MOUNTED BALL BEARING APPLICATION GUIDE

MOUNTING INSTRUCTIONS

Proper mounting of ball bearing units is critical to unit performance. Failure to follow accepted mounting practice may result in poor performance and short bearing life.

Good engineering and design practice does not recommend the application of more than two bearings to support any shaft. Where more than two bearings are used to support the same shaft, it is possible to induce heavy bearing overloads. In these cases, extreme care must be taken to line up bearings in both the vertical and horizontal planes. When the recommended two bearings are used, alignment is not as critical. Moline Bearing self-aligning mounted bearing units will compensate for minor differences in mounting structure.

For best results, use turned and ground shafts that are free of rough spots and burrs. If an old shaft is used, mount bearing units on a relatively smooth and unworn section.

Prior to mounting, clean both the shaft and the bearing bore. Coat the shaft with a small amount of oil. Slide the bearing unit on the shaft. Do not hammer the ends of the inner race. If necessary to apply some force in mounting, use a soft metal bar or pipe against the inner race only. Tap the bearing unit into place.

Tighten the two set screws securely to lock the bearing to the shaft. In applications where the bearing is subjected to heavy vibration, shock loads, or heavy thrust loads, then it may be desirable to file the shaft flat or drill the shaft slightly in the area where the set screws will contact.

MAXIMUM SPEED

The maximum speed limits listed for the ball bearings can be found in the load rating table. These numbers should be used as a guide and considered along with other factors affecting bearing operation. Load characteristics, bearing lubrication, and temperature factors all influence bearing operation. It is possible that cataloged speed limits may be exceeded after factory engineers complete a complete application analysis.

LUBRICATION

The proper lubrication of ball bearing units is critical in order to attain maximum bearing life expectancy. Moline ball bearing units need to be lubricated prior to use. They should be re-lubricated periodically, depending on the environment the bearing is exposed to. The following table can be used as a general guide. Experience will determine the best interval for each specific application.

Lubrication Guide

OPERATING CONDITIONS	BEARING TEMPERATURES	GREASE INTERVAL
Clean	32°F to 120°F 120°F to 150°F 150°F to 200°F	6–12 Months 1–3 Months 1–4 Weeks
Dirty	32°F to 150°F 150°F to 200°F	1–4 Weeks Daily–1 Week
Moisture	32°F to 200°F	Daily–1 Week

The amount and type of lubricant used will affect bearing life. Lack of lubricant can lead to premature surface fatigue failures of balls and races. Over lubrication can damage seals and result in premature failure from contamination due to the inability of damaged seals to keep foreign material out of the bearing.

When lubricating bearings add grease slowly while the shaft is rotating. When the first sign of grease appears at the seals, the bearing will contain the correct amount of lubricant.

Bearings should not run in steady operation over 200°F and should not exceed 225°F for intermittent operation.

For unusual lubrication requirements or severe duty applications, contact Moline Bearing engineering for recommendations.

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MOLINE BEARING Co

BEARING SELECTION

Selection of the proper Moline bearing unit for a determined speed and load can be made by referring to the load rating tables. Proper selection is made by finding a bearing having the desired bore size which has a load rating equal to or greater than the radial or equivalent radial load required for the application.

The ratings shown in the rating tables are based on an average bearing life of 2500 hours. Average bearing life is approximately 5 times L10 life and is the life which may be expected from 50% or more of a given group of bearings operating under identical load conditions. Life expectancies for other than 2,500 hours average life may be determined by using the rating modification factors listed.

BEARING LOADS

Radial loads and thrust force in combination are the principal load components of bearing applied loads. Moline ball bearing unit ratings are based upon the radial load capacity of the bearing. For applications where bearings are required to absorb thrust loads in addition to normal radial loads, the following considerations must be made concerning the magnitude of the thrust force.

When thrust loads are less than half the radial load, the equivalent load should be considered to be the same as the radial load. If the thrust load is equal to or greater than ½ the radial load, the equivalent load is determined by adding the two loads together. For thrust loads equal to or greater than the radial load, consult the factory.

EXAMPLE 1: RADIAL LOAD SERVICE LIFE

Select a mounted bearing flange block to meet the following application requirements.

a. Shaft diameter of 1 inch

b. Shaft speed is 1500 RPM

c. Radial load requirement is 300 lbs.

d. Average life requirement is 5000 hours

From the rating table located on the previous page, locate the series bearing corresponding to a one-inch shaft diameter and follow that line to the 1500 RPM column. The load capacity in this case is 860 lbs. These published radial load capacities are based on an average life of 2,500 hours and must be modified to suit the application requirement 5,000 hours average life by using the proper multiplier from the chart below. Calculate the equivalent radial load capacity for 5,000 hours average life expectancy as follows:

860 lbs. radial capacity
x .794 5,000 hours avg. life factor
683 lbs. radial capacity
for 5,000 hours avg. life

EXAMPLE 2: COMBINATION RADIAL AND THRUST LOAD REQUIREMENT

Select a mounted pillow block to meet the following specifications.

a. Shaft diameter of 1 3⁄16

b. A Combination load is applied consisting of

Radial Load of 400 lbs.

Thrust Load is 250 lbs.

c. Shaft speed is 1000 RPM

d. The average life requirement is 2,500 hours

From the load rating table on the previous page, locate the line with the series bearing corresponding to 1 3⁄16 inch shaft size and follow this line to the right to the 1000 RPM column. The radial load capacity for the bearing is 1389 lbs.

Since the application average life is what the catalog rating charts are based on there's no need to apply further modification factors.

Because the applied thrust load of 250 lbs. is more than half of the applied radial load of 400 lbs., these loads must be added together to obtain the equivalent load requirement.

Equivalent load:
400 lbs. + 250 lbs. = 650 lbs.

The equivalent radial requirement of 650 lbs. is less than the rated capacity, so the bearing size desired can be used.