At Moline, our goal is to provide you with the most reliable products, helpful service, and expert support. We work to make our application guides clear and easy to understand. But if you have further questions, please contact us. 800.242.4633

LUBRICATION - VARIOUS OPERATIONS

Normal Operation

Your Moline bearing has been greased at the factory and is ready to install and run. When establishing a re-lubrication schedule, note that a small amount of grease at frequent intervals is preferable to a large amount of grease at infrequent intervals. Table 2 below is a general guide for Lubrication. It should be noted that certain conditions may require a change of lubricating periods as dictated by experience.

High Speed Operation

At higher operating speeds, too much grease may cause overheating. In these cases, the amount of lubrication can only be determined by experience. If excess grease in the bearing causes overheating, it will be necessary to remove grease fitting and run for 10 minutes. This will allow excess grease to escape. Then wipe off excess grease and replace grease fitting.

Operating Temperatures

Normal temperature may range from "cool or warm to the touch" up to a point of "too hot to touch for more than a few seconds," depending on the bearing size, speed and surrounding conditions. Abnormal bearing temperature may indicate faulty lubrication practices. Unusually high temperature accompanied by excessive leakage of grease indicates too much grease. High temperature with no grease showing at the seals, particularly if the bearing is noisy, usually indicates too little grease. Normal temperature and a slight showing of grease at the seals indicate proper lubrication.

Special Operating Conditions

Refer acid, chemical, extreme or other special operating conditions to the factory.

LUBRICATION INSTRUCTIONS

Moline bearings have been lubricated at the factory with No. 2 consistency lithium base grease that is suitable for normal operating applications. Many ordinary cup greases will disintegrate at speeds far below those at which Moline bearings will operate successfully if proper grease is used. Relubricate with lithium base grease or a grease that is compatible with original lubricant and suitable for roller bearing service. It should be noted that when re-lubricating, adding a small amount of grease on a frequent basis is preferable to a large amount of grease infrequently. In unusual cases consult the factory or a reputable grease supplier.

Storage or Special Shutdown

If equipment will be idle for some time, before shutting down, add grease to the bearing, rotating the sleeve to distribute grease. If possible, cover the bearing to protect from dust and other contaminants. This will ensure protection of the bearing, particularly when exposed to severe environmental conditions. After lengthy storage, add a small amount of fresh grease before running.

TABLE 2 - LUBRICATION CHART

HOURS RUN PER DAY	SUGGESTED LUBRICATION PERIOD IN WEEKS							
	1 TO 250 RPM	251 TO 500 RPM	501 TO 750 RPM	751 TO 1000 RPM	1001 TO 1500 RPM	1501 TO 2000 RPM	2001 TO 2500 RPM	2501 TO 3000 RPM
8	12	12	10	7	5	4	3	2
16	12	7	5	4	2	2	2	1
24	12	5	3	2	1	1	1	1

Read Operations and Lubrication sections above before establishing lubrication schedule.

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Moline spherical bearings have the capacity to carry substantial radial loads, thrust loads or a combined radial and thrust load. The maximum load that can be applied is limited by the various components in the system, and the life requirements listed in this catalog. The factory should be consulted on any application that exceeds the recommendations in the catalog.

MOUNTING INSTRUCTIONS

It is critical to the performance of the bearing that it be mounted properly. Failure to follow proper mounting practice may result in reduced bearing life.

INSTALLATION

ME2000 Non-Expansion Bearing Applications

1. Clean shaft and bore of bearing. The shaft should be straight, free of burrs and nicks, and the correct size.
2. Lubricate shaft and bearing bore with grease or oil to facilitate assembly. Slip bearing into position. When light press fit is required, press against the end of the inner ring of bearing. Do not strike or exert pressure on the housing or seals.
3. Bolt bearing to support, using shims where necessary to align bearing so inner ring does not rub on housing bore. Use full shims which cover across the entire housing base.
4. Determine final shaft position and hand tighten screws in the locking collar(s) of non-expansion bearing firmly onto the shaft, while the other bearings remain free. If possible, rotate the shaft slowly under load to properly center the rolling elements with respect to the raceways. Tighten set screws alternately in small increments to the torque value specified in Table below. To ensure full locking of the inner race to the shaft, after 24 hours of operation the setscrews should be retightened to the original torque value below.

SHAFT SIZE		SET SCREW SIZE	TORQUE IN – LBS
IN	MM		
1 7/16 – 2 1/4	40 – 55	3/8 – 24	290
2 7/16 – 3 1/2	60 – 90	1/2 – 20	620
3 11/16 – 5	100 – 130	5/8 – 18	1325

5. Check rotation. If there is any strain, irregular rotational torque or vibration, it could be due to incorrect alignment, bent shaft or bent supports. Installation should be rechecked and correction made where necessary.

ME2000 Expansion Bearing Applications

1. Clean shaft and bore of bearing. The shaft should be straight, free of burrs and nicks, and the correct size.
2. Lubricate shaft and bearing bore with grease or oil to facilitate assembly. Slip bearing into position. When light press fit is required, press against the end of the inner ring of bearing. Do not strike or exert pressure on the housing or seals.
3. Position expansion bearing in the housing. For normal expansion conditions, the bearing insert should be positioned in the center of the housing. To center bearing insert in housing, move bearing insert to extreme position (-.100" on all expansion units) and mark shaft. Then using bearing maximums total expansion table, move bearing insert in opposite direction one-half the total expansion to center bearing in the housing. If maximum expansion is required, move bearing insert to the extreme position in the housing to permit full movement in direction of expansion. After the expansion bearing has been positioned in the housing, tighten the set screws in the locking collar securely to the shaft to the recommended torque.
4. Check rotation. If there is any strain, irregular rotational torque or vibration, it could be due to incorrect alignment, bent shaft or bent supports. Installation should be rechecked and correction made where necessary.

Bearing Maximum Total Expansion

All Expansion Units have - .100" Capacity
Misalignment Capacity = +/- 1½°

SPECIAL OPERATING CONDITIONS

Refer acid, chemical, extreme or other special operating conditions to the Moline Bearing Company.

Select a bearing from the ME2000 load-rating chart on page 100 having a radial load rating at the operating speed equal to or greater than the calculated Equivalent Radial Load for a desired L10 life. This simple method is all that is necessary for most general applications and provides for occasional shock loads.

L10 Hours of Life - Is the life that may be expected from at least 90% of a given group of bearings operated under identical conditions. The average life (L50) will be approximately five times the L10 life. To determine the L10 hours of life for loads and RPM's not listed, use the following equation.

$$L_{10} = \left(\frac{C}{P}\right)^{10/3} \times \frac{16667}{RPM}$$

Where: C= Dynamic Capacity (See Table below)
P= Equivalent Radial Load

If the load on a double row spherical bearing is only in a radial direction (no axial load), the Equivalent Radial Load (P) is equal to the actual radial load. In situations where the bearing load consists of radial and thrust loads, the total load must be converted into an Equivalent Radial Load by the equation:

$$P = XF_R + YF_A$$

Where:
FA = Axial (thrust) Load – see page 99 for maximum
FR= Radial Load
X= Radial Load Factor
(page 99)
Y= Thrust Load Factor
(page 99)

To find the X and Y values, first calculate FA/FR. Then use the ME2000 Thrust Factors and Seal Speeds table on the following page to determine the appropriate values for X and Y. Substitute all known values into the Equivalent Radial Load equation.

For longer L10 hours other than 30,000 hours and not shown, multiply the Equivalent Radial Load by one of the following factors: for 20,000 L10 hours life, use a factor of .87; for 40,000 L10 hours of live, use 1.25; and for 80,000 L10 hours of live, use 1.38.

In applications that have heavy shock loads, frequent shock or severe vibrations, add up to 50% to the Equivalent Radial Load to obtain a modified Equivalent Radial Load. The amount of load added is relative to the severity of the application. Additional assistance can be obtained by consulting with the factory.

The shaft tolerances noted in the chart below are sufficient for normal applications. As noted in the following, "Thrust Factors and Seal Speeds" table on the following page 99, extremely heavy radial loads may require a light to snug press fit onto the shaft.

SHAFT SIZE		SHAFT TOLERANCES
IN	MM	
1 7/16 – 1 1/2	40 – 50	Plus .0000" to minus .0005"
1 11/16 – 4	55 – 100	Plus .0000" to minus .0010"
4 7/16 – 5	110 – 130	Plus .0000" to minus .0015"

The magnitude and direction of both the thrust and radial load must be taken into account when selecting the housing. When pillow blocks are used, heavy loads should be directed through the base. If the bearing must be used in a situation where the load pulls the housing away from the mounting base, both the hold down bolts and housing must be of adequate strength. Auxiliary load carrying devices such as shear bars are advisable for side or end loading of pillow blocks and radial loads for flange units.

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ME2000 Thrust Factors and Seal Speeds

SHAFT SIZE	e	LIGHT THRUST IF FA/FR≤E		HEAVY THRUST IF FA/FR≥E		LOAD RATING		SEAL SPEED LIMITS			MAXIMUM SLIP FIT RADIAL LOAD FR**
		X	Y	X	Y	DYNAMIC C LBS.	STATIC C_0 LBS.	CONTACT TRIPLE LIP RPM	LABYRINTH RPM	GARTER SPRING RPM	
1 7/16 - 1 1/2	.28	1.0	2.4	.67	3.6	16600	18300	2800	5300	1700	2000
1 11/16 - 1 3/4 40mm 45mm	.26	1.0	2.6	.67	3.9	17300	19800	2650	4700	1600	2100
1 15/16 - 2 50mm	.24	1.0	2.8	.67	4.2	19000	22500	2400	4250	1450	2300
2 3/16 - 2 1/4 55mm	.23	1.0	2.9	.67	4.3	22400	26500	2150	3800	1300	2700
2 7/16 - 2 1/2 60mm 65mm	.24	1.0	2.8	.67	4.2	33300	41100	1800	3250	1100	4000
2 11/16 - 3 70mm 75mm	.22	1.0	3.1	.67	4.6	34500	46800	1600	2800	950	4200
3 3/16 - 3 1/2 80mm 85mm 90mm	.23	1.0	2.9	.67	4.3	56900	76400	1300	2200	800	6800
3 11/16 - 4 100mm	.24	1.0	2.8	.67	4.2	69900	93300	1200	2000	700	8400
4 7/16 - 4 1/2 110mm 115mm	.25	1.0	2.7	.67	4.1	91700	126000	1150	1400	700	11000
4 15/16 - 5 125mm 130mm	.26	1.0	2.6	.67	3.9	123000	180000	900	1150	700	14800

* Comparing Spherical to Tapered Roller Bearings—The dynamic capacity C (Spherical) and C90 (Tapered) are not the same base. To compare basic dynamic capacities, multiply C x .259 and compare to C90.

** If load exceeds maximum allowable slip fit radial load, snug to light press fit of shaft is required. For applications that exceed the load ratings above, please contact the factory for assistance. For load requirements higher than those stated above, please contact the factory.