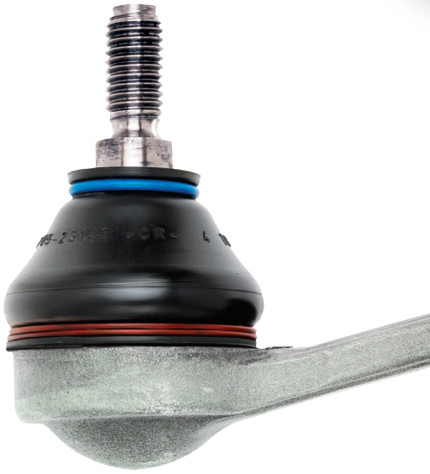
ZF AFTERMARKET

Bulletin 70058

Tech - Talk

SEALED FOR LIFE

MARKET ISSUE:



The original equipment ball joint and tie rod designs, used throughout the 1970's were metal-on-metal and required regular grease maintenance. In the early 1980's, vehicle manufacturers shifted in favor of low friction technology which consisted of a highly polished ball stud, high strength and resilient lower polymer bearing and an exclusionary seal to lock out contaminants.

Most recently, although very limited applications still use a greasable version, OE's have moved toward a "low friction" design which provides improved steering, vehicle handling and helps to reduce warranty and repair costs.

Modern vehicles are highly complex systems in which all components mutually affect each other. The components work together to provide very specific handling characteristics in a vehicle. Modern electric steering racks require low friction linkages to ensure proper function. A sealed-for-life design ensures a constant low friction linkage to keep the vehicle operating as intended.

TRW Aftermarket Solution:

TRW's state-of-the-art tie rod and ball joint program includes the latest, high performance designs which incorporate the following features and resultant benefits:

Housing - The outer housing is manufactured using forged or cold formed steel for additional strength and reliability under the harshest of conditions.

Stud - The full ball metal stud is highly polished and encapsulated within a high strength polymer bearing for smooth articulation. This low-friction allows for free range of motion and provides smooth steering and suspension which restores the vehicle to original operating performance. The ball pin is either stainless steel, geo-met or similar coated for corrosion-free performance.

Boot and Grease - High-end dust boots protect the part from road grime and contamination, which improves longevity of the part and reduces warranty claims with maintenance free parts. TRW's long lasting dust covers are made from the highest quality rubber with an exclusionary seal to lock out contaminants which improves the reliability and life span of the part.

TRW uses durable grease during the manufacturing process. This means optimal performance for the life of the part, which in many cases could be 10 years or 150,000 miles. Install and forget as the there is no monitoring required, no grease maintenance and no chance of contamination.

Polymer Bearing - Unlike competitors who use metal, we utilize a high strength and resilient low-friction glass fiber reinforced polymer bearing which enhances road shock damping and provides smooth movement. Our bearings are made from either standard polymer (polaximethylene) known as a POM design or a high temperature polymer (polyetheretherketone), known as a PEEK design. The strength of the polymer bearing can absorb the toughest road shocks and retract back to its original shape without loss of steering or suspension feel.

A TRW SYSTEM CORNER MODULE

TRW

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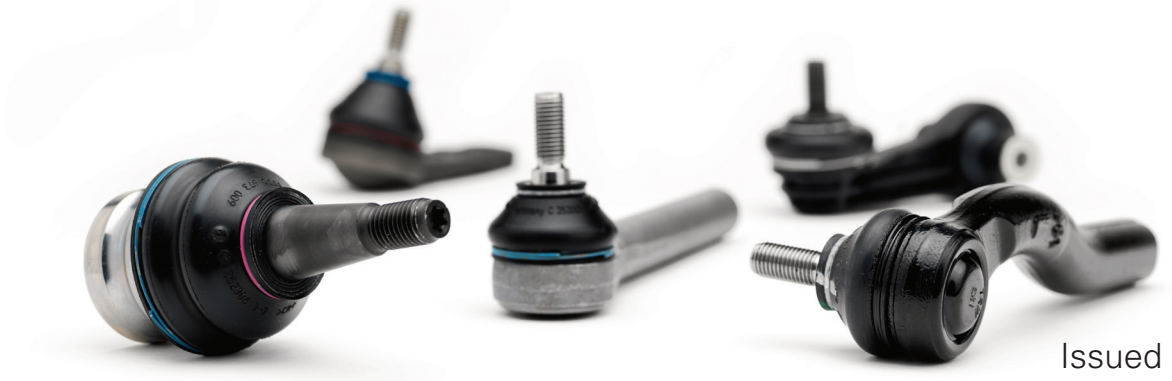
AFTERMARKET

BEST IN MARKET JOINTS FOR SEALED FOR LIFE JOINTS

We understand ball joint and tie-rod relationships to the entire system in which it operates.
With this understanding, we can design and choose the best materials and combine them with the best manufacturing processes to offer the best market solution.

Feature	TRW Joints	Competitor
Ball Stud	**4** The full ball metal stud is highly polished for smooth articulation and is either stainless steel or geo-met or similar coated for corrosion-free performance	**8** Some use a full ball but some are still using partial ball design made of steel with many non-coated
Seat Design	**4** Polymer - High strength and resilient low-friction glass fiber reinforced polymer bearing which enhances road shock damping and provides smooth movement	**8** Either double sintered metal bearings or half-bearing with the housing being the other surface.
Rubber Boot	**4** Fixed - Highest quality rubber that eliminates dust and water from entering the joint, improving the reliability and life-span of the part	**8** Push-On or Umbrella - Greasable outlet hole or hanging boot leads to potential entry of contaminants
High Temp Grease	**4** The highest quality high-temp and long-lasting grease is added during the manufacturing process and sealed in for the life of the part which can be 100K miles plus	**8** Part must be greased with whatever the service center offers as their main grease, should they even check to do this
Electronic Steering Interaction	**4** Modern electric steering racks require low friction linkages to ensure proper function	**8** OE engineers have warned against using a non-low friction joint as additional torque may interfere with steering mechanism



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