AURORA BEARING COMPANY...

Manufacturer and worldwide supplier of the highest quality rod ends and spherical bearings - *anywhere!*

General Information

In 1971 a new company entered the rod end and spherical bearing marketplace. This new firm, Aurora Bearing Company, soon became a major force in the rod end industry.

Known primarily for a high quality product and a strong commitment to customer service, the firm dramatically increased its market coverage and now serves nearly every industry and aerospace market. These markets include among others: textile and packaging machinery, machine tools, business machines, recreation and exercise equipment, agricultural and off highway vehicles, commercial transportation and high performance racing vehicles as well as military equipment and commercial air and space craft.

Over the years, Aurora Bearing has retained its original business philosophy of furnishing a high quality product at competitive prices. In addition, the company's initial goals of providing prompt delivery and furnishing service with a personal touch have been rigidly maintained.

Aurora Bearing offers a complete line of standard rod end and spherical bearings. We also design and manufacture special bearings to meet a variety of applications that require custom engineered units or special materials.

Now marketing products worldwide, Aurora Bearing fields a very competent sales force that is available to assist and provide you with a practical and sound solution to rod end and spherical bearing application problems and challenges.

Product Information-Engineering Data

ROD ENDS

Aurora Bearing Company rod ends are manufactured utilizing two construction styles. They are of the two or three-piece type. Both are made with the solid, or one-piece, race construction method and feature the advantages of metal-to-metal contact between bearing components. (PTFE to metal interface may also be incorporated when specified).

The standard two-piece style consists of a body and precision ground oil impregnated sintered steel ball. This type of construction allows the rod end body to carry a greater radial static load and the oil-impregnated ball is self-lubricating under normal operating conditions. This unit also offers greater misalignment capabilities. A variety of materials and plating options for the component parts in this series are available. Any cold-formable steel in stainless and alloy steel categories can be specified for the body, and all hardenable alloys such as 52100 and 440C stainless steel may be employed as options for the ball component.

The three-piece style consists of a body, ball and race. This type of unit, offering fully swaged bearing construction, features the advantages of maximum spherical conformity between the ball and race. It also offers flexibility in that many different types of materials can be interchanged in each component part, providing combinations that can be tailored to meet just about any application requirement.

Consult our engineering department for materials to fit your special application. Materials used in the standard catalog items are outlined on the appropriate detail page.

SPHERICAL BEARINGS

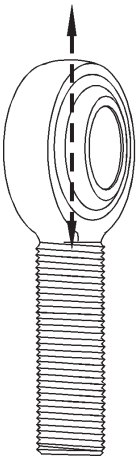
These bearings incorporate the single piece race type construction, also providing excellent ball-to-race conformity. They can be re-lubricated through an annular groove in the outer race with two interconnecting holes positioned at 180 degrees. Various metals may also be substituted in these types of units to meet special requirements. Recommended housing bores are given on pages 47-49.

PTFE LINED ROD ENDS AND SPHERICAL BEARINGS

PTFE (bonded coated PTFE liner) lined races are available in all three-piece bearing units and all spherical bearings. The steel race has a self-lubricating liner; a PTFE impregnated woven fabric, chemically bonded to the inner diameter of the race. Aurora Bearing offers two major liner style options: both are maintenance free and offer improved frictional characteristics.

AT1700 is supplied as the standard liner in all except the military specification bearings. It is designed primarily to satisfy the demands of the commercial/industrial market as well as most high performance applications. This liner can be used in temperatures ranging from -65° to +250° F.

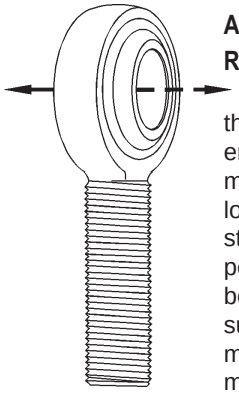
AT3200 is an ultra-high performance liner fully qualified to SAE-AS81820(formerly MIL-B-81820), developed for military and aircraft/aerospace applications. This liner offers higher load carrying capacity as well as greatly increased dynamic wear characteristics and can be used in temperatures ranging from -65° to +325° F. This liner is now standard on all military specification bearings manufactured by Aurora Bearing, as well as certain high performance commercial bearings as used in the automotive racing industry. It can also be specified on other lined products manufactured by Aurora Bearing where demanding applications require its superior performance characteristics. Aurora Bearing also has available a variety of alternate liner configurations to suit special requirements.



ULTIMATE RADIAL STATIC LOAD CAPACITY ROD ENDS

The ultimate radial static load capacity is based upon the minimum mechanical properties of the design configuration in the stressed area. The ultimate radial static load capacity called out in the rod end specification charts is defined as a single cycle, unidirectional applied load to cause ultimate failure. Operating loads should be based on the static load ratings, incorporating appropriate safety factors to suit the application. When a rod end is to be applied in full rotation, up to a maximum of 100 RPM, the operating loads should not exceed 10% of the ultimate radial static load.

Load ratings listed in the standard detail pages are applicable to rod ends supplied without grease fittings. Load ratings for units employing fittings may be affected due to lighter cross section in the stressed area. For information on the rod end radial static load ratings with fittings and other specific load rating information, consult the Aurora Bearing engineering department.



AXIAL STATIC LOAD CAPACITY ROD ENDS

Axial static load capacity is the force that is applied through the bore of the ball. For Aurora two-piece rod ends, maximum axial static load capacity is recommended to be 15 percent of the ultimate radial static load capacity. For three-piece rod ends, maximum axial static load capacity is generally recommended as 10 percent of ultimate radial static load capacity. It should be noted, however, that on three-piece units factors such as race material, body material and dimensions may affect axial static load capacity. For further information, consult the Aurora Bearing engineering department.

RADIAL STATIC LOAD CAPACITY SPHERICAL BEARINGS

Radial static loads are maximum static based on the maximum permanent set in the bearing race of 0.2% of the ball diameter. If greater permanent set can be allowed or if alternate race materials are used consult our engineering department for change factors. Operating loads are based on the radial static load rating and appropriate safety factors should be utilized to suit the application.

Max axial load is recommended at 20 percent of the radial static load. Extreme care should be used on selecting a sufficiently strong housing to accept this type of bearing.

BEARING MISALIGNMENT

A rod end or spherical bearing's ability to misalign is measured by the degree of angle the ball can accommodate without interference.

The angle of misalignment in a rod end is limited by the ball width and head diameter as shown in figure 1. This arrangement is called a clevis mount, and is the type represented in the standard rod end detail pages. If added misalignment is necessary, this can be accomplished by utilizing spacers between the clevis mounting and ball face, or by using special rod ends designed to meet specific requirements.

Misalignment angle in a spherical bearing is limited by the ball and race width with respect to the ball diameter, illustrated in figure 3. This is the mounting type represented in the standard detail pages for spherical bearings.

Mounting arrangements for spherical bearings such as shown in figures 2 through 4 are also used with rod ends. The misalignment angle is then calculated by selecting the proper formula.

Angle of Misalignment

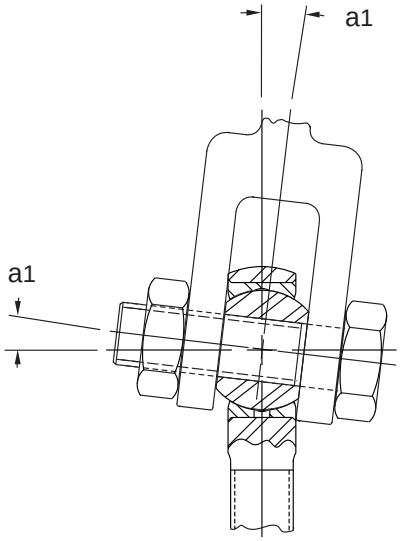


FIGURE 1

$a1 = \text{Sin}^{-1}\frac{W}{D} - \text{Sin}^{-1}\frac{H}{D}$

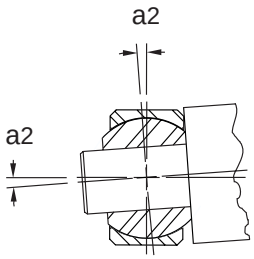


FIGURE 2

$a2 = \text{Sin}^{-1}\frac{W}{A} - \text{Sin}^{-1}\frac{H}{A}$

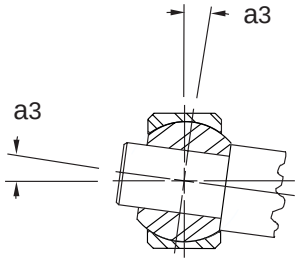


FIGURE 3

$a3 = \text{Sin}^{-1}\frac{W}{R} - \text{Sin}^{-1}\frac{H}{R}$

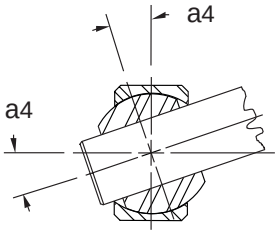


FIGURE 4

$a4 = \text{Cos}^{-1}\frac{B}{R} - \text{Sin}^{-1}\frac{H}{R}$

Reference Letters

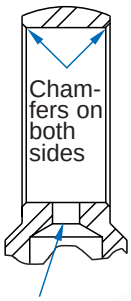
B - Ball Bore
M - Outer Race Chamfer
D - Head Diameter of Outer Race Diameter
R - Ball Diameter
H - Housing Width
$A = \sqrt{(D-2M)^2 + H^2}$
W - Ball Width

3-Piece and 2-Piece Bearing Design

3-Piece A & M Series Unit

Ball component is heat-treated alloy steel, precision ground and hard chrome plated.

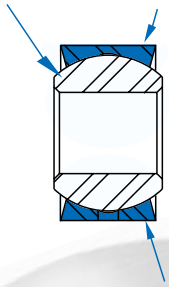
HOUSING



NOTE - Re-Lube hole for lubrication through shank of housing.

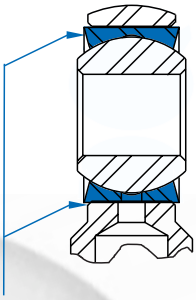
INSERT

Consists of BALL and RACE



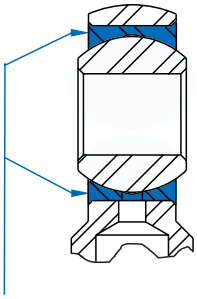
Single piece race, steel, heat-treated (optional), features swaged construction for maximum performance. Alternate race materials available to suit your application.

ASSEMBLED HOUSING AND INSERT IN PRE-STAKING POSITION



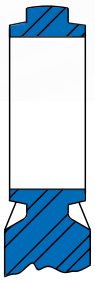
Note extension of race beyond width of housing in the pre-staking position.

ASSEMBLED HOUSING AND INSERT IN STAKED POSITION

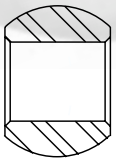


After staking, the sides of race have been upset into chamfers. Ball is subsequently loosened holding close tolerance fits between ball and race.

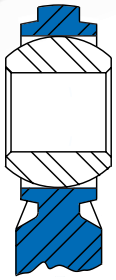
2-Piece C Series Unit



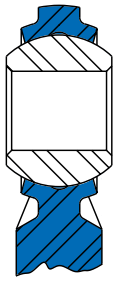
Housing ready for swaging



Precision ground ball - (available in alternate materials) - for close tolerance fits.



Housing and Ball in pre-swaging position.



Sides of housing are closed around ball for maximum strength unit.