. The non-locating diameters of both thrust plates are specially designed to allow lubricant flow. The sizes range from 1 to 22 inches I.D. and 2.125 to 34 inches O.D. with dynamic capacities from 10,000 lbs to 1,620,000 lbs. These bearings are used in a variety of applications such as extruder gear drives, pumps, crane hook swivels and machine tools.



“AT” Aligning Type

The aligning style design replaces the housing plate with aligning plates. The aligning plates are matched plates, one convex and one concave, that will correct for 3° initial static misalignment. These aligning plates are not designed for applications requiring dynamic aligning capabilities. They are designed to correct an initial misalignment prior to full loading. The concave plate (housing plate) is precision ground but not hardened.

The standard “AT” type is recommended for vertical shaft applications. Where the alignment feature is required in some horizontal shaft applications, the convex aligning plate may ride on the shaft and the plate should be modified to provide a satisfactory bearing surface in the bore. This is usually achieved by the installation of a brass bushing into the bore of the plate.

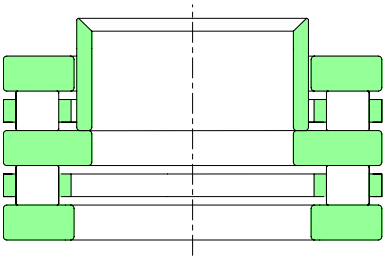
Types and Styles continued

Crane Hook Thrust Bearings

Crane hook bearings are similar to the single acting inch series but are specifically designed for crane hooks or similar applications where heavy thrust loads and low speeds of rotation are encountered. Crane hook bearings are simply single acting thrust bearings supplied with a weathershed. The weathershed is a steel band pressed on to the rotating plate extending to the middle of the stationary plate forming a shield to help protect the roller assembly.

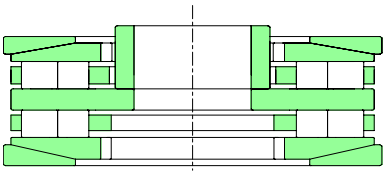
The weathersheds are supplied with or without grease fittings.

This type of bearing undergoes static loading in normal applications. Our static capacities are based on a total permanent deformation of .0002 inch per inch of roller diameter and are not the ABMA basic capacity.



“DT” Double Acting Thrust

The “DT” type thrust bearing is a double acting thrust bearing that will withstand reversal in the direction of the load at normal speeds of rotation. The center thrust plate and sleeve must be keyed to the shaft or clamped tightly between the shaft shoulders to prevent rotation of the center plate relative to the shaft. The two outer thrust plates are stationary with respect to the housing. There are two roller assemblies on either side of the center thrust plate. The center plate drives the roller assembly corresponding to the direction of the thrust load.



“DAT” Aligning, Double Acting Thrust

This bearing is basically a combination of the “DT” type and the “AT” type. The bearing is designed to take reversals in thrust load and correct for initial static misalignment up to 3°.

Types and Styles continued

"SDT" Simplified Double Acting Thrust

This bearing is similar in concept to the "DT" double acting type except the design has been simplified to only one roller assembly and two thrust plates. With the load in one direction, one of the thrust plates is stationary with respect to the housing and the other thrust plate rotates. When the direction of the load is reversed, the stationary plate rotates and the rotating plate becomes the stationary plate.

To provide necessary clearance for this action, the inner and outer spacer sleeves are made wider than the combined thickness of the thrust plates and roller assembly. This bearing is recommended for applications where the direction of the thrust load changes when the bearing is stationary or rotating at slow speed.

ROLLWAY® *Cylindrical Thrust Bearings*

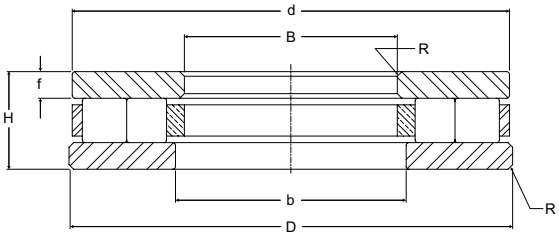
Basic Construction Type: Standard Cylindrical Roller Thrust Or Aligning Type Bearing

Rolling Elements: Crowned Cylindrical Rollers With Sphered Ends

Bearing Material: Through Hardened Or Case Carburized Bearing Grade Steel

Series: Medium Duty (600), Heavy Duty (700), Or Metric

Retainer Types: Machined Brass With Steel Retaining Ring



Cylindrical Roller Thrust Bearings

Part No.	B	D	H	b	d	f	R	Bearing Weight	C	Co
	Bore	Outside Diameter	Height	Internal Dimensions			Housing & Shaft Fillet		Basic Dynamic Rating	Basic Static Rating
	inch mm	inch mm	inch mm	inch mm	inch mm	inch mm	inch mm	lb kg	lb/N	lb/N
T601	1.000 25.40	2.125 53.98	0.812 20.62	1.130 28.70	2.000 50.80	.220 5.59	.031 .79	.5 .2	10,550 47,260	18,760 84,040
T602	1.062 26.97	2.125 53.98	0.812 20.62	1.130 28.70	2.000 50.80	.220 5.59	.031 .79	.5 .2	10,550 47,260	18,760 84,040
T603	1.125 28.58	2.250 57.15	0.812 20.62	1.250 31.75	2.150 54.61	.220 5.59	.031 .79	.6 .3	12,140 54,390	25,540 114,420
T604	1.187 30.15	2.250 57.15	0.812 20.62	1.250 31.75	2.150 54.61	.220 5.59	.031 .79	.6 .3	12,140 54,390	25,540 114,420
T605	1.250 31.75	2.375 60.33	0.812 20.62	1.430 36.32	2.310 58.67	.220 5.59	.031 .79	.6 .3	13,280 59,490	28,380 127,140
T606	1.312 33.32	2.375 60.33	0.812 20.62	1.430 36.32	2.310 58.67	.220 5.59	.031 .79	.6 .3	13,280 59,490	28,380 127,140
T607	1.375 34.93	2.875 73.03	0.812 20.62	1.630 41.40	2.790 70.87	.220 5.59	.031 .79	1.0 .4	17,470 78,270	47,800 214,140
T608	1.437 36.50	2.875 73.03	0.812 20.62	1.630 41.40	2.790 70.87	.220 5.59	.031 .79	1.0 .4	17,470 78,270	47,800 214,140
T609	1.500 38.10	3.000 76.20	0.812 20.62	1.750 44.45	2.900 73.66	.220 5.59	.031 .79	1.0 .4	18,730 83,910	52,140 233,590
T610	1.562 39.67	3.000 76.20	0.812 20.62	1.750 44.45	2.900 73.66	.220 5.59	.031 .79	1.0 .4	18,730 83,910	52,140 233,590
T611	1.625 41.28	3.250 82.55	1.000 25.40	1.880 47.75	3.150 80.01	.250 6.35	.062 1.57	1.5 .7	25,620 114,780	67,380 301,860
T612	1.687 42.85	3.250 82.55	1.000 25.40	1.880 47.75	3.150 80.01	.250 6.35	.062 1.57	1.5 .7	25,620 114,780	67,380 301,860
T613	1.750 44.45	3.375 85.73	1.000 25.40	2.030 51.56	3.300 83.82	.250 6.35	.062 1.57	1.6 .7	27,670 123,960	74,120 332,060
T614	1.812 46.02	3.375 85.73	1.000 25.40	2.030 51.56	3.300 83.82	.250 6.35	.062 1.57	1.6 .7	27,670 123,960	74,120 332,060
T615	1.875 47.63	3.500 88.90	1.000 25.40	2.130 54.10	3.410 86.61	.250 6.35	.062 1.57	1.7 .8	27,760 124,360	74,120 332,060
T616	1.937 49.20	3.500 88.90	1.000 25.40	2.130 54.10	3.410 86.61	.250 6.35	.062 1.57	1.6 .7	27,760 124,360	74,120 332,060
T617	2.000 50.80	3.625 92.08	1.000 25.40	2.190 55.63	3.500 88.90	.250 6.35	.062 1.57	1.7 .8	27,870 124,860	74,120 332,060
T618	2.125 53.98	3.750 95.25	1.000 25.40	2.380 60.45	3.650 92.71	.250 6.35	.062 1.57	1.8 .8	28,740 128,760	80,850 362,210
T619	2.250 57.15	3.875 98.43	1.000 25.40	2.440 61.98	3.750 95.25	.250 6.35	.062 1.57	1.9 .9	32,030 143,490	87,590 392,400

Metric dimensions for reference only.
For tolerances see pages F-41 to F-42.
Not all parts are available from stock. Please contact customer service for availability (800) 626-2120.
For more information on bearing capabilities outside of our standard offering, please contact Application Engineering (800) 626-2093.

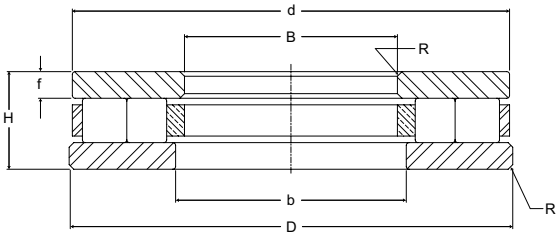
Basic Construction Type: Standard Cylindrical Roller Thrust Or Aligning Type Bearing

Rolling Elements: Crowned Cylindrical Rollers With Sphered Ends

Bearing Material: Through Hardened Or Case Carburized Bearing Grade Steel

Series: Medium Duty (600), Heavy Duty (700), Or Metric

Retainer Types: Machined Brass With Steel Retaining Ring



Cylindrical Roller Thrust Bearings

Part No.	B	D	H	b	d	f	R	Bearing Weight	C	Co
	Bore	Outside Diameter	Height	Internal Dimensions			Housing & Shaft Fillet		Basic Dynamic Rating	Basic Static Rating
	inch mm	inch mm	inch mm	inch mm	inch mm	inch mm	inch mm	lb kg	lb/N	lb/N
T620	2.375 60.33	4.000 101.60	1.000 25.40	2.630 66.80	3.900 99.06	.250 6.35	.062 1.57	2.0 .9	32,250 144,480	87,590 392,400
T621	2.500 63.50	4.125 104.78	1.000 25.40	2.670 67.82	4.000 101.60	.250 6.35	.062 1.57	2.1 1.0	34,180 153,130	94,330 422,600
T622	2.625 66.68	4.343 110.31	1.000 25.40	2.880 73.15	4.220 107.19	.250 6.35	.062 1.57	2.3 1.0	36,150 161,950	101,070 452,790
T623	2.750 69.85	4.468 113.49	1.000 25.40	3.060 77.72	4.340 110.24	.250 6.35	.062 1.57	2.4 1.1	38,350 171,810	107,800 482,940
T624	3.000 76.20	4.718 119.84	1.000 25.40	3.250 82.55	4.590 116.59	.250 6.35	.062 1.57	2.6 1.2	40,510 181,480	114,540 513,140
T625	3.250 82.55	4.968 126.19	1.000 25.40	3.500 88.90	4.840 122.94	.250 6.35	.062 1.57	2.7 1.2	40,770 182,650	114,540 513,140
T626	3.500 88.90	5.218 132.54	1.000 25.40	3.750 95.25	5.090 129.29	.250 6.35	.062 1.57	2.9 1.3	44,350 198,690	128,020 573,530
T727	2.000 50.80	6.000 152.40	1.375 34.93	2.250 57.15	5.880 149.35	.380 9.65	.062 1.57	8.6 3.9	77,500 347,200	295,900 1,325,630
T728	2.000 50.80	7.000 177.80	1.375 34.93	2.250 57.15	6.880 174.75	.380 9.65	.062 1.57	11.7 5.3	105,600 473,090	363,600 1,628,930
T729	2.000 50.80	8.000 203.20	1.375 34.93	2.250 57.15	7.880 200.15	.380 9.65	.062 1.57	16.0 7.3	111,900 501,310	460,200 2,061,700
T730	3.000 76.20	6.000 152.40	1.375 34.93	3.250 82.55	5.880 149.35	.380 9.65	.062 1.57	7.3 3.3	82,200 368,260	268,000 1,200,640
T731	3.000 76.20	7.000 177.80	1.375 34.93	3.250 82.55	6.880 174.75	.380 9.65	.062 1.57	10.8 4.9	98,800 442,620	365,800 1,638,780
T732	3.000 76.20	8.000 203.20	1.375 34.93	3.250 82.55	7.880 200.15	.380 9.65	.062 1.57	14.7 6.7	126,200 565,380	494,500 2,215,360
T733	3.000 76.20	9.000 228.60	1.375 34.93	3.250 82.55	8.880 225.55	.380 9.65	.062 1.57	19.2 8.7	147,500 660,800	642,800 2,879,740
T734	4.000 101.60	7.000 177.80	1.750 44.45	4.250 107.95	6.880 174.75	.500 12.70	.062 1.57	11.4 5.2	111,100 497,730	320,500 1,435,840
T735	4.000 101.60	8.000 203.20	1.750 44.45	4.250 107.95	7.880 200.15	.500 12.70	.062 1.57	16.6 7.6	132,200 592,260	454,200 2,034,820
T736	4.000 101.60	9.000 228.60	1.750 44.45	4.250 107.95	8.880 225.55	.500 12.70	.062 1.57	22.4 10.2	158,400 709,630	658,100 2,948,290
T737	4.000 101.60	10.000 254.00	1.750 44.45	4.250 107.95	9.880 250.95	.500 12.70	.062 1.57	29.0 13.2	192,200 861,060	777,800 3,484,540

ROLLWAY® *Cylindrical Thrust Bearings*

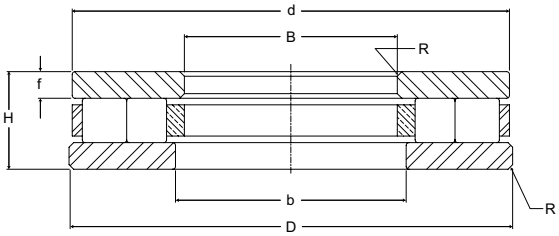
Basic Construction Type: Standard Cylindrical Roller Thrust Or Aligning Type Bearing

Rolling Elements: Crowned Cylindrical Rollers With Sphered Ends

Bearing Material: Through Hardened Or Case Carburized Bearing Grade Steel

Series: Medium Duty (600), Heavy Duty (700), Or Metric

Retainer Types: Machined Brass With Steel Retaining Ring



Cylindrical Roller Thrust Bearings (continued)

Part No.	B	D	H	b	d	f	R	Bearing Weight	C	Co
	Bore	Outside Diameter	Height	Internal Dimensions			Housing & Shaft Fillet		Basic Dynamic Rating	Basic Static Rating
	inch mm	inch mm	inch mm	inch mm	inch mm	inch mm	inch mm	lb kg	lb/N	lb/N
T738	5.000 127.00	8.000 203.20	1.750 44.45	5.250 133.35	7.880 200.15	.500 12.70	.062 1.57	13.5 6.1	111,000 497,280	419,400 1,878,910
T739	5.000 127.00	9.000 228.60	1.750 44.45	5.250 133.35	8.880 225.55	.500 12.70	.062 1.57	19.5 8.8	162,000 725,760	631,800 2,830,460
T740	5.000 127.00	10.000 254.00	2.000 50.80	5.250 133.35	9.880 250.95	.560 14.22	.125 3.18	30.0 13.6	205,100 918,850	703,300 3,150,780
T741	5.000 127.00	11.000 279.40	2.000 50.80	5.250 133.35	10.880 276.35	.560 14.22	.125 3.18	38.0 17.2	231,200 1,035,780	870,900 3,901,630
T742	5.000 127.00	12.000 304.80	2.000 50.80	5.250 133.35	11.880 301.75	.560 14.22	.125 3.18	47.0 21.3	276,100 1,236,930	1,144,000 5,125,120
T743	6.000 152.40	9.000 228.60	2.000 50.80	6.380 162.05	8.750 222.25	.560 14.22	.125 3.18	18.0 8.1	130,600 585,090	450,100 2,016,450
T744	6.000 152.40	10.000 254.00	2.000 50.80	6.380 162.05	9.750 247.65	.560 14.22	.125 3.18	25.0 11.3	190,300 852,540	648,600 2,905,730
T745	6.000 152.40	11.000 279.40	2.000 50.80	6.380 162.05	10.750 273.05	.560 14.22	.125 3.18	34.0 15.4	233,400 1,045,630	929,900 4,165,950
T746	6.000 152.40	12.000 304.80	2.000 50.80	6.380 162.05	11.750 298.45	.560 14.22	.125 3.18	42.0 19.1	267,000 1,196,160	1,097,100 4,915,010
T747	7.000 177.80	10.000 254.00	2.000 50.80	7.380 187.45	9.750 247.65	.560 14.22	.125 3.18	20.0 4.1	154,500 692,160	550,100 2,464,450
T748	7.000 177.80	11.000 279.40	2.000 50.80	7.380 187.45	10.750 273.05	.560 14.22	.125 3.18	28.0 12.7	213,600 956,930	790,800 3,542,780
T749	7.000 177.80	12.000 304.80	2.000 50.80	7.380 187.45	11.750 298.45	.560 14.22	.125 3.18	40.0 18.1	251,600 1,127,170	1,022,900 4,582,590
T750	7.000 177.80	14.000 355.60	3.000 76.20	7.380 187.45	13.750 349.25	.880 22.35	.250 6.35	88.0 39.9	436,200 1,954,180	1,598,200 7,159,940
T751	8.000 203.20	12.000 304.80	3.000 76.20	8.380 212.85	11.750 298.45	.880 22.35	.250 6.35	48.0 21.7	258,000 1,155,840	945,400 4,235,390
T752	7.000 177.80	14.000 355.60	3.000 76.20	8.380 212.85	13.750 349.25	.880 22.35	.250 6.35	78.0 35.4	397,500 1,780,800	1,487,900 6,665,790
T753	7.000 177.80	16.000 406.40	3.000 76.20	8.380 212.85	15.750 400.05	.880 22.35	.250 6.35	114.0 51.7	516,400 2,313,470	2,072,500 9,284,800
T754	10.000 254.00	16.000 406.40	3.000 76.20	10.380 263.65	15.750 400.05	.880 22.35	.250 6.35	88.0 39.9	437,800 1,961,340	1,747,200 7,827,460
T755	10.000 254.00	18.000 457.20	3.750 95.25	10.380 263.65	17.750 450.85	1.130 28.70	.250 6.35	168.0 76.2	614,200 2,751,620	2,697,600 12,085,250
T756	10.000 254.00	20.000 508.00	3.750 95.25	10.380 263.65	19.750 501.65	1.130 28.70	.250 6.35	225.0 102.1	766,000 3,431,680	3,250,900 14,564,030

Metric dimensions for reference only.
Not all parts are available from stock. Please contact customer service for availability (800) 626-2120.
For more information on bearing capabilities outside of our standard offering, please contact Application Engineering (800) 626-2093.

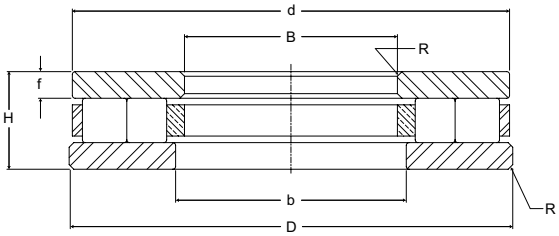
Basic Construction Type: Standard Cylindrical Roller Thrust Or Aligning Type Bearing

Rolling Elements: Crowned Cylindrical Rollers With Sphered Ends

Bearing Material: Through Hardened Or Case Carburized Bearing Grade Steel

Series: Medium Duty (600), Heavy Duty (700), Or Metric

Retainer Types: Centrifugally Cast Brass



Cylindrical Roller Thrust Bearings (continued)

Part No.	B	D	H	b	d	f	R	Bearing Weight	C	Co
	Bore	Outside Diameter	Height	Internal Dimensions			Housing & Shaft Fillet		Basic Dynamic Rating	Basic Static Rating
	inch mm	inch mm	inch mm	inch mm	inch mm	inch mm	inch mm	lb kg	lb/N	lb/N
T757	12.000 304.80	18.000 457.20	3.750 95.25	12.500 317.50	17.750 450.85	1.130 28.70	.250 6.35	134.0 60.8	469,200 2,102,020	2,031,900 9,102,910
T758	12.000 304.80	20.000 508.00	4.500 114.30	12.500 317.50	19.750 501.65	1.380 35.05	.250 6.35	222.0 100.0	724,600 3,246,210	2,937,800 13,161,340
T759	12.000 304.80	24.000 609.60	4.500 114.30	12.500 317.50	23.750 603.25	1.380 35.05	.250 6.35	372.0 168.7	1,045,900 4,685,630	4,688,000 21,002,240
T760	14.000 355.60	20.000 508.00	3.750 95.25	14.500 368.30	19.750 501.65	1.130 28.70	.250 6.35	152.0 68.9	540,000 2,419,200	2,385,200 10,685,700
T761	14.000 355.60	22.000 558.80	3.750 95.25	14.500 368.30	21.750 552.45	1.130 28.70	.250 6.35	215.0 97.5	732,000 3,279,360	3,339,900 14,962,750
T762	14.000 355.60	24.000 609.60	3.750 95.25	14.500 368.30	23.750 603.25	1.130 28.70	.250 6.35	285.0 129.2	858,100 3,844,290	4,280,300 19,175,740
T763	16.000 406.40	22.000 558.80	4.500 114.30	16.500 419.10	21.500 546.10	1.380 35.05	.250 6.35	205.0 92.9	609,800 2,731,900	2,362,800 10,585,340
T764	16.000 406.40	24.000 609.60	4.500 114.30	16.500 419.10	23.500 596.90	1.380 35.05	.250 6.35	290.0 131.5	878,700 3,936,580	3,819,100 17,109,570
T765	16.000 406.40	26.000 660.40	4.500 114.30	16.500 419.10	25.500 647.70	1.380 35.05	.250 6.35	238.0 107.9	1,041,500 4,665,920	4,916,300 22,025,020
T766	18.000 457.20	26.000 660.40	5.000 127.00	18.750 476.25	25.500 647.70	1.500 38.10	.250 6.35	350.0 158.7	945,500 4,235,840	3,937,500 17,640,000
T767	18.000 457.20	28.000 711.20	5.000 127.00	18.750 476.25	27.500 698.50	1.500 38.10	.250 6.35	460.0 208.6	1,571,600 7,040,770	5,393,500 24,162,880
T768	18.000 457.20	30.000 762.00	5.500 139.70	18.750 476.25	29.500 749.30	1.500 38.10	.250 6.35	630.0 285.7	1,571,600 7,040,770	6,753,800 30,257,020
T769	20.000 508.00	28.000 711.20	5.500 139.70	21.250 539.75	27.500 698.50	1.500 38.10	.250 6.35	420.0 190.5	1,091,700 4,890,820	4,407,200 19,744,260
T770	20.000 508.00	30.000 762.00	5.500 139.70	21.250 539.75	29.500 749.30	1.500 38.10	.250 6.35	550.0 249.5	1,544,800 6,920,700	6,885,500 30,847,040
T771	20.000 508.00	32.000 812.80	6.000 152.40	21.250 539.75	31.500 800.10	1.750 44.45	.250 6.35	750.0 340.2	1,712,000 7,669,760	7,850,000 35,168,000
T772	22.000 558.80	30.000 762.00	5.500 139.70	23.250 590.55	29.500 749.30	1.500 38.10	.250 6.35	450.0 204.1	1,161,900 5,205,310	4,774,500 21,389,760
T773	22.000 558.80	32.000 812.80	5.500 139.70	23.250 590.55	31.500 800.10	1.500 38.10	.250 6.35	590.0 267.6	1,431,000 6,410,880	6,153,200 27,566,340
T744	22.000 558.80	34.000 863.60	6.000 152.40	23.250 590.55	33.500 850.90	1.750 44.45	.250 6.35	800.0 362.8	1,742,200 7,805,060	7,981,700 35,758,020

ROLLWAY® *Cylindrical Thrust Bearings*

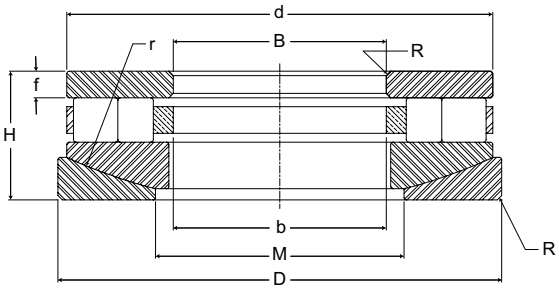
Basic Construction Type: Standard Cylindrical Roller Thrust Or Aligning Type Bearing

Rolling Elements: Crowned Cylindrical Rollers With Sphered Ends

Bearing Material: Through Hardened Or Case Carburized Bearing Grade Steel

Series: Medium Duty (600), Heavy Duty (700), Or Metric

Retainer Types: Machined Brass With Steel Retaining Ring



Self Aligning Cylindrical Roller Thrust Bearings

Part No.	B	D	H	b	d	f	m	f	R	Bearing Weight	C	Co
	Bore	Outside Diameter	Height	Internal Dimensions					Housing & Shaft Fillet		Basic Dynamic Rating	Basic Static Rating
	inch mm	inch mm	inch mm	inch mm	inch mm	inch mm	inch mm	inch mm	inch mm	lb kg	lb/N	lb/N
AT601	1.000 25.40	2.250 57.15	1.062 26.97	1.130 28.70	2.000 50.80	.220 5.59	1.310 33.27	1.500 38.10	.031 .79	.7 .3	10,550 47,260	18,760 84,040
AT602	1.062 26.97	2.250 57.15	1.062 26.97	1.130 28.70	2.000 50.80	.220 5.59	1.310 33.27	1.500 38.10	.031 .79	.7 .3	10,550 47,260	18,760 84,040
AT603	1.125 28.58	2.375 60.33	1.062 26.97	1.250 31.75	2.150 54.61	.220 5.59	1.440 36.58	1.750 44.45	.031 .79	.8 .4	12,140 54,390	25,540 114,420
AT604	1.187 30.15	2.375 60.33	1.062 26.97	1.250 31.75	2.150 54.61	.220 5.59	1.440 36.58	1.750 44.45	.031 .79	.70 .3	12,140 54,390	25,540 114,420
AT605	1.250 31.75	2.500 63.50	1.062 26.97	1.380 35.05	2.310 58.67	.220 5.59	1.500 38.10	1.875 47.63	.031 .79	.8 .4	13,280 59,490	28,380 127,140
AT606	1.312 33.32	2.500 63.50	1.062 26.97	1.380 35.05	2.310 58.67	.220 5.59	1.630 41.40	1.875 47.63	.031 .79	.8 .4	13,280 59,490	28,380 127,140
AT607	1.375 34.93	3.000 76.20	1.062 26.97	1.500 38.10	2.790 70.87	.220 5.59	1.810 45.97	2.750 69.85	.031 .79	1.3 .6	17,470 78,270	47,800 214,140
AT608	1.437 36.50	3.000 76.20	1.062 26.97	1.500 38.10	2.790 70.87	.220 5.59	1.810 45.97	2.750 69.85	.031 .79	1.3 .6	17,470 78,270	47,800 214,140
AT609	1.500 38.10	3.125 79.38	1.062 26.97	1.630 41.40	2.900 73.66	.220 5.59	1.880 47.75	3.000 76.20	.031 .79	1.4 .6	18,730 83,910	52,140 233,590
AT610	1.562 39.67	3.125 79.38	1.062 26.97	1.630 41.40	2.900 73.66	.220 5.59	1.880 47.75	3.000 76.20	.031 .79	1.4 .6	18,730 83,910	52,140 233,590
AT611	1.625 41.28	3.375 85.73	1.312 33.32	1.750 44.45	3.150 80.01	.250 6.35	2.000 50.80	3.000 76.20	.062 1.57	2 .9	25,620 114,780	67,380 301,860
AT612	1.687 42.85	3.375 85.73	1.312 33.32	1.750 44.45	3.150 80.01	.250 6.35	2.000 50.80	3.000 76.20	.062 1.57	2 .9	25,620 114,780	67,380 301,860
AT613	1.750 44.45	3.500 88.90	1.312 33.32	1.880 47.75	3.300 83.82	.250 6.35	2.060 52.32	3.250 82.55	.062 1.57	2 .9	27,670 123,960	74,120 332,060
AT614	1.812 46.02	3.500 88.90	1.312 33.32	1.880 47.75	3.300 83.82	.250 6.35	2.060 52.32	3.250 82.55	.062 1.57	2 .9	27,670 123,960	74,120 332,060
AT615	1.875 47.63	3.625 92.08	1.312 33.32	2.000 50.80	3.410 86.61	.250 6.35	2.250 57.15	3.250 82.55	.062 1.57	2.2 1.0	27,760 124,360	74,120 332,060
AT616	1.937 49.20	3.625 92.08	1.312 33.32	2.000 50.80	3.410 86.61	.250 6.35	2.250 57.15	3.250 82.55	.062 1.57	2.2 1.0	27,760 124,360	74,120 332,060
AT617	2.000 50.80	3.750 95.25	1.312 33.32	2.060 52.32	3.500 88.90	.250 6.35	2.480 62.99	3.250 82.55	.062 1.57	2.3 1.0	27,870 124,860	74,120 332,060
AT618	2.125 53.98	3.875 98.43	1.312 33.32	2.190 55.63	3.650 92.71	.250 6.35	2.500 63.50	3.500 88.90	.062 1.57	2.3 1.0	28,740 128,760	80,850 362,210
AT619	2.250 57.15	4.000 101.60	1.312 33.32	2.310 58.67	3.750 95.25	.250 6.35	2.690 68.33	3.500 88.90	.062 1.57	2.5 1.1	32,030 143,490	87,590 392,400

Metric dimensions for reference only.
Not all parts are available from stock. Please contact customer service for availability (800) 626-2120.
For more information on bearing capabilities outside of our standard offering, please contact Application Engineering (800) 626-2093.

Thrust Bearing Engineering see page F-44.

For more information on bearing capabilities outside of our standard offering, please contact Application Engineering (800) 626-2093.

Load Ratings and Life

Life Calculations

The L10 (rating) life for any given application and bearing selection can be calculated in terms of millions of revolutions by using the bearing Basic Dynamic Rating and applied thrust load. The L10 life for any given application can be calculated in terms of hours, using the bearing Basic Dynamic Rating, applied load and suitable speed factors, by the following equation:

For thrust cylindrical roller and thrust tapered roller bearings:

$$L_{10} = \left(\frac{C}{P}\right)^{10/3} x \frac{1{,}000{,}000}{60 \times n} = \left(\frac{C}{P}\right)^{10/3} x \frac{16667}{n}$$

Where:

L_{10} = The # of hours that 90% of identical bearings under ideal conditions will operate at a specific speed and condition before fatigue is expected to occur.

C = Basic Dynamic Rating (lbs) 1,000,000 Revolutions

P = Constant Equivalent Load (lbs)

n = Speed (RPM)

Additionally, the ABMA provides application factors for all types of bearings which need to be considered to determine an adjusted Rated Life (Lna). L10 life rating is based on laboratory conditions yet other factors are encountered in actual bearing application that will reduce bearing life. Lna life rating takes into account reliability factors, material type, and operating conditions.

$$L_{na} = a_1 \times a_2 \times a_3 \times L_{10}$$

Where:

L_{na} = Adjusted Rated Life.

a_1 = Reliability Factor. Adjustment factor applied where estimated fatigue life is based on reliability other than 90% (See Table No 1).

a_2 = Material Factor. Life adjustment for bearing race material. Regal Power Transmission Solutions bearing races are manufactured from bearing quality steel. Therefore the a_2 factor is 1.0.

Table No. 1 Life Adjustment Factor for Reliability

Reliability %	L_{na}	a_1
90	L10	1
95	L5	0.62
96	L4	0.53
97	L3	0.44
98	L2	0.33
99	L1	0.21
50	L50	5

a_3 = Life Adjustment Factor for Operating Conditions. This factor should take into account the adequacy of lubricant, presence of foreign matter, conditions causing changes in material properties, and unusual loading or mounting conditions. Assuming a properly selected and mounted bearing having adequate seals and lubricant operating below 250°F and tight fitted to the shaft, the a3 factor should be 1.0.

Load Ratings and Life Continued

Vibration and shock loading can act as an additional loading to the steady expected applied load. When shock or vibration is present, an a3 Life Adjustment Factor can be applied. Shock loading has many variables which often are not easily determined. Typically, it is best to rely on one's experience with the particular application. Consult Application Engineering for assistance with applications involving shock or vibration loading.

The a3 factor takes into account a wide range of application and mounting conditions as well as bearing features and design. Accurate determination of this factor is normally achieved through testing and in-field experience. Regal Power Transmission Solutions offers a wide range of options which can maximize bearing performance. Consult Application Engineering for more information.

Variable Load Formula

Root mean load (RML) is to be used when a number of varying loads are applied to a bearing for varying time limits. Maximum loading still must be considered for bearing size selection.

$$RML^{*} = \sqrt[10/3]{\frac{(L_1^{10/3} N_1) + (L_2^{10/3} N_2) + (L_3^{10/3} N_3)}{100}}$$

Where:
RML = Root Mean Load (lbs.)
L_1, L_2, etc. = Load in pounds
N_1, N_2, etc. = Percent of total time operated at loads L_1, L_2, etc.

* Apply RML to rating at mean speed to determine resultant life.

Mean Speed Formula

The following formula is to be used when operating speed varies over time.

$$\text{Mean Speed} = \frac{S_1N_1 + S_2N_2 + S_3N_3}{100}$$

S_1S_2, etc = Speeds in RPM
N_1N_2, etc = Percentage of total time operated at speeds S_1S_2, etc

Load Ratings and Life Continued

Bearing Life In Oscillating Applications

The equivalent rotative speed (ERS) is used in life calculations when the bearing does not make complete revolutions during operation. The ERS is then used as the bearing operating speed in the calculation of the L10 (Rating) Life. The formula is based on sufficient angular rotation to have roller paths overlap.

ERS = Equivalent Rotative Speed

N = Total number of degrees per minute through which the bearing will rotate.

$$ERS = \frac{N}{360}$$

In the above formula, allowance is made for the total number of stress applications on the weakest race per unit time, which, in turn, determines fatigue life and the speed factors. The theory behind fretting corrosion is best explained by the fact that the rolling elements in small angles of oscillation retrace a path over an unchanging area of the inner or outer races where the lubricant is prevented by inertia from flowing in behind the roller as the bearing oscillates in one direction. Upon reversal, this small area of rolling contact is traversed by the same roller in the dry state. The friction of the two unlubricated surfaces causes fretting corrosion and produces failures which are unpredictable from a normal life standpoint.

With a given bearing selected for an oscillating application, the best lubrication means is a light mineral oil under positive flow conditions. With a light oil, there is a tendency for all areas in the bearing load zone to be immersed in lubricant at all times. The full flow lubrication dictates that any oxidized material which may form is immediately carried away by the lubricant, and since these oxides are abrasive, further wear tends to be avoided. If grease lubrication must be used, it is best to consult with either the bearing manufacturer or the lubricant manufacturer to determine the best possible type of lubricant. Greases have been compounded to resist the detrimental effect of fretting corrosion for such applications.

Static Load Rating

The “static load rating” for rolling element bearings is that uniformly distributed static radial load acting on a non-rotating bearing, which produces a contact stress of 580,000 psi (roller bearings) or 630,000 psi (ball bearings) at the center of the most heavily loaded rolling element. At this stress level, plastic deformation begins to be significant. Experience has shown that the plastic deformation at this stress level can be tolerated in most bearing applications without impairment of subsequent bearing operation. In certain applications where subsequent rotation of the bearing is slow and where smoothness and friction requirements are not too exacting, a higher static load limit can be tolerated. Where extreme smoothness is required or friction requirements are critical, a lower static load limit may be necessary.

Minimum Bearing Load

Skidding, or sliding, of the rolling elements on the raceway instead of a true rolling motion can cause excessive wear. Applications with high speeds and light loading are particularly prone to skidding. As a general guideline, rolling element bearings should be radially loaded at least 2% of Basic Dynamic Rating. For applications where load is light relative to the bearings dynamic load rating, consult Application Engineering for assistance.

Thrust Engineering Section

Rollway cylindrical roller thrust bearings are designed to support thrust loads (loads parallel to the axis of rotation) at relatively high speeds. Cylindrical roller thrust bearings are relatively stiff, require a minimum amount of axial space, and handle shock loading relatively well. Rollway manufactures four different styles of cylindrical roller thrust bearings:

1. Single Acting – Supports thrust or axial load in one direction.
2. Aligning – Accepts an initial static misalignment of nor more than 3 degrees.
3. Double Acting – Supports thrust or axial load in two directions.
4. Crane Hook Thrust – A shielded cylindrical roller thrust bearing that supports thrust or axial load in one direction.

Rollway tapered thrust bearings (TTHD and TTVF) are engineered for applications that contain high thrust loads and heavy shock loads. These bearings feature tapered or conical rollers positioned between two plates with tapered raceways. The tapered thrust bearing allows for true rolling motion with the vertex of the conical sections intersecting the bearing axis. The large end of each tapered roller is spherically ground. When the bearing is under load, this curvature guides the rollers accurately. The large spherical end of the roller is counterbored to improve lubrication between the roller and guide rib. By virtue of the additional contact surface, these bearings will have a higher dynamic rating than a similar sized cylindrical roller thrust bearing. Furthermore, they have superior performance in horizontal shaft applications. The self-centering action of the rollers counteract the gravitational effect of the roller assembly reducing the effects of the roller assembly contacting the shaft.

The tapered thrust bearings of the TTVF style are similar to the TTHD tapered thrust style except one thrust plate is flat. The guide rib on the one tapered raceway resists the induced radial force component caused by the inclined plane while the flat plate allows radial displacement without adversely affecting bearing operation. Maximum capacity is achieved through close spacing of the rollers through the use of a steel, hardened pin type retainer.

Rollway tandem thrust bearings, also referred to as multi-stage thrust bearings, were originally designed and patented by Rollway. The bearing consists of a series of thrust plates and roller assemblies with compression sleeves separating the stages. The design of the bearing sleeves and precision match grinding of the components allow the load to be equally applied through the stages of the bearing.

The tandem design allows the use of a high capacity bearing in a small area. Popular applications for this bearing type are rotary swivels, single screw extruders, and twin screw extruders. The tandem bearing allows for the increased output of machines without increasing the size of the gearbox. Rollway manufactures tandem bearings in two, three, four, six, and eight stages. Both inch and metric series sizes are available. Bore sizes range from about 1 to 22 inches with corresponding outside diameter ranging from 3.5 to 42 inches. Rollway tandem thrust bearings are supplied to original equipment manufacturers and the aftermarket.

Operating Conditions Factor

The life of a bearing is dependent on the operating conditions of the application. Lubrication, effects of the external environment, shaft and housing geometry and mounting, all have an effect on the actual bearing life. To determine a more realistic life calculation, the Operating Conditions Factor (F) can be included into the L_{10} life equation. The actual values determination will be based on experience of the designer and the expected operating conditions.

Using the Operating Conditions Factor (F) in the life equation, L_{10} life in hours now becomes:

$$L_{10} = F \times \left[\left(\frac{C}{P} \right)^{3.33} \times \frac{16667}{n} \right]$$

Thrust Engineering Section continued

Proper selection of the F factor demands intimate knowledge of the application. Where little is known of the application, it is recommended that F = 1 be selected. As a guide in selecting a realistic value for F, Rollway suggests use of the following, cumulative, individual sub-factors, f, to arrive at the over-all factor, F, thus:

$F = f_1 X f_2 X f_3 X f_4 .....$

The table below defines the application parameters and values recommended for derivation of the individual sub-factors.

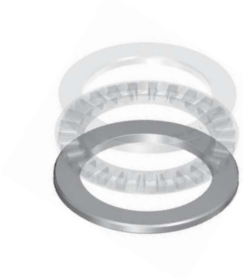
Thrust Bearing Factors

Factor	Application Condition	Factor Estimates	
		Poor	Excellent
f_1	Lubricant viscosity suitability @ bearing operating temperature (see Lubrication)	.5	1.0
f_2	External environment and provisions for isolation	.5	1.0
f_3	Operational conditions of shaft and housing squareness & rigidity	.5	1.0
f_4	Bearing thrust plate backing system full backing vs partial backing	.5	1.0

Cylindrical Roller Thrust Shaft Plate

The bore of the shaft plate is precision ground for a line to loose fit on in relation to the shaft outside diameter. The shaft plate outside diameter has a turned finish and is smaller than the housing plate's outside diameter. The plate is made from either through-hardened or carburizing grade steel with hardness to Rockwell (Rc) 58-63. Upon request we can manufacture these components from either CEVM or VIMVAR grades of material or M- 50 tool steel for high temperature applications.

All thrust plates are accurately ground for flatness and parallelism of the roller riding and backing surfaces. The roller contacting surfaces of the plates are superfinished to provide for long life. Locating diameters are ground to obtain an accurate fit on the shaft.

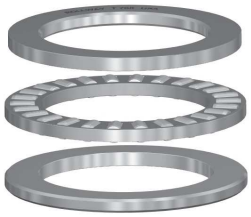


Cylindrical Roller Thrust Housing Plate

The outside diameter of the housing plate is precision ground for a line to loose fit in housing bore. The inside diameter has a turned finish and is larger than the shaft plate's inside diameter. The plate is made from either through-hardened or carburizing grade steel with hardness to Rockwell (Rc) 58-63. Upon request we can manufacture these components from either CEVM or VIMVAR grades of material or M- 50 tool steel for high temperature applications.

All thrust plates are accurately ground for flatness and parallelism of the roller riding and backing surfaces. The roller contacting surfaces of the plates are superfinished to provide for long life. Locating diameters are ground to obtain an accurate fit in the housing.

Thrust Engineering Section continued



Cylindrical Roller Thrust Roller Assembly

The roller assembly contains a machined brass roller-riding cage. Rollway thrust bearing retainers are machined from centrifugally cast brass. The retainers for all cylindrical roller thrust bearings are designed to be roller riding. The contoured roller pockets are accurately machined at right angles to the thrust force, which will be applied to the bearing. The rollers are retained in the assembly by a steel ring pinned to the outside diameter of the retainer.

The rollers in the roller assembly are matched to have outside diameters within .0001 inches. It should be noted that the Rollway design has a sphered roller end, which rides against the steel retaining ring for reduced wear. (The center of the contact point has zero velocity vs. the higher velocity that results from a flat ended roller contacting the ring.) The rollers used in cylindrical thrust roller bearings are also crowned. For the benefits of crowning please refer to page F-9.

Tapered Thrust Bearing Plates

The tapered thrust plates and rollers are made from carburizing grade steel surface hardened to HRc 58 minimum. Other material grades such as CEVM or VIMVAR are available upon request. All thrust plates are accurately ground for flatness and parallelism of the roller riding and backing surfaces. Locating plate diameters are surface ground to obtain an accurate fit on the shaft or in the housing. The tapered roller contacting surfaces are ground to ensure satisfactory bearing operating life.

Tapered Thrust Bearing Rollers

The tapered rolling elements are precision ground to provide an even load over the contact surfaces. The rollers are crowned for optimum stress patterns. The large end of the rollers are spherically ground providing controlled contact between the rollers and the guide rib.

Tapered Thrust Bearing Retainer

The tapered thrust bearing retainers are of two designs. The first design is a machined retainer from a single piece of centrifugally cast brass. The second design is a two-piece retainer made from hardened steel rings.

Tolerances

Rollway thrust bearings are produced to standard tolerances as listed in the following tables. Thrust bearings are available to increased accuracy upon request. Cylindrical roller thrust bearings contain rollers having a diameter variation of .0001 inches maximum per bearing.

Thrust Engineering Section continued

600 Series, Single Direction, Flat Seats

Bore Diameter		Bore Tolerance		Height Tolerance	
over	incl	high (+)	low (-)	high (+)	low (-)
inch mm	inch mm	inch mm	inch mm	inch mm	inch mm
0.0000 0.0000	1.1870 30.1498	0.0000 0.0000	0.0005 0.0127	0.0000 0.0000	0.0060 0.1524
1.1870 30.1498	1.3750 34.9250	0.0000 0.0000	0.0006 0.0152	0.0000 0.0000	0.0060 0.1524
1.3750 34.9250	1.5620 39.6748	0.0000 0.0000	0.0007 0.0178	0.0000 0.0000	0.0060 0.1524
1.5620 39.6748	1.7500 44.4500	0.0000 0.0000	0.0008 0.0203	0.0000 0.0000	0.0060 0.1524
1.7500 44.4500	1.9370 49.1998	0.0000 0.0000	0.0009 0.0229	0.0000 0.0000	0.0060 0.1524
1.9370 49.1998	2.0000 50.8000	0.0000 0.0000	0.0010 0.0254	0.0000 0.0000	0.0060 0.1524
2.0000 50.8000	2.1250 53.9750	0.0000 0.0000	0.0010 0.0254	0.0000 0.0000	0.0080 0.2032
2.1250 53.9750	2.5000 63.5000	0.0000 0.0000	0.0011 0.0279	0.0000 0.0000	0.0080 0.2032
2.5000 63.5000	3.0000 76.2000	0.0000 0.0000	0.0012 0.0305	0.0000 0.0000	0.0080 0.2032
3.0000 76.2000	3.5000 88.9000	0.0000 0.0000	0.0013 0.0330	0.0000 0.0000	0.0100 0.2540

Outside Diameter		Outside Diameter Tolerance	
over	incl	high (+)	low (-)
inch mm	inch mm	inch mm	inch mm
0.0000 0.0000	2.8750 73.0250	0.0005 0.0127	0.0000 0.0000
2.8750 73.0250	3.3750 85.7250	0.0007 0.0178	0.0000 0.0000
3.3750 85.7250	3.7500 95.2500	0.0009 0.0229	0.0000 0.0000
3.7500 95.2500	4.1250 104.7750	0.0011 0.0279	0.0000 0.0000
4.1250 104.7750	4.7180 119.8372	0.0013 0.0330	0.0000 0.0000
4.7180 119.8372	5.0000 127.0000	0.0015 0.0381	0.0000 0.0000

Thrust Engineering Section continued

600 Series, Single Direction, Aligning Seat With Aligning Washers

Bore Diameter		Bore Tolerance		Height Tolerance	
over	incl	high (+)	low (-)	high (+)	low (-)
inch mm	inch mm	inch mm	inch mm	inch mm	inch mm
0.0000 0.0000	1.1870 30.1498	0.0000 0.0000	0.0005 0.0127	0.0000 0.0000	0.0060 0.1524
1.1870 30.1498	1.3750 34.9250	0.0000 0.0000	0.0006 0.0152	0.0000 0.0000	0.0060 0.1524
1.3750 34.9250	1.5620 39.6748	0.0000 0.0000	0.0007 0.0178	0.0000 0.0000	0.0060 0.1524
1.5620 39.6748	1.7500 44.4500	0.0000 0.0000	0.0008 0.0203	0.0000 0.0000	0.0060 0.1524
1.7500 44.4500	1.9370 49.1998	0.0000 0.0000	0.0009 0.0229	0.0000 0.0000	0.0060 0.1524
1.9370 49.1998	2.0000 50.8000	0.0000 0.0000	0.0010 0.0254	0.0000 0.0000	0.0060 0.1524
2.0000 50.8000	2.1250 53.9750	0.0000 0.0000	0.0010 0.0254	0.0000 0.0000	0.0080 0.2032
2.1250 53.9750	2.5000 63.5000	0.0000 0.0000	0.0011 0.0279	0.0000 0.0000	0.0080 0.2032
2.5000 63.5000	3.0000 76.2000	0.0000 0.0000	0.0012 0.0305	0.0000 0.0000	0.0080 0.2032
3.0000 76.2000	3.5000 88.9000	0.0000 0.0000	0.0013 0.0330	0.0000 0.0000	0.0100 0.2540

Outside Diameter		Outside Diameter Tolerance	
over	incl	high (+)	low (-)
inch mm	inch mm	inch mm	inch mm
0.0000 0.0000	3.0000 76.2000	0.0007 0.0178	0.0000 0.0000
3.0000 76.2000	3.3750 85.7250	0.0009 0.0229	0.0000 0.0000
3.3750 85.7250	3.6250 92.0750	0.0011 0.0279	0.0000 0.0000
3.6250 92.0750	3.8750 98.4250	0.0013 0.0330	0.0000 0.0000
3.8750 98.4250	4.5312 115.0925	0.0015 0.0381	0.0000 0.0000
4.5312 115.0925	5.0000 127.0000	0.0017 0.0432	0.0000 0.0000

Thrust Engineering Section continued

700 Series, Single Direction, Flat Seats

Bore Diameter		Bore Tolerance		Height Tolerance	
over	incl	high (+)	low (-)	high (+)	low (-)
inch mm	inch mm	inch mm	inch mm	inch mm	inch mm
2.0000 50.8000	3.0000 76.2000	0.0000 0.0000	0.0010 0.0254	0.0000 0.0000	0.0080 0.2032
3.0000 76.2000	3.5000 88.9000	0.0000 0.0000	0.0012 0.0305	0.0000 0.0000	0.0100 0.2540
3.5000 88.9000	6.0000 152.4000	0.0000 0.0000	0.0015 0.0381	0.0000 0.0000	0.0100 0.2540
6.0000 152.4000	9.0000 228.6000	0.0000 0.0000	0.0015 0.0381	0.0000 0.0000	0.0150 0.3810
9.0000 228.6000	10.0000 254.0000	0.0000 0.0000	0.0018 0.0457	0.0000 0.0000	0.0150 0.3810
10.0000 254.0000	12.0000 304.8000	0.0000 0.0000	0.0018 0.0457	0.0000 0.0000	0.0200 0.5080
12.0000 304.8000	18.0000 457.2000	0.0000 0.0000	0.0020 0.0508	0.0000 0.0000	0.0200 0.5080
18.0000 457.2000	22.0000 558.8000	0.0000 0.0000	0.0025 0.0635	0.0000 0.0000	0.0250 0.6350
22.0000 558.8000	30.0000 762.0000	0.0000 0.0000	0.0030 0.0762	0.0000 0.0000	0.0250 0.6350

Outside Diameter		Outside Diameter Tolerance	
over	incl	high (+)	low (-)
inch mm	inch mm	inch mm	inch mm
5.0000 127.0000	10.0000 254.0000	0.0015 0.0381	0.0000 0.0000
10.0000 254.0000	18.0000 457.2000	0.0020 0.0508	0.0000 0.0000
18.0000 457.2000	26.0000 660.4000	0.0025 0.0635	0.0000 0.0000
26.0000 660.4000	34.0000 863.6000	0.0030 0.0762	0.0000 0.0000
34.0000 863.6000	44.0000 1,117.6000	0.0040 0.1016	0.0000 0.0000

Thrust Engineering Section continued

700 Series, Single Direction, Aligning Seat With Aligning Washers

Bore Diameter		Bore Tolerance		Height Tolerance	
over	incl	high (+)	low (-)	high (+)	low (-)
inch mm	inch mm	inch mm	inch mm	inch mm	inch mm
2.0000 50.8000	3.0000 76.2000	0.0000 0.0000	0.0010 0.0254	0.0000 0.0000	0.0100 0.2540
3.0000 76.2000	3.5000 88.9000	0.0000 0.0000	0.0012 0.0305	0.0000 0.0000	0.0150 0.3810
3.5000 88.9000	6.0000 152.4000	0.0000 0.0000	0.0015 0.0381	0.0000 0.0000	0.0150 0.3810
6.0000 152.4000	9.0000 228.6000	0.0000 0.0000	0.0015 0.0381	0.0000 0.0000	0.0200 0.5080
9.0000 228.6000	10.0000 254.0000	0.0000 0.0000	0.0018 0.0457	0.0000 0.0000	0.0200 0.5080
10.0000 254.0000	12.0000 304.8000	0.0000 0.0000	0.0018 0.0457	0.0000 0.0000	0.0250 0.6350
12.0000 304.8000	18.0000 457.2000	0.0000 0.0000	0.0020 0.0508	0.0000 0.0000	0.0250 0.6350
18.0000 457.2000	22.0000 558.8000	0.0000 0.0000	0.0025 0.0635	0.0000 0.0000	0.0300 0.7620

Outside Diameter		Outside Diameter Tolerance	
over	incl	high (+)	low (-)
inch mm	inch mm	inch mm	inch mm
5.0000 127.0000	10.0000 254.0000	0.0019 0.0483	0.0000 0.0000
10.0000 254.0000	18.0000 457.2000	0.0021 0.0533	0.0000 0.0000
18.0000 457.2000	26.0000 660.4000	0.0023 0.0584	0.0000 0.0000
26.0000 660.4000	34.0000 863.6000	0.0025 0.0635	0.0000 0.0000
34.0000 863.6000	44.0000 1,117.6000	0.0030 0.0762	0.0000 0.0000

Thrust Engineering Section continued

Crane Hook

Bore Diameter		Bore Tolerance		Height Tolerance	
over	incl	high (+)	low (-)	high (+)	low (-)
inch mm	inch mm	inch mm	inch mm	inch mm	inch mm
0.0000 0.0000	2.0156 51.1962	0.0100 0.2540	0.0000 0.0000	0.0000 0.0000	0.0080 0.2032
2.0156 51.1962	3.0156 76.5962	0.0100 0.2540	0.0020 0.0508	0.0000 0.0000	0.0100 0.2540
3.0156 76.5962	6.0156 152.7962	0.0150 0.3810	0.0020 0.0508	0.0000 0.0000	0.0150 0.3810
6.0156 152.7962	10.1560 257.9624	0.0150 0.3810	0.0050 0.1270	0.0000 0.0000	0.0200 0.5080

Outside Diameter		Outside Diameter Tolerance	
over	incl	high (+)	low (-)
inch mm	inch mm	inch mm	inch mm
2.5000 63.5000	4.0000 101.6000	0.0050 0.1270	0.0050 0.1270
4.0000 101.6000	6.0000 152.4000	0.0060 0.1524	0.0060 0.1524
6.0000 152.4000	10.0000 254.0000	0.0100 0.2540	0.0100 0.2540
10.0000 254.0000	34.0000 863.6000	0.0120 0.3048	0.0120 0.3048

Thrust Engineering Section continued

Tapered Roller Thrust

Bore Diameter		Bore Tolerance		Height Tolerance	
over	incl	high (+)	low (-)	high (+)	low (-)
inch mm	inch mm	inch mm	inch mm	inch mm	inch mm
0.0000 0.0000	12.0000 304.8000	0.0010 0.0254	0.0000 0.0000	0.0150 0.3810	0.0150 0.3810
12.0000 304.8000	24.0000 609.6000	0.0020 0.0508	0.0000 0.0000	0.0150 0.3810	0.0150 0.3810
24.0000 609.6000	36.0000 914.4000	0.0030 0.0762	0.0000 0.0000	0.0150 0.3810	0.0150 0.3810
36.0000 914.4000	48.0000 1,219.2000	0.0040 0.1016	0.0000 0.0000	0.0150 0.3810	0.0150 0.3810

Outside Diameter		Outside Diameter Tolerance	
over	incl	high (+)	low (-)
inch mm	inch mm	inch mm	inch mm
0.0000 0.0000	12.0000 304.8000	0.0010 0.0254	0.0000 0.0000
12.0000 304.8000	24.0000 609.6000	0.0020 0.0508	0.0000 0.0000
24.0000 609.6000	36.0000 914.4000	0.0030 0.0762	0.0000 0.0000
36.0000 914.4000	48.0000 1,219.2000	0.0040 0.1016	0.0000 0.0000

Thrust Engineering Section continued

Thrust Bearing Mounting

Suitable tolerances for the shaft and housings of the 600 and 700 series thrust bearings and the tapered thrust bearings are listed in the following tables. These tolerances will provide satisfactory radial guidance for the cylindrical and/or tapered thrust bearings. For further information on bearing mounting and installation, refer to page F-56 of this catalog

Cylindrical Thrust
Thrust Bearing Mounting Practice – Shaft and Housing Fits

Bearing		Shaft Diameter Deviation	
Bore Diameter		from Bore Diameter (-)	
over	incl	high	low
inch mm	inch mm	inch mm	inch mm
0.0000 0.0000	1.1250 28.5750	0.0005 0.0127	0.0015 0.0381
1.1250 28.5750	1.3125 33.3375	0.0006 0.0152	0.0016 0.0406
1.3125 33.3375	1.5000 38.1000	0.0007 0.0178	0.0017 0.0432
1.5000 38.1000	1.6875 42.8625	0.0008 0.0203	0.0018 0.0457
1.6875 42.8625	1.8750 47.6250	0.0009 0.0229	0.0019 0.0483
1.8750 47.6250	2.1250 53.9750	0.0010 0.0254	0.0020 0.0508
2.1250 53.9750	2.5000 63.5000	0.0011 0.0279	0.0021 0.0533
2.5000 63.5000	3.0000 76.2000	0.0012 0.0305	0.0022 0.0559
3.0000 76.2000	3.5000 88.9000	0.0013 0.0330	0.0023 0.0584
3.5000 88.9000	7.0000 177.8000	0.0015 0.0381	0.0025 0.0635
7.0000 177.8000	9.0000 228.6000	0.0015 0.0381	0.0030 0.0762
9.0000 228.6000	12.0000 304.8000	0.0018 0.0457	0.0033 0.0838
12.0000 304.8000	15.0000 381.0000	0.0020 0.0508	0.0035 0.0889
15.0000 381.0000	19.0000 482.6000	0.0020 0.0508	0.0040 0.1016
19.0000 482.6000	23.0000 584.2000	0.0025 0.0635	0.0045 0.1143
23.0000 584.2000	30.0000 762.0000	0.0030 0.0762	0.0055 0.1397

Thrust Engineering Section continued

Cylindrical Thrust
Thrust Bearing Mounting Practice – Shaft and Housing Fits continued

Bearing		Housing Diameter Deviation	
Outside Diameter		from Outside Diameter (+)	
over	incl	high	low
inch mm	inch mm	inch mm	inch mm
2.0000 50.8000	2.3750 60.3250	0.0015 0.0381	0.0005 0.0127
2.3750 60.3250	3.2500 82.5500	0.0017 0.0432	0.0007 0.0178
3.2500 82.5500	3.6875 93.6625	0.0019 0.0483	0.0009 0.0229
3.6875 93.6625	4.0000 101.6000	0.0021 0.0533	0.0011 0.0279
4.0000 101.6000	4.5312 115.0925	0.0028 0.0711	0.0013 0.0330
4.5312 115.0925	10.0000 254.0000	0.0030 0.0762	0.0015 0.0381
10.0000 254.0000	18.0000 457.2000	0.0040 0.1016	0.0020 0.0508
18.0000 457.2000	22.0000 558.8000	0.0050 0.1270	0.0025 0.0635
22.0000 558.8000	26.0000 660.4000	0.0055 0.1397	0.0025 0.0635
26.0000 660.4000	28.0000 711.2000	0.0060 0.1524	0.0030 0.0762
28.0000 711.2000	34.0000 863.6000	0.0070 0.1778	0.0030 0.0762
34.0000 863.6000	38.0000 965.2000	0.0080 0.2032	0.0035 0.0889
38.0000 965.2000	44.0000 1,117.6000	0.0090 0.2286	0.0040 0.1016

Thrust Engineering Section continued

Tapered Thrust

Thrust Bearing Mounting Practice – Shaft and Housing Fits

Bearing		Spring Loaded Shaft Diameter Deviation	
Bore Diameter		from Bore Diameter (-)	
over	incl	high	low
inch mm	inch mm	inch mm	inch mm
0.0000 0.0000	6.8750 174.6250	0.0000 0.0000	0.0010 0.0254
6.8750 174.6250	7.9999 203.1975	0.0000 0.0000	0.0010 0.0254
7.9999 203.1975	12.0000 304.8000	0.0000 0.0000	0.0015 0.0381
12.0000 304.8000	24.0000 609.6000	0.0000 0.0000	0.0020 0.0508
24.0000 609.6000	36.0000 914.4000	0.0000 0.0000	0.0025 0.0635
36.0000 914.4000	48.0000 1,219.2000	0.0000 0.0000	0.0030 0.0762

Bearing		Housing Diameter Deviation	
Outside Diameter		from Outside Diameter (+)	
over	incl	high	low
inch mm	inch mm	inch mm	inch mm
0.0000 0.0000	10.5000 266.7000	0.0025 0.0635	0.0010 0.0254
10.5000 266.7000	13.0000 330.2000	0.0030 0.0762	0.0010 0.0254
13.0000 330.2000	20.0000 508.0000	0.0040 0.1016	0.0020 0.0508
20.0000 508.0000	25.0000 635.0000	0.0045 0.1143	0.0020 0.0508
25.0000 635.0000	30.0000 762.0000	0.0060 0.1524	0.0030 0.0762
30.0000 762.0000	35.0000 889.0000	0.0070 0.1778	0.0030 0.0762

Thrust Engineering Section continued

When mounting thrust bearings, there exists the possibility of a slight press fit due to the acceptable tolerances of the bearing bore and outside diameters. Under no circumstances should a press fit exceeding the limits shown be used with the thrust plates, as any expansion or contraction in the plates due to fit could result in a misalignment in the plates and subsequent limited bearing life.

Cylindrical and tapered roller thrust bearings require the support surfaces in the housing and the shaft to be at right angles to the shaft axis within .0005 inch per inch of diameter. For example, a four inch diameter shaft should be square to the shaft shoulder within .002 inches. The support surfaces should also provide for continuous support for the bearing thrust plates across the extent of the raceways. As a general rule, the minimum shaft shoulder and maximum housing shoulder should be as follows:

- Shaft shoulder at a minimum should be equal to the outside diameter of the shaft plate.
- Housing shoulder must have a maximum diameter to not exceed the inside diameter of the housing plate.

The tapered thrust bearing plates are manufactured with the same inside diameter and outside diameter on both plates. Applications using these bearings must be designed with ample clearance between the outside diameter of the shaft plate and the housing. Clearance must also be designed between the inside diameter of the housing plate and the shaft. It is recommended to provide for clearances of approximately .030 inches.

Tandem thrust bearings are designed to allow for the use of minimal shaft and housing shoulders. The cantilevering action of the thrust plates use of compression sleeves enable these bearings to be used effectively where only minimal shaft and housing shoulders exist.

Tandem Thrust Bearing Minimum Load

Tandem thrust bearings are designed to be used in horizontal shaft applications such as an extruder gear drive, and it is essential that a sufficient thrust load is applied to prevent roller skid. The minimum load required for tandem thrust bearings is expressed as a ratio of the bearing's dynamic rating (C) to the applied load (P). For ideal bearing operation, the C/P ratio should be less than 8. Bearing loads creating a C/P ratio greater than 12 must be avoided.

Lubrication

The required viscosity for the lubricant on cylindrical thrust bearings is 125 SSU at operating temperature. The required viscosity for the lubricant on tapered thrust bearings is 160 SSU at operating temperature. The required viscosity for the lubricant on tandem thrust bearings is 160 SSU at operating temperature. For further information in regards to thrust bearing lubrication please refer to page A-17 of this catalog.