

7/27/2012

Cottrell Customer Name
Cottrell Customer Address

NOTICE: Defect Information Report, in accordance with 49 CFR §573.6, concerning field recall actions 10E-057 and 11E-015, Remedy modification and population correction.

Meritor File: C11AA NHTSA File No.: 12V-370

Dear Cottrell Customer:

Based on information provided by Meritor, Cottrell has decided that a defect which relates to motor vehicle safety exists in certain Meritor TL Series trailer axles originally equipped with FAG brand bearing units supplied by Schaeffler Group USA Inc. that were supplied by Meritor from April 2005 through October 2010.

Description of Defect

Meritor previously contacted you about the FAG brand unitized bearing system. (See enclosed letter dated 2/22/2011). As Meritor mentioned at that time, the FAG brand unitized bearing system exhibits low durability life in certain vehicle applications. Prolonged use of the system in these applications can result in degradation of the bearing grease, thereby potentially resulting in a bearing failure and subsequent wheel-end fire. While implementing the repair procedures described in those communications, Meritor determined that the subject TL axles may exhibit the following conditions:

- False Shoulder - Road debris not removed during the original repair procedure can create a false shoulder on the seal journal. This condition can interfere with the seal journal, leading to seal wear, water ingress and bearing distress.
- Lack of Lubrication - Insufficient grease being packed in the hub during the original repair procedure can lead to unlubricated wheel seals which, in turn, can then lead to seal wear, water ingress and bearing distress.

Both of the above conditions can lead to field performance issues, including a wheel separation, which could lead to loss of vehicle control, property damage and/or personal injury. As a result, Meritor is modifying the repair procedures as described in detail below.

Recommended Action

Based on information provided by Meritor, Cottrell recommends that owners of trailers originally equipped with suspect axles contact ONTRAC immediately and ask to undertake remedial actions as described in the attached procedure TP1128 (for units that have *not* been repaired using the original repair procedures) or TP1268 (for units that have been repaired using the original repair procedures). If the ABS system warning light on the instrument panel illuminates, it may be an indication of the wheel end prematurely wearing out. All ABS system warnings need to be investigated as soon as possible.

The original TL type hub will be replaced with a conventional design hub as the remedy. The conventional design hub assembly will require at a minimum an annual inspection and lubrication

replacement. This program will be managed by Meritor, and will be at no expense to vehicle owners.

Identification of Affected Parts

The suspect population information containing the trailer serial numbers in your fleet is attached with this notification. Vehicle owners are requested to provide VIN information and In-Service Dates for the corresponding serial numbers for tracking field actions.

The requested information is to be forwarded to:

Phone: 1-866-668-7221 - OnTrac Performance Plus Call Center, follow the menu system for the appropriate language and select option number 5

Fax: 248-435-5580

Email: ontrac@Meritor.com

Availability of Replacement Parts and Service Instructions

Conventional hubs intended as replacement for original TL series hubs, are now available. Vehicle Owners or repair facilities should obtain replacement parts by contacting the Meritor OnTrac Customer Service Call Center using any of the above methods.

Parts, Labor and Handling Allowance

The following are the details of allowances relating to parts, labor and handling available to vehicle owners:

- ☐ For installation of new conventional hubs, Meritor will reimburse at the repair facility standard warranty repair rate of up to 3 hours per axle for replacement of hubs.
- ☐ For conversion of previously installed conventional hubs, Meritor will reimburse at the repair facility standard warranty repair rate of up to 3.5 hours per axle.

Claims for Credit

Meritor will accept warranty claims for inspecting and replacing the suspect hub units associated with this notice directly from the vehicle owners and repair facilities. In order to receive proper credit, such claims must contain the following information at the time of submission:

- ☐ Reference to Meritor Campaign ID Number : C11AA
- ☐ Reference to NHTSA Campaign ID Number : 12E-015
- ☐ Reference to the vehicle manufacturer's campaign number (optional)
- ☐ 17-digit vehicle identification number (VIN)
- ☐ Axle model and serial number
- ☐ Vehicle owner's name, address, and telephone number
- ☐ Vehicle in-service date
- ☐ Vehicle repair date
- ☐ Vehicle mileage at the time of repair (if available)
- ☐ Repair facility work order number
- ☐ Repairing facility name, address, and telephone number
- ☐ Total labor hours required performing the work, not to exceed agreed amount

☐ Repair facilities hourly rate

Failure to provide complete information will delay processing of the claim.
Questions relating to claims, replacement parts delivery and parts disposition can be addressed to the Meritor OnTrac Customer Support Center using any of the below methods.

Phone: 1-866-668-7221 - OnTrac Performance Plus Call Center, follow the menu system for the appropriate language and select option number 5

Fax: 248-435-5580

Email: ontrac@Meritor.com

Communication

If you conclude that Meritor 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
1200 New Jersey, S.E.
Washington, D.C. 20590

- or -

Call the toll free Vehicle Safety Hotline: 1-888-327-4236; (TTY: 800-424-9153
or go to <http://www.safercar.gov>

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

Sincerely,

Jeff Waggoner
Customer Service Specialist

Attachments: All Meritor Recall Information



MERITOR

Technical Bulletin

Replacing Bearing Cartridge Wheel Ends with Conventional Bearing Wheel Ends

Meritor TL Series Trailer Axles Equipped with Unitized Wheel Ends

Hazard Alert Messages

Read and observe all Warning and Caution hazard alert messages in this publication. They provide information that can help prevent serious personal injury, damage to components, or both.

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.

ASBESTOS AND NON-ASBESTOS FIBERS WARNING

Some brake linings contain asbestos fibers, a cancer and lung disease hazard. Some brake linings contain non-asbestos fibers, whose long-term effects to health are unknown. You must use caution when you handle both asbestos and non-asbestos materials.

CAUTION

Only repair areas on the axle spindle and seal journal with a crocus or emery cloth. Do not use pneumatic or electric power tools, which can excessively remove material from these areas. Damage to components can result.

How to Obtain Additional Maintenance and Service Information

Refer to Maintenance Manual 14, Trailer Axles. To access this publication, visit Literature on Demand at meritor.com.

How to Obtain Parts

Call the Meritor OnTrac Customer Service Center at 866-OnTrac1 (668-7221) to obtain service parts for the C11AA campaign.

How to Obtain Tools

Call Meritor's Commercial Vehicle Aftermarket at 888-725-9355.

Replacement Procedures for Campaign C11AA

This bulletin provides procedures to install conventional bearing wheel ends on Meritor TL Series trailer axles equipped with bearing cartridge wheel ends.

Remove the TL Series Bearing Cartridge Hub

1. Wear safe eye protection. Park the vehicle on a level surface. Block the wheels to prevent the vehicle from moving. Set the parking brake.
2. Raise the trailer until the tires are off the ground.
3. Place safety stands under the trailer frame or under each axle spring seat. Figure 1.

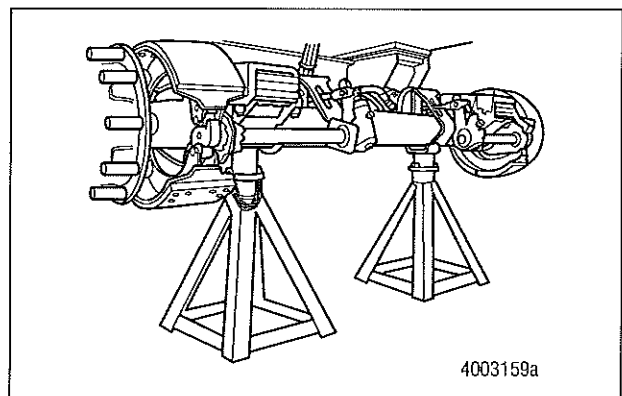


Figure 1

4. Remove the tire and wheel assembly. Refer to the wheel manufacturer's service information for correct procedures. Figure 2.

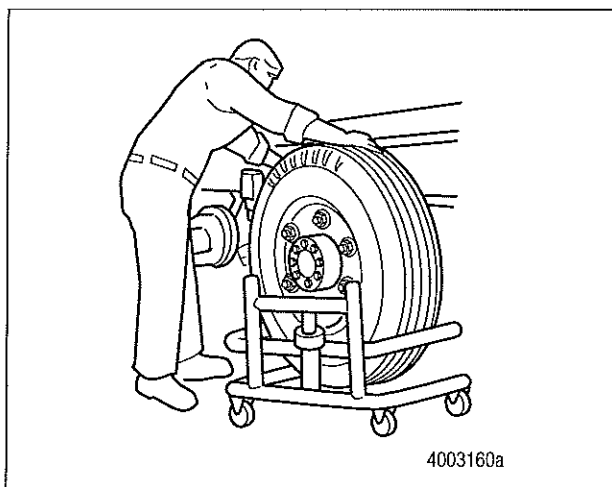


Figure 2

5. De-adjust and release the brakes. Remove the brake drum. Figure 3.

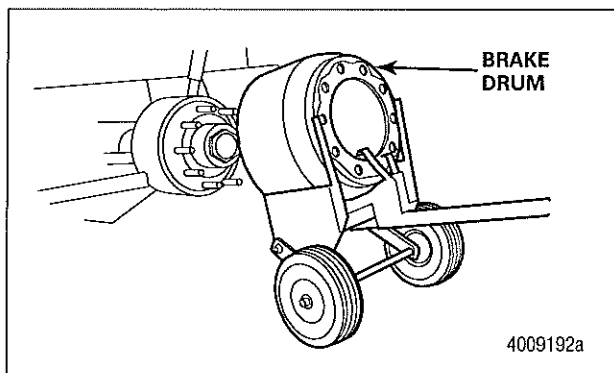


Figure 3

6. Remove the hubcap and hubcap gasket. Figure 4.

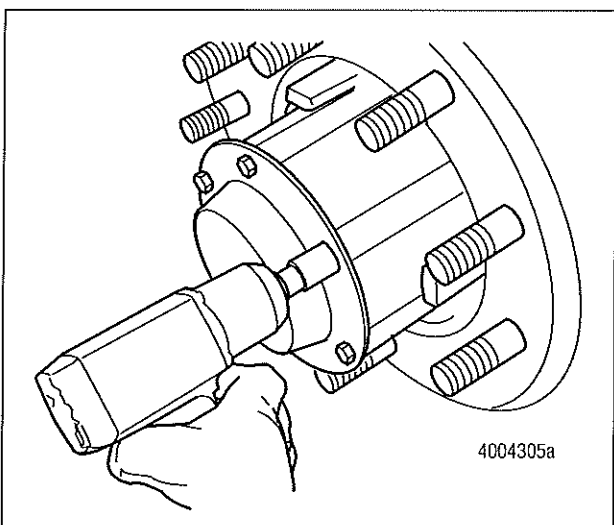


Figure 4

7. Use a small chisel or screwdriver to lever back the retaining washer flange from where it was staked to the spindle nut slots. The retaining washer flange must be completely clear of the spindle nut flange. Figure 5.

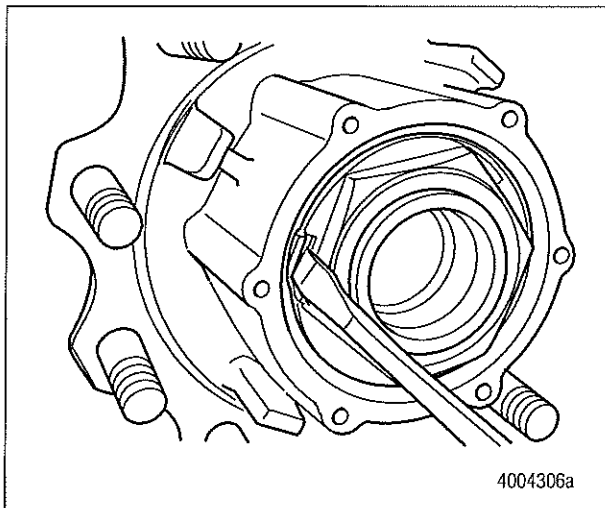


Figure 5

8. Wear gloves to protect your hands from sharp edges on the retaining washer. Remove the spindle nut and retaining washer. Due to the high installation torque, a torque multiplier is recommended for removing the spindle nut. Figure 6.

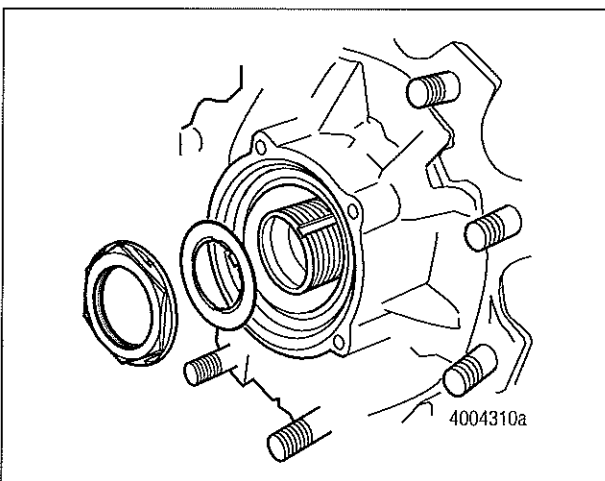


Figure 6

CAUTION

Always use a metal plate at the end of the spindle when you use a puller to remove a hub to prevent damage to the spindle end plug.

9. Either loosen the hub from the spindle by hand or use a puller to remove the hub from the axle spindle as follows. Figure 7.
 - A. Install a metal plate onto the end of the spindle.

- B. Attach a three-pronged puller to the hub.
- C. While holding the puller screw stationary, spin the hub to break it free from the axle.
- D. Remove the puller from the axle.

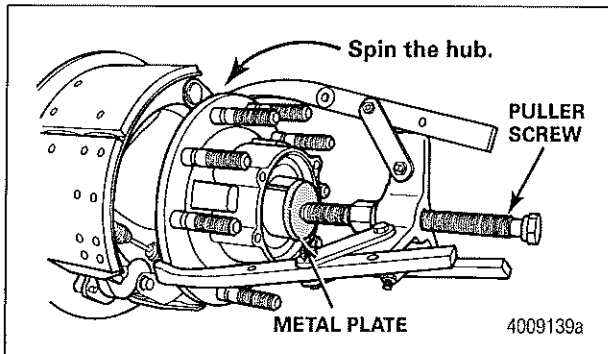


Figure 7

⚠ CAUTION

The TL Series unitized hub bearing cartridge is pressed into the hub. The cartridge is non-serviceable. Do not try to remove the bearing cartridge from the hub. Damage to components can result. You must remove the hub and bearing cartridge as a unit.

10. Pull the hub as straight as possible off the spindle to avoid dislodging the clip inside the hub bore. Do not try to remove the outer bearing. The bearings should be removed together with the hub. Discard the inner bearing O-ring, if present. Figure 8 and Figure 9.

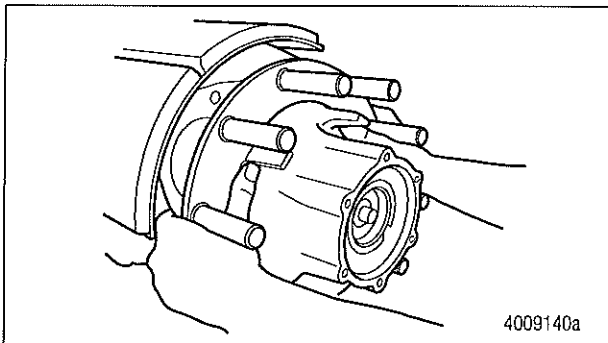


Figure 8

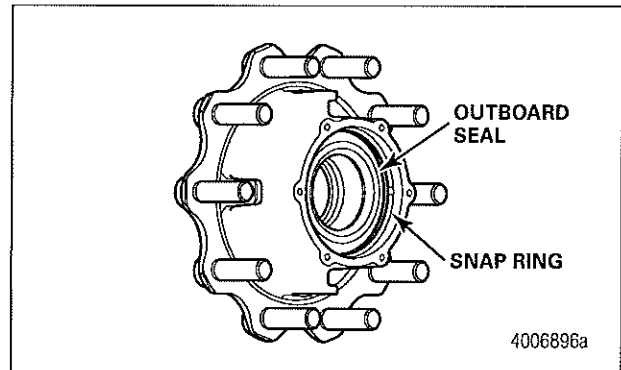


Figure 9

Clean and Inspect the Spindle

⚠ WARNING

Solvent cleaners can be flammable, poisonous and cause burns. Examples of solvent cleaners are carbon tetrachloride, and emulsion-type and petroleum-base cleaners. Read the manufacturer's instructions before using a solvent cleaner, then carefully follow the instructions. Also follow the procedures below.

- Wear safe eye protection.
 - Wear clothing that protects your skin.
 - Work in a well-ventilated area.
 - Do not use gasoline or solvents that contain gasoline. Gasoline can explode.
 - You must use hot solution tanks or alkaline solutions correctly. Read the manufacturer's instructions before using hot solution tanks and alkaline solutions. Then carefully follow the instructions.
1. Clean the axle spindle and oil seal journal by wiping with a clean rag and using solvent. If needed, these areas can be cleaned using emery or crocus cloth. Do not use pneumatic or electric power tools. Figure 10 and Figure 11. Figure 12 and Figure 13 are before and after cleaning examples.

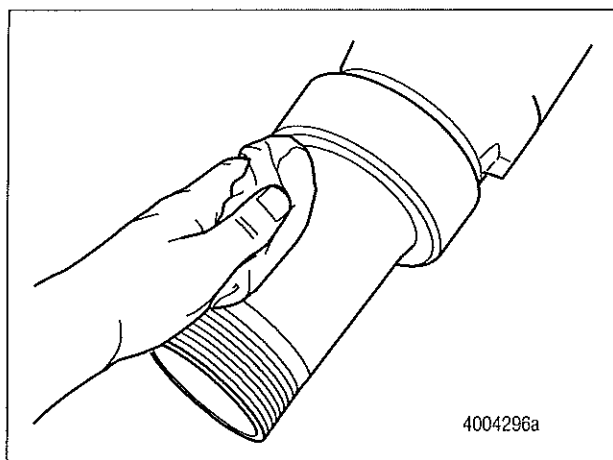


Figure 10

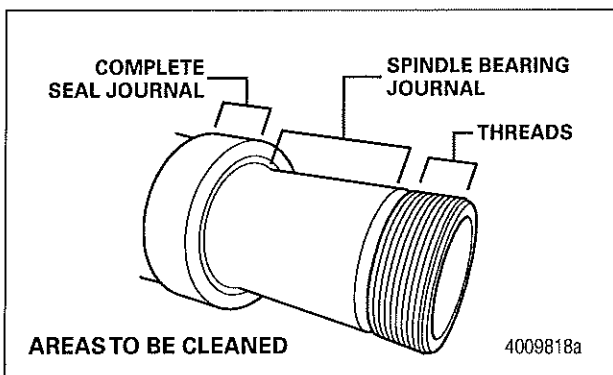


Figure 11

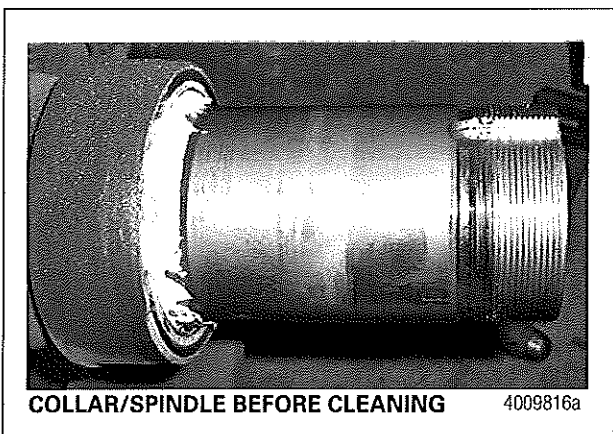
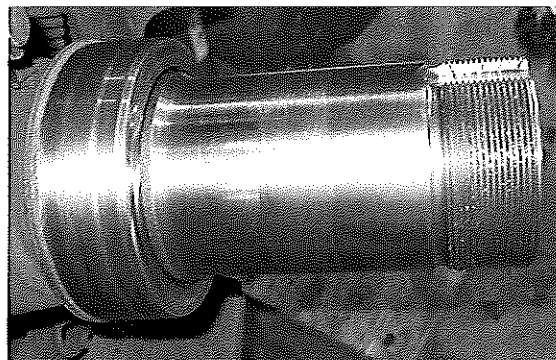


Figure 12



COLLAR/SPINDLE AFTER CLEANING

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Figure 13

2. Check the axle spindle and seal journal for scratches, nicks or wear marks. Repair them with a crocus or emery cloth. Do not use pneumatic or electric power tools. Figure 14.

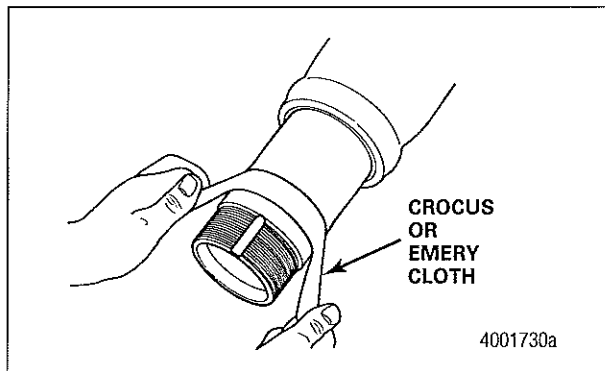


Figure 14

⚠ CAUTION

The seal journal must be clean and free from nicks, flat spots, rust and debris. If not cleaned correctly, the seal journal can cause seal damage, resulting in damage to components.

3. Verify the complete and entire seal journal is clean the full 1.32-inch (33.53 mm) width of the seal journal. The new seal provided in this kit will sit further inboard on the seal journal than the previous seal. Therefore, it is important that the entire seal journal be thoroughly clean.
4. Measure the collar to ensure the diameter is 4.625-4.630-inches (117.48-117.6 mm). Figure 15.
 - If the collar diameter is below 4.625-inches (117.48 mm) after cleaning: Replace the axle.

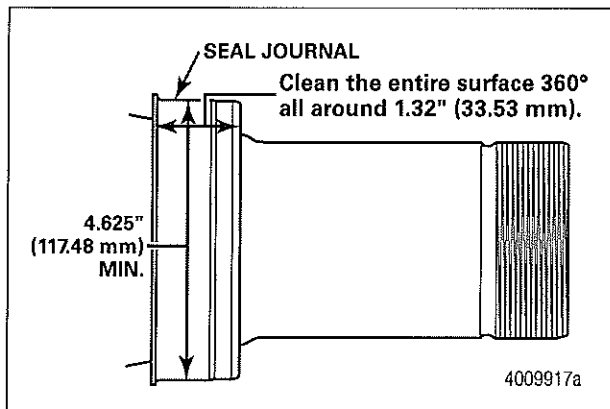


Figure 15

⚠ CAUTION

Remove all debris from the joint between the hub and axle backup collar. Debris in this joint can cause the hub to lose clamp load. Damage to components can result.

5. Use your finger to verify that the hub side of the axle backup collar is clear of debris. Use a clean rag and solvent to clean, as needed. Figure 16.

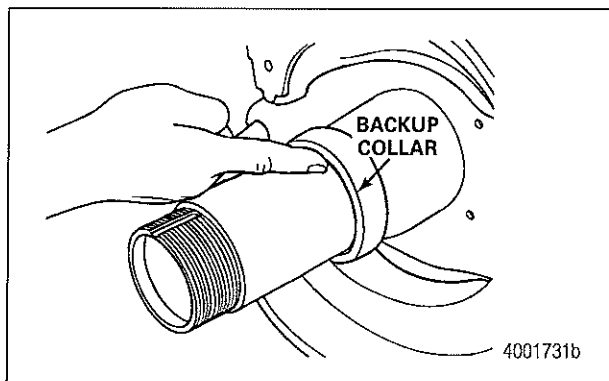


Figure 16

6. Check and clean the spindle threads. Figure 11.
 - If the threads are not free running and no more than two threads are damaged: Repair the threads with a thread file, Snap-On® part number TTFM932, or equivalent.
 - If there are more than two threads damaged: Replace the axle beam. Refer to Maintenance Manual 14 for the procedures.
7. Apply a light coat of oil to the spindle.
8. Install the inner bearing cone on the spindle and push it tight against the seal journal. While holding the bearing cone tight against the seal journal, ensure the bearing cone touches the seal journal all 360 degrees around. Figure 17.

- If the bearing cone cannot be evenly seated: Pull off the bearing cone. Inspect the collar and spindle for debris and excessive wear.
- If the spindle and collar cannot be adequately cleaned for the bearing cone to seat correctly: Replace the axle.

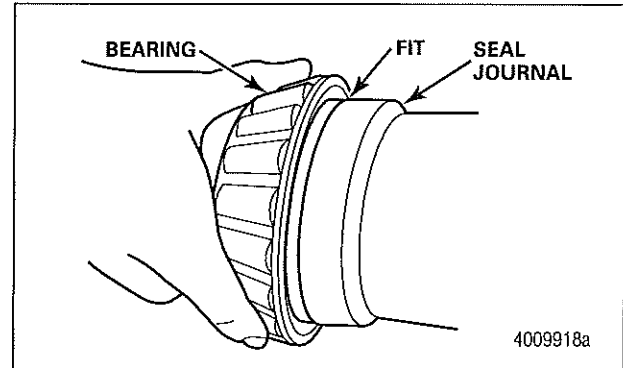


Figure 17

Install the Conventional Wheel End

1. If the axle is equipped with ABS, check the condition of the sensor and pull it fully forward on its mounting block.
2. Apply a light coat of approved oil to the spindle bearing journal and outside diameter of the seal journal. Figure 18.

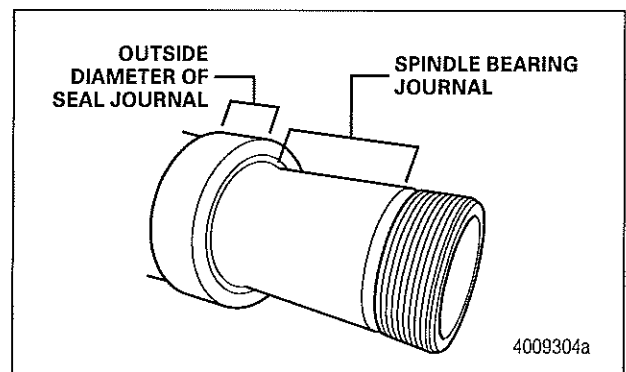


Figure 18

3. Oil and install the inner bearing cone and then the hub seal in the hub. Use the following steps to install the seal.
 - A. Lubricate the seal according to the following recommendations, then place the seal with the "AIR SIDE" towards the installation tool, Stemco® tool number 551-5412. Figure 19.

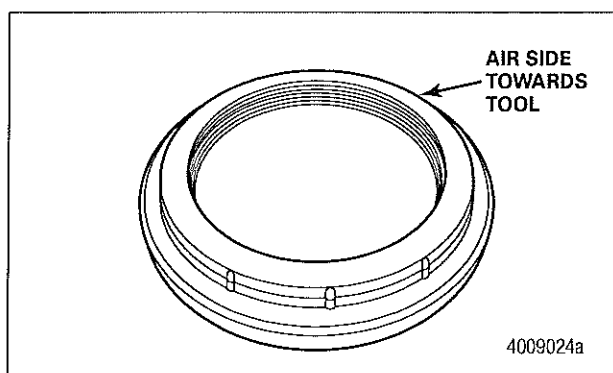


Figure 19

- B. Apply a light smear of oil to the outer bore of the seal.
- C. Align the seal and tool with the hub seal bore and drive the seal until it bottoms out in the hub seal bore. Figure 20.

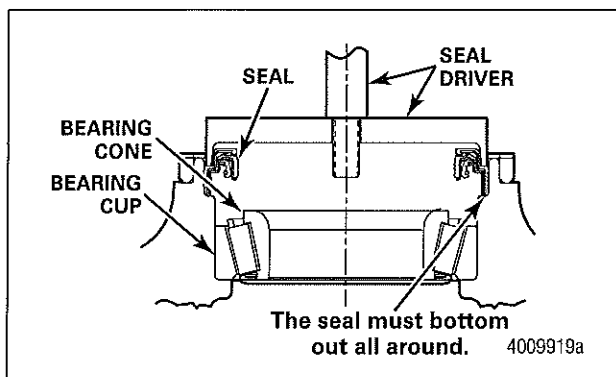


Figure 20

- D. Rotate the tool and apply several light blows to ensure the seal is correctly seated. The seal should be square to the hub all around.
 - E. Check the inner bearing to verify it rotates freely.
4. Apply a light coat of oil the seal's inner bore.

⚠ WARNING

Take care when using lifting devices during service and maintenance procedures to avoid serious personal injury and damage to components. Inspect a lifting strap to ensure that it is not damaged. Do not subject the lifting straps to shocks or drop-loading.

⚠ CAUTION

When you tighten the spindle nuts, the hub will seat to the correct position. Do not try to completely seat the hub by hand. Damage to components can result.

5. Support the hub using an appropriate method. Align and install the hub onto the spindle. The hub must be supported correctly or damage to the spindle threads or seal can occur. Figure 21.

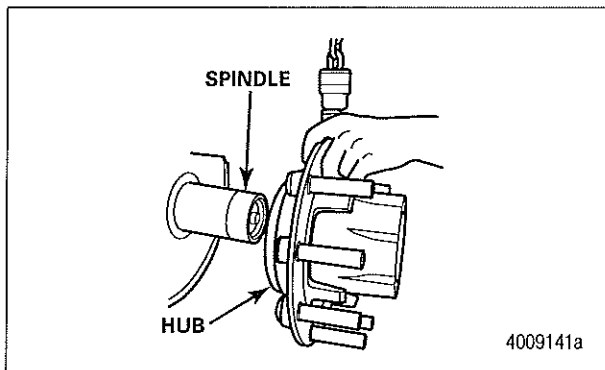


Figure 21

6. Align the hub bore with the spindle and push the hub assembly into position until the inner bearing cone in the hub bottoms out against the oil seal collar. The bearing cone in the hub will help maintain alignment of the assembly.

⚠ CAUTION

Correctly support the hub before you install the outer bearing. Ensure the hub remains supported during the bearing installation to prevent damage to components.

7. With the hub correctly supported, install the outer bearing cone and adjust the bearings as follows. Do not allow the hub to become unsupported prior to the installation of the outer bearing.
 - A. Install the retaining washer into the hub. Ensure the adjustment indicator markings are facing outwards. Figure 22.

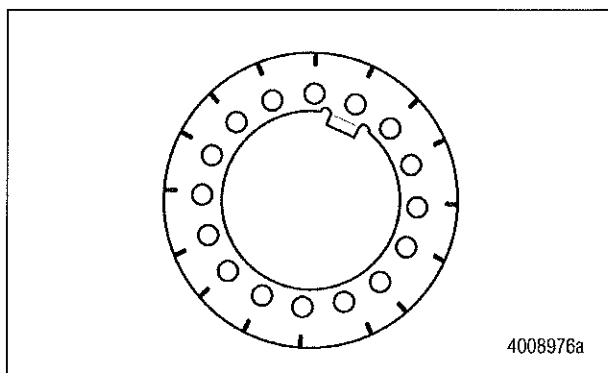


Figure 22

- B. Install the hub retaining nut and tighten until the nut is fully engaged on the spindle thread. Figure 23.

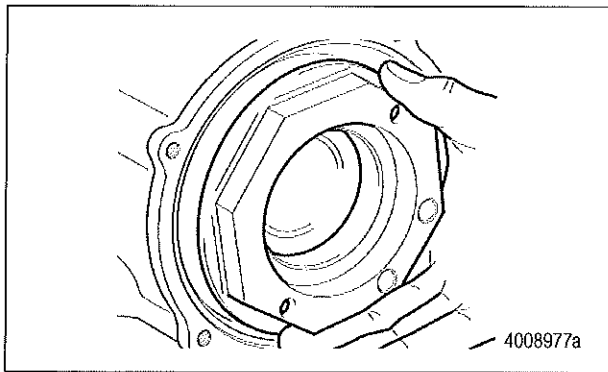




Figure 23

- C. While rotating the hub, use a 4-3/8" eight-sided socket to tighten the nut to 200 lb-ft (272 N•m). The hub **MUST** be rotated three revolutions while the end nut torque is continuously applied. 
- D. Back off the nut two to four flats of the socket, approximately 1/4-1/2 turn, counterclockwise.
- E. Retighten the nut to 50 lb-ft (68 N•m) while rotating the hub assembly three times. 
- F. Back off the nut one flat of the socket, approximately 1/8 turn, counterclockwise.
- G. Rotate the nut in a **CLOCKWISE** direction, in the 'tightening' direction, until the corners of the nut align with the **NEXT** nearest mark on the face of the retaining washer. Figure 24.

- **If the corners of the nut already line up EXACTLY with an index mark:** Do not further rotate the nut.

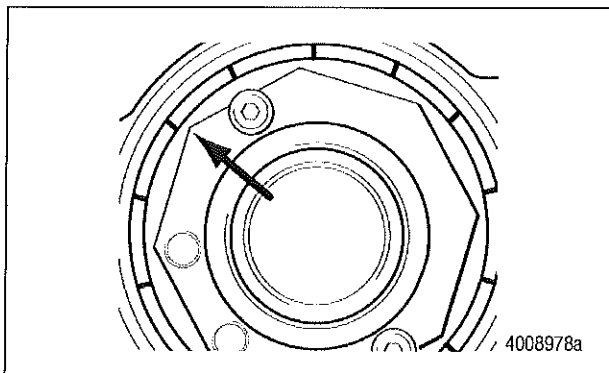


Figure 24

- H. Mark the washer and nut to ensure correct alignment. Figure 25.

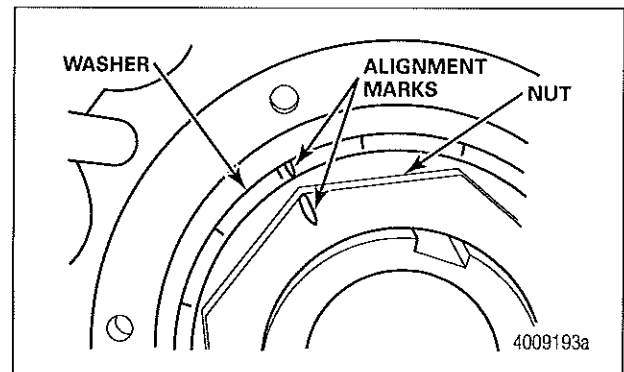



Figure 25

NOTE: The button-head screws include a nylon thread locking patch. The locking properties of this patch are only effective three times during initial assembly and adjustment. Discard these screws once they have been used three times and replace them with new screws.

- I. Install the two button-head screws into the hub retaining nut and tighten evenly until both the heads are flush with the face of the nut. Ensure the marked nut and washer are aligned prior to installing the retaining screws. Ensure the screws correctly engage in the holes in the lock washer.
- J. Use a 5 mm Allen-head socket and torque wrench to tighten the two button-head screws to 11-15 lb-ft (15-20 N•m). Figure 26. 

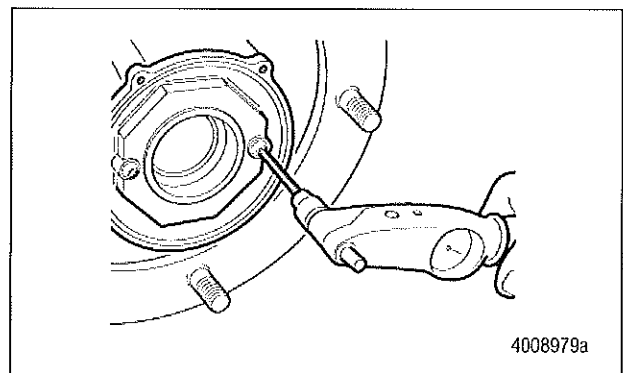


Figure 26

8. Check for free rotation of the hub assembly and inspect the wheel bearing end play as follows.
 - A. Attach the magnetic base of a dial indicator to the spindle. Touch the dial indicator stem to the hubcap gasket face. Figure 27.

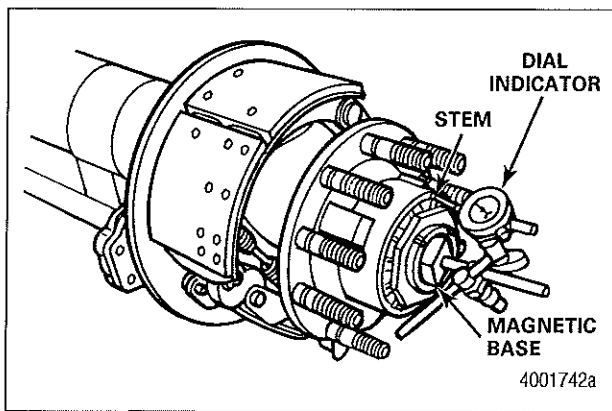


Figure 27

- B. Slightly rotate the wheel end in both directions while pushing inward until the dial indicator does not change. Set the dial indicator to ZERO. Figure 28.

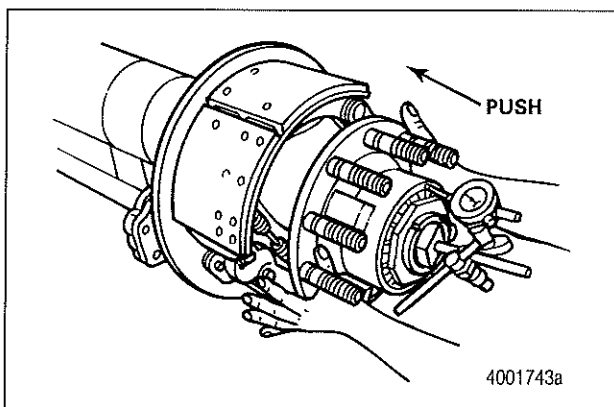


Figure 28

- C. Slightly rotate the wheel end in both directions while pulling outward until the dial indicator does not change. Figure 29.

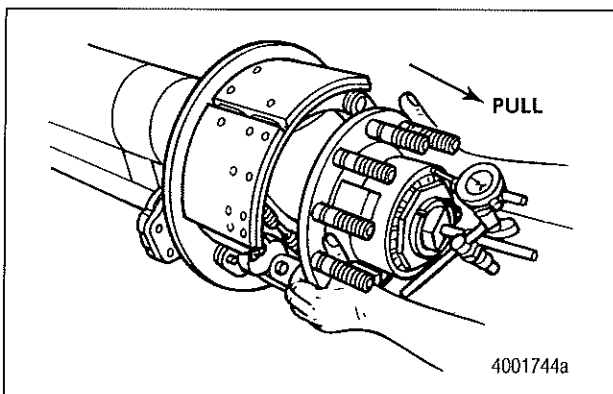


Figure 29

⚠ WARNING

You must adjust wheel bearing end play to within 0.001-0.005-inch (0.025-0.127 mm). An adjustment that is too loose will reduce wheel-end bearing life, increase spindle wear and cause seal leakage. An adjustment that is too tight can affect wheel-end bearing performance. Loss of wheel-end components, serious personal injury and damage to components can result.

- D. End play is the difference between the two readings. Ensure the bearing end play is 0.001-0.005-inch (0.025-0.127 mm).

- If end play is excessive (over 0.005-inch [0.127 mm]): Back off the two screws and retaining nut and restart the procedure at Step 8.
- If end play is too tight (under 0.001-inch [0.025 mm]) or the hub assembly does not rotate freely: Back off the two screws and back the retaining nut off (counterclockwise) by ONE washer tick mark. Reinstall the two screws. Ensure the hub is rotating freely and recheck the end play.

9. Once end play is within specifications, install the hubcap using a new black hubcap gasket. Install the capscrews and tighten them in a crisscross pattern to 15-30 lb-ft (20-41 N•m).

Figure 30. ①

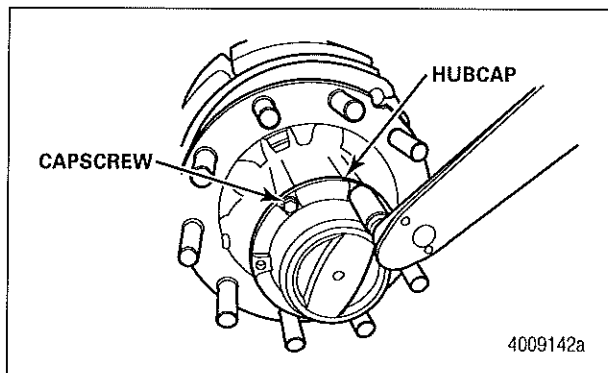



Figure 30

⚠ WARNING

Only add lubricant to the hubcap full line. Do not overfill the wheel-end cavity. Wipe away any excess oil, because it can contaminate the brake linings and affect brake performance. Serious personal injury and damage to components can result.

10. Fill the wheel end with oil as follows.

- A. Fill the wheel end with an approved oil to the hubcap full line, approximately 17 oz. (0.5 liter) per hub. The oil must be given sufficient time to settle prior to a final check of the oil level. This is especially important in cold conditions.
- B. Install the hubcap fill plug and tighten to 15-20 lb-ft (20-27 N•m). Figure 31. 

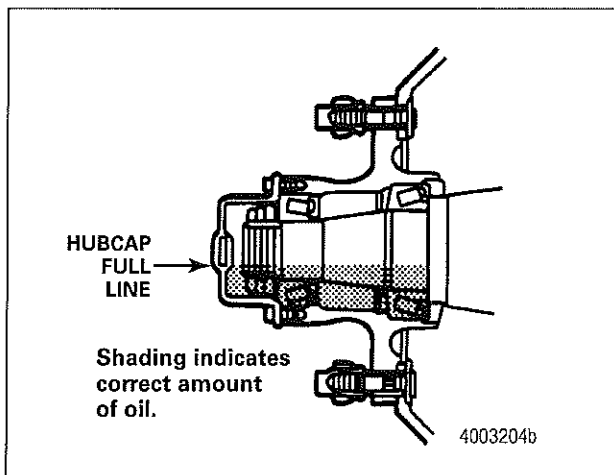


Figure 31

Approved Gear Oil Specification

API GL-5 SAE 80W/90

API GL-5 SAE 75W/90

API GL-5 SAE 75W/140

- C. Inspect the wheel-end oil level at least every 1,000 miles (1600 km). To check, verify that the vehicle is on level ground, then clean the hubcap window and observe the oil level. Add lubricant if the oil level is below the full line.
- 11. If equipped with ABS, ensure the wheel sensor is pushed outward to the hub's ABS ring.
 - 12. Reinstall the tire and wheel assembly. Refer to the wheel manufacturer's service information for correct procedures. Install the tire inflation components, if equipped.



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(16579)



MERITOR

Technical Bulletin

Replacing Grease-lubricated Conventional Bearing Wheel Ends with Oil-lubricated Conventional Bearing Wheel Ends

Meritor TL Series Trailer Axles Equipped
with Conventional Wheel Ends

Hazard Alert Messages

Read and observe all Warning and Caution hazard alert messages in this publication. They provide information that can help prevent serious personal injury, damage to components, or both.

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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.

⚠ ASBESTOS AND NON-ASBESTOS FIBERS WARNING

Some brake linings contain asbestos fibers, a cancer and lung disease hazard. Some brake linings contain non-asbestos fibers, whose long-term effects to health are unknown. You must use caution when you handle both asbestos and non-asbestos materials.

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Refer to Maintenance Manual 14, Trailer Axles. To access this publication, visit Literature on Demand at meritor.com.

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How to Obtain Tools

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Replacement Procedures for Campaign C11AA

This bulletin provides procedures to install conventional bearing wheel ends with oil on Meritor TL Series trailer axles equipped with conventional greased bearing wheel ends.

Remove the TL Series Conventional Hub with Grease

1. Wear safe eye protection. Park the vehicle on a level surface. Block the wheels to prevent the vehicle from moving. Set the parking brake.
2. Raise the trailer until the tires are off the ground.
3. Place safety stands under the trailer frame or under each axle spring seat. Figure 1.

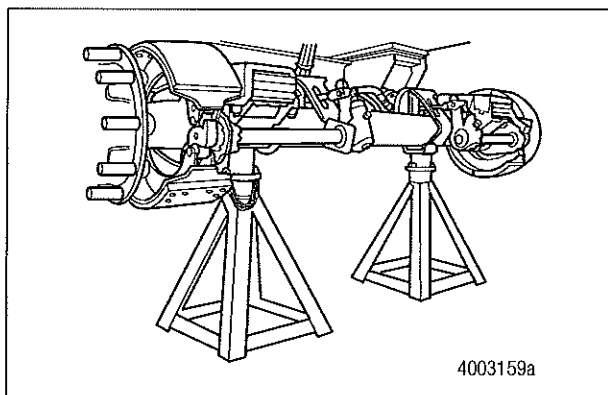


Figure 1

4. Remove the tire and wheel assembly. Refer to the wheel manufacturer's service information for correct procedures. Figure 2.

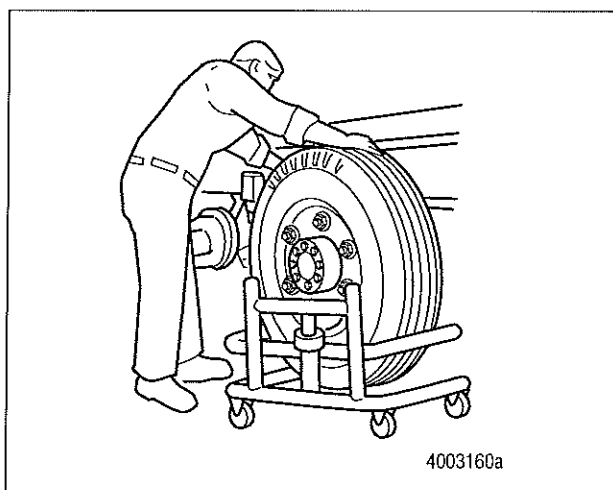


Figure 2

5. De-adjust and release the brakes. Remove the brake drum. Figure 3.

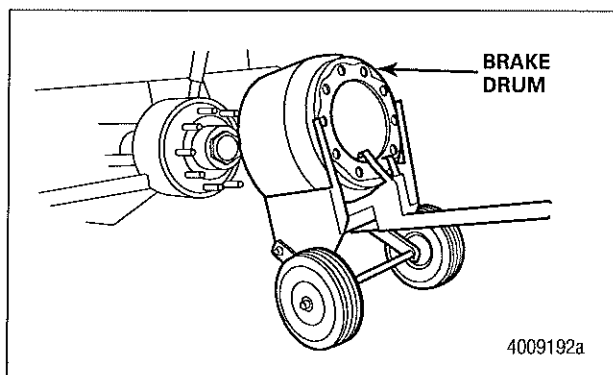


Figure 3

6. Remove the hubcap and hubcap gasket. Figure 4.

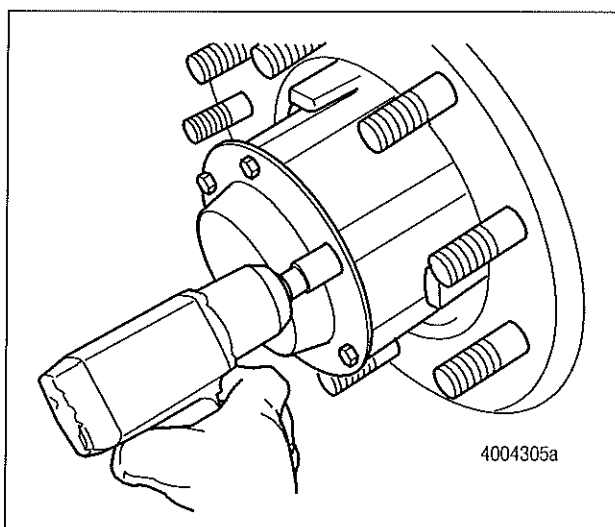


Figure 4

7. Use a 5 mm Allen-head socket and wrench to loosen and remove the two button-head screws. Thoroughly clean them and place them in a clean area. They will be reused during reassembly. Figure 5.

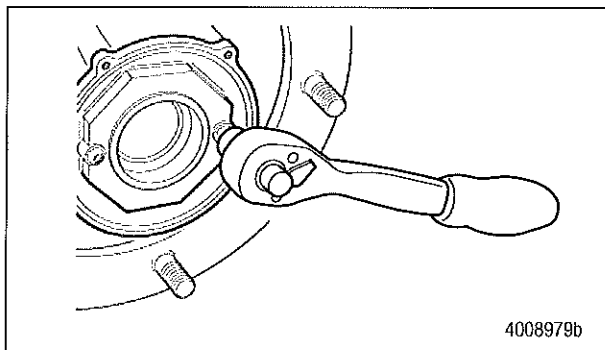


Figure 5

8. Wear gloves to protect your hands from sharp edges on the retaining washer. Remove the spindle nut and retaining washer. Thoroughly clean them and place them in a clean area. They will be reused during reassembly. Figure 6.

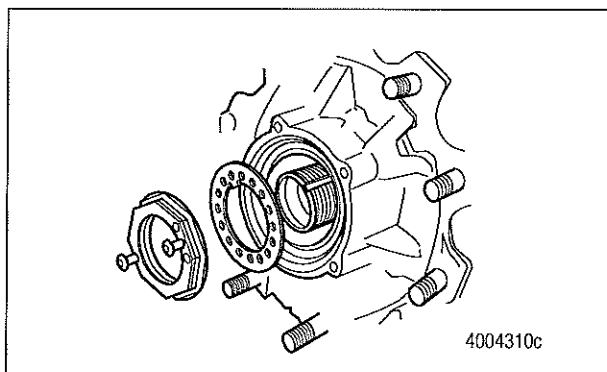


Figure 6

9. Remove the outer bearing and discard. These used bearings will not be reused.

⚠ CAUTION

Always use a metal plate at the end of the spindle when you use a puller to remove a hub to prevent damage to the spindle end plug.

10. Either loosen the hub from the spindle by hand or use a puller to remove the hub from the axle spindle as follows. Figure 7.
 - A. Install a metal plate onto the end of the spindle.
 - B. Attach a three-pronged puller to the hub.
 - C. While holding the puller screw stationary, spin the hub to break it free from the axle.
 - D. Remove the puller from the axle.

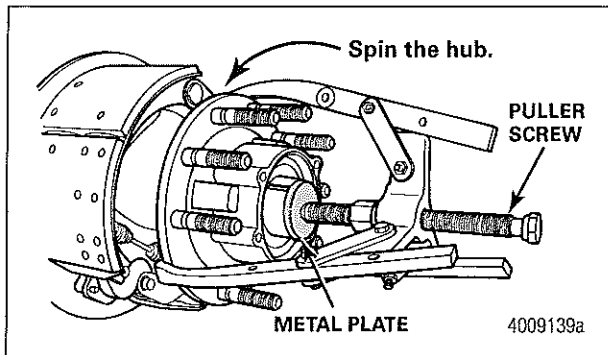


Figure 7

11. Pull the hub as straight as possible off the spindle to avoid damaging the axle spindle. Figure 8.

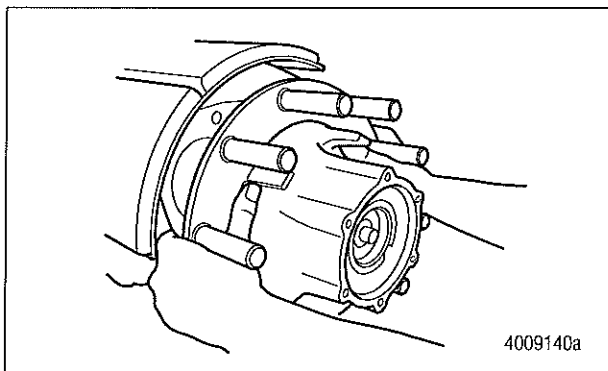


Figure 8

12. Remove the oil seal. This seal must be discarded. Never reuse an oil seal after the hub has been dismantled from the axle. Figure 9.

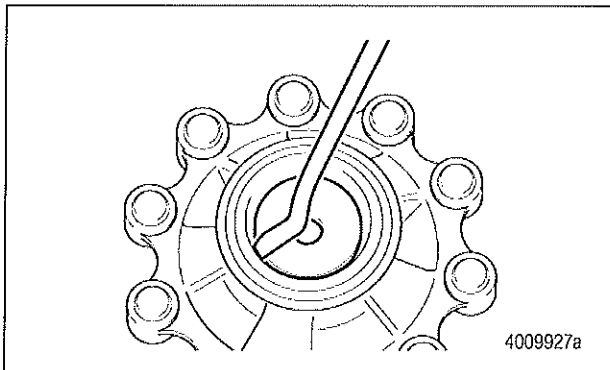


Figure 9

13. Remove the inner bearing and discard. These used bearings will not be reused.

Clean and Inspect the Hub

⚠ WARNING

Solvent cleaners can be flammable, poisonous and cause burns. Examples of solvent cleaners are carbon tetrachloride, and emulsion-type and petroleum-base cleaners. Read the manufacturer's instructions before using a solvent cleaner, then carefully follow the instructions. Also follow the procedures below.

- Wear safe eye protection.
 - Wear clothing that protects your skin.
 - Work in a well-ventilated area.
 - Do not use gasoline, or solvents that contain gasoline. Gasoline can explode.
 - You must use hot solution tanks or alkaline solutions correctly. Read the manufacturer's instructions before using hot solution tanks and alkaline solutions. Then carefully follow the instructions.
1. Use a cloth or parts solvent wash to clean the hub cavity, removing all the old grease and any contamination.
 2. Dry the hub to reduce oxidation build-up.
 3. Inspect the hub thoroughly for any damage to the hub cap gasket face and seal area.
 - If damage exists that cannot be repaired: Replace the hub.

⚠ WARNING

Observe all warnings and cautions provided by the press manufacturer to avoid damage to components and serious personal injury.

⚠ CAUTION

Do not use old cups or cones, or damage to components can result.

4. Use a drift or press with a bearing cup driver to remove the bearing cups from the hub, making sure that the bearing bore within the hub is not damaged. Discard and do not re-use the bearing cups.
5. Make sure the hub cavity is clean, free of grease and free from visual damage, debris, burrs or any oxidation.
6. Inspect the hubcap face and clean any oxidation that is present.

⚠ CAUTION

Bearing cups and cones are clearly marked by manufacturer type for identification. Never assemble a bearing cone using a cup from another manufacturer. Always check that bearing components are new and from the same manufacturer before installation. Damage to components can result.

7. Insert the bearing cups into the hub and using the correct bearing cup driver, Euclid part number E-6040 or O.T.C part number 7180, drive the cup fully home to make sure the cup is seated squarely against the hub shoulder. Figure 10.

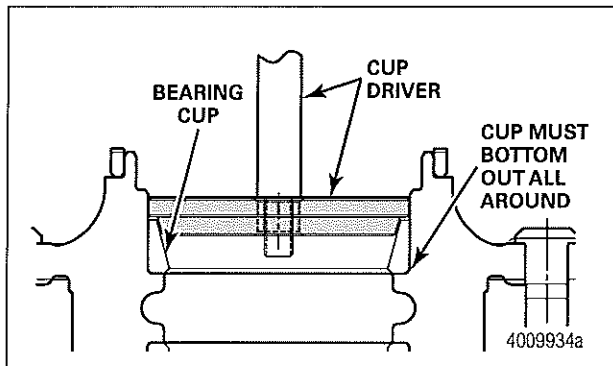


Figure 10

8. Check that the cups are retained correctly by making sure each cup has no axial movement or rotation.

Clean and Inspect the Spindle

1. Clean the axle spindle and oil seal journal by wiping with a clean rag and using solvent. If needed, these areas can be cleaned using emery or crocus cloth. Figure 11 and Figure 12. Figure 13 and Figure 14 are before and after cleaning examples.

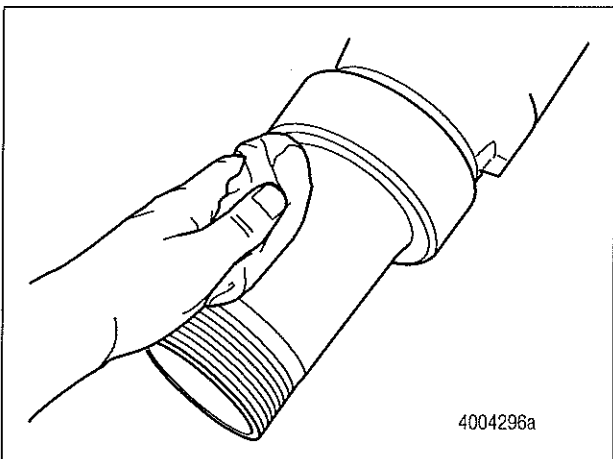


Figure 11

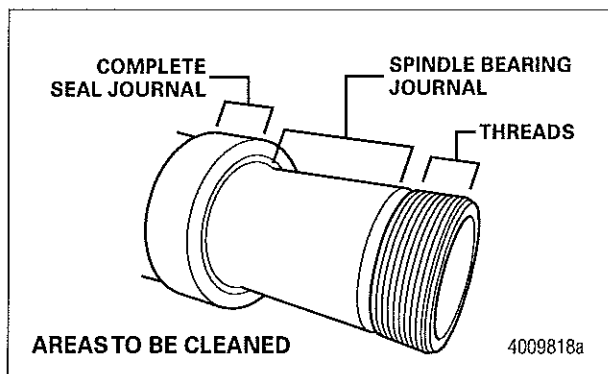


Figure 12

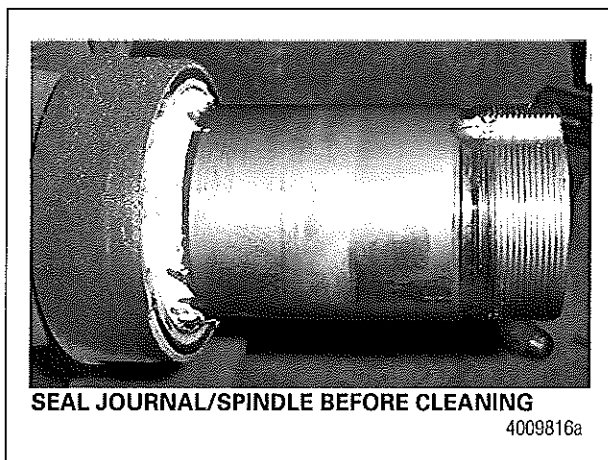


Figure 13

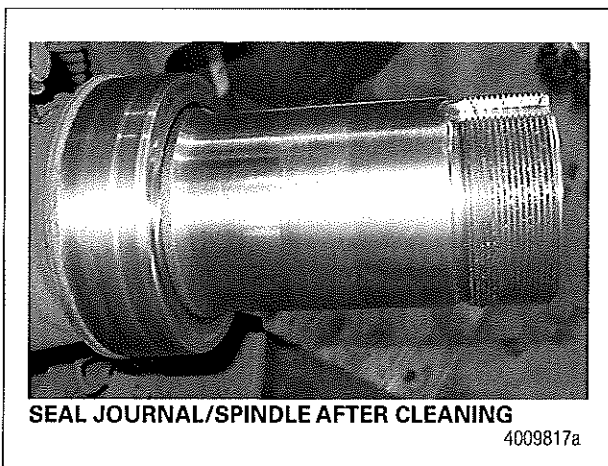


Figure 14

⚠ CAUTION

Do not use pneumatic or electric power tools with a sanding pad to repair the axle spindle and seal journal. These tools can remove too much material and create flat spots. Seal and bearing damage can occur, resulting in damage to other components.

2. Check the axle spindle and seal journal for scratches, nicks or wear marks. Repair them with a crocus or emery cloth or electric power tool and wire brush wheel. Do not use pneumatic or electric power tools with a sanding pad. Using a pneumatic or electric power tool and sanding pad can remove too much material and create flat spots. Figure 15.

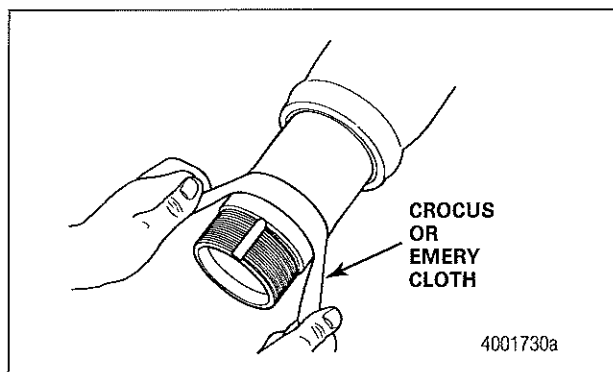


Figure 15

⚠ CAUTION

The seal journal must be clean and free from nicks, flat spots, rust and debris. If not cleaned correctly, the seal journal can cause seal and bearing damage, resulting in damage to components.

3. Verify the complete and entire seal journal is clean the full 1.32-inch (33.53 mm) width of the seal journal up to and including the seal flange.
4. Measure the collar to ensure the diameter is 4.623-4.630-inches (117.42-117.6 mm). Figure 16.
 - If the collar diameter is below 4.623-inches (117.42 mm) after cleaning: Replace the axle.

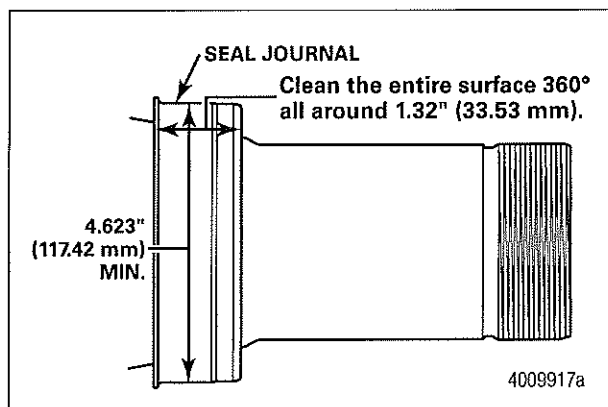


Figure 16

⚠ CAUTION

Remove all debris from the joint between the hub and axle backup collar. Debris in this joint can cause the hub to lose clamp load. Damage to components can result.

5. Use your finger to verify that the hub side of the axle backup collar is clear of debris. Use a clean rag and solvent to clean, as needed. Figure 17.

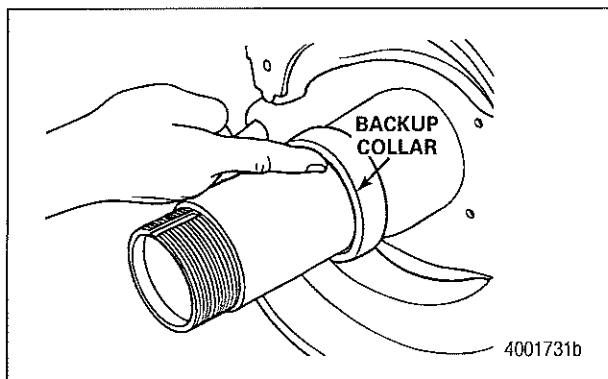


Figure 17

6. Check and clean the spindle threads. Figure 12.

- If the threads are not free running and no more than two threads are damaged: Repair the threads with a thread file, Snap-On® part number TF1FM932, or equivalent.
- If there are more than two threads damaged: Replace the axle beam. Refer to Maintenance Manual 14 for the procedures.

7. Apply a light coat of oil to the spindle and seal journal.

8. Install a new inner bearing cone on the spindle and push it tight against the seal journal. While holding the bearing cone tight against the seal journal, ensure the bearing cone touches the seal journal all 360 degrees around. Figure 18.

- **If the bearing cone cannot be evenly seated:** Pull off the bearing cone. Inspect the collar and spindle for debris and excessive wear.
- **If the spindle and collar cannot be adequately cleaned for the bearing cone to seat correctly:** Replace the axle.

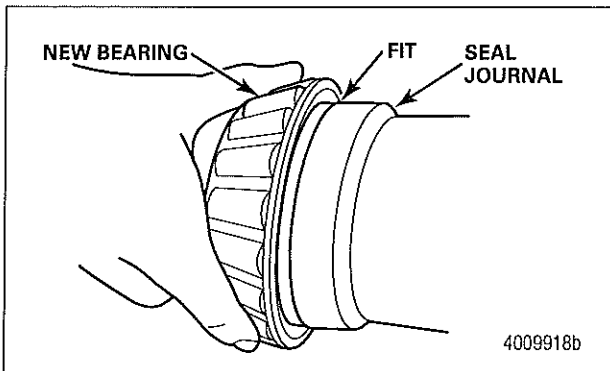


Figure 18

Install the Conventional Wheel End

1. If the axle is equipped with ABS, check the condition of the sensor and pull it fully forward on its mounting block.
2. Apply a light coat of approved oil to the spindle bearing journal and outside diameter of the seal journal. Figure 19.

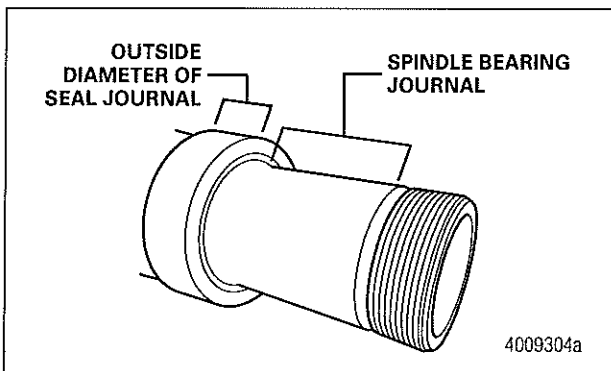


Figure 19

3. Oil and install the new inner bearing cone and the new hub seal in the hub. Use the following steps to install the seal.
 - A. Lubricate the seal according to the following recommendations, then place the seal with the "AIR SIDE" towards the installation tool, Stemco® tool number 551-5412. Figure 20.

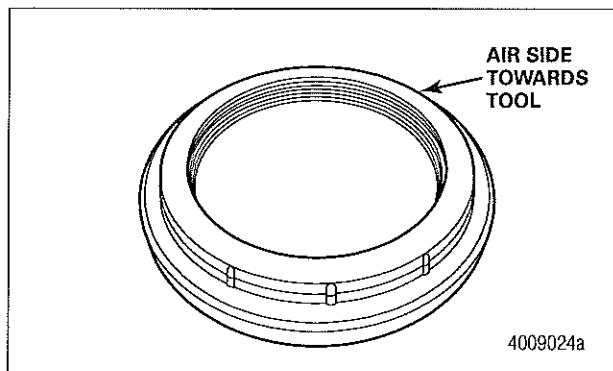


Figure 20

- B. Align the seal and tool with the hub seal bore and drive the seal until it bottoms out in the hub seal bore. Figure 21.

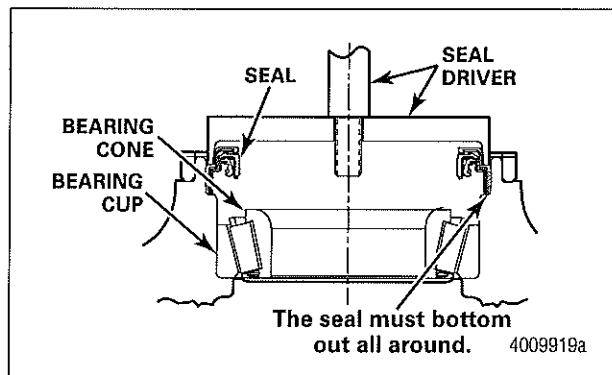


Figure 21

- C. Rotate the tool and apply several light blows to ensure the seal is correctly seated. The seal should be square to the hub all around.
 - D. Check the inner bearing to verify it rotates freely.
 - E. Check the inner seal surface rotates freely after installation in the hub.
4. Apply a light coat of oil the seal's inner bore.

⚠ WARNING

Take care when using lifting devices during service and maintenance procedures to avoid serious personal injury and damage to components. Inspect a lifting strap to ensure that it is not damaged. Do not subject the lifting straps to shocks or drop-loading.

⚠ CAUTION

When you tighten the spindle nuts, the hub will seat to the correct position. Do not try to completely seat the hub by hand. Damage to components can result.

5. Support the hub using an appropriate method. Align and install the hub onto the spindle. The hub must be supported correctly or damage to the spindle threads or seal can occur. Figure 22.

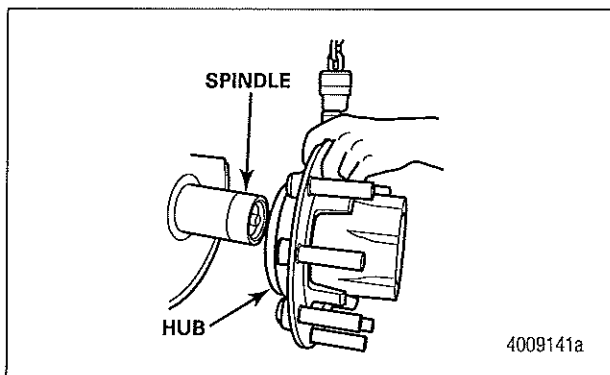


Figure 22

6. Align the hub bore with the spindle and push the hub assembly into position until the seal is started on the oil seal collar.

⚠ CAUTION

Correctly support the hub before you install the outer bearing. Ensure the hub remains supported during the bearing installation to prevent damage to components.

7. With the hub correctly supported, install an oiled outer bearing cone. This will help maintain alignment of the components.
8. Adjust the bearings as follows. Do not allow the hub to become unsupported prior to the installation of the outer bearing.
 - A. Install the retaining washer into the hub. Ensure the adjustment indicator markings are facing outwards. Figure 23.

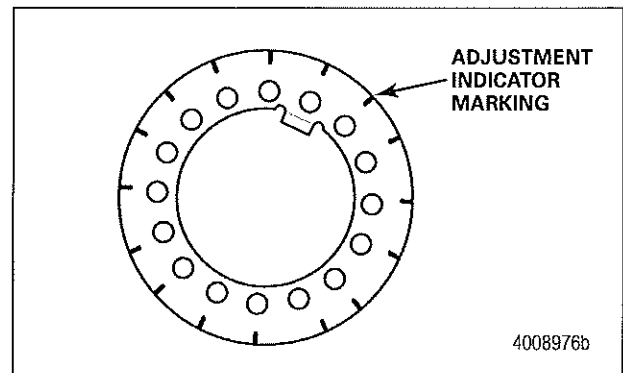


Figure 23

- B. Install the hub retaining nut and tighten until the nut is fully engaged on the spindle thread. Figure 24.

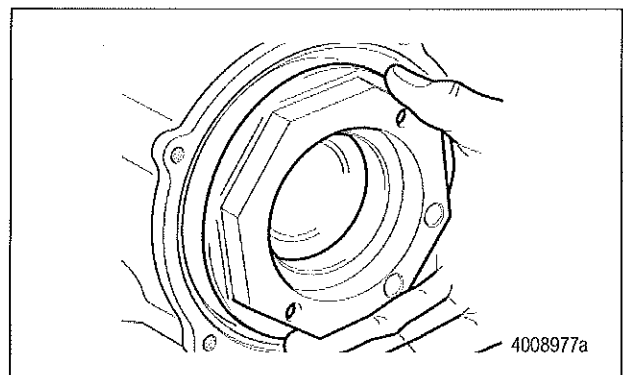


Figure 24

- C. While rotating the hub, use a 4-3/8" eight-sided socket to tighten the nut to 200 lb-ft (272 N•m). The hub **MUST** be rotated three revolutions while the end nut torque is continuously applied. ⚠

⚠ CAUTION

Do not rotate the hub assembly with the retaining nut loose. The bearings can become unseated and damage to components can result.

- D. Back off the nut two to four flats of the socket, approximately 1/4-1/2 turn, counterclockwise. Do NOT rotate the hub assembly with the retaining nut loose or the bearings can become unseated.
- E. Retighten the nut to 50 lb-ft (68 N•m) while rotating the hub assembly a minimum of three times. ⚠
- F. Back off the nut one flat of the socket, approximately 1/8 turn, counterclockwise. Do NOT rotate the hub assembly with the retaining nut loose or the bearings can become unseated.

- G. Rotate the nut in a **CLOCKWISE** direction, in the 'tightening' direction, until the corners of the nut align with the **NEXT** nearest mark on the face of the retaining washer. Figure 25.

- If the corners of the nut already line up **EXACTLY** with an index mark: Do not further rotate the nut.

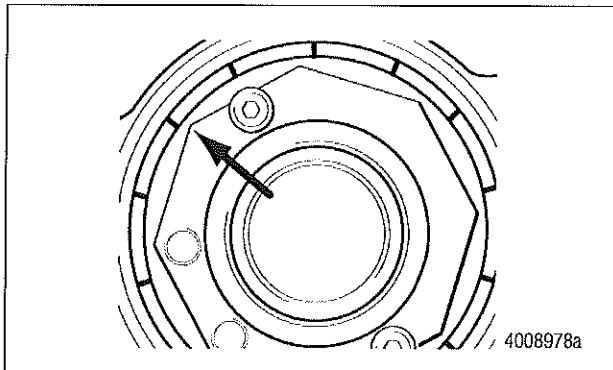


Figure 25

- H. Mark the washer and nut to ensure correct alignment. Figure 26.

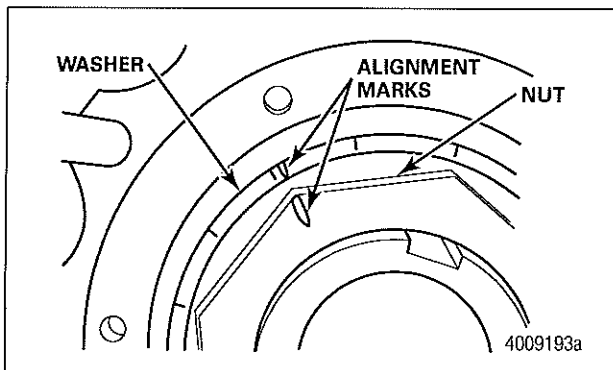



Figure 26

NOTE: The button-head screws include a nylon thread locking patch. The locking properties of this patch are only effective three times during initial assembly and adjustment. Discard these screws once they have been used three times and replace them with new screws.

- Install the two new button-head screws into the hub retaining nut and tighten evenly until both the heads are flush with the face of the nut. Ensure the marked nut and washer are aligned prior to installing the retaining screws. Ensure the screws correctly engage in the holes in the lock washer.
- Use a 5 mm Allen-head socket and torque wrench to tighten the two button-head screws to 11-15 lb-ft (15-20 N·m). Ensure the button-head screws are fully seated flush with the nut face. Figure 27. 

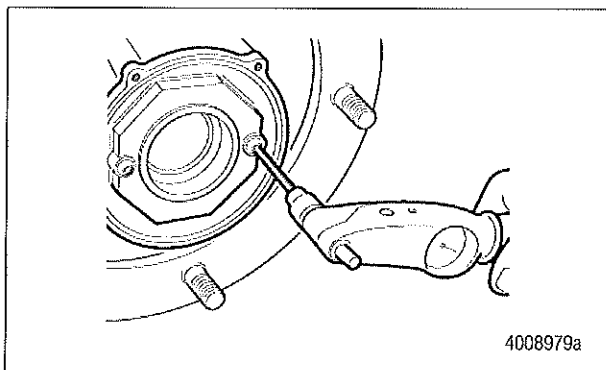


Figure 27

- Check for free rotation of the hub assembly and inspect the wheel bearing end play as follows.
 - Attach the magnetic base of a dial indicator to the spindle. Touch the dial indicator stem to the hubcap gasket face. Figure 28.

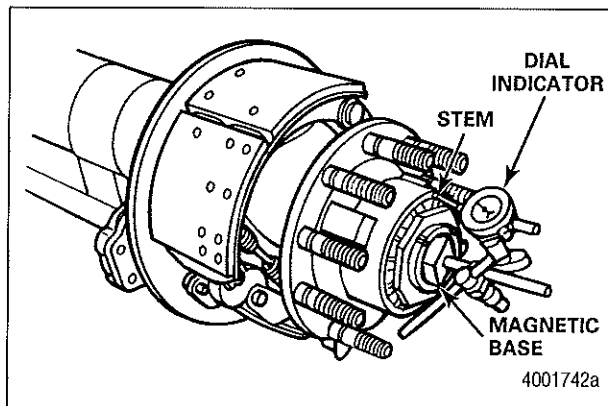


Figure 28

- Slightly rotate the wheel end in both directions while pushing inward until the dial indicator does not change. Set the dial indicator to **ZERO**. Figure 29.

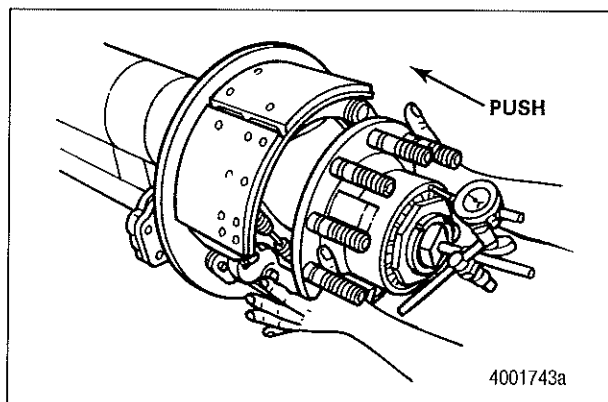


Figure 29

- C. Slightly rotate the wheel end in both directions while pulling outward until the dial indicator does not change. Figure 30.

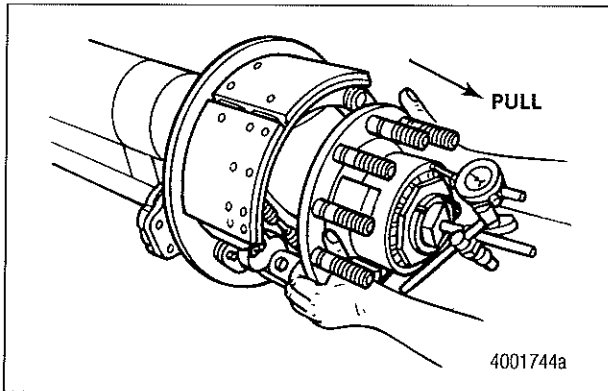


Figure 30

⚠ WARNING

You must adjust wheel bearing end play to within 0.001-0.005-inch (0.025-0.127 mm). An adjustment that is too loose will reduce wheel-end bearing life, increase spindle wear and cause seal leakage. An adjustment that is too tight can affect wheel-end bearing performance. Loss of wheel-end components, serious personal injury and damage to components can result.

- D. End play is the difference between the two readings. Ensure the bearing end play is 0.001-0.005-inch (0.025-0.127 mm).
- If end play is excessive (over 0.005-inch [0.127 mm]): Back off the two screws and retaining nut and restart the procedure at Step 8C.
 - If end play is too tight (under 0.001-inch [0.025 mm]) or the hub assembly does not rotate freely: Back off the two screws and back the retaining nut off (counterclockwise) by ONE washer tick mark. Reinstall the two screws. Ensure the hub is rotating freely and recheck the end play.
10. Once end play is within specifications, install the hubcap using a new black hubcap gasket. Install the capscrews and tighten them in a crisscross pattern to 15-30 lb-ft (20-41 N•m). Figure 31. ①

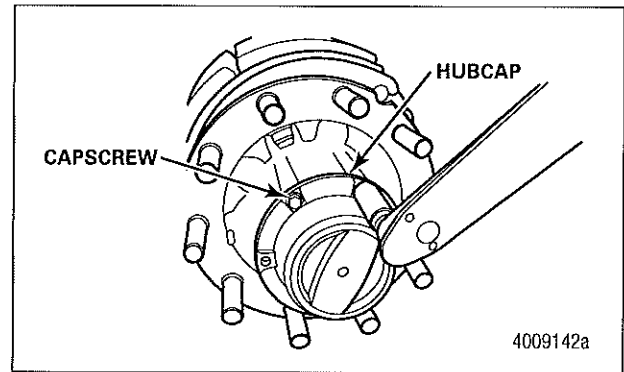


Figure 31

11. Install the MTIS thru-tee into the hubcap, if equipped.

⚠ WARNING

Only add lubricant to the hubcap full line. Do not overfill the wheel-end cavity. Wipe away any excess oil, because it can contaminate the brake linings and affect brake performance. Serious personal injury and damage to components can result.

12. Fill the wheel end with oil as follows.
- Fill the wheel end with an approved oil to the hubcap full line. Figure 32.
 - Install the hubcap fill plug and tighten to 15-20 lb-ft (20-27 N•m). ①
 - Rotate the hub to help distribute the oil. The oil must be given sufficient time to settle prior to a final check of the oil level. This is especially important in cold conditions.

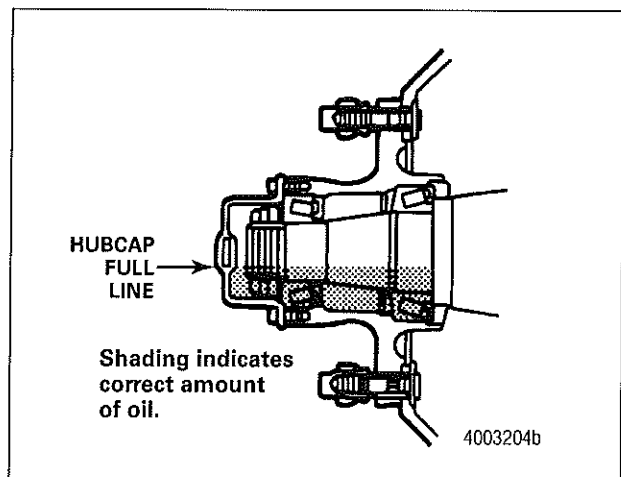


Figure 32

Approved Gear Oil Specification

API GL-5 SAE 80W/90

API GL-5 SAE 75W/90

API GL-5 SAE 75W/140

13. If equipped with ABS, ensure the wheel sensor is pushed outward to the hub's ABS ring.
14. Reinstall the tire and wheel assembly. Refer to the wheel manufacturer's service information for correct procedures.
15. With the vehicle lowered on level ground, recheck the oil level in each hub's sight glass.
16. Inspect the wheel-end oil level at least every 1,000 miles (1600 km). To check, verify that the vehicle is on level ground, then clean the hubcap window and observe the oil level. Add lubricant if the oil level is below the full line.



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