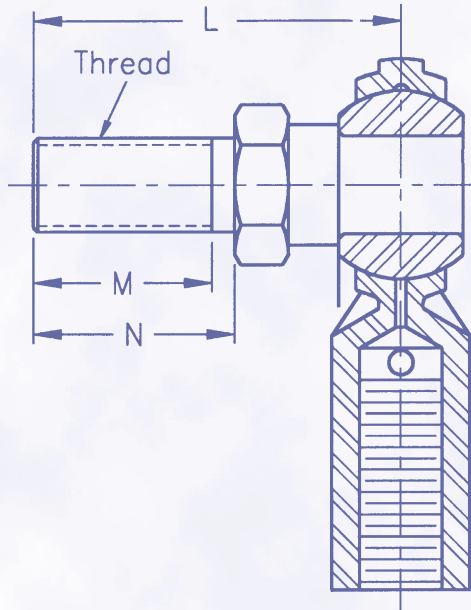


Technical Information



ROD END STUD SPECIFICATIONS

- Inch / Metric
- Low Carbon Steel / Stainless Steel
- Protective Coated for Corrosion Resistance
- Right Hand Threads Standard
- Available with All Catalogued Rod Ends, Male and Female*

DIMENSIONS IN INCHES

Rod End Bore Size	L Ref.	N $\pm .010$	M Ref.	Thread UNF-2A
3/16	1.000	0.500	0.437	10-32
1/4	1.031	0.562	0.500	1/4-28
5/16	1.219	0.687	0.593	5/16-24
3/8	1.562	0.906	0.812	3/8-24
7/16	1.750	1.062	0.937	7/16-20
1/2	2.000	1.125	1.000	1/2-20
5/8	2.500	1.500	1.375	5/8-18
3/4	3.000	1.182	1.625	3/4-16

When ordering a standard stud, add the letter "S" to the completed rod end number. **Example: CMR8S**
 If studded rod end is ordered with a grease fitting, the standard placement is in the right hand location with stud pointed toward the viewer. Please specify if alternate placement is required. When ordering a stud and grease fitting, add the letter "S" and "Z" to the completed number.

Example: CMR8SZ

* Please consult QA1 for availability of stainless steel studs and metric studs.

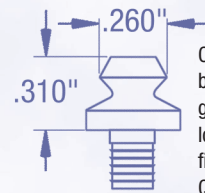
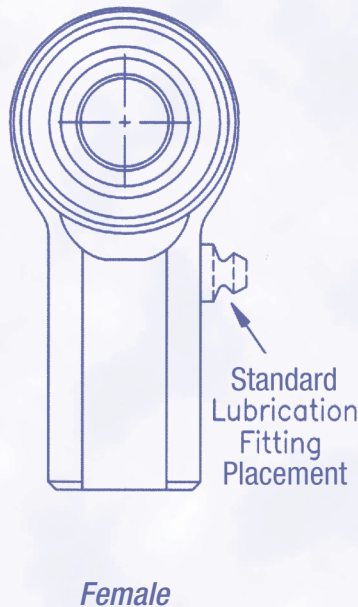
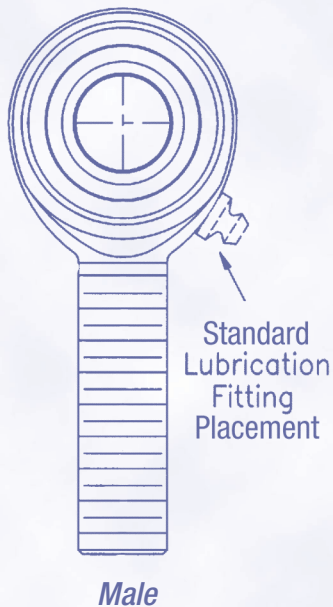
GREASE FITTING CONFIGURATION

Location

Standard grease fitting locations are illustrated below. Note that for a female configuration, once the male threaded component is fully engaged, the grease is forced through the hole at the top of the female shank to facilitate ball lubrication.

Standard Grease Fitting

Order by adding the letter "Z" to the completed number. **Example: CMR8Z**



Catalog load ratings are based on rod ends without grease fittings. For adjusted load ratings with grease fittings, consult QA1 Engineering.

Technical Information



Radial Static Load Ratings



The ultimate radial static load rating is measured as the failure point when a load is increasingly applied to a pin inserted through the rod end's bore and pulled straight up while the rod end is fixtured. The point at which a rod end begins to yield is lower, in some cases dramatically lower, than the ultimate failure point, and is dependent on the material used. Note that QA1's cataloged radial load ratings include a safety factor, and that the insertion of a grease fitting into the radius of the rod end may reduce the load rating due to less cross-sectional material in the stressed point. QA1's load ratings are determined by calculating the lowest of the following three values:

1. Race material compressive strength (R value): $R = E \times T \times X$
2. Rod end head strength (H Value, cartridge type construction): $H = \left[\left(\frac{T}{2} \sqrt{D^2 - T^2} \right) + \left(\frac{D^2}{2} \times \sin^2 \frac{T}{D} \right) - (O.D. \text{ of Bearing} \times T) \right] \times X$
Angle of $\frac{T}{D}$ expressed in radians
3. Shank strength (S Value) Male threaded rod end: $S = [(\text{root diameter of thread} \times .78) - (N^2 \times .78)] \times X$
Female threaded rod end: $S_f = [(J^2 \times .78) - (\text{major diameter of thread} \times .78)] \times X$

Where: E = Ball Diameter

T = Housing Width

X = Allowable Stress (See Table)

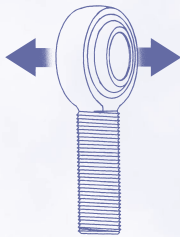
D = Head Diameter

N = Diameter of Drilled Hole in Shank of Male Rod End

J = Shank Diameter of Female Rod End

MATERIAL	ALLOWABLE STRESS (PSI)
Brass	30,000
Aluminum Bronze	35,000
300 Series Stainless Steel	35,000
Low Carbon Steel	52,000
Alloy Steel	140,000

Axial Static Load Ratings



The axial static load capacity is measured as the force required to cause failure via a load parallel to the axis of the bore. Depending on material types and construction methods, the ultimate axial load is generally 10-20% of the ultimate radial static load. The formula does not account for the bending of the shank due to a moment of force, nor the strength of the stake in cartridge-type construction.

AXIAL STRENGTH (A Value): $A = .78 [(E + .176 T)^2 - E^2] \times X$

Where: X = Allowable Stress (See Table)

E = Ball Diameter

T = Housing Width

Frequently Asked Questions

The Teflon® liner in my three piece rod ends always pounds out when I run my car on dirt, leaving the rod end loose. What can I do to avoid this?

Teflon® "pounding out" on dirt applications is a common problem. It occurs because the Teflon® fabric liner and the three piece design of these rod ends are not engineered to withstand the introduction of sand, dirt, etc. QA1 has addressed this problem with the Endura series rod ends, engineered specifically for racing applications. This series of rod ends includes a self-lubricating, maintenance-free Teflon®/Kevlar® injection-molded liner, and is constructed in such a manner that it is nearly impossible for the liner to ever "pound out". These rod ends are offered in aluminum (over 10% lighter than traditional three-piece aluminum rod ends), carbon steel, heat-treated chromoly steel, and chrome plated chromoly steel.

What maintenance do I need to perform on my rod ends to keep them operating properly?

Most rod ends are designed to be relatively maintenance-free. For metal-to-metal rod ends, a thin layer of grease applied occasionally to the ball will assist in extending the life of these products. Rod ends that are Teflon® lined are self-lubricating and are designed to be relatively maintenance-free. **Check your rod ends frequently for wear and replace them as needed.**

What rod end is best for my application?

With over 5,000 sizes, styles and materials in QA1 rod ends to choose from, QA1 manufactures a rod end for virtually every application. However, for nearly all performance racing applications, QA1 strongly recommends the Endura series rod ends. QA1 Endura rod ends are engineered specifically for the rigors of performance racing, and are the only rod ends designed to withstand

dirt, sand, grit, and other debris that commonly come into contact with racing vehicles. The Endura series is self-lubricating, self-sealing and maintenance-free. These rod ends have all of the advantages of metal-to-metal rod ends when encountering heavy shock loads, while also enjoying the advanced wear characteristics of three-piece rod ends. They are available in aluminum, heat-treated chromoly steel, polished chromoly steel, and carbon steel. The QA1 aluminum Endura series rod ends are over 10% lighter than traditional three-piece aluminum units, and also have greater tensile strength due to increased cross-sectional thickness in the rod end body. If you need assistance with your particular application, please call the QA1 technical support line at 952-985-5675.

Will QA1 assist me in determining which product to use for my application?

We are always glad to assist you in making your product selection. QA1 technical support staff is very experienced and knowledgeable about QA1 products and their use. When requested, we will use information supplied by you to assist you in determining which QA1 product is best suited to your application. However, the final decision as to part selection and the correct installation and usage of the product is yours. Please call for assistance if a QA1 product does not appear to fit your application – there is always the possibility that another part will work better or, where appropriate, QA1 can work with you on a custom designed component specific to your application. **Parts that have been installed, damaged, altered or forced in any way are not eligible for return. Always replace your rod ends after a crash, impact or other high shock load.**

Technical support and order lines are open
Monday - Friday 8 a.m. to 5 p.m. CST.