Description of Revisions: *This bulletin replaces the version dated November 2005. The related VMRS codes are added.*

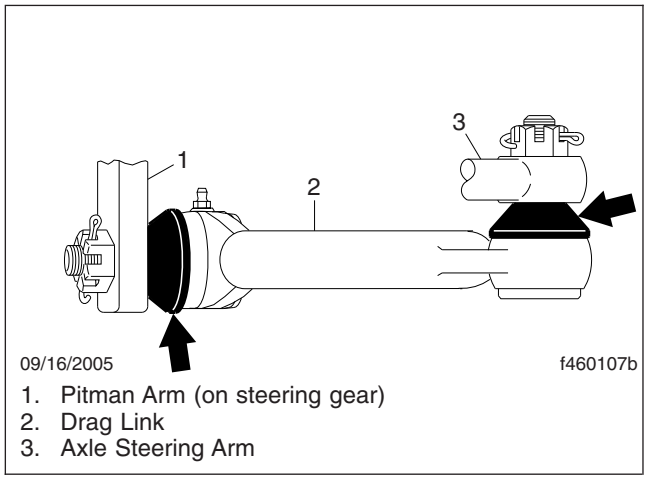
General Information

Some of the rubber ball-stud covers used on steering drag links and steer axle tie rods are prematurely deteriorating. Affected vehicles are those equipped with Meritor or Freightliner axles having TRW tie rods and drag links.

The affected vehicles are those built from April through December 2004 (equipped with Meritor axles), and those built from March through August 2004 (equipped with Freightliner axles).

The ball-stud covers are made of nitrile rubber. The chemical that protects the rubber from exposure to ozone was omitted from the mixing process for a period of time. The result is that (depending on the amount of ozone present in the operating environment) the ball-stud covers can deteriorate in as little as seven months.

Check the drag-link and tie-rod ball-stud covers as part of the regular lubrication routine. See **Fig. 1** and **Fig. 2**.



1. Pitman Arm (on steering gear)
2. Drag Link
3. Axle Steering Arm

Fig. 1, Drag-Link Rubber Ball-Stud Covers

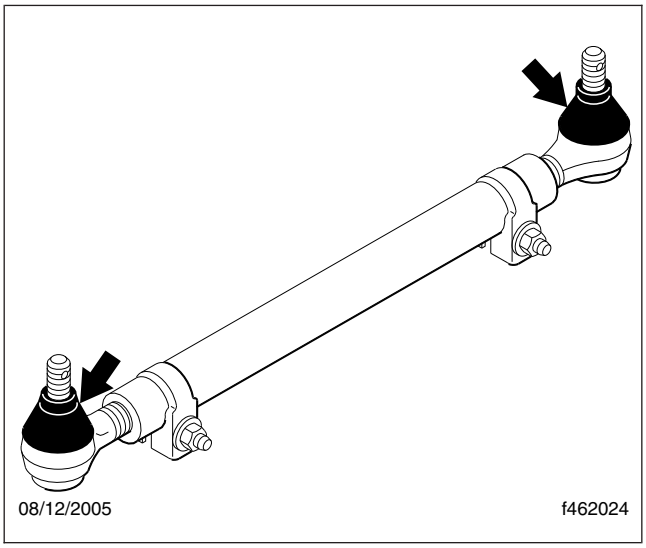


Fig. 2, Tie-Rod End Rubber Ball-Stud Covers

If the drag-link ball-stud covers are deteriorated, replace them, following the procedure in this bulletin.

If the tie-rod ball-stud covers are deteriorated, replace the tie-rod ends following the procedure in this bulletin. Note that front-wheel alignment will also need to be done after replacing the tie-rod ends.

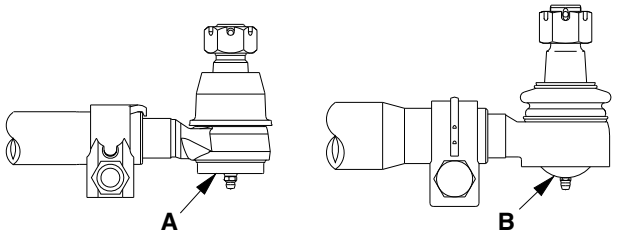
Parts Required

Refer to the vehicle specifications or PartsPro® for the correct tie-rod-end part numbers and drag-link ball-stud covers.

Procedure

1. Park the vehicle on a level surface, apply the parking brakes, shut down the engine, and chock the rear tires.

2. Check the tie-rod ends to see if they are manufactured by TRW. TRW tie-rod ends are flat on the bottom. If the part is unpainted, the company logo and a date code are visible on the bottom. See **Fig. 3** and **Fig. 4**.



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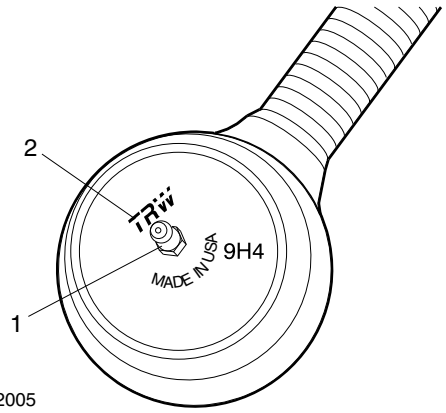
A. TRW tie-rod end has a flat bottom.
B. Other style tie-rod end has a rounded bottom.

Fig. 3, Tie-Rod Ends



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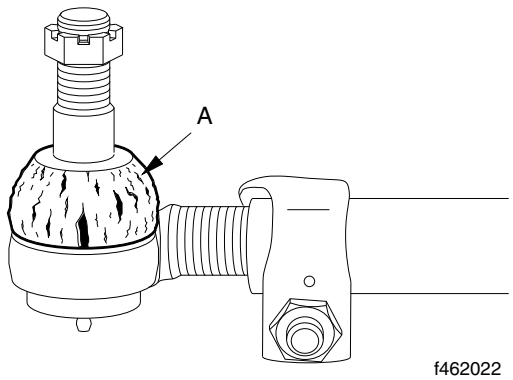
1. Grease Fitting 2. TRW Logo

Fig. 4, TRW Tie-Rod End (view from bottom)

NOTE: If the front axle has tie-rod ends made by TRW, the drag link will also be made by TRW.

3. Check the ball-stud covers on the drag link and the tie-rod ends to see if they are deteriorated. See **Fig. 3**, **Fig. 4**, and **Fig. 5**.



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A. The ball-stud cover is entirely deteriorated, rather than having a single crack.

Fig. 5, Deteriorated Rubber Ball-Stud Cover (tie-rod end)

IMPORTANT: Painted ball-stud covers can give the appearance of deterioration due to the paint cracking and peeling over time. Cracked paint alone is not a problem if the rubber underneath is intact. Examine a painted ball-stud cover very carefully to determine if the rubber itself is affected.

4. If the vehicle is equipped with Meritor front axles, call ArvinMeritor's OnTrac Customer Service Center at 1-866-668-7221 before continuing with the procedure. Hours are 8:00 AM to 8:00 PM EDST on weekdays and 9:00 AM to 5:00 PM EDST on Saturdays.

   In order to start a case number and get permission to proceed with the work, be prepared to supply the following information :

   - 17-digit VIN
   - ArvinMeritor axle serial number
   - vehicle owner's name, address, and telephone number
   - vehicle in-service date
   - name, address, and telephone number of the repair facility
   - repair date
   - itemized individual costs, such as parts, labor, and handling

5. If the drag link ball-stud covers are deteriorated, replace them, following the instructions under "Drag Link Ball-Stud Cover Replacement," in this bulletin.

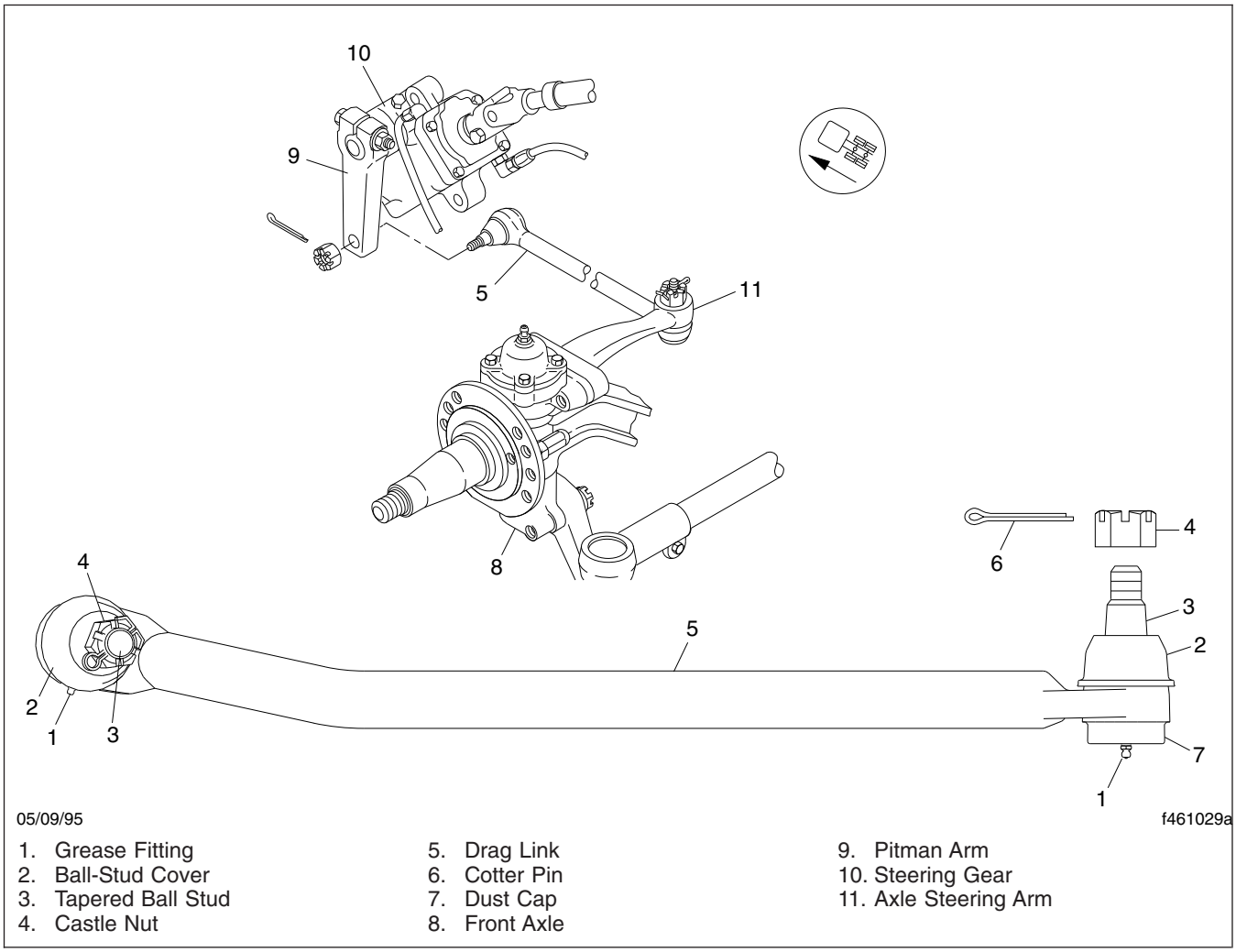
   If the tie-rod ball-stud covers are deteriorated, replace both tie-rod ends, following the instructions under "Tie-Rod End Replacement," in this bulletin. Note that you cannot replace just the ball-stud covers on the tie-rod ends; the tie-rod end itself must be replaced.

Drag-Link Ball-Stud Cover Replacement

⚠ CAUTION

Turn the steering wheel only enough to provide sufficient clearance to remove the drag link from the steering arm; no more than one complete left turn of the steering wheel. Do not make contact with the axle stops. To do so may result in having to reset the poppet valves on the steering gear.

1. Check the clearance between the axle steering arm and the axle beam. If needed, turn the steering wheel left just enough to provide sufficient clearance to remove the drag link from the axle steering arm.
2. At both ends of the drag link, remove the cotter pins and castle nuts from the ball studs. See **Fig. 6**.



1. Grease Fitting
2. Ball-Stud Cover
3. Tapered Ball Stud
4. Castle Nut
5. Drag Link
6. Cotter Pin
7. Dust Cap
8. Front Axle
9. Pitman Arm
10. Steering Gear
11. Axle Steering Arm

Fig. 6, Drag Link Removal/Installation

3. Using a ball-stud removal tool, disconnect the drag-link ball studs from the pitman arm and the axle steering arm.

⚠ CAUTION

Use care when removing the ball stud cover with a screwdriver. Damage to the sealing surface of the socket forging could occur.

4. Using a screwdriver, press or tap on the flanged portion of the ball-stud cover and remove it from the ball-stud socket assembly.
5. Using a clean rag, wipe off all grease and dirt from around the ball stud and socket throat.

6. At each end of the drag link, grease the socket throat and ball stud with a multipurpose chassis grease NLGI Grade 2 (8% 12-hydroxy lithium stearate grease) or NLGI Grade 1 (6% 12-hydroxy lithium stearate grease). Using the same grease, fill the new ball-stud covers three-quarters full.

NOTE: NLGI Grade 2 grease is preferred.

7. Position the socket assembly in a large vise or on a press so that the ball stud is perpendicular to the socket stem.

⚠ CAUTION

Do not use a screwdriver, chisel, or punch (or any other sharp-pointed tool) to install the ball stud cover. Using these types of tools could cut and damage the cover.

IMPORTANT: To install the ball-stud cover, use a section of tubing that has an inside diameter as close as possible to the outside diameter of the cover. Also, make sure that the inside edge of the tube is chamfered (angled) to avoid cutting the rubber stud cover.

8. Using a section of suitable tubing, press on the new ball-stud cover. The cover is in place when the flanged portion of the cover is seated on the machined section (sealing face) of the socket forging.

⚠ CAUTION

Do not apply excessive pressure when pressing on the seal. Too much pressure during installation could deform the cover and result in incorrect sealing.

9. Insert the axle-end ball stud up through the bottom of the axle steering arm, then install the castle nut, finger-tight.
10. Connect the other end of the drag link to the pitman arm, making sure the ball stud is facing outboard. Tighten the castle nut finger-tight.
11. Tighten both of the castle nuts:
    - *3/4–16:* 90 to 170 lbf·ft (122 to 230 N·m)
    - *7/8–14:* 160 to 300 lbf·ft (217 to 407 N·m)

    If needed, continue tightening each nut until a slot on the nut aligns with the hole in the ball stud. *Do not back off the nut to align it with the cotter pin hole.*

⚠ WARNING

Install and lock new cotter pins in the ball studs and nuts. Failure to do so could result in disengagement of the components, causing loss of steering control, which could result in personal injury and property damage.

12. Install and lock a new cotter pin in each of the ball studs and castle nuts.
13. If the front wheels were turned, turn the steering wheel so the tires are pointing straight ahead.
14. Check the ball-stud covers on the tie rod. If they are deteriorated, go to "Tie-Rod End Replacement;" otherwise, remove the chocks from the tires.

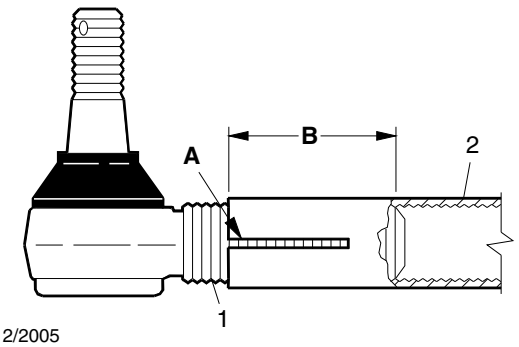
Tie-Rod End Replacement

IMPORTANT: Before replacing the tie rod ends, make sure the tires are pointing straight ahead. Do not turn the steering wheel at any time during this procedure.

1. With the tires straight ahead, and using a ball-stud removal tool, disconnect the tie rod cross tube from the right- and left-side axle steering arms.
2. Put the cross tube in a suitable vise and remove the tie-rod ends from it.
   - 2.1 At one end of the cross tube, count and record the number of tie-rod-end threads showing outside the cross tube.
   - 2.2 Remove the pinch bolt and nut from the cross-tube clamp. Rotating the clamp (unless it's tack-welded) around the cross tube aids in the removal of the pinch bolt and nut.
   - 2.3 Remove the tie-rod end from the cross tube.
   - 2.4 Repeat the procedure at the other end of the cross tube.
3. Install the new tie-rod ends in the cross tube.

   NOTE: The cross tube has right-hand threads on one end, and left-hand threads on the other.

   - 3.1 Install the new tie-rod ends in the cross tube, making sure they are installed to the approximate depth of the previously removed tie-rod ends. See **Fig. 7**. Refer to the number of threads exposed in the old ends.



NOTE: Clamp and pinch bolt not shown for the sake of clarity.

A. No open space in the cross arm slot.
B. Tie-rod end to be installed to the same depth as before removal.

1. Exposed Threads On Tie-Rod End
2. Cross Tube

Fig. 7, Installing Tie-Rod Ends

IMPORTANT: The tie-rod ends must be installed in the cross tube ends at a depth greater than the slots in the tube. Both ends must be installed to the same depth.

- 3.2 Install the pinch bolts and nuts in the cross-tube clamps. Tighten them as follows:
  - *5/8–11:* 40 to 60 lbf·ft (55 to 81 N·m)

- *3/4–10:* 155 to 175 lbf·ft (211 to 237 N·m)

4. Connect the tie-rod cross tube to the axle steering arms. Install the castle nuts and tighten them to the applicable torque value in **Table 1**.

Castle Nut Torque Values	
Castle Nut Size	**Torque: lbf·ft (N·m)**
7/8–14	160 to 300 (217 to 406)
1–14	250 to 450 (339 to 610)
1-1/8–12	350 to 650 (475 to 881)
1-1/4–12	500 to 675 (678 to 915)

Table 1, Castle Nut Torque Values

5. Pump multipurpose chassis grease NLGI Grade 1 (6% 12-hydroxy lithium stearate grease) or NLGI Grade 2 (8% 12-hydroxy lithium stearate grease) into the tie-rod ends until grease flows out of the ball-stud necks. Wipe off the excess grease.

NOTE: NLGI Grade 2 grease is preferred.

6. Do a front-wheel toe-in alignment procedure. For instructions, see **Group 33** in the vehicle workshop manual.
7. Remove the chocks from the tires.

Warranty

Normal warranty applies. See **Table 2** for damage code and time guide information. Enter this bulletin number in the story of the claim. To enter the failed part number for the tie-rod ends or the drag-link ball-stud covers, refer to the vehicle specifications or PartsPro.

Damage Code and Time Guide Information			
Damage Code	**Operation Number**	**Description**	**Time: hours**
531-001064180	SRT 400-5000A	Drag Link Boots, R/R	0.5
400-000611740	SRT 400-5000B	Tie Rod Ends, R/R	1.6

Table 2, Damage Code and Time Guide Information

NOTE:

Component Code / VMRS = 015-004-010 ROD - STEERING CONNECTING (DRAG LINK)

Component Code / VMRS = 015-004-023 TIE ROD END ASSEMBLY - RIGHT

Component Code / VMRS = 015-004-024 TIE ROD END ASSEMBLY - LEFT