02E-017.002
.102

ArvinMeritor™

Fax Cover

To: Associate Administrator of Enforcement **From:** Marlene Vorhees

Company: National Highway Traffic Safety Administration

Attention: Kelly Schuler

Tel: **Tel:** 248-435-9415

Fax: 202-366-7882 **Fax:** 248-435-8682

Pages: <no. of pages, including cover> 10 **Date:** May 23, 2002

Subject: Customer Notification Letter and Technical Bulletin

Enclosed are the final drafts of the following documents for your review:

- Second Amendment Campaign of certain Model 20-EDL Tie Rod End Sockets Manufactured by TRW and Incorporated into ArvinMeritor Axles
- Technical Bulletin (TP-0284)
- Line Haul Customer Listing with Quantities

Specialty and Aftermarket Customer Letters and Listings will follow at a later date.

ArvinMeritor

2135 West Maple Road
Troy, MI 48084-7186

arvinmeritorinc.com

May 23, 2002

[FIRST AND LAST NAME]
[TITLE]
[COMPANY NAME]
[ADDRESS]
[CITY], [STATE] [ZIP CODE]

NOTICE: Second Amendment Campaign of certain Model 20-EDL Tie Rod End Sockets Manufactured by TRW and Incorporated into ArvinMeritor Axles

ArvinMeritor File: C2AE NHTSA File: 02E-017.002

Dear ArvinMeritor Customer:

This notice is sent to you in accordance with the requirements of the National Traffic and Motor Vehicle Safety Act.

ArvinMeritor (formerly Meritor Automotive) has determined that a defect which relates to motor vehicle safety exists in certain Model 20-EDL Ball Sockets that TRW manufactured and shipped to ArvinMeritor from October 31, 1999 through May 12, 2000, and from June 12, 2000 through August 8, 2000; and that ArvinMeritor incorporated into axles it manufactured from October 31, 1999 through May 31, 2000 and from June 12, 2000 through August 31, 2000.

Description of Defect

Based on our own engineering investigation, ArvinMeritor has concluded that the TRW Model 20-EDL Ball-Socket Assemblies have a less robust bearing design, which leads to higher wear rates and more rapid wear-out than previous TRW designs. Specifically, the material specifications for the 20-EDL Ball-Socket Assemblies render the bearings in those assemblies more vulnerable to manufacturing variations that can result in inadequate case depth and hardness. A ball socket with inadequate case depth and hardness may prematurely wear-out, which, in turn, may lead to a separation of the tie rod. For additional information, see the enclosed copy of ArvinMeritor's Defect Information Report to NHTSA.

Recommended Action

ArvinMeritor recommends that owners of vehicles originally equipped with ArvinMeritor axle assemblies containing TRW Model 20-EDL Ball Sockets replace such sockets with appropriate size TRW DL ball-socket assemblies. Affected vehicles should be

repaired as soon as feasible by a vehicle manufacturer's authorized repair facility. This replacement program will be managed by ArvinMeritor, and will be at no expense to vehicle owners.

Identification of Affected Parts

Attached is a shipment report listing the ArvinMeritor axle assemblies that are suspected to contain TRW Model 20-EDL Ball Sockets that ArvinMeritor shipped to your facility. ArvinMeritor is continuing to research shipment records that pertain to aftermarket shipments. You may receive a separate notice if your company purchased aftermarket tie rod ends or x-tubes from ArvinMeritor.

The manufacturing date codes on the suspect TRW Model 20-EDL Ball-Socket Assemblies are limited to the following date codes:

TRW Date Codes	
9L1, 9L2, 9L3, 9L4, 9L5	0D1, 0D2, 0D3, 0D4
9M1, 9M2, 9M3, 9M4	0E1, 0E2
0A1, 0A2, 0A3, 0A4, 0A5	0F2, 0F3, 0F4
0B1, 0B2, 0B3, 0B4	0G1, 0G2, 0G3, 0G4
0C1, 0C2, 0C3, 0C4	

The manufacturing date code is stamped either on the ball socket cap, opposite the ball stud opening, or on the bar or tube of the tie rod assembly. Date codes not listed in this table are not included in this campaign, but may be a part of a previous TRW Model 20-EDL campaign (see NHTSA file numbers 00E-047.005 and 00E-047.009).

Availability of Replacement Parts and Service Instructions

Replacement parts and service instructions will be available as of June 21, 2002.

Vehicle manufacturers may obtain replacement DL ball-sockets directly from TRW. TRW DL ball-socket assemblies can be obtained as individual TRW DL ball-socket assemblies, or as service kits. The service kits for tie-rods will contain two TRW DL ball-socket assemblies and a service bulletin. The service instruction to be used for this campaign is ArvinMeritor Technical Publication (TP-0284, Replacing TRW Model 20-EDL (20-Size) Tie Rod Assembly Socket Ends on Meritor Axles).

Replacement parts can be ordered directly from TRW through the OEMs normal order entry process. TRW will ship kits and replacement parts direct to the location the vehicle manufacturer specifies.

For other questions concerning the campaign, you can contact ArvinMeritor's Customer Service Center at 1-800-535-5560 (US and Canada) between 8:00 a.m. and 6:00 p.m. EDT.

Labor and Handling Allowance

The same labor and handling allowance that were established for the original TRW Model 20-EDL campaign will continue to be used. Dealers should follow their standard warranty claim processing procedures to obtain reimbursement of expenses associated with installing service kits and replacement parts.

Removed Material Disposition

ArvinMeritor requires the dealers or fleets to grind the stem threads of the replaced parts to the point where the ball-socket assembly can no longer be used. The removed tie-rod ends should then be scrapped unless the replaced part is requested through the normal warranty channels. The dealer or fleet should complete the instructions included with the service kit and then file a warranty claim. ArvinMeritor will accept warranty claims directly from the vehicle manufacturers.

Claims for Credit

ArvinMeritor will pay valid claims for the replacement of suspect parts. Warranty claims for installing the replacement parts associated with this notice should contain the following information:

- Reference to ArvinMeritor's Campaign Number C2AE.
- Reference to the vehicle manufacturers campaign number.
- 17-digit vehicle identification number (VIN).
- Axle Serial Number.
- Axle weight rating (FAWR).
- Vehicle owner's name, address, and telephone number.
- Vehicle in-service date.
- Vehicle repair date.
- Vehicle mileage at the time of repair.
- Dealer work order number.
- Repairing facility name, address, and telephone number.
- Total labor hours required performing the work.
- Repair facilities hourly rate.
- Repair parts and quantities used for the repair.
- TRW date code of removed parts.

Failure to provide complete information may delay processing of the warranty claim.

Communication

If you conclude that ArvinMeritor has not enabled you to remedy this condition in a reasonable time, you may submit a complaint to the:

Administrator
National Highway Traffic Safety Administration
400 Seventh Street, S.W.
Washington, D.C. 20590

- or -

Call the toll free Auto Safety Hotline: 1-888-DASH-2-DOT or 1-888-327-4236

We regret any inconvenience that this situation may cause. ArvinMeritor wants to assure you that we are concerned for customer safety and your continued satisfaction with our products.

Sincerely,

ArvinMeritor

Marlene Vorhees

Marlene Vorhees
Director, Quality

Attachments: Shipment Report
ArvinMeritor TP-0284
Defect Information Report to NHTSA

cc: NHTSA
TRW (R. Sichau)

TP-0284
Issued 05-02

MERITOR.

Technical Bulletin

Replacing TRW 20-EDL (20-Size) Tie Rod Assembly Socket Ends on Meritor Axles

This technical bulletin provides instructions to replace TRW's 20-EDL (20-size) tie rod assembly socket ends on Meritor axles. Use the following procedures to determine if you should replace the socket ends.

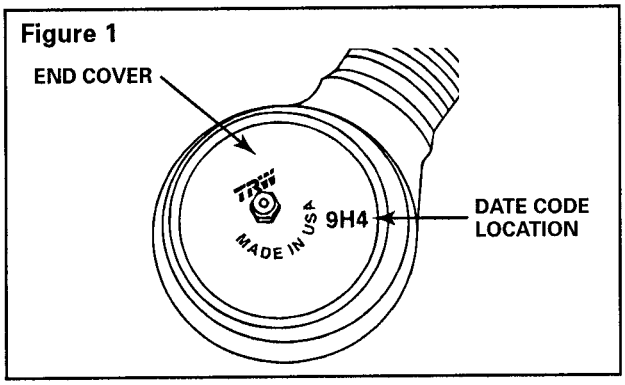
Determine That In-Service Sockets are TRW 20-EDL (20-Size)

NOTE: Only 20-size sockets are subject to this campaign. Be sure you are servicing the correct size socket.

NOTE: A socket with **"DL"** stamped into the end cover is a different design and is not part of this campaign. Be sure you are servicing the correct socket type.

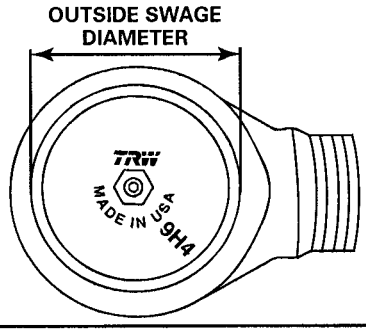
1. Check the date code on the socket end. **Figure 1**. A truck chassis number will be identified on the original equipment (OE) manufacturer's list, along with the tie rod end date codes that are affected by this campaign. **A chassis number and date code combination that is not on the list is not part of this campaign.**

Figure 1



2. The sockets are 20-size sockets. To identify the size, measure the outside swage diameter. **Figure 2**. The outside swage diameter of a 20-EDL (20-size) socket measures approximately 1-7/8-inch. **A socket that measures 2-1/8-inch is a "24-size" socket and is not part of this campaign.**

Figure 2



3. If the conditions in Steps 1 and 2 are met: Use this kit to replace both tie rod ends. Proceed to Remove and Install the Tie Rod Ends in this bulletin for instructions.
4. If the conditions in Steps 1 and 2 are **not** met: The sockets are **not** part of this campaign.

Remove the Tie Rod Ends and Cross Tube

WARNING

To prevent serious eye injury, always wear safe eye protection when you perform vehicle maintenance or service.

Park the vehicle on a level surface. Block the wheels to prevent the vehicle from moving. Support the vehicle with safety stands. Do not work under a vehicle supported only by jacks. Jacks can slip and fall over. Serious personal injury and damage to components can result.

Support the tie rod assembly during maintenance and service to prevent serious personal injury and damage to components.

Use a brass or leather mallet for assembly and disassembly procedures. Do not hit steel parts with a steel hammer. Pieces of a part can break off and cause serious personal injury and damage to components.

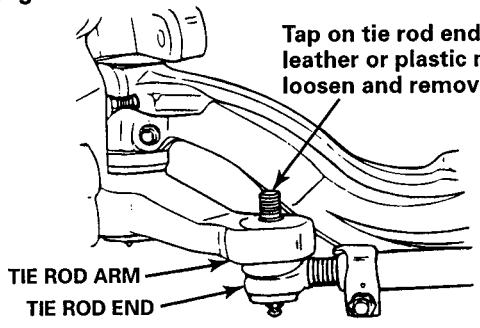
1. Park the vehicle on a level surface. Block the wheels to prevent the vehicle from moving. Set the parking brake.
2. Remove the cotter pins and nuts on both sides of the axle that fasten each tie rod end to the tie rod arms.

WARNING

Do not heat the arm to remove the tie rod assembly. Heating the tie rod arm will soften parts. Damage to components will result.

3. Use a tie rod puller or a ball-joint separator to disconnect the cross tube assembly from the tie rod arms. Do not heat the arm to remove the tie rod assembly. If necessary, tap the tie rod end with a leather or plastic mallet to loosen the tie rod end. Do not use a steel hammer. **Figure 3.**

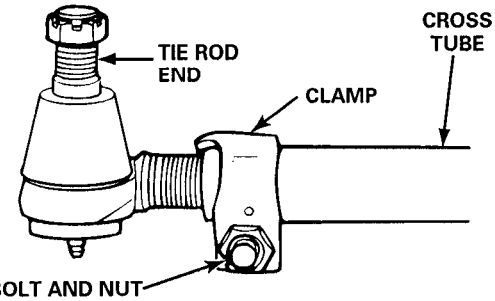
Figure 3



Remove and Install the Tie Rod Ends

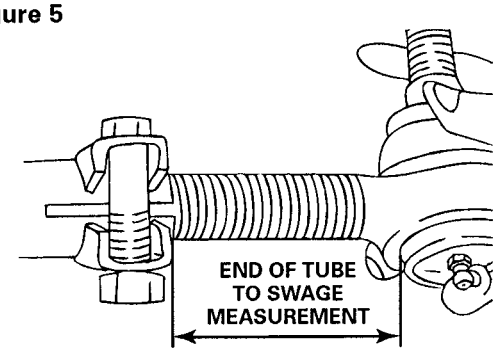
1. Note the position of the bolt and nut in the clamp, and the position of the clamp relative to the ground. **Figure 4.**

Figure 4



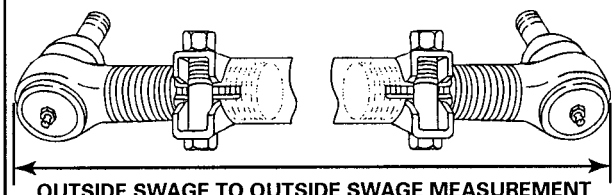
2. On one end, measure from the end of the cross tube to the nearest outside swage diameter. **Figure 5.** Record the measurement.

Figure 5



3. Measure the length of the tie rod from the outside of the swage diameter on one socket end to the outside of the swage diameter on the outer socket end. **Figure 6.** Record the measurement.

Figure 6

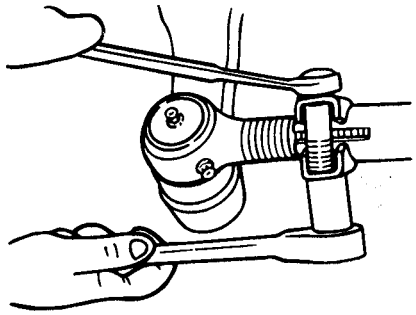


⚠ WARNING

If the cross tube clamps are tack-welded, do not remove the tack weld during tie rod end assembly removal and installation procedures. If you remove tack weld, clamp force is reduced. Loss of steering control, serious personal injury and damage to components can result. Replace the cross tube if weld is broken.

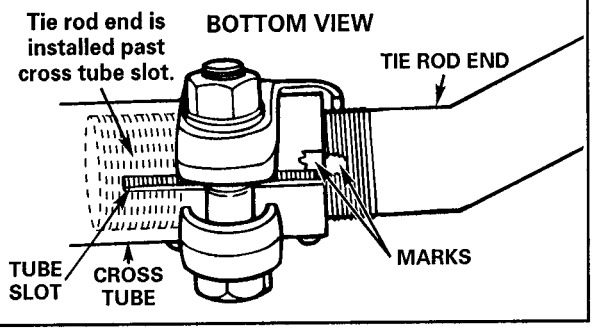
4. Loosen the clamp on the cross tube. **Figure 7.** Remove one threaded tie rod end from the tube.

Figure 7



5. Thread the new socket end into the cross tube until the measurement from the end of the tube to the nearest outside swage diameter is the same as Step 2. Repeat Steps 4 and 5 for the other socket end.
6. Verify that both socket ends are threaded into the cross tube deeper than the cross tube slot. **Figure 8.**

Figure 8



7. Measure the length of the tie rod again. Verify that it's the same length that you measured in Step 3. Sight the tie rod ends to verify that the socket ends are aligned.
8. Verify that the tab on the cross tube clamp is firmly seated against the end of the cross tube. Install the nuts and bolts into the clamps and tighten them to specification. Refer to the Torque Specifications table.
   - **If the tab on the clamp is tack-welded:** Do not remove the tack weld, which can reduce clamping force.

Install the Tie Rod Ends and Cross Tube onto the Axle

1. Clean and dry the tie rod end taper and tie rod arm taper hole. Install the tie rod end into the knuckle tie rod arm.
2. Install both tie rod end nuts to secure the tie rod end and cross tube assembly linkage to the tie rod arm. Tighten the nuts to specification. Refer to the Torque Specifications table.
3. Install the cotter pins. If necessary, tighten the lock nut until the holes are aligned. Do not loosen the nut to install the cotter pin.
4. Sight the tie rod ends to verify that the socket ends are aligned. Verify that the clamps are positioned correctly relative to the ground as noted earlier.
5. Check vehicle toe-in measurements. Refer to Maintenance Manual 2, Front Non-Drive Steering Axles, for procedures to adjust toe-in, if necessary. Call ArvinMeritor's Customer Service Center at 800-535-5560 to order this publication.

Torque Specifications

Description	Size	Torque Range ①	
		lb-ft	N•m
Tie rod arm to tie rod end castellated nut	7/8"-14	160-300	217-406
	1"-14	250-450	339-610
	1-1/8"-12	350-650	475-881
	1-1/4"-12	500-675	678-915
Cross tube clamp nut	5/8"-11	40-60	55-81
	3/4"-10	155-175	211-237

ArvinMeritor™
Commercial Vehicle Systems

Meritor Heavy Vehicle Systems, LLC
2135 West Maple Road
Troy, MI 48084 USA
800-535-5560
arvinmeritor.com

Printed in the USA

TP-0284
Issued 05-02
16579/Meritor

Mailing List "A"
(Ref. NHTSA File No.: 02E-017.002)

OEM Manufacturers of "Line Haul Vehicles" who Purchased TRW Model 20-EDL Tie Rod Ends As Part of Axle Assemblies from ArvinMeritor's Arden*, NC Plant between October 31, 1999 through May 31, 2000 and June 12, 2000 and August 31, 2000

OEM	Suspect Axles
Freightliner LLC Attn: Timothy Blubaugh 4747 N. Channel Avenue Portland, Oregon 97208-7699 Phone: 503-745-5219	84,579
Kenworth Truck Company (PACCAR) Attn: Rick Sedgley 10630 N.E. 38th Place Kirkland, Washington 98033 Phone: 425-828-5201	1718
International Truck and Engine Corp. Attn: Rick L. Van Laar 3033 Wayne Trace Ft. Wayne, Indiana 46801 Phone: 219-461-1890	11750
Mack Trucks, Inc. Attn: William J. Smith 2100 Mack Blvd. Allentown, Pennsylvania 18103-5622 Phone: 610-709-2198	1956
Peterbilt Motors Company (PACCAR) Attn: Paul Allen 3200 Airport Road Denton, Texas 76202-0550 Phone: 940-566-7770	2177
Volvo Trucks North America, Inc. Attn: Charles D. Powell 7900 National Service Rd. (27409) Greensboro, North Carolina 27402-6115 Phone: 336-393-2233	14288
Total Axles:	116,468

Note: OEM recall numbers may be less than the numbers reported above due to Amendment 2 Tie Rod Ends getting replaced during the previous recall.

* Includes Freightliner Chassis shipments out of Heath, OH

ArvinMeritor™

Corporate Quality – SE 020
2135 West Maple Road
Troy, MI 48084
Phone: 248-435-8793
Fax: 248-435-8682
Email: Niran.Audimoolam@ArvinMeritor.com

September 04, 2002

National Highway Traffic Administration
Office of Defects Investigation, Room 5319
400 Seventh Street S.W.
Washington, D.C. 20590
Attention: Kelly Shuler

Re: NHTSA File: 02E-017.102, representative copies of Campaign Notifications to Purchasers in accordance with 49 CFR 573.5 (c)(9)

Second Amendment Campaign of certain Model 20-EDL Tie Rod End Sockets Manufactured by TRW and Sold by ArvinMeritor Aftermarket Division

Dear Kelly,

Please find enclosed representative copies of the Aftermarket Customer Campaign Notification Letters that was sent to the ArvinMeritor and Euclid Industries LLC Aftermarket Customers.

ArvinMeritor Aftermarket customer notification letters were mailed out between June 28 and August 2, 2002 and the Euclid Industries customer notification letters were mailed out between August 26 and 27, 2002.

Please contact me should you have any questions.

Sincerely

Niran Audimoolam
Corporate Quality Project Manager

ArvinMeritor

2135 West Maple Road.
Troy, MI 48084-7186

arvinmeritor.com

July 17, 2002

TO: ArvinMeritor Aftermarket Purchasers of Suspect TRW Tie Rod Ends

NOTICE: Second Amendment Campaign of certain Model 20-EDL Tie Rod End Sockets Manufactured by TRW and Sold by ArvinMeritor Aftermarket Division

ArvinMeritor File: C2AG NHTSA File: 02E-017.102

Dear ArvinMeritor Aftermarket Customer:

This notice is sent to you in accordance with the requirements of the National Traffic and Motor Vehicle Safety Act.

ArvinMeritor (formerly Meritor Automotive) has determined that a defect, which relates to motor vehicle safety, exists in certain Model 20-EDL Ball Sockets that TRW manufactured and shipped to ArvinMeritor from October 31, 1999 through May 12, 2000, and from June 12, 2000 through August 8, 2000. ArvinMeritor records (see attached) indicate that you purchased suspect parts in tie rod assemblies, tie rods ends or complete service axle assemblies.

Description of Defect:

Based on our own engineering investigation, ArvinMeritor has concluded that the TRW Model 20-EDL Ball-Socket Assemblies have a less robust bearing design, which leads to higher wear rates and more rapid wear-out than previous TRW designs. Specifically, the material specifications for the 20-EDL Ball-Socket Assemblies render the bearings in those assemblies more vulnerable to manufacturing variations that can result in inadequate case depth and hardness. A ball socket with inadequate case depth and hardness may prematurely wear-out, which, in turn, may potentially lead to a separation of the tie rod and loss of steering control in some applications.

Identifying Suspect Part Numbers:

A list of affected product shipped to your company is attached. The suspect population-at-large is limited to the following part numbers.

Tie Rod Ends & Tie Rod Assembly Part Numbers:

A 1 3102E3437	A 2 3102M4225	A 2 3102V3454	R230018	R230036	R230090	R250112
A 1 3102H1932	A 2 3102P3474	A 2 3102X3456	R230019	R230068	R230420	
A 1 3102R1916	A 2 3102P3500	A 2 3102Z3458	R230028	R230069	R230421	
A 1 3102T3972	A 2 3102Q4229	A 2 3144Q1005	R230029	R230086	R230422	
A 2 3102G3465	A 2 3102S4257	A 3 3102Z3484	R230030	R230087	R250001	
A 2 3102L4380	A 2 3102U3453	A 3 144P562	R230031	R230088	R250051	

Axle Assembly Part Numbers that contain suspect tie rod ends:

FD 965LX 14	FF 961NX 125	FF 961NX 340	FF 981 LX 6
FF 966NX 1	FF 961NX 270	FG 941NX 663	

Identifying Suspect Part Date Codes:

The manufacturing date codes on the suspect TRW 20-EDL model ball-socket assemblies are limited to the following date codes:

TRW Date Codes	
9L1, 9L2, 9L3, 9L4, 9L5	0D1, 0D2, 0D3, 0D4
9M1, 9M2, 9M3, 9M4	0E1, 0E2
0A1, 0A2, 0A3, 0A4, 0A5	0F2, 0F3, 0F4
0B1, 0B2, 0B3, 0B4	0G1, 0G2, 0G3, 0G4
0C1, 0C2, 0C3, 0C4	

Date codes not listed in this table are not included in the suspect population.

The manufacturing date code is stamped either on the ball socket cap, opposite the ball stud opening or on the bar or tube of the tie rod assembly. Refer to attached ArvinMeritor Technical Publication (TP-0284, Replacing TRW Model 20-EDL Tie Rod Assembly Socket Ends on Meritor Axles) for more details.

INFORMATION REGARDING UNSOLD PRODUCT

(NEW PRODUCT THAT HAS NOT BEEN INSTALLED)

Recommended Action

ArvinMeritor recommends that you inspect your inventory for any of the suspect part numbers and date codes indicated above on those products that you had purchased directly from ArvinMeritor. The packaging date code is not the same as the manufacturing date code stamped on the product. You need to inspect the manufacturing date code on the product. If you find product that has any of the suspect part numbers and manufacturing date codes, please return them to Florence, KY for replenishment with good merchandise. When ordering replacement merchandise the date code will be required to verify eligibility. Only product with the effected date codes should be returned for replacement.

Availability of Replacement Parts and Service Instructions:

Replacement parts can be ordered directly from ArvinMeritor Commercial Vehicle Aftermarket in Florence, Kentucky by contacting Carol Babb between 8:00 a.m. and 4:30 p.m. EDST.

Phone: 859-525-3362 or Fax: 859-817-3301
Toll free: 888-725-9355
(Press 7, press 1, press 1 again and then dial 3362#)

Replacement parts and kits will be shipped direct from TRW to the location you specify.

The service instruction to be used for this campaign is ArvinMeritor Technical Publication (TP-0284, Replacing TRW Model 20-EDL Tie Rod Assembly Socket Ends on Meritor Axles).

Returning Suspect Parts for Replenishment with Good Merchandise:

Please obtain an RGA (Returned Goods Authorization) number from ArvinMeritor Commercial Vehicle Aftermarket in Florence, Kentucky by contacting Carol Babb at the number listed above. Please fill out the required information below to receive proper credit and enclose a copy of this letter as a packing slip when you return the suspect parts. Please mark the exterior of the shipping carton(s) for "TRW Recall Campaign C2AG" and ship the product to the address listed below:

Return Product To:	
Date: _____ RGA# _____ Campaign#: **C2AG**	ArvinMeritor 7975 Dixie Highway Florence, KY 41042-2754 Attention: Peggy Carroll
Returned From: Name: _____ Address: _____ City: _____ State/Province: _____ Country: _____ Zip: _____	

INFORMATION REGARDING INSTALLED PRODUCT

(PRODUCT THAT HAS BEEN INSTALLED ON A VEHICLE)

If your customer has suspect parts installed in their vehicle please contact the **ArvinMeritor Customer Service Center at 1-800-535-5560** (US and Canada) between 8:00 a.m. and 6:00 p.m. EDT.

Recommended Action:

It is imperative that you determine whether any of your customers purchased suspect TRW 20-EDL ball-socket assemblies. The customers who purchased the suspect parts need to inspect their vehicle to determine whether the part number and date code is one of those listed above. If suspect parts are found, please instruct the customer to replace them with new TRW tie rod assemblies or ends as soon as practical. The attached ArvinMeritor Technical Publication (TP-0284, Replacing TRW Model 20-EDL Tie Rod Assembly Socket Ends on Meritor Axles) service bulletins will provide the instructions that your customers need to replace the suspect parts.

Part Procurement:

If your customer has suspect parts installed in their vehicle, they should purchase replacement by contacting ArvinMeritor Customer Service Center at 1-800-535-5560 (US and Canada) between 8:00 a.m. and 6:00 p.m. EDT.

Submitting Recall Claims:

ArvinMeritor will pay valid claims for the replacement of suspect parts and reimburse customers directly for incurred expenses. Failure to return parts may delay processing of the recall claim.

For questions regarding claim processing contact the ArvinMeritor Customer Service Center at 1-800-535-5560 (US and Canada) between 8:00 a.m. and 6:00 p.m. EDT.

Labor and Handling Allowance:

- Cost of parts limited to actual purchase cost.
- ArvinMeritor will allow up to 0.8 labor hours to replace one tie rod end and will allow up to 1.1 labor hours to replace two tie rod ends on the same vehicle.
- The maximum labor rate to be paid will be $55 per hour.
- Cost to return parts not to exceed standard UPS ground charges.

Communication:

If you conclude that ArvinMeritor has not enabled you to remedy this condition in a reasonable time, you may submit a complaint to the:

Administrator
National Highway Traffic Safety Administration
400 Seventh Street, S.W.
Washington, D.C. 20590
- or -
Call the toll free Auto Safety Hotline: 1-888-DASH-2-DOT or 1-888-327-4236

We regret any inconvenience that this situation may cause. ArvinMeritor wants to assure you that we are concerned for customer safety and your continued satisfaction with our products.

Sincerely,

ArvinMeritor
Marlene Vorhees

Marlene Vorhees
Director, Quality

Attachments: * Shipment Report
* ArvinMeritor TP-0284

MERITOR.

Technical Bulletin

Replacing TRW 20-EDL (20-Size) Tie Rod Assembly Socket Ends on Meritor Axles

This technical bulletin provides instructions to replace TRW's 20-EDL (20-size) tie rod assembly socket ends on Meritor axles. Use the following procedures to determine if you should replace the socket ends.

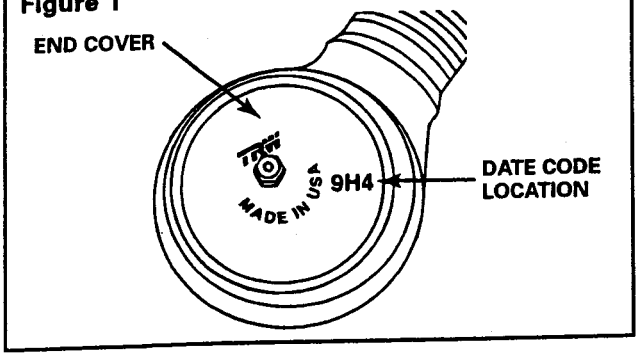
Determine That In-Service Sockets are TRW 20-EDL (20-Size)

NOTE: Only 20-size sockets are subject to this campaign. Be sure you are servicing the correct size socket.

NOTE: A socket with **"DL"** stamped into the end cover is a different design and is not part of this campaign. Be sure you are servicing the correct socket type.

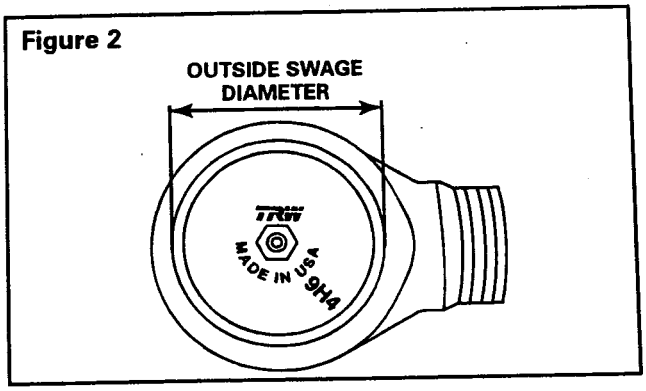
1. Check the date code on the socket end. **Figure 1.** A truck chassis number will be identified on the original equipment (OE) manufacturer's list, along with the tie rod end date codes that are affected by this campaign. **A chassis number and date code combination that is not on the list is not part of this campaign.**

Figure 1



2. The sockets are 20-size sockets. To identify the size, measure the outside swage diameter. **Figure 2.** The outside swage diameter of a 20-EDL (20-size) socket measures approximately 1-7/8-inch. **A socket that measures 2-1/8-inch is a "24-size" socket and is not part of this campaign.**

Figure 2



3. If the conditions in Steps 1 and 2 are met: Use this kit to replace both tie rod ends. Proceed to Remove and Install the Tie Rod Ends in this bulletin for instructions.
4. If the conditions in Steps 1 and 2 are **not** met: The sockets are **not** part of this campaign.

Remove the Tie Rod Ends and Cross Tube

⚠ WARNING

To prevent serious eye injury, always wear safe eye protection when you perform vehicle maintenance or service.

Park the vehicle on a level surface. Block the wheels to prevent the vehicle from moving. Support the vehicle with safety stands. Do not work under a vehicle supported only by jacks. Jacks can slip and fall over. Serious personal injury and damage to components can result.

Support the tie rod assembly during maintenance and service to prevent serious personal injury and damage to components.

Use a brass or leather mallet for assembly and disassembly procedures. Do not hit steel parts with a steel hammer. Pieces of a part can break off and cause serious personal injury and damage to components.

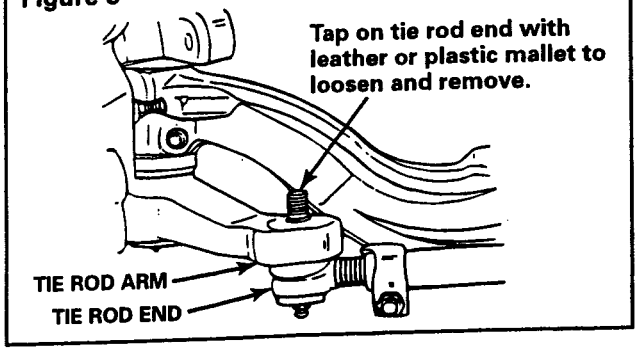
1. Park the vehicle on a level surface. Block the wheels to prevent the vehicle from moving. Set the parking brake.
2. Remove the cotter pins and nuts on both sides of the axle that fasten each tie rod end to the tie rod arms.

⚠ WARNING

Do not heat the arm to remove the tie rod assembly. Heating the tie rod arm will soften parts. Damage to components will result.

3. Use a tie rod puller or a ball-joint separator to disconnect the cross tube assembly from the tie rod arms. Do not heat the arm to remove the tie rod assembly. If necessary, tap the tie rod end with a leather or plastic mallet to loosen the tie rod end. Do not use a steel hammer. **Figure 3.**

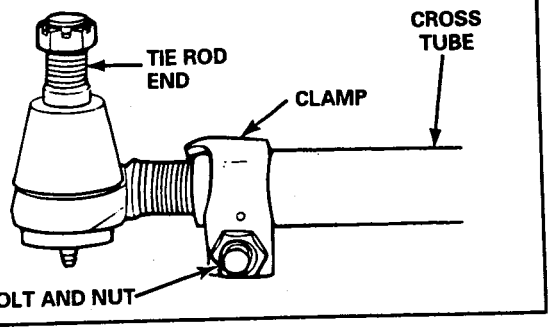
Figure 3



Remove and Install the Tie Rod Ends

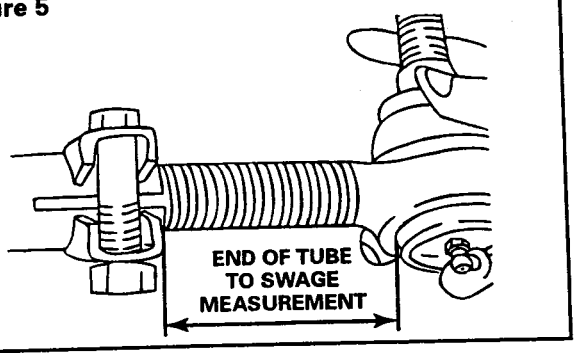
1. Note the position of the bolt and nut in the clamp, and the position of the clamp relative to the ground. **Figure 4.**

Figure 4



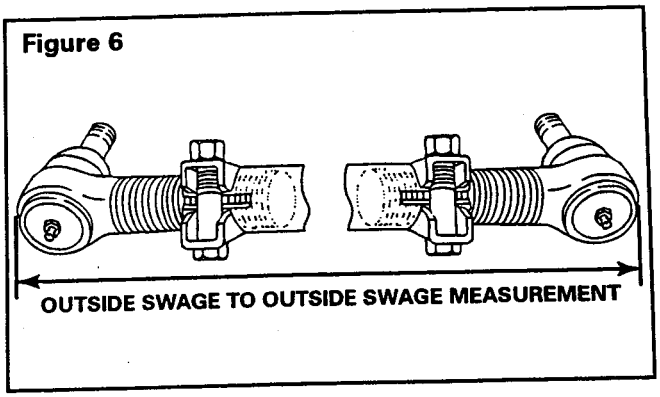
2. On one end, measure from the end of the cross tube to the nearest outside swage diameter. **Figure 5.** Record the measurement.

Figure 5



3. Measure the length of the tie rod from the outside of the swage diameter on one socket end to the outside of the swage diameter on the outer socket end. **Figure 6.** Record the measurement.

Figure 6

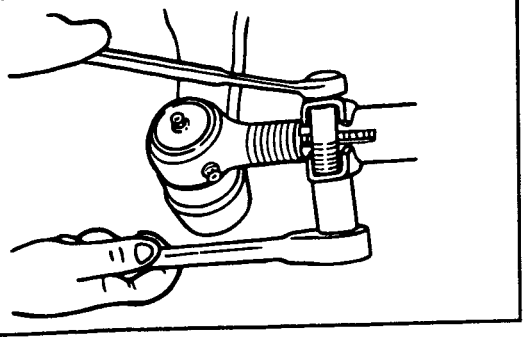


⚠ WARNING

If the cross tube clamps are tack-welded, do not remove the tack weld during tie rod end assembly removal and installation procedures. If you remove tack weld, clamp force is reduced. Loss of steering control, serious personal injury and damage to components can result. Replace the cross tube if weld is broken.

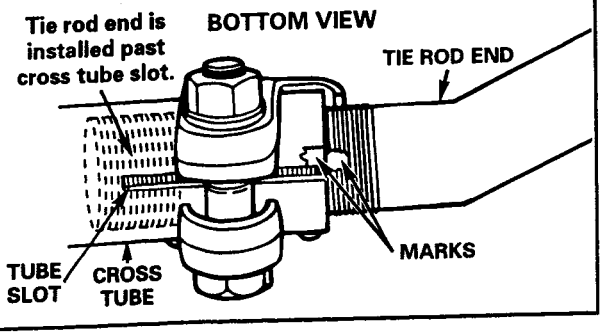
4. Loosen the clamp on the cross tube. **Figure 7.** Remove one threaded tie rod end from the tube.

Figure 7



5. Thread the new socket end into the cross tube until the measurement from the end of the tube to the nearest outside swage diameter is the same as Step 2. Repeat Steps 4 and 5 for the other socket end.
6. Verify that both socket ends are threaded into the cross tube deeper than the cross tube slot. **Figure 8.**

Figure 8



7. Measure the length of the tie rod again. Verify that it's the same length that you measured in Step 3. Sight the tie rod ends to verify that the socket ends are aligned.
8. Verify that the tab on the cross tube clamp is firmly seated against the end of the cross tube. Install the nuts and bolts into the clamps and tighten them to specification. Refer to the Torque Specifications table.
   - **If the tab on the clamp is tack-welded:** Do not remove the tack weld, which can reduce clamping force.

Install the Tie Rod Ends and Cross Tube onto the Axle

1. Clean and dry the tie rod end taper and tie rod arm taper hole. Install the tie rod end into the knuckle tie rod arm.
2. Install both tie rod end nuts to secure the tie rod end and cross tube assembly linkage to the tie rod arm. Tighten the nuts to specification. Refer to the Torque Specifications table.
3. Install the cotter pins. If necessary, tighten the lock nut until the holes are aligned. Do not loosen the nut to install the cotter pin.
4. Sight the tie rod ends to verify that the socket ends are aligned. Verify that the clamps are positioned correctly relative to the ground as noted earlier.
5. Check vehicle toe-in measurements. Refer to Maintenance Manual 2, Front Non-Drive Steering Axles, for procedures to adjust toe-in, if necessary. Call ArvinMeritor's Customer Service Center at 800-535-5560 to order this publication.

Torque Specifications

Description	Size	Torque Range (T)	
		lb-ft	N•m
Tie rod arm to tie rod end castellated nut	7/8"-14	160-300	217-406
	1"-14	250-450	339-610
	1-1/8"-12	350-650	475-881
	1-1/4"-12	500-675	678-915
Cross tube clamp nut	5/8"-11	40-60	55-81
	3/4"-10	155-175	211-237

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ArvinMeritor

2135 West Maple Road.
Troy, MI 48084-7186

arvinmeritor.com

August 14, 2002

TO: ArvinMeritor (Euclid Industries, LLC) Aftermarket Purchasers of Suspect TRW Tie Rod Ends

NOTICE: Second Amendment Campaign of certain Model 20-EDL Tie Rod End Sockets Manufactured by TRW and Sold by ArvinMeritor Aftermarket Division

ArvinMeritor File: C2AG NHTSA File: 02E-017.102

Dear ArvinMeritor Aftermarket Customer:

This notice is sent to you in accordance with the requirements of the National Traffic and Motor Vehicle Safety Act.

ArvinMeritor (formerly Meritor Automotive) has determined that a defect, which relates to motor vehicle safety, exists in certain Model 20-EDL Ball Sockets that TRW manufactured and shipped to ArvinMeritor from October 31, 1999 through May 12, 2000, and from June 12, 2000 through August 8, 2000. ArvinMeritor records (see attached) indicate that you purchased suspect parts in tie rod assemblies, tie rods ends or complete service axle assemblies.

Description of Defect:

Based on our own engineering investigation, ArvinMeritor has concluded that the TRW Model 20-EDL Ball-Socket Assemblies have a less robust bearing design, which leads to higher wear rates and more rapid wear-out than previous TRW designs. Specifically, the material specifications for the 20-EDL Ball-Socket Assemblies render the bearings in those assemblies more vulnerable to manufacturing variations that can result in inadequate case depth and hardness. A ball socket with inadequate case depth and hardness may prematurely wear-out, which, in turn, may potentially lead to a separation of the tie rod and loss of steering control in some applications.

Identifying Suspect Part Numbers:

A list of affected product shipped to your company is attached. The suspect population-at-large is limited to the following part numbers.

Tie Rod Ends Part Numbers:

E-10110	E-4604	E-4610	E-4622	E-5470	E-9956
E-10111	E-4605	E-4611	E-4623	E-6827	E-9965
E-10112	E-4606	E-4612	E-4630	E-6854	E-9966
E-10113	E-4607	E-4613	E-4631	E-6855	E-9967
E-10148	E-4608	E-4614	E-4640	E-8757	
E-10149	E-4609	E-4615	E-5363	E-8758	

Identifying Suspect Part Date Codes:

The manufacturing date codes on the suspect TRW 20-EDL model ball-socket assemblies are limited to the following date codes:

TRW Date Codes and Phase Summary	
9F2, 9F3, 9F4	01, 0A2, 0A3, 0A4, 0A5
9G1, 9G2, 9G3, 9G4	0B1, 0B2, 0B3, 0B4
9H1, 9H2, 9H3, 9H4, 9H5	0C1, 0C2, 0C3, 0C4
9J1, 9J2, 9J3, 9J4	0D1, 0D2, 0D3, 0D4
9K1, 9K2, 9K3, 9K4	0E1, 0E2, 0E3, 0E4, 0E5
9L1, 9L2, 9L3, 9L4, 9L5	0F1, 0F2, 0F3, 0F4
9M1, 9M2, 9M3	0G1, 0G2, 0G3, 0G4, 0G5
	0H1, 0H2, 0H3

Date codes not listed in this table are not included in the suspect population.

The manufacturing date code is stamped either on the ball socket cap, opposite the ball stud opening or on the bar or tube of the tie rod assembly. Refer to attached ArvinMeritor Technical Publication (TP-0284, Replacing TRW Model 20-EDL Tie Rod Assembly Socket Ends on Meritor Axles) for more details.

INFORMATION REGARDING UNSOLD PRODUCT

(NEW PRODUCT THAT HAS NOT BEEN INSTALLED)

Recommended Action

ArvinMeritor recommends that you inspect your inventory for any of the suspect part numbers and date codes indicated above on those products that you had purchased directly from ArvinMeritor. The packaging date code is not the same as the manufacturing date code stamped on the product. You need to inspect the manufacturing date code on the product. If you find product that has any of the suspect part numbers and manufacturing date codes, please return them to the address mentioned below for replenishment with good merchandise. When ordering replacement merchandise the date code will be required to verify eligibility. Only product with the effected date codes should be returned for replacement.

Availability of Replacement Parts and Service Instructions:

Replacement parts can be ordered directly from ArvinMeritor Commercial Vehicle Aftermarket Euclid Technical Service by contacting James Novakovich between 8:00 a.m. and 4:30 p.m. EDST.

Phone: 859-817-5920 or Fax: 859-817-3301

Toll free: 866-238-2543 & then choose option 3

Replacement parts and kits will be shipped direct from TRW to the location you specify.

The service instruction to be used for this campaign is ArvinMeritor Technical Publication (TP-0284, Replacing TRW Model 20-EDL Tie Rod Assembly Socket Ends on Meritor Axles).

Returning Suspect Parts for Replenishment with Good Merchandise:

Please obtain an RGA (Returned Goods Authorization) number from ArvinMeritor Commercial Vehicle Aftermarket Euclid Technical Service by contacting James Novakovich at the number listed above. Please fill out the required information below to receive proper credit and enclose a copy of this letter as a packing slip when you return the suspect parts. Please mark the exterior of the shipping carton(s) for "TRW Recall Campaign C2AG" and ship the product to the address listed below:

Return Product To:	
Date: _____ RGA# _____ Campaign#: **C2AG**	ArvinMeritor Euclid Technical Service 6660 Beta Drive Mayfield Village, OH 44143 Attention: Warranty Department
Returned From: Name: _____ Address: _____ City: _____ State/Province: _____ Country: _____ Zip: _____	

INFORMATION REGARDING INSTALLED PRODUCT

(PRODUCT THAT HAS BEEN INSTALLED ON A VEHICLE)

Recommended Action:

It is imperative that you determine whether any of your customers purchased suspect TRW 20-EDL ball-socket assemblies. The customers who purchased the suspect parts need to inspect their vehicle to determine whether the part number and date code is one of those listed above. If suspect parts are found, please instruct the customer to replace them with new TRW tie rod ends as soon as practical. The attached ArvinMeritor Technical Publication (TP-0284, Replacing TRW Model 20-EDL Tie Rod Assembly Socket Ends on Meritor Axles) will provide the instructions that your customers need to replace the suspect parts.

Availability of Replacement Parts and Service Instructions:

If your customer has suspect parts installed in their vehicle, they should purchase replacement parts by contacting **ArvinMeritor Customer Service Center at 1-800-535-5560** (US and Canada) between 8:00 a.m. and 6:00 p.m. EDT.

The service instruction to be used for this campaign is ArvinMeritor Technical Publication (TP-0284, Replacing TRW Model 20-EDL Tie Rod Assembly Socket Ends on Meritor Axles).

Submitting Recall Claims for Installed Parts Replacement:

ArvinMeritor will pay valid claims for the replacement of suspect parts and reimburse customers directly for incurred expenses. Failure to provide complete information or return suspect parts may delay processing of the recall claim.

For questions regarding claim processing contact the **ArvinMeritor Customer Service Center at 1-800-535-5560** (US and Canada) between 8:00 a.m. and 6:00 p.m. EDT.

Labor and Handling Allowance:

- Cost of parts limited to actual purchase cost.
- ArvinMeritor will allow up to 0.8 labor hours to replace one tie rod end and will allow up to 1.1 labor hours to replace two tie rod ends on the same vehicle.
- The maximum labor rate to be paid will be $55 per hour.
- Cost to return parts not to exceed standard UPS ground charges.

Communication:

If you conclude that ArvinMeritor has not enabled you to remedy this condition in a reasonable time, you may submit a complaint to the:

Administrator
National Highway Traffic Safety Administration
400 Seventh Street, S.W.
Washington, D.C. 20590
- or -
Call the toll free Auto Safety Hotline: 1-888-DASH-2-DOT or 1-888-327-4236

We regret any inconvenience that this situation may cause. ArvinMeritor wants to assure you that we are concerned for customer safety and your continued satisfaction with our products.

Sincerely,

ArvinMeritor

Marlene Vorhees

Director, Quality

Attachments: * Shipment Report
* ArvinMeritor TP-0284

TP-0284
Issued 05-02

MERITOR.

Technical Bulletin

Replacing TRW 20-EDL (20-Size) Tie Rod Assembly Socket Ends on Meritor Axles

This technical bulletin provides instructions to replace TRW's 20-EDL (20-size) tie rod assembly socket ends on Meritor axles. Use the following procedures to determine if you should replace the socket ends.

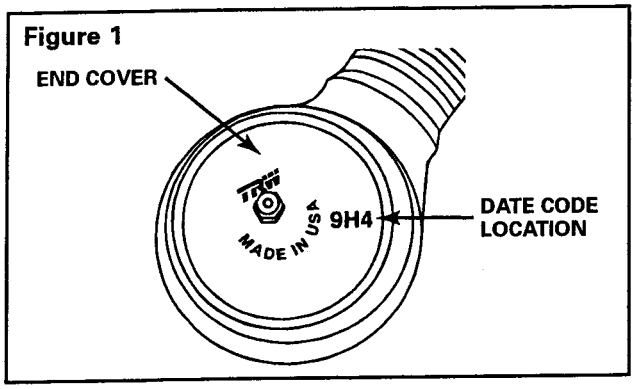
Determine That In-Service Sockets are TRW 20-EDL (20-Size)

NOTE: Only 20-size sockets are subject to this campaign. Be sure you are servicing the correct size socket.

NOTE: A socket with **"DL"** stamped into the end cover is a different design and is not part of this campaign. Be sure you are servicing the correct socket type.

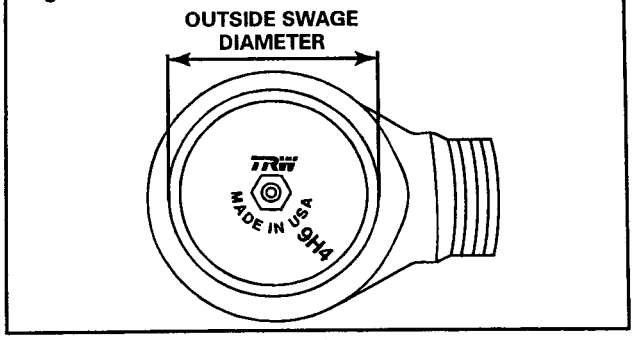
1. Check the date code on the socket end. **Figure 1.** A truck chassis number will be identified on the original equipment (OE) manufacturer's list, along with the tie rod end date codes that are affected by this campaign. **A chassis number and date code combination that is not on the list is not part of this campaign.**

Figure 1



2. The sockets are 20-size sockets. To identify the size, measure the outside swage diameter. **Figure 2.** The outside swage diameter of a 20-EDL (20-size) socket measures approximately 1-7/8-inch. **A socket that measures 2-1/8-inch is a "24-size" socket and is not part of this campaign.**

Figure 2



3. If the conditions in Steps 1 and 2 are met: Use this kit to replace both tie rod ends. Proceed to Remove and Install the Tie Rod Ends in this bulletin for instructions.
4. If the conditions in Steps 1 and 2 are **not** met: The sockets are **not** part of this campaign.

Remove the Tie Rod Ends and Cross Tube

⚠ WARNING

To prevent serious eye injury, always wear safe eye protection when you perform vehicle maintenance or service.

Park the vehicle on a level surface. Block the wheels to prevent the vehicle from moving. Support the vehicle with safety stands. Do not work under a vehicle supported only by jacks. Jacks can slip and fall over. Serious personal injury and damage to components can result.

Support the tie rod assembly during maintenance and service to prevent serious personal injury and damage to components.

Use a brass or leather mallet for assembly and disassembly procedures. Do not hit steel parts with a steel hammer. Pieces of a part can break off and cause serious personal injury and damage to components.

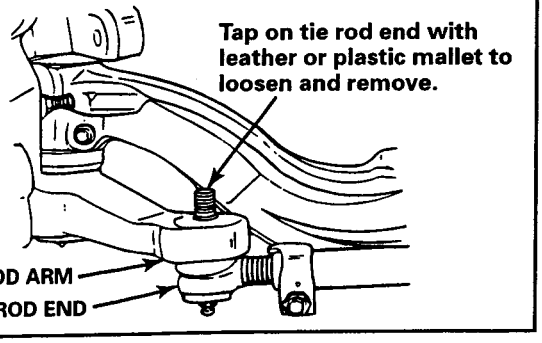
1. Park the vehicle on a level surface. Block the wheels to prevent the vehicle from moving. Set the parking brake.
2. Remove the cotter pins and nuts on both sides of the axle that fasten each tie rod end to the tie rod arms.

⚠ WARNING

Do not heat the arm to remove the tie rod assembly. Heating the tie rod arm will soften parts. Damage to components will result.

3. Use a tie rod puller or a ball-joint separator to disconnect the cross tube assembly from the tie rod arms. Do not heat the arm to remove the tie rod assembly. If necessary, tap the tie rod end with a leather or plastic mallet to loosen the tie rod end. Do not use a steel hammer. **Figure 3.**

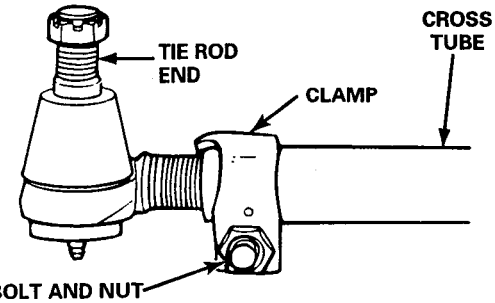
Figure 3



Remove and Install the Tie Rod Ends

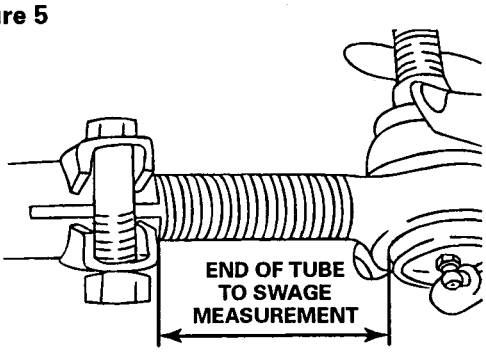
1. Note the position of the bolt and nut in the clamp, and the position of the clamp relative to the ground. **Figure 4.**

Figure 4



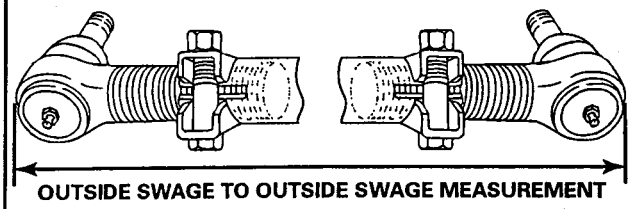
2. On one end, measure from the end of the cross tube to the nearest outside swage diameter. **Figure 5.** Record the measurement.

Figure 5



3. Measure the length of the tie rod from the outside of the swage diameter on one socket end to the outside of the swage diameter on the outer socket end. **Figure 6.** Record the measurement.

Figure 6

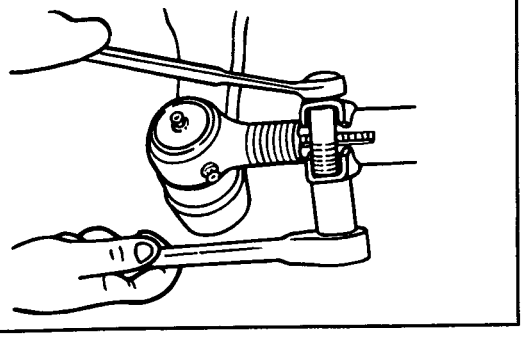


⚠ WARNING

If the cross tube clamps are tack-welded, do not remove the tack weld during tie rod end assembly removal and installation procedures. If you remove tack weld, clamp force is reduced. Loss of steering control, serious personal injury and damage to components can result. Replace the cross tube if weld is broken.

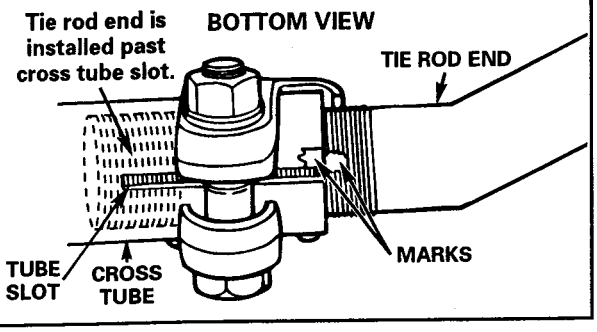
4. Loosen the clamp on the cross tube. **Figure 7.** Remove one threaded tie rod end from the tube.

Figure 7



5. Thread the new socket end into the cross tube until the measurement from the end of the tube to the nearest outside swage diameter is the same as Step 2. Repeat Steps 4 and 5 for the other socket end.
6. Verify that both socket ends are threaded into the cross tube deeper than the cross tube slot. **Figure 8.**

Figure 8



7. Measure the length of the tie rod again. Verify that it's the same length that you measured in Step 3. Sight the tie rod ends to verify that the socket ends are aligned.
8. Verify that the tab on the cross tube clamp is firmly seated against the end of the cross tube. Install the nuts and bolts into the clamps and tighten them to specification. Refer to the Torque Specifications table.
   - **If the tab on the clamp is tack-welded:** Do not remove the tack weld, which can reduce clamping force.

Install the Tie Rod Ends and Cross Tube onto the Axle

1. Clean and dry the tie rod end taper and tie rod arm taper hole. Install the tie rod end into the knuckle tie rod arm.
2. Install both tie rod end nuts to secure the tie rod end and cross tube assembly linkage to the tie rod arm. Tighten the nuts to specification. Refer to the Torque Specifications table.
3. Install the cotter pins. If necessary, tighten the lock nut until the holes are aligned. Do not loosen the nut to install the cotter pin.
4. Sight the tie rod ends to verify that the socket ends are aligned. Verify that the clamps are positioned correctly relative to the ground as noted earlier.
5. Check vehicle toe-in measurements. Refer to Maintenance Manual 2, Front Non-Drive Steering Axles, for procedures to adjust toe-in, if necessary. Call ArvinMeritor's Customer Service Center at 800-535-5560 to order this publication.

Torque Specifications

Description	Size	Torque Range (T)	
		lb-ft	N•m
Tie rod arm to tie rod end castellated nut	7/8"-14	160-300	217-406
	1"-14	250-450	339-610
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Cross tube clamp nut	5/8"-11	40-60	55-81
	3/4"-10	155-175	211-237

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