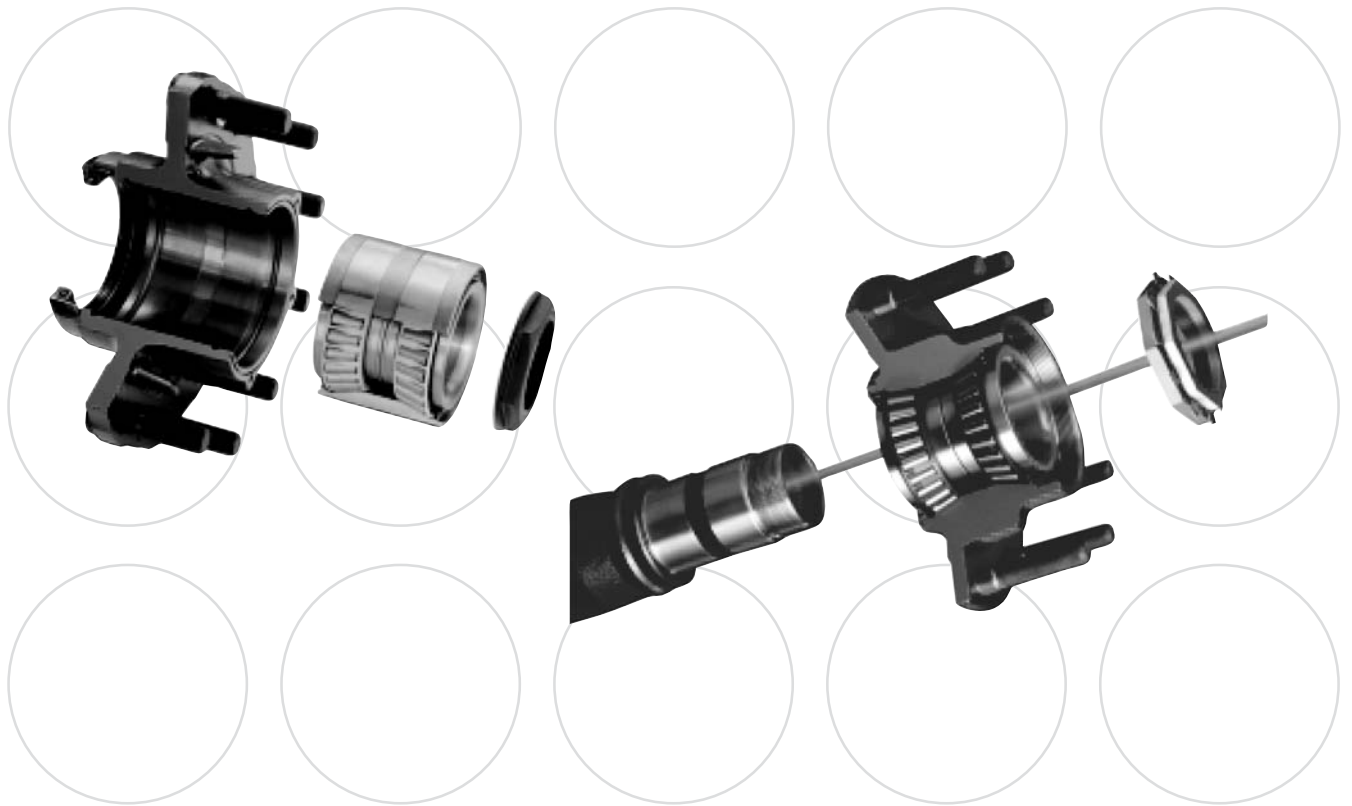


Maintenance Manual MM-0420

Trailer Axles with Unitized Wheel Ends TB and TL Series

Revised 09-11



Service Notes

About This Manual

This manual provides wheel-end maintenance and service instructions for Meritor trailer axles with unitized wheel ends.

Before You Begin

1. Read and understand all instructions and procedures before you begin to service components.
2. 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.
3. Follow your company's maintenance and service, installation, and diagnostics guidelines.
4. Use special tools when required to help avoid serious personal injury and damage to components.


Hazard Alert Messages and Torque Symbols

WARNING

A Warning alerts you to an instruction or procedure that you must follow exactly to avoid serious personal injury and damage to components.

CAUTION

A Caution alerts you to an instruction or procedure that you must follow exactly to avoid damage to components.

 This symbol alerts you to tighten fasteners to a specified torque value.

How to Obtain Additional Maintenance and Service Information

On the Web

Visit Literature on Demand at meritor.com to access and order product, service, aftermarket, and warranty literature for Meritor's truck, trailer and specialty vehicle components.

Refer to brochure SP-95155, Commercial Vehicle Systems Model Year Warranty; and Technical Bulletin TP-0860, Procedures and Intervals to Inspect the Wheel Ends and Tighten the Spindle Nuts on Meritor TL Series Trailer Axles with Unitized Wheel Ends.

Literature on Demand DVD (LODonDVD)

The LODonDVD contains product, service and warranty information for Meritor components. To order the DVD, visit Literature on Demand at meritor.com and specify TP-0742.

How to Obtain Tools and Supplies Specified in This Manual

Call Meritor's Commercial Vehicle Aftermarket at 888-725-9355 to obtain Meritor tools and supplies.

Information contained in this publication was in effect at the time the publication was approved for printing and is subject to change without notice or liability. Meritor Heavy Vehicle Systems, LLC, reserves the right to revise the information presented or to discontinue the production of parts described at any time.

pg. i	Asbestos and Non-Asbestos Fibers
1	Section 1: Introduction
	Overview
	Scope
	Axle Identification
	Identification Tag
2	Production Model Numbers
7	Aftermarket Model Numbers
9	Section 2: Inspection
	Unitized Wheel Ends
	Hazard Alert Messages
	Inspection and Maintenance Intervals by Service Applications
10	Prepare the Trailer for Inspection
	Check for Smooth Rotation and Movement
12	Check the Seals
13	Check the Wheel Bearing End Play
15	Section 3: TB Series
	Description
	Identification
17	Remove the Unitized Hub
20	Install the Unitized Hub
25	Section 4: TL Series
	Description
	Identification
27	Hub Bearing Inspection Procedures
	Inspect the Wheel Ends
	Quick Clamp Load Check
29	Detailed Hub Inspection
	Thread Inspection
31	Remove the Unitized Hub
34	Install the Unitized Hub
37	Install the Spindle Nut and Retaining Washer
39	Section 5: Component Service
	Remove and Install the Studs
	Brakes
	Service Brakes Without Removing Hubs

Asbestos and Non-Asbestos Fibers

ASBESTOS FIBERS WARNING

The following procedures for servicing brakes are recommended to reduce exposure to asbestos fiber dust, a cancer and lung disease hazard. Material Safety Data Sheets are available from ArvinMeritor.

Hazard Summary

Because some brake linings contain asbestos, workers who service brakes must understand the potential hazards of asbestos and precautions for reducing risks. Exposure to airborne asbestos dust can cause serious and possibly fatal diseases, including asbestosis (a chronic lung disease) and cancer, principally lung cancer and mesothelioma (a cancer of the lining of the chest or abdominal cavities). Some studies show that the risk of lung cancer among persons who smoke and who are exposed to asbestos is much greater than the risk for non-smokers. Symptoms of these diseases may not become apparent for 15, 20 or more years after the first exposure to asbestos.

Accordingly, workers must use caution to avoid creating and breathing dust when servicing brakes. Specific recommended work practices for reducing exposure to asbestos dust follow. Consult your employer for more details.

Recommended Work Practices

1. **Separate Work Areas.** Whenever feasible, service brakes in a separate area away from other operations to reduce risks to unprotected persons. OSHA has set a maximum allowable level of exposure for asbestos of 0.1 f/cc as an 8-hour time-weighted average and 1.0 f/cc averaged over a 30-minute period. Scientists disagree, however, to what extent adherence to the maximum allowable exposure levels will eliminate the risk of disease that can result from inhaling asbestos dust. OSHA requires that the following sign be posted at the entrance to areas where exposures exceed either of the maximum allowable levels:

DANGER: ASBESTOS
CANCER AND LUNG DISEASE HAZARD
AUTHORIZED PERSONNEL ONLY
RESPIRATORS AND PROTECTIVE CLOTHING
ARE REQUIRED IN THIS AREA.

2. **Respiratory Protection.** Wear a respirator equipped with a high-efficiency (HEPA) filter approved by NIOSH or MSHA for use with asbestos at all times when servicing brakes, beginning with the removal of the wheels.

3. **Procedures for Servicing Brakes.**

- a. Enclose the brake assembly within a negative pressure enclosure. The enclosure should be equipped with a HEPA vacuum and worker arm sleeves. With the enclosure in place, use the HEPA vacuum to loosen and vacuum residue from the brake parts.
 - b. As an alternative procedure, use a catch basin with water and a biodegradable, non-phosphate, water-based detergent to wash the brake drum or rotor and other brake parts. The solution should be applied with low pressure to prevent dust from becoming airborne. Allow the solution to flow between the brake drum and the brake support or the brake rotor and caliper. The wheel hub and brake assembly components should be thoroughly wetted to suppress dust before the brake shoes or brake pads are removed. Wipe the brake parts clean with a cloth.
 - c. If an enclosed vacuum system or brake washing equipment is not available, employers may adopt their own written procedures for servicing brakes, provided that the exposure levels associated with the employer's procedures do not exceed the levels associated with the enclosed vacuum system or brake washing equipment. Consult OSHA regulations for more details.
 - d. Wear a respirator equipped with a HEPA filter approved by NIOSH or MSHA for use with asbestos when grinding or machining brake linings. In addition, do such work in an area with a local exhaust ventilation system equipped with a HEPA filter.
 - e. **NEVER** use compressed air by itself, dry brushing, or a vacuum not equipped with a HEPA filter when cleaning brake parts or assemblies. **NEVER** use carcinogenic solvents, flammable solvents, or solvents that can damage brake components as wetting agents.
4. **Cleaning Work Areas.** Clean work areas with a vacuum equipped with a HEPA filter or by wet wiping. **NEVER** use compressed air or dry sweeping to clean work areas. When you empty vacuum cleaners and handle used rags, wear a respirator equipped with a HEPA filter approved by NIOSH or MSHA for use with asbestos. When you replace a HEPA filter, wet the filter with a fine mist of water and dispose of the used filter with care.
5. **Worker Clean-Up.** After servicing brakes, wash your hands before you eat, drink or smoke. Shower after work. Do not wear work clothes home. Use a vacuum equipped with a HEPA filter to vacuum work clothes after they are worn. Launder them separately. Do not shake or use compressed air to remove dust from work clothes.
6. **Waste Disposal.** Dispose of discarded linings, used rags, cloths and HEPA filters with care, such as in sealed plastic bags. Consult applicable EPA, state and local regulations on waste disposal.

Regulatory Guidance

References to OSHA, NIOSH, MSHA, and EPA, which are regulatory agencies in the United States, are made to provide further guidance to employers and workers employed within the United States. Employers and workers employed outside of the United States should consult the regulations that apply to them for further guidance.

NON-ASBESTOS FIBERS WARNING

The following procedures for servicing brakes are recommended to reduce exposure to non-asbestos fiber dust, a cancer and lung disease hazard. Material Safety Data Sheets are available from ArvinMeritor.

Hazard Summary

Most recently manufactured brake linings do not contain asbestos fibers. These brake linings may contain one or more of a variety of ingredients, including glass fibers, mineral wool, aramid fibers, ceramic fibers and silica that can present health risks if inhaled. Scientists disagree on the extent of the risks from exposure to these substances. Nonetheless, exposure to silica dust can cause silicosis, a non-cancerous lung disease. Silicosis gradually reduces lung capacity and efficiency and can result in serious breathing difficulty. Some scientists believe other types of non-asbestos fibers, when inhaled, can cause similar diseases of the lung. In addition, silica dust and ceramic fiber dust are known to the State of California to cause lung cancer. U.S. and international agencies have also determined that dust from mineral wool, ceramic fibers and silica are potential causes of cancer.

Accordingly, workers must use caution to avoid creating and breathing dust when servicing brakes. Specific recommended work practices for reducing exposure to non-asbestos dust follow. Consult your employer for more details.

Recommended Work Practices

1. **Separate Work Areas.** Whenever feasible, service brakes in a separate area away from other operations to reduce risks to unprotected persons.

2. **Respiratory Protection.** OSHA has set a maximum allowable level of exposure for silica of 0.1 mg/m³ as an 8-hour time-weighted average. Some manufacturers of non-asbestos brake linings recommend that exposures to other ingredients found in non-asbestos brake linings be kept below 1.0 f/cc as an 8-hour time-weighted average. Scientists disagree, however, to what extent adherence to these maximum allowable exposure levels will eliminate the risk of disease that can result from inhaling non-asbestos dust.

Therefore, wear respiratory protection at all times during brake servicing, beginning with the removal of the wheels. Wear a respirator equipped with a high-efficiency (HEPA) filter approved by NIOSH or MSHA, if the exposure levels may exceed OSHA or manufacturers' recommended maximum levels. Even when exposures are expected to be within the maximum allowable levels, wearing such a respirator at all times during brake servicing will help minimize exposure.

3. **Procedures for Servicing Brakes.**

- a. Enclose the brake assembly within a negative pressure enclosure. The enclosure should be equipped with a HEPA vacuum and worker arm sleeves. With the enclosure in place, use the HEPA vacuum to loosen and vacuum residue from the brake parts.
 - b. As an alternative procedure, use a catch basin with water and a biodegradable, non-phosphate, water-based detergent to wash the brake drum or rotor and other brake parts. The solution should be applied with low pressure to prevent dust from becoming airborne. Allow the solution to flow between the brake drum and the brake support or the brake rotor and caliper. The wheel hub and brake assembly components should be thoroughly wetted to suppress dust before the brake shoes or brake pads are removed. Wipe the brake parts clean with a cloth.
 - c. If an enclosed vacuum system or brake washing equipment is not available, carefully clean the brake parts in the open air. Wet the parts with a solution applied with a pump-spray bottle that creates a fine mist. Use a solution containing water, and, if available, a biodegradable, non-phosphate, water-based detergent. The wheel hub and brake assembly components should be thoroughly wetted to suppress dust before the brake shoes or brake pads are removed. Wipe the brake parts clean with a cloth.
 - d. Wear a respirator equipped with a HEPA filter approved by NIOSH or MSHA when grinding or machining brake linings. In addition, do such work in an area with a local exhaust ventilation system equipped with a HEPA filter.
 - e. **NEVER** use compressed air by itself, dry brushing, or a vacuum not equipped with a HEPA filter when cleaning brake parts or assemblies. **NEVER** use carcinogenic solvents, flammable solvents, or solvents that can damage brake components as wetting agents.
4. **Cleaning Work Areas.** Clean work areas with a vacuum equipped with a HEPA filter or by wet wiping. **NEVER** use compressed air or dry sweeping to clean work areas. When you empty vacuum cleaners and handle used rags, wear a respirator equipped with a HEPA filter approved by NIOSH or MSHA, to minimize exposure. When you replace a HEPA filter, wet the filter with a fine mist of water and dispose of the used filter with care.
5. **Worker Clean-Up.** After servicing brakes, wash your hands before you eat, drink or smoke. Shower after work. Do not wear work clothes home. Use a vacuum equipped with a HEPA filter to vacuum work clothes after they are worn. Launder them separately. Do not shake or use compressed air to remove dust from work clothes.
6. **Waste Disposal.** Dispose of discarded linings, used rags, cloths and HEPA filters with care, such as in sealed plastic bags. Consult applicable EPA, state and local regulations on waste disposal.

Regulatory Guidance

References to OSHA, NIOSH, MSHA, and EPA, which are regulatory agencies in the United States, are made to provide further guidance to employers and workers employed within the United States. Employers and workers employed outside of the United States should consult the regulations that apply to them for further guidance.

Overview

Meritor offers two trailer axle series equipped with unitized wheel ends.

- TB Series
- TL Series

These series feature permanently sealed and lubricated hub assemblies designed to help reduce wheel-end maintenance when compared to axles equipped with conventional wheel-end equipment.

On unitized wheel ends, the hub, seal, lubricant and bearings are installed onto the trailer axle as an assembly. Figure 1.1. On conventional wheel ends, the hub, seal, lubricant and bearings are installed onto the trailer axle as separate components. Figure 1.2.

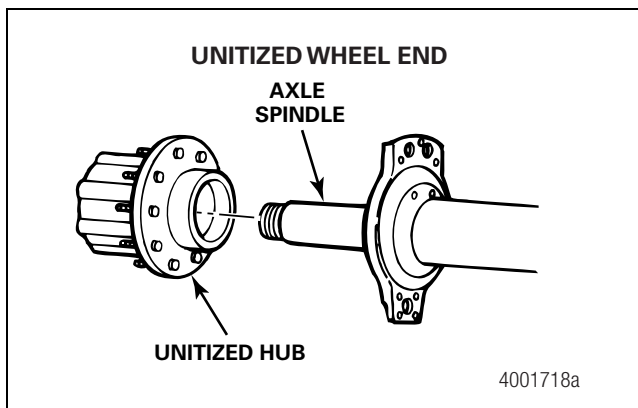


Figure 1.1

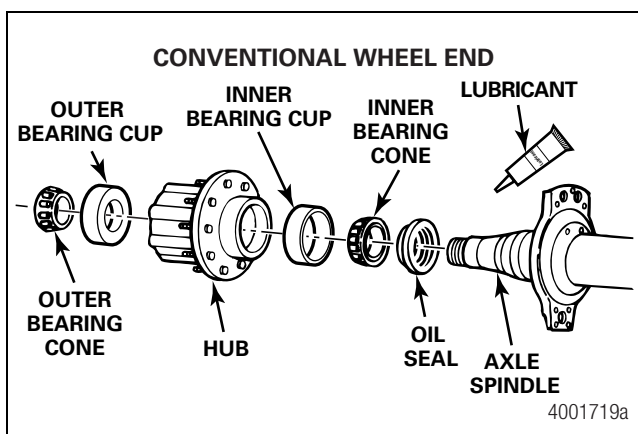


Figure 1.2

Scope

This manual is intended to provide service information on the unitized wheel ends installed on Meritor TB and TL Series trailer axle models.

Refer to Maintenance Manual 14, Trailer Axles, for maintenance information on the conventional wheel ends installed on all other Meritor trailer axle models to include TN, TP and TR Series axles. To obtain this publication, refer to the Service Notes page on the front inside cover of this manual.

Refer to Maintenance Manual 14, Trailer Axles, for the following maintenance information on all trailer axles including those equipped with both unitized and conventional wheel ends.

- Installing axles
- Inspecting axles
- Aligning axles
- Performing bearing adjustments
- Welding brackets to axle beams
- Servicing cam brakes
- Lubricating axle components

Refer to Maintenance Manual 14, Trailer Axles; and Maintenance Manual 4, Cam Brakes and Automatic Slack Adjuster, for maintenance information on the cam brakes and automatic slack adjusters installed on trailer axles. To obtain these publications, refer to the Service Notes page on the front inside cover of this manual.

Refer to the service publications from the wheel manufacturer to service the tire and wheel assemblies installed on trailer axles.

Axle Identification

Identification Tag

An identification tag is attached to the center of the axle beam on all Meritor trailer axles. All of the information necessary to identify a particular trailer axle is located on this tag including the axle model number, serial number and date of manufacture. Figure 1.3.

1 Introduction

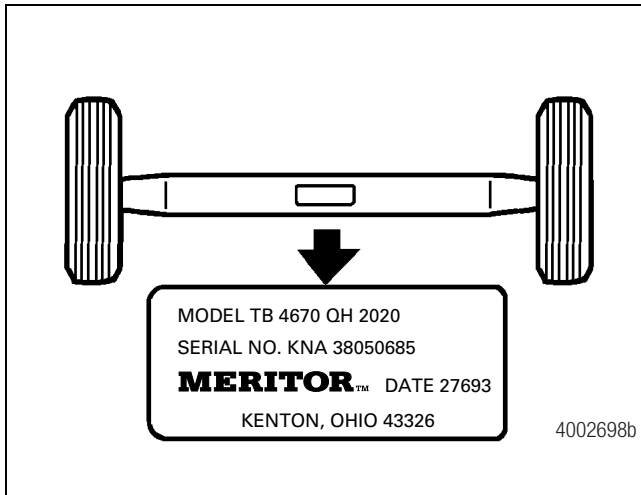


Figure 1.3

The model number is composed of letters and digits; for example, TB 4670 QH 2020. This number is used to identify the axle assembly when obtaining replacement parts.

The serial number is composed of letters and digits; for example, KNA-38050685. This number is used to identify a particular trailer axle, and the material and components used to build the axle.

The date of manufacture is indicated by a conventional or Julian date. A conventional date is 10/03/00. A Julian date is 27600. The first three digits (276) indicate the 276th day of the year, or October 3. The last two digits (00) indicate the year, or 2000.

Production Model Numbers

Model numbers for Meritor production trailer axles are composed of letters and digits; for example, TQD 4670 QH 2020. These letters and digits indicate the weight capacity and type of components installed on the axle as detailed below. For a more comprehensive list of Meritor current production trailer axle models, refer to publication TP-8301, Trailer Axle Specifications. To obtain this publication, refer to the Service Notes page on the front inside cover of this manual.

TQD 4670 QH 2020

The first position indicates the geometry of the steel tube. Figure 1.4.

- T is for tubular.
- S is for square.
- R is for rectangular.
- W is for axles built for Wabash National, a trailer manufacturer.

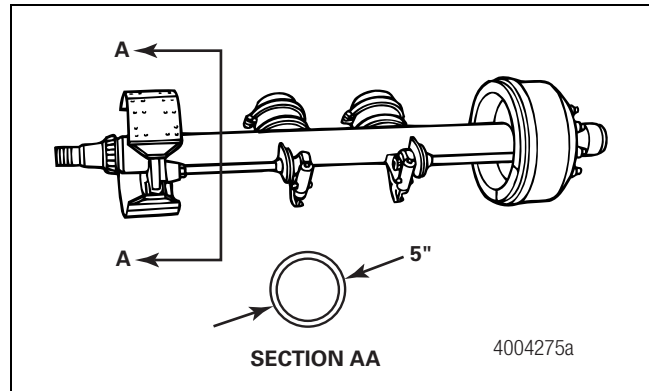


Figure 1.4

TQD 4670 QH 2020

The second position indicates the type of bearings and spindle design used. Figure 1.5.

- TN and TQ Series axles use the most common bearings in the trailer industry.
- TP Series axles use bearings compatible with Fruehauf axles.
- TR Series axles use bearings compatible with drive axles.
- TB and TL Series axles use unitized bearings.

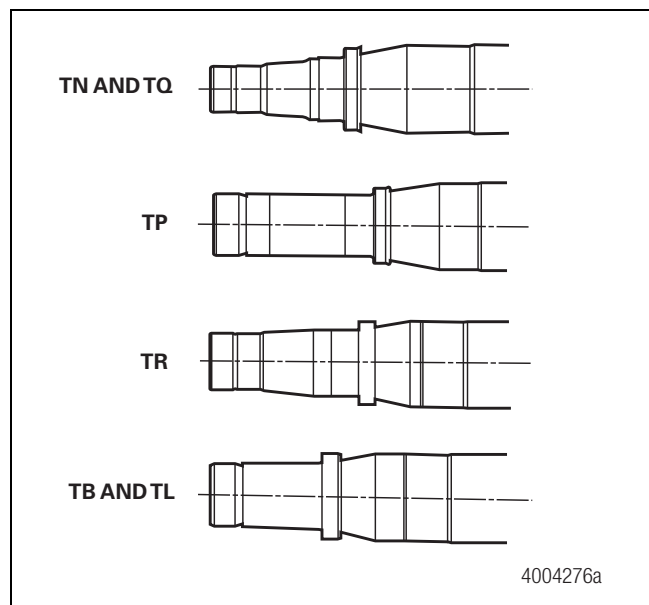


Figure 1.5

TQD 4670 QH 2020

The third position indicates whether the axle is a straight, drop or crank model. Figure 1.6.

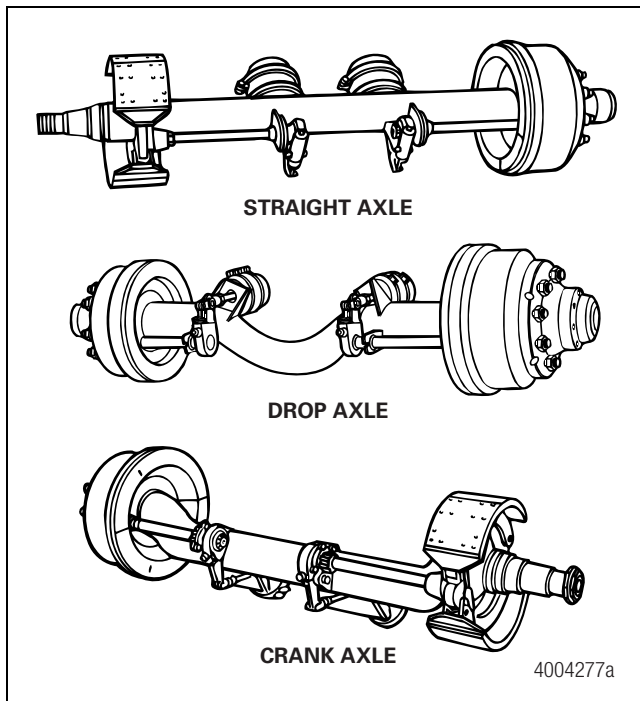


Figure 1.6

TQD 4670 QH 2020

The fourth position identifies the type of bearing adjustment and the axle tube wall thickness. Figure 1.7.

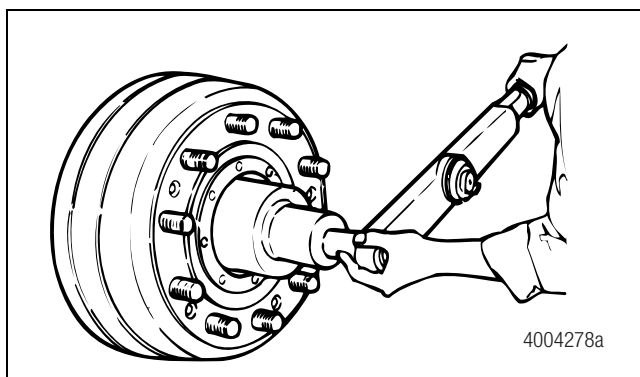


Figure 1.7

TQD 4670 QH 2020

The fifth and sixth positions indicate the brake size. Figure 1.8.

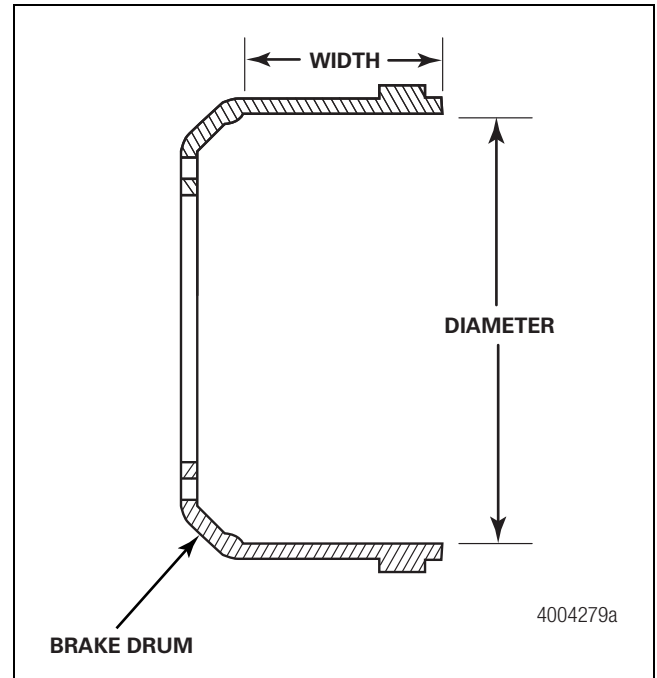


Figure 1.8

TQD 4670 QH 2020

The seventh position indicates whether the axle is built with ABS provisions. Figure 1.9.

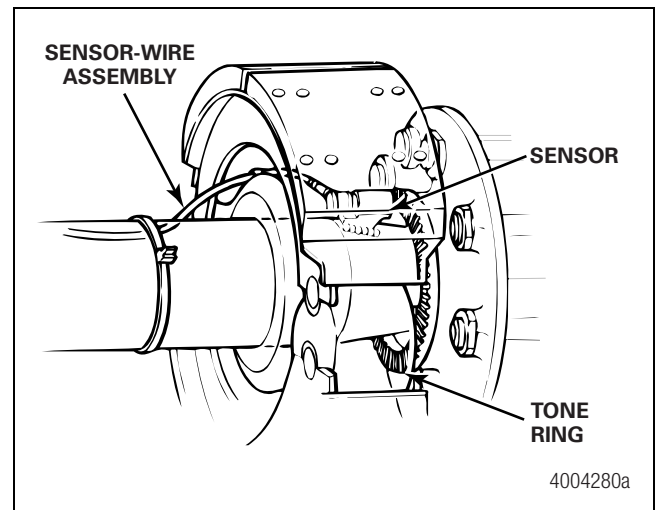


Figure 1.9

1 Introduction

TQD 4670 QH 2020

The eighth position indicates whether the axle is built with cam, disc or wedge brakes. Figure 1.10.

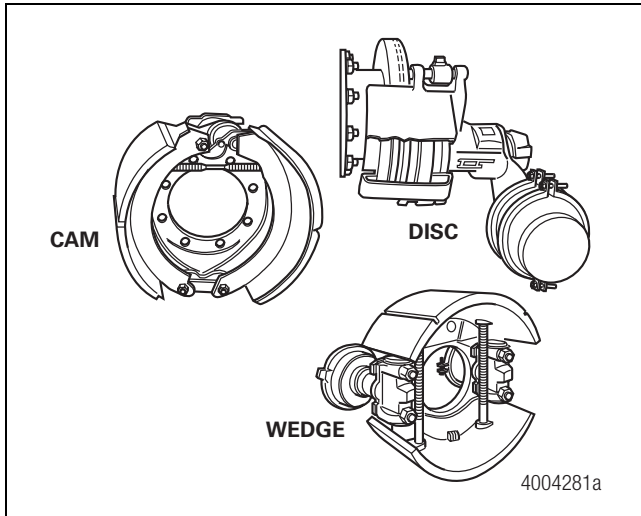


Figure 1.10

TQD 4670 QH 2020

The ninth position indicates whether Meritor furnished the axle with a hub or a spoke wheel. Figure 1.11.

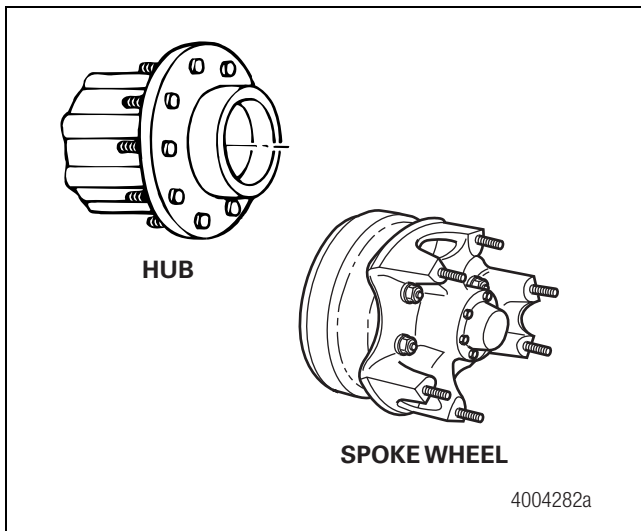


Figure 1.11

TQD 4670 QH 2020

The final number group completes the trailer axle model number. Axle parameters described include, but are not limited to, the following items: axle track, Figure 1.12; brake linings, Figure 1.13; camshaft length, Figure 1.14; air chamber and slack provisions, Figure 1.15; tire inflation system provisions, Figure 1.16; camshaft bushings, Figure 1.17; brake clocking, Figure 1.18; or spider, Figure 1.19. These digits together with the other letters and digits identify all parameters which completely describes the trailer axle. Figure 1.20.

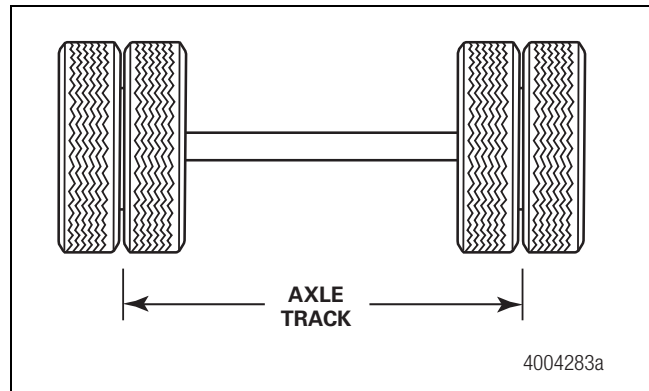


Figure 1.12

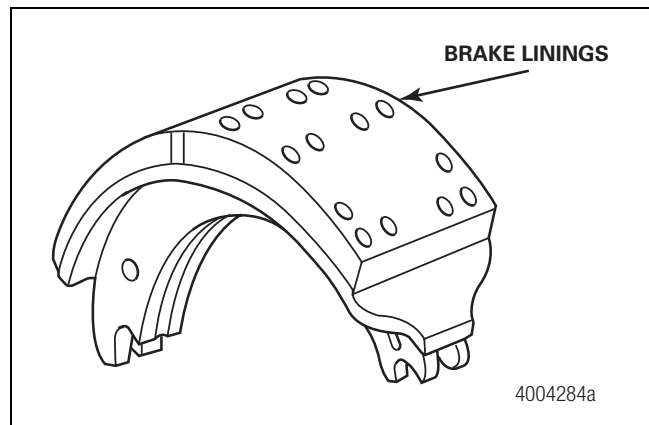


Figure 1.13

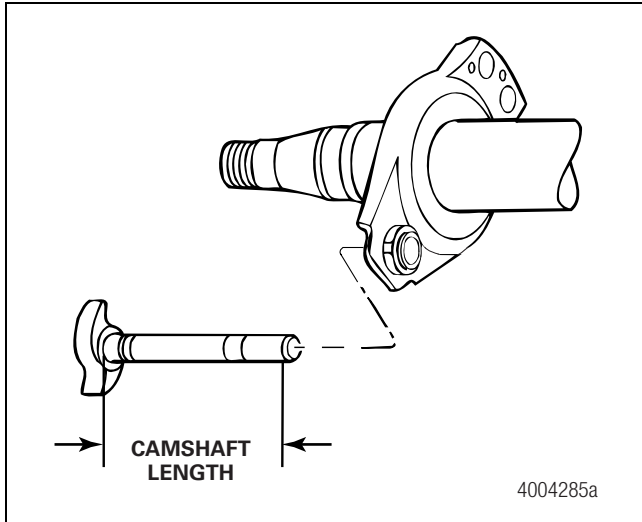


Figure 1.14

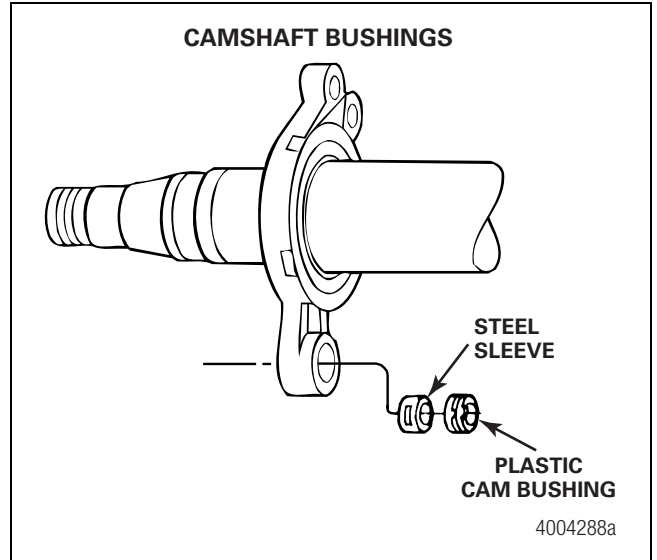


Figure 1.17

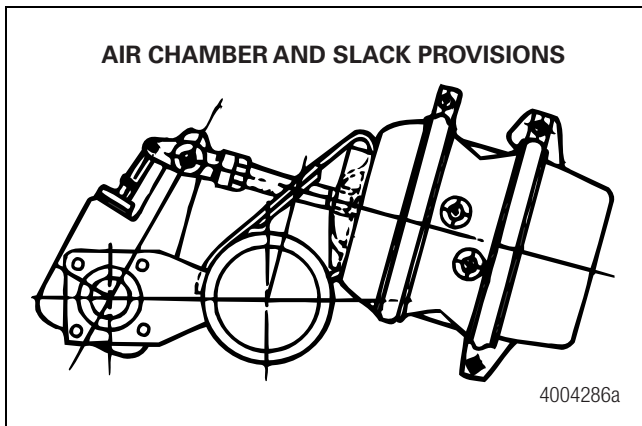


Figure 1.15

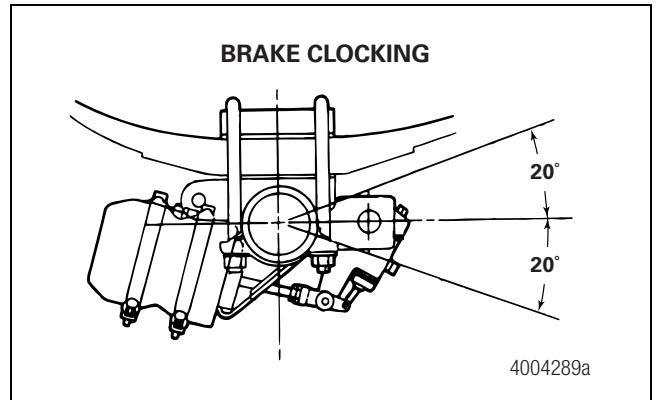


Figure 1.18

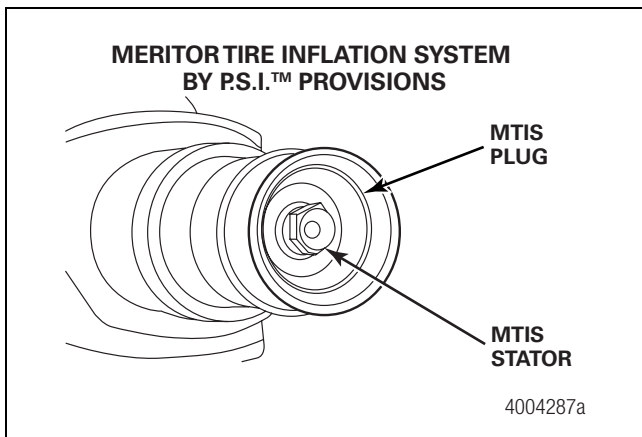


Figure 1.16

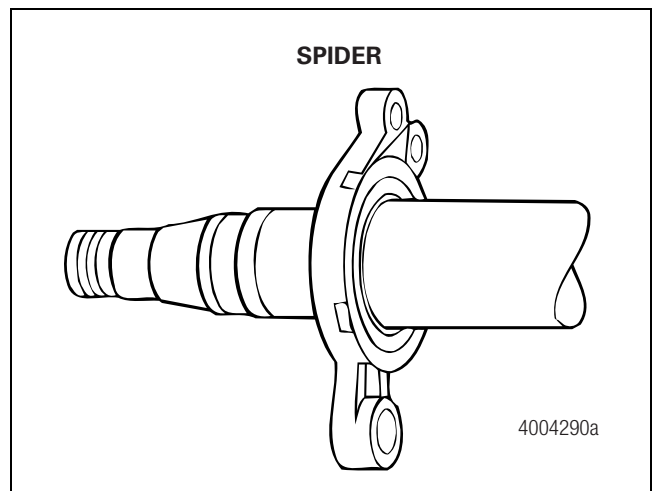


Figure 1.19

1 Introduction

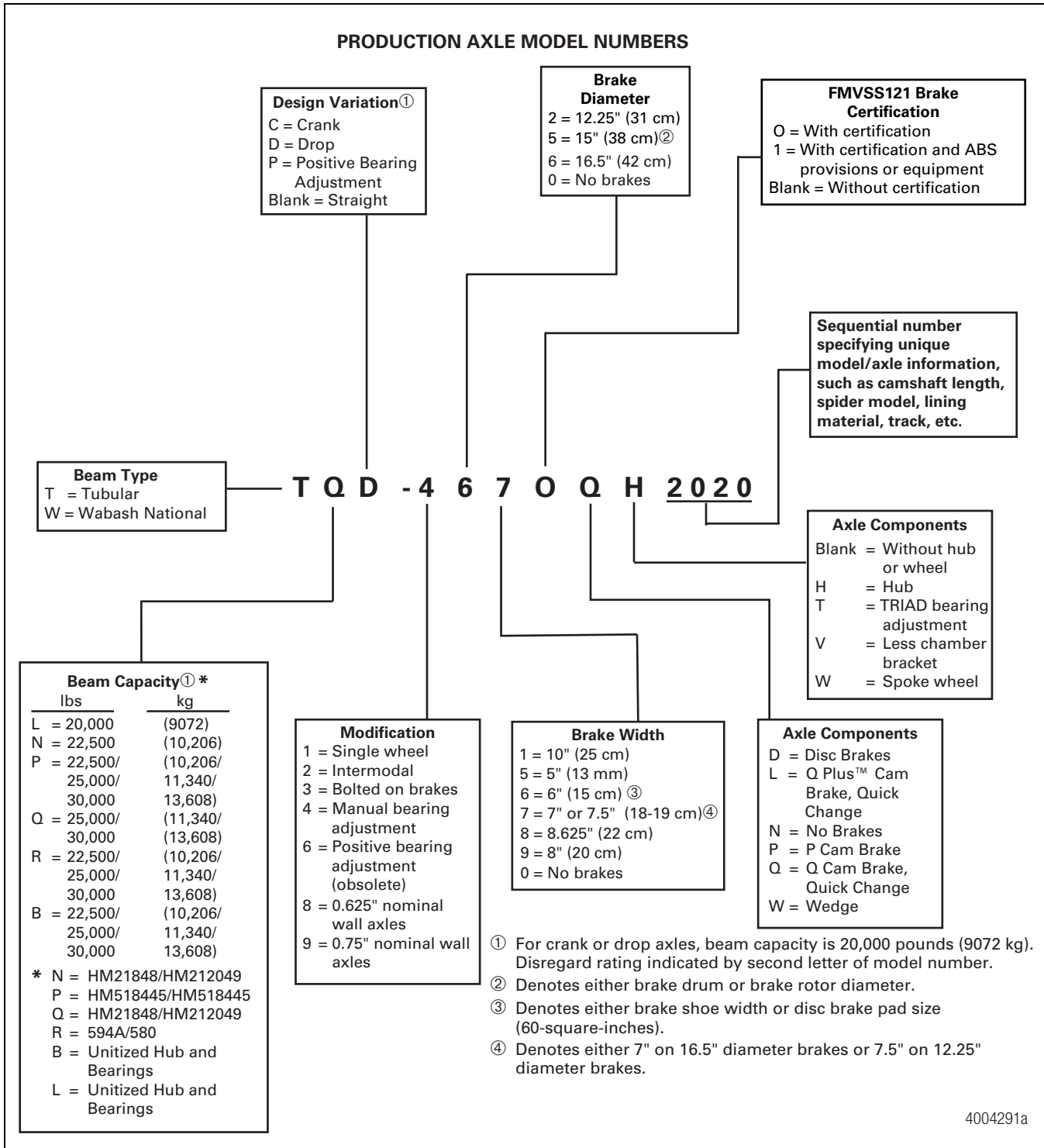


Figure 1.20

Aftermarket Model Numbers

Model numbers for Meritor aftermarket trailer axles are composed of letters and digits; for example, TQD 4670 QR 1120. When compared to the production numbering system, the aftermarket numbering system provides a more complete description of the axle.

TQD 4670 QR 1120

The highlighted group above describes the same information as detailed previously for production model numbers.

TQD 4670 **QR** 1120

The second group indicates the type of brake and identifies the axle as an aftermarket model.

TQD 4670 QR **1120**

The third group identifies the specific axle track, camshaft, lining mix and Meritor suspension brackets provided. Figure 1.21.

1 Introduction

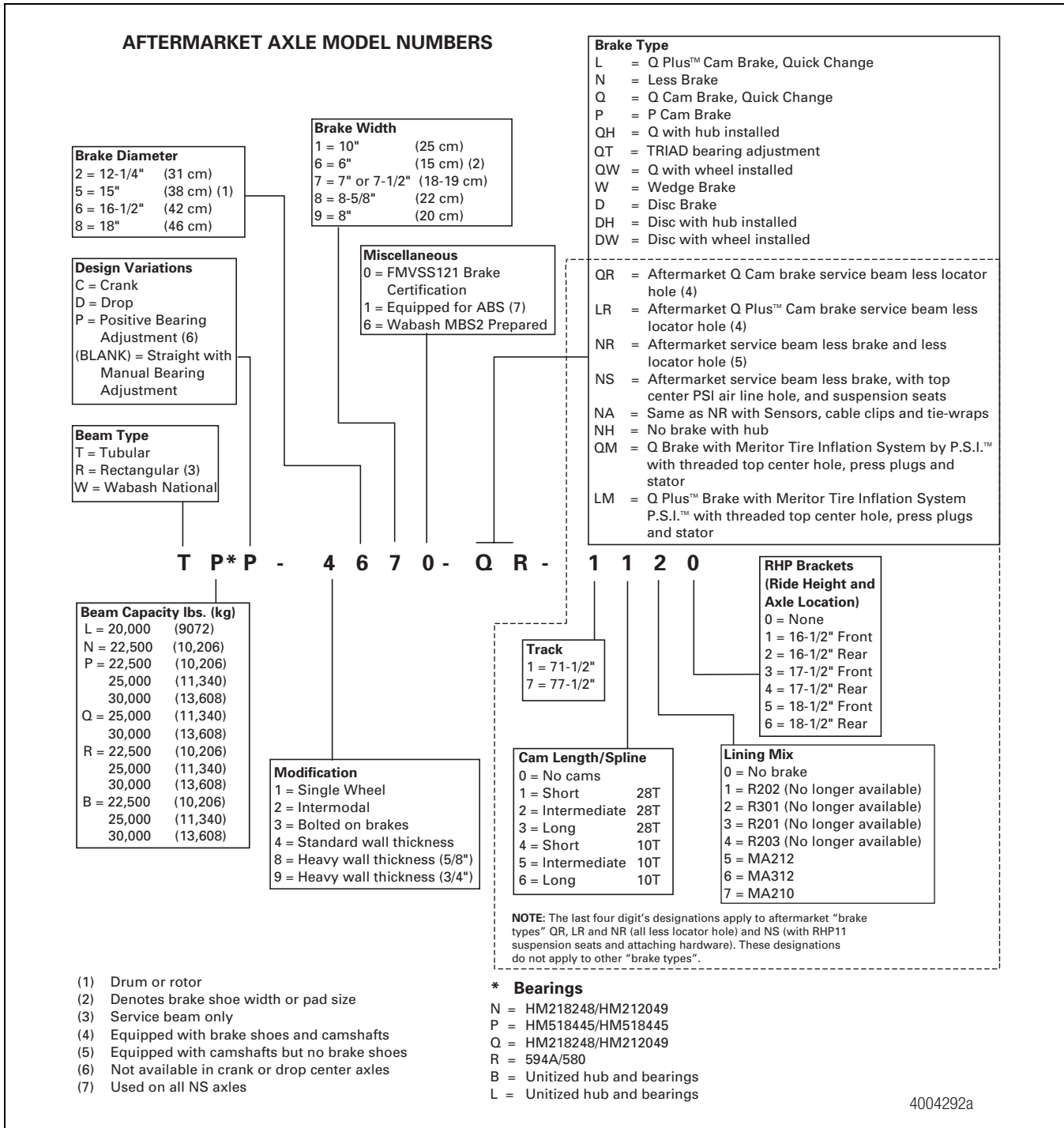


Figure 1.21

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.

Wheel Ends

Table A: Wheel Ends

Application	Description	Intervals
Linehaul	High mileage, over 60,000 miles per year. On-road service; operated on concrete, asphalt, maintained gravel, crushed rock, hard/packed dirt, or other similar surfaces; moderate grades. More than 30 miles between stopping and starting.	Every 100,000 miles (160 000 km) or 12 months, whichever comes first. Some Examples: Haulers (auto, bulk, grain, etc.), general freight, tanker.
General Service	Lower mileage, usually less than 60,000 miles per year. Generally on-road service, with usually less than 10% off-road. Usually 3 miles between stopping and starting.	Every 100,000 miles (160 000 km) or 12 months, whichever comes first. Some Examples: Intermodel chassis service, auto hauler, flatbed.
Heavy Service	Moderate mileage, usually less than 60,000 miles per year. On- and off-road service, with usually 10% or more off-road. Moderate to frequent stops and starts, usually up to 10 stops per mile.	At tire replacement. At brake reline. Every 30,000 miles (48 270 km) or 2 months, whichever comes first. Some Examples: Flatbed trailer hauler, log hauling, equipment hauling.

Trailer axles built with unitized wheel ends provide extended warranties and reduced maintenance requirements when compared to trailer axles built with conventional wheel-end equipment. Note, however, that while the maintenance requirements for unitized wheel ends is reduced, this equipment must still be regularly inspected. Use the following procedure to inspect unitized wheel ends.

Inspection and Maintenance Intervals by Service Applications

Refer to Meritor's brochure SP-95155, Commercial Vehicle Systems Model Year Warranty, for complete descriptions and warranty information for the vocations listed in Table A and Table B. The Service Notes page on the front inside cover of this manual provides instructions to obtain this publication.

2 Inspection

Brakes

Table B: Brakes

Application	Interval
Linehaul and General Service Vehicles	Q Plus™, Cast Plus™ and Q Series brakes at every 100,000 miles (160 000 km); or every six months, whichever comes first. P Series brakes at every 50,000 miles (80 000 km); or every six months, whichever comes first.
General Service and Heavy Service Vehicles	At least every four months, when you replace the seals and reline the brakes. Every two weeks during the first four-month period, inspect for hardened or contaminated grease, and for the absence of grease, to help determine lubrication intervals. Lubricate more often for severe-duty applications.

Scheduled Maintenance

Inspect the wheel end for smooth rotation, movement and seal leaks at each brake reline or regularly scheduled preventive maintenance.

ABS Warning Signal

Inspect the wheel end for smooth rotation, movement and bearing end play if a driver reports that an ABS light has been coming on and ABS diagnostics indicates excessive sensor gap.

Prepare the Trailer for Inspection

⚠ CAUTION

A unitized hub is permanently sealed and lubricated as an assembly. Do not attempt to remove the hub bearings, seals or lubricant. You cannot service or reinstall these components back into a unitized hub. Damage to components can result. Removal of the long-life bearings, seals or lubricants from the Meritor TB or TL Series unitized hub will void the warranty.

1. Park the trailer on a level surface.
2. Use a jack to raise the trailer until the tires are off the ground. Place safety stands under the trailer frame or axles.
3. Attach an air line to the trailer emergency glad hand connection to back the brake linings off the drums. The linings must completely clear the drums prior to inspection. If the linings are rubbing on the drums, the inspection results may be incorrect. Figure 2.1.
 - **If the linings still touch the drums:** Use the slack adjusters to manually back off the linings.

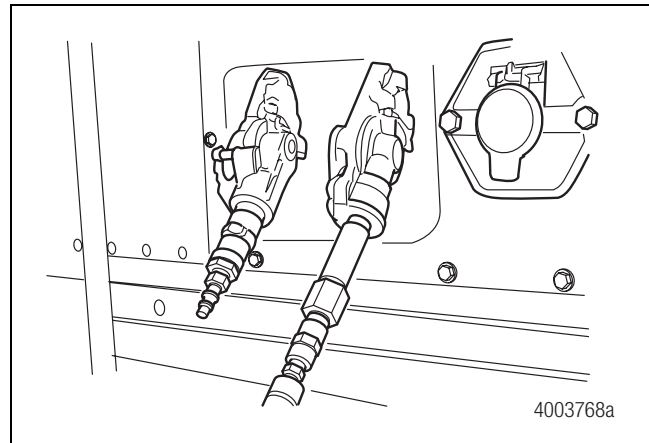


Figure 2.1

Check for Smooth Rotation and Movement

You can perform the following inspections for smooth rotation and movement with or without the tire and wheel assembly installed.

1. Rotate the hub. Figure 2.2.

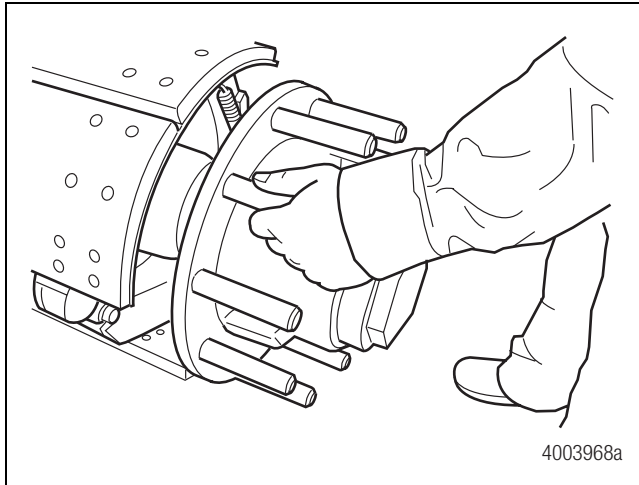


Figure 2.2

2. Listen for worn bearings that make a low-pitched grinding sound as the hub is rotated. If the tires are installed, the wheel will amplify the wheel-end noise. Figure 2.3.
 - **If the bearing sounds noisy:** Check the bearing end play. Refer to the procedure in this section.

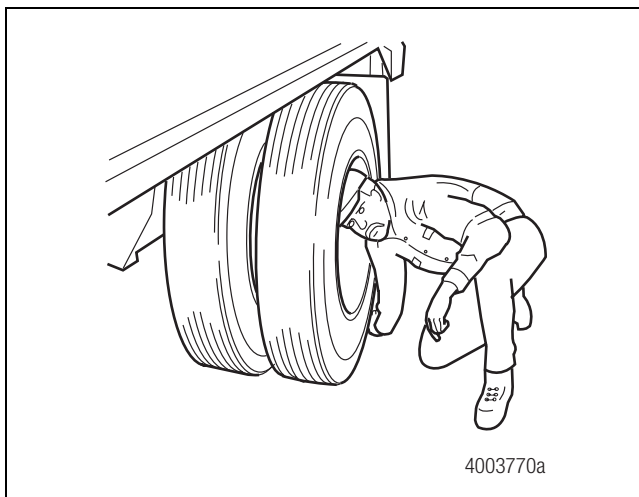


Figure 2.3

3. Place your hand on the brake air chamber that services the wheel end. Feel for any bearing vibration as the hub is rotated. The air chamber will amplify any vibration. Rely more on vibration than noise since dirt in the hub seal can make a noise similar to a worn bearing. Figure 2.4.
 - **If the bearing feels rough:** Check the bearing end play. Refer to the procedure in this section.

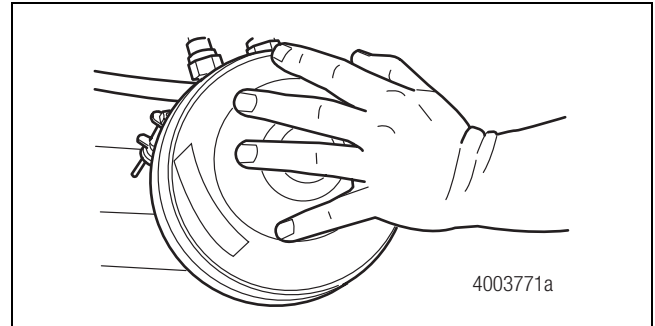


Figure 2.4

4. If the tires are installed, insert a pry bar under the tires. Lift the pry bar and examine the wheel end for movement. Figure 2.5.
 - **If you detect movement:** Check the bearing end play. Refer to the procedure in this section.

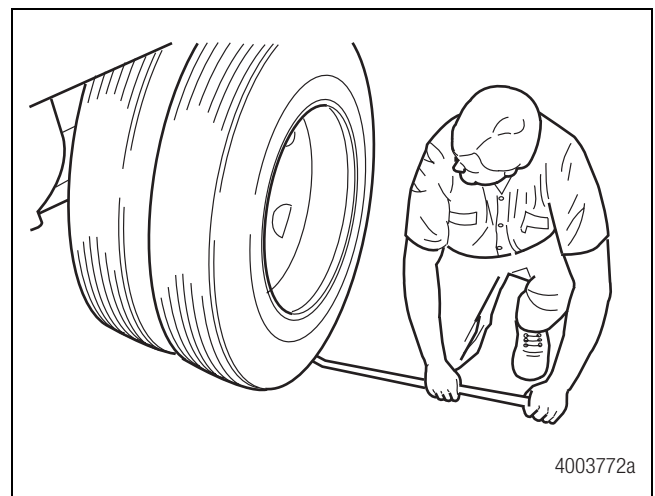


Figure 2.5

5. If the tires are not installed, push and pull on opposite sides of the hub flange and examine the wheel end for movement. Figure 2.6.
 - **If you detect movement:** Check the bearing end play. Refer to the procedure in this section.

2 Inspection

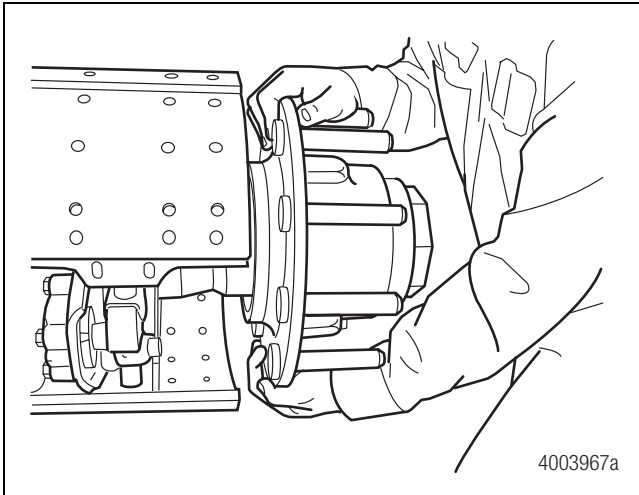


Figure 2.6

Check the Seals

1. Check the hub inner grease seal for leakage. A leaking seal will stain the backside of the unitized hub with lubricant, similar to a conventional hub. Figure 2.7.
 - **If the seal is leaking:** Replace the hub.

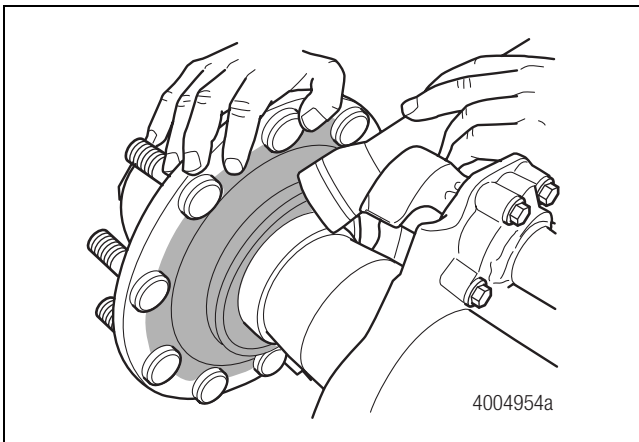


Figure 2.7

2. On the TB Series, when the hub is installed, a small bead of grease may appear at the spindle backup collar-to-hub joint. This is normal and does not indicate a seal leak. Figure 2.8.

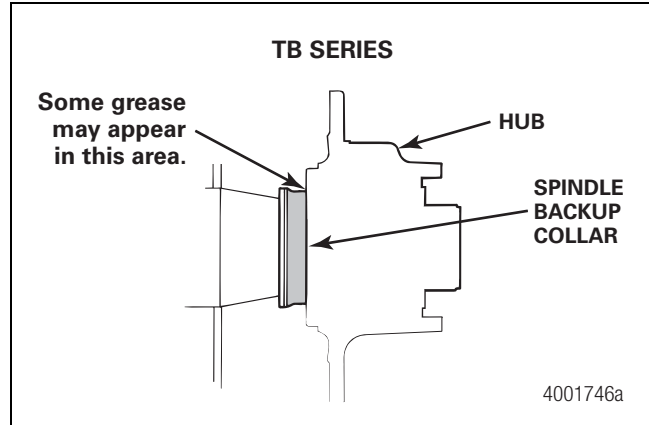


Figure 2.8

3. Check the hub outer grease seal for leakage. A small bead of grease around the perimeter of the seal is normal. Figure 2.9.
 - **If you detect a large amount of grease staining the entire surface of the outer grease seal and the surrounding hub surfaces:** Replace the hub.

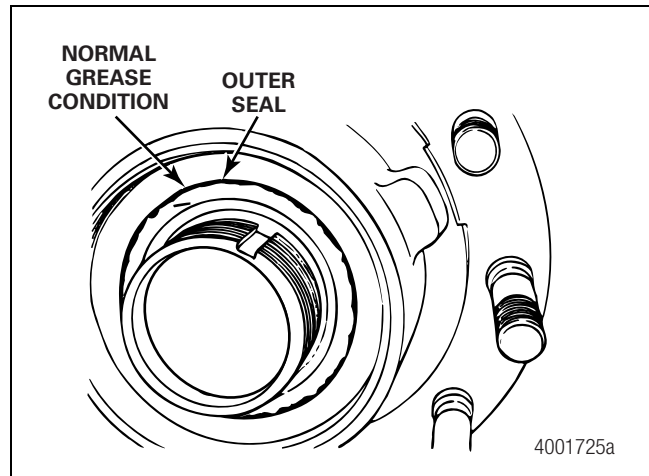


Figure 2.9

4. On the TB Series, check the hubcap O-ring for splitting or cracking. Figure 2.10.
 - **If the O-ring is damaged:** Replace the O-ring.

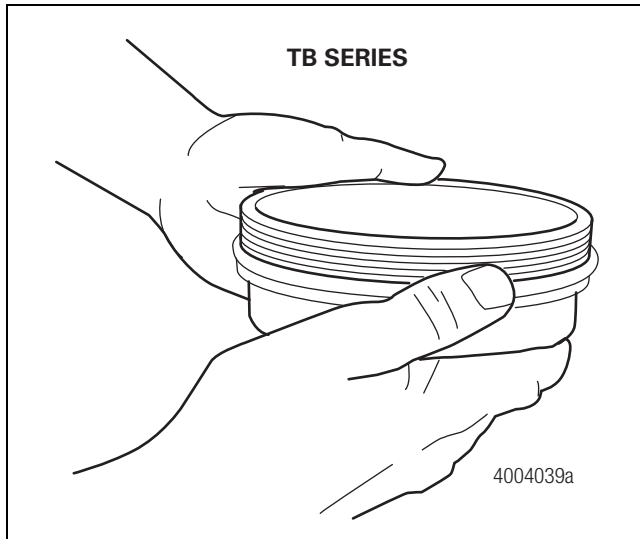


Figure 2.10

Check the Wheel Bearing End Play

1. Remove the tire and wheel assembly and the brake drum.
2. Attach the magnetic base of a dial indicator to the end of the axle spindle and touch the dial indicator stem against the hub. Figure 2.11.

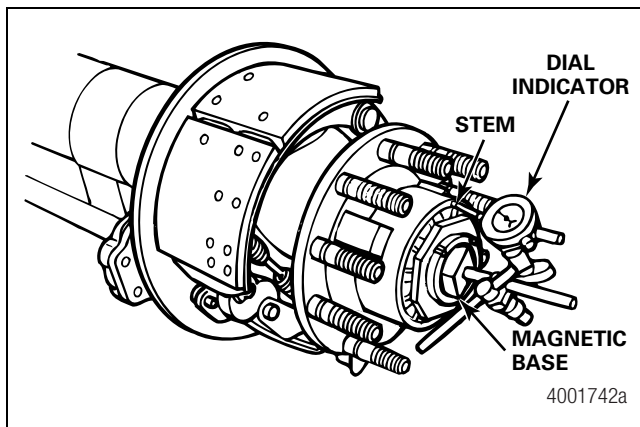


Figure 2.11

3. Push the hub INWARD until the dial indicator does not change. Do not rotate the wheel end. Set the dial indicator to ZERO. Figure 2.12.

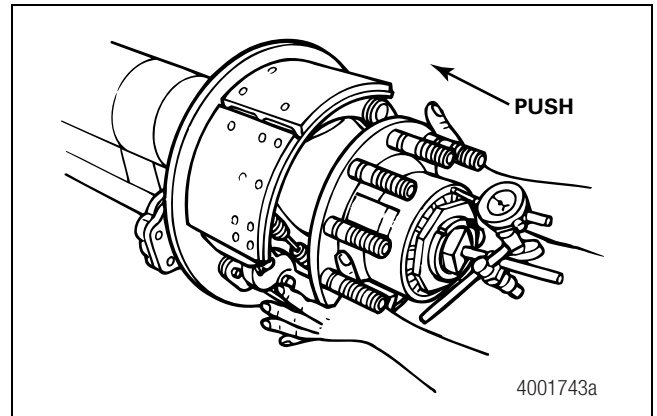


Figure 2.12

4. Pull the hub OUTWARD until the dial indicator does not change. Do not rotate the wheel end. Figure 2.13. The difference in readings between pushing the hub INWARD and pulling it OUTWARD is wheel bearing end play. Use the following instructions based on the end play measurement you obtained.

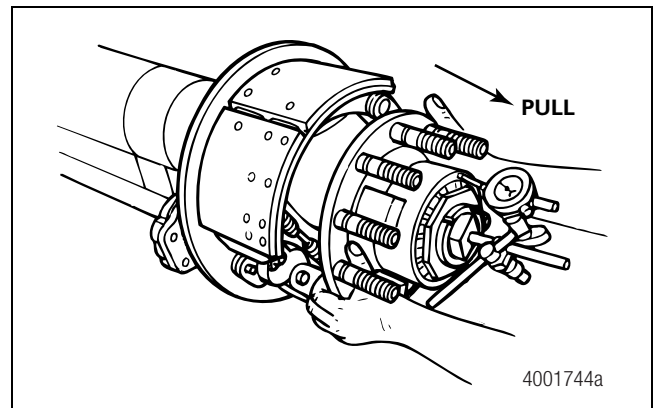


Figure 2.13

End Play is Less than 0.003-inch (0.0762 mm)

No further action is required.

End Play is 0.003-inch (0.0762 mm) or Greater


Use one of the following procedures for the trailer axle series you are servicing.

2 Inspection


TB Series Trailer Axles

WARNING

When you remove the outer spindle nut and tabbed lock washer to adjust end play on TB Series trailer axles with unitized wheel ends, discard the lock washer you removed and install a new one at reassembly. Do not reinstall a used lock washer. A bent lock washer tab can affect inner nut spindle torque. The spindle nut can loosen during operation and cause the wheel end to separate from the vehicle. Serious personal injury and damage to components can result.

1. Remove the outer spindle nut and lock washer. Discard the lock washer. Install a new one during reassembly. The inner and outer spindle nuts are reusable.
2. Tighten the inner spindle nut to 700-750 lb-ft (942-1020 N•m) while rotating the wheel end a minimum of five rotations. 

TL Series Trailer Axles

1. Pry back the retaining washer flange from where it was staked at the spindle nut slot.
2. Tighten the spindle nut to 810-850 lb-ft (1100-1150 N•m) while rotating the wheel end a minimum of five rotations. 

End Play is 0.003-inch (0.0762 mm) or Greater After You Tighten the Spindle Nut

Replace the hub.

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.

When you remove the outer spindle nut and tabbed lock washer to adjust end play on TB Series trailer axles with unitized wheel ends, discard the lock washer you removed and install a new one at reassembly. Do not reinstall a used lock washer. A bent lock washer tab can affect inner nut spindle torque. The spindle nut can loosen during operation and cause the wheel end to separate from the vehicle. 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

A unitized hub is permanently sealed and lubricated as an assembly. Do not attempt to remove the hub bearings, seals or lubricant. You cannot service or reinstall these components back into a unitized hub. Damage to components can result. Removal of long-life bearings, seals or lubricant from the Meritor TB Series unitized hub will void the warranty.

Description

TB Series trailer axles feature unitized hub assemblies fully assembled at the factory for simple installation and reduction of wheel-end maintenance. Figure 3.1.

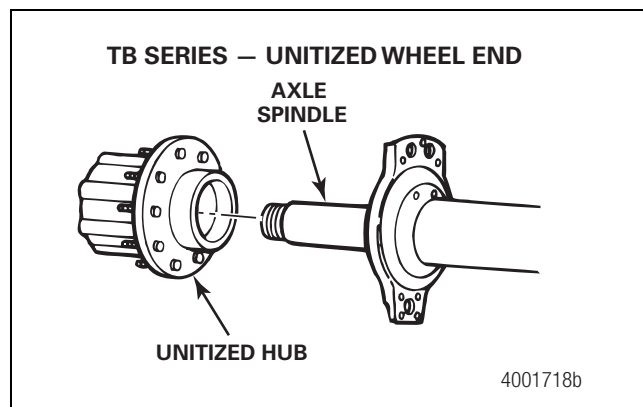


Figure 3.1

TB Series unitized hubs provide the following features.

- Built with factory-installed inner and outer seals
- Built with the correct lubricant installed at the factory to the correct levels
- Built with bearings that are automatically adjusted as the retention hardware is tightened

These features eliminate the need for adjusting bearings, installing seals and installing lubricant in the field. These features also greatly reduce the need for periodic maintenance and the possibility of incorrect maintenance being performed in the field.

Identification

TB model trailer axles can be identified as follows.

- The axle model number will have the letter B at the second position; for example, TB 4670 QH 2000.
- The axle spindles are straight and shorter than conventional spindles. Figure 3.2.
- The hub is a one-piece assembly containing non-serviceable bearings, seals and lubricant. Seals are located on the inboard and outboard sides of the hub. Figure 3.3.
- The hubcaps are a screw-on type with no provisions for adding lubricant. Plastic hubcaps are standard. Aluminum hubcaps are optional and are used primarily with hubodometers and the Meritor Tire Inflation System by P.S.I.™ Figure 3.4.
- Warranty and service information is marked on the hubcap. Figure 3.5.

3 TB Series

- The retention hardware consists of a four-piece system including two nuts, a bendable lock washer and a hardened washer. Earlier versions of the retention hardware did not use a hardened washer. Figure 3.6.
- The retention hardware inner nut is thicker than a conventional nut and is stamped with installation information. Figure 3.7.

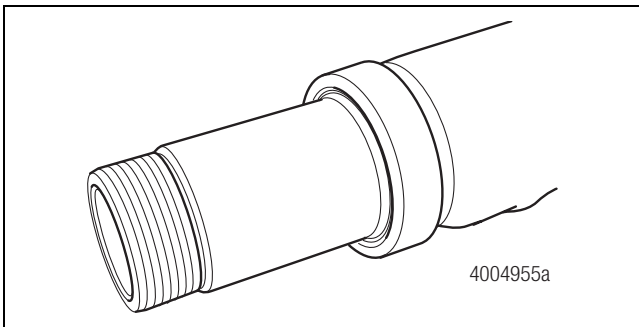


Figure 3.2

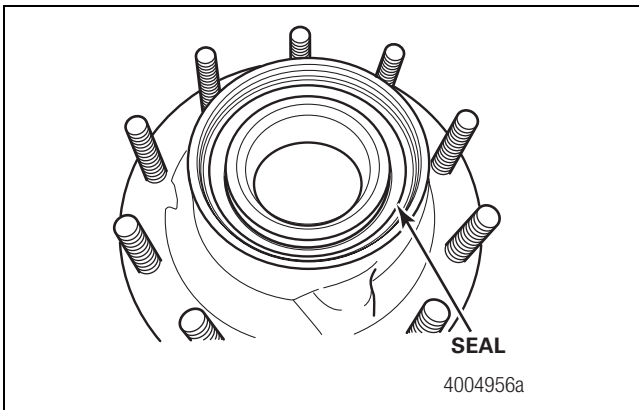


Figure 3.3

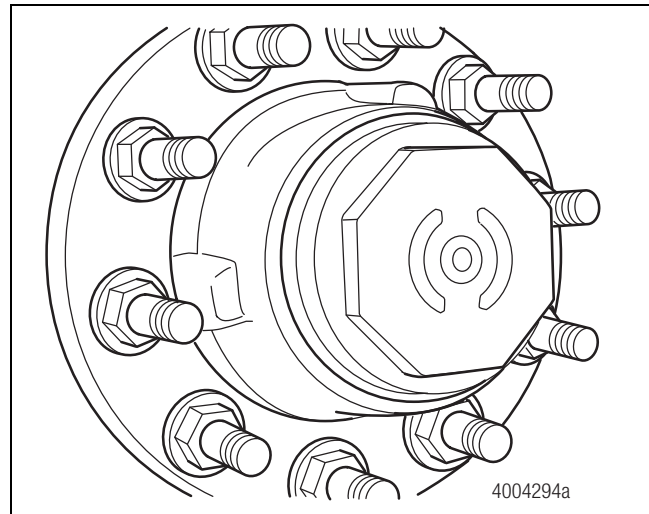


Figure 3.4

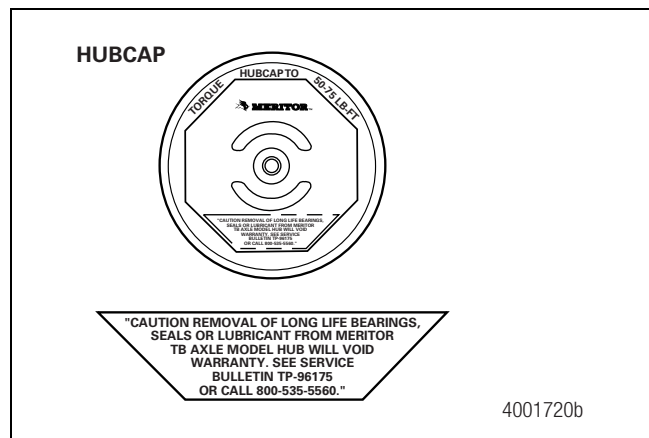


Figure 3.5

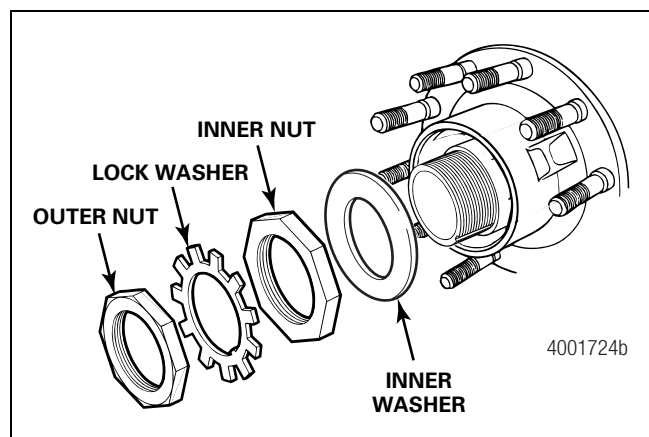


Figure 3.6

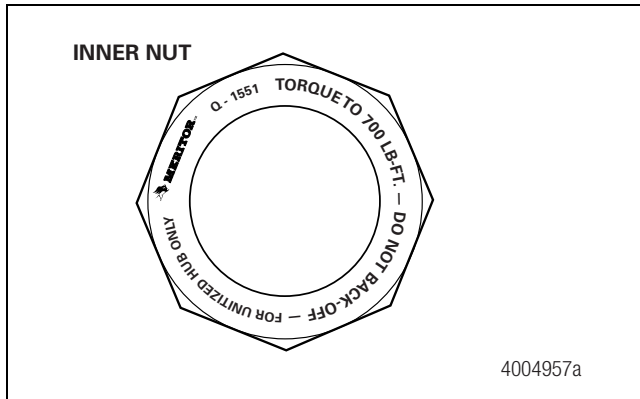


Figure 3.7

Remove the Unitized Hub

Under normal operating conditions, you are not required to remove the TB Series unitized hub from the axle spindle. However, maintenance procedures, such as replacing damaged wheel studs, require that you remove the hub.

1. Park the trailer on a level surface.
2. Use a jack to raise the trailer until the tires are off the ground. Place safety stands under the trailer frame or axles. Figure 3.8.

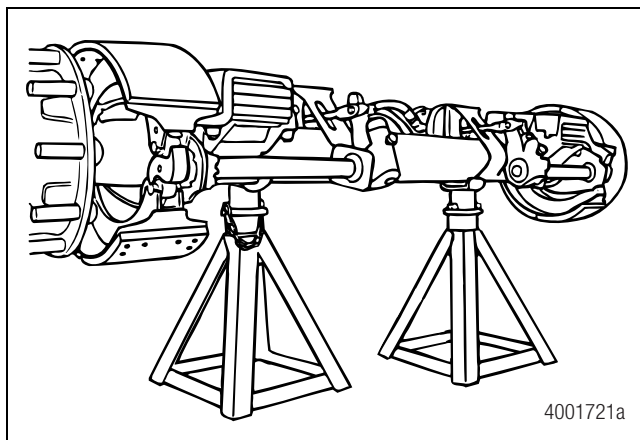


Figure 3.8

⚠ WARNING

Do not attempt to remove the tire and wheel, and hub and drum, as an assembly from the spindle. The clip inside the hub bore can dislodge, and the hub can disassemble. If the hub disassembles, you must install a new factory-sealed hub to avoid serious personal injury and damage to components.

3. Remove the tire and wheel assembly. Figure 3.9.

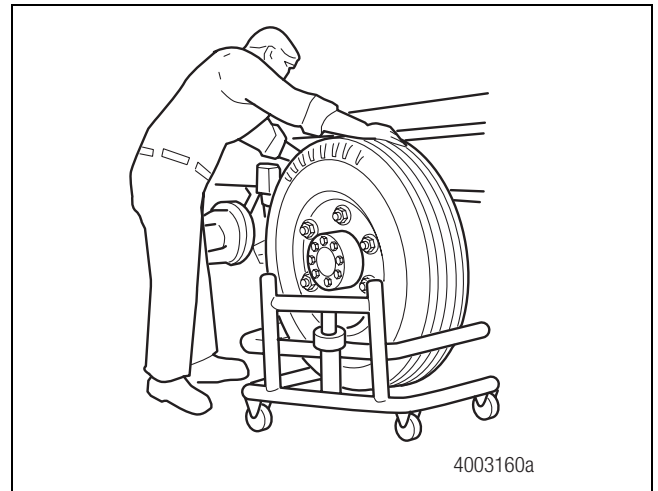


Figure 3.9

4. Release the brakes and remove the brake drum. Figure 3.10.

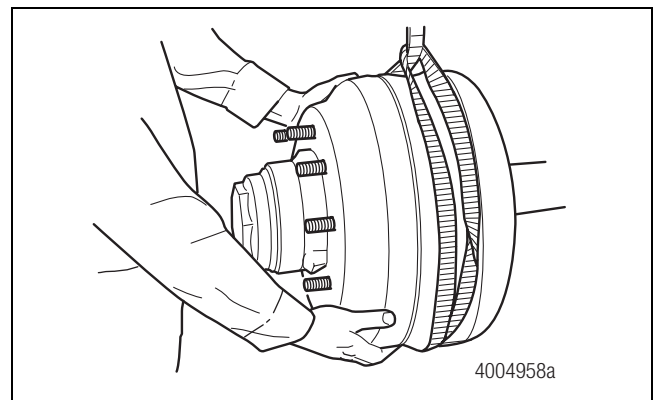


Figure 3.10

5. Remove the hubcap. Figure 3.11.

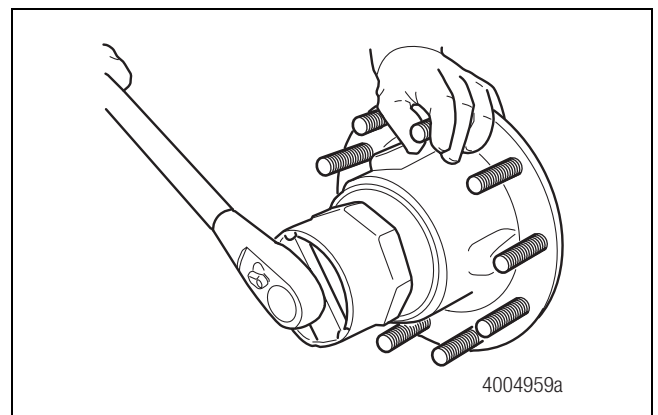


Figure 3.11

3 TB Series

6. Use a tool to straighten the two opposing flattened lock washer tabs, until they clear the outer nut. Always discard the lock washer you removed and install a new one. Do not reinstall a used lock washer. Keep the tool securely on the tabs, so that the tool doesn't slip off and damage the hub seal. Figure 3.12.

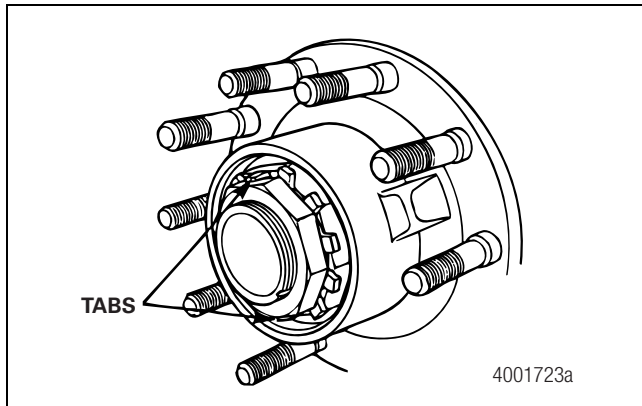


Figure 3.12

⚠ CAUTION

Prevent contaminants from entering the seal on the back side of the hub when you remove the hub. This will help prevent damage to the seal.

7. If you are going to reuse the hub, clean the back of the hub to help prevent contaminants from entering the seal during removal. Figure 3.13.

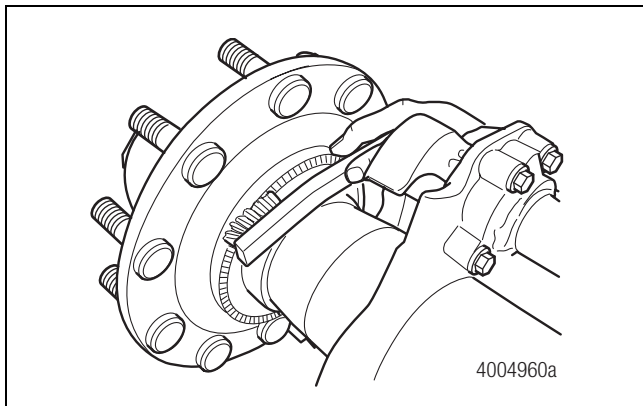


Figure 3.13

NOTE: An inner washer was not installed on early TB Series trailer axles.

8. Remove the outer spindle nut, tabbed lock washer, inner spindle nut (and inner washer, if installed). Always discard the lock washer you removed and install a new one. Do not reinstall a used lock washer. Figure 3.14.

Take care when you remove the inner nut to prevent damage to the hub seal. Because of the high installation torque, a torque multiplier may be useful in removing the inner nut.

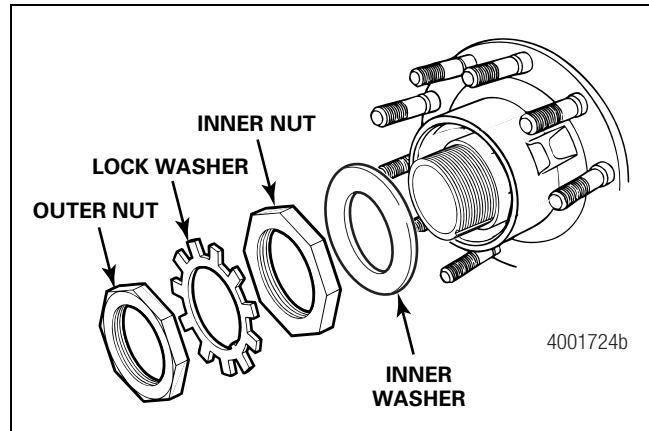


Figure 3.14

⚠ WARNING

When you remove the hub from the axle spindle, carefully pull the hub off the spindle as straight as possible to help avoid dislodging the clip inside the hub bore. If the clip becomes dislodged, the hub will disassemble, which will contaminate the interior of the hub and void the warranty. Do not attempt to rebuild a hub that has disassembled. If the hub disassembles, you must install a new hub to avoid serious personal injury and damage to components.

9. Grasp the hub assembly with both hands and pull the hub as straight as possible to avoid dislodging the clip inside the hub bore. Figure 3.15 and Figure 3.16.

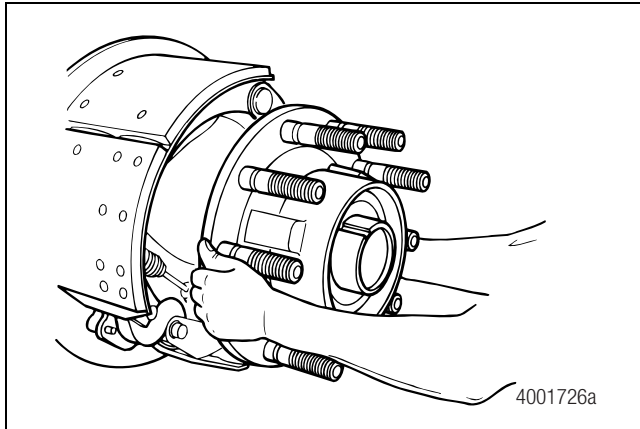


Figure 3.15

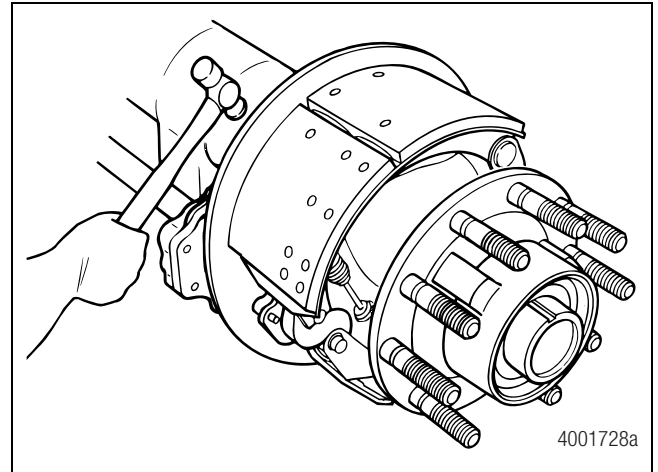


Figure 3.17

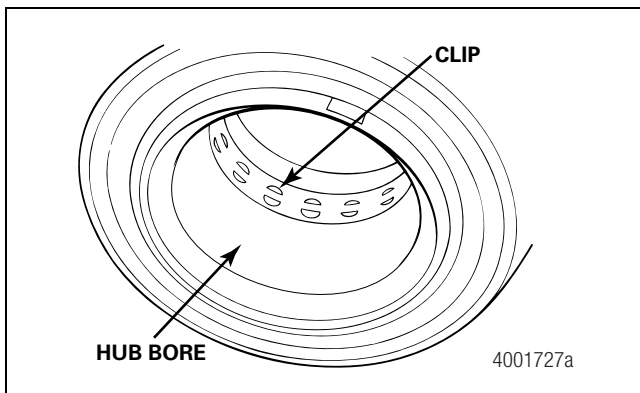


Figure 3.16

10. If the hub sticks to the axle spindle, use one of the following procedures to remove the hub from the spindle.

- A. Tap lightly on the rough part of the axle with a hammer while pulling the hub from the spindle. Tapping may loosen the hub assembly for easier removal. Figure 3.17.

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.

- B. Use a puller to remove a hub that sticks to the axle spindle.
 - Install a metal plate onto the end of the spindle. Figure 3.18.
 - Attach a three-pronged puller to the hub. Figure 3.18.
 - While holding the puller screw stationary, spin the hub to break it free from the axle. Figure 3.18.
 - Remove the puller from the axle.
 - Pull the hub as straight as possible off the spindle to avoid dislodging the clip inside the hub bore. Figure 3.15 and Figure 3.16.

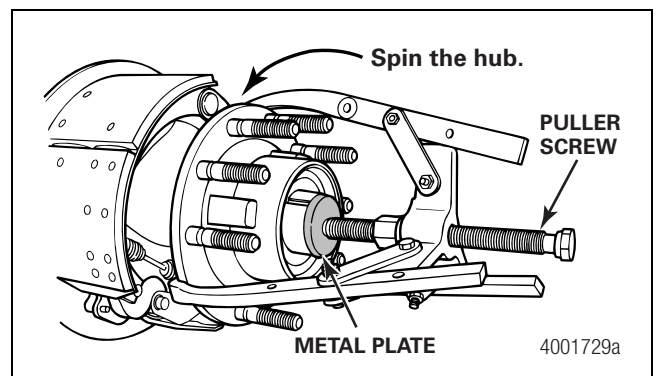


Figure 3.18

Install the Unitized Hub

⚠ WARNING

You must follow the installation procedures outlined below when you install a unitized hub. Wheel separation, damage to components and serious personal injury can result if you do not carefully follow these procedures.

Do not attempt to install a hub and drum, and tire and wheel, as an assembly onto the spindle. The clip inside the hub bore can dislodge, and the hub can disassemble. Serious personal injury and damage to components can result.

⚠ CAUTION

When you install the hub, prevent contaminants from entering the hub inner seal to help prevent damage to the seal.

Do not use solvents to clean the hub bore. Solvents can enter the hub and contaminate the lubricant. Damage to components can result.

1. Clean the axle spindle and hub bore by wiping them with a clean rag. Figure 3.19 and Figure 3.20.

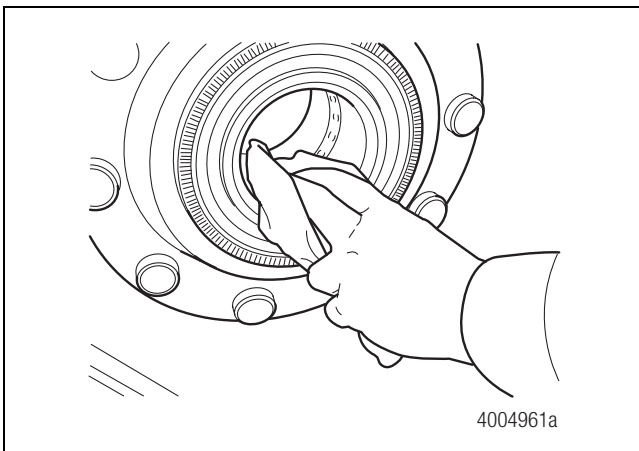


Figure 3.19

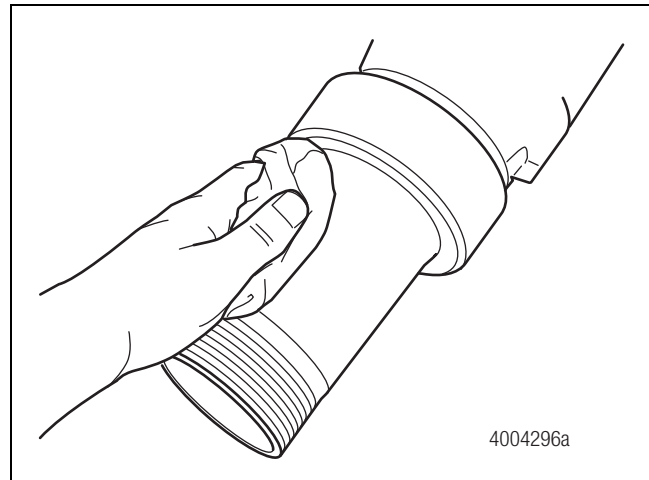


Figure 3.20

2. Check the axle spindle and hub bore for scratches, nicks or marks. Repair them with a crocus or emery cloth. Figure 3.21.

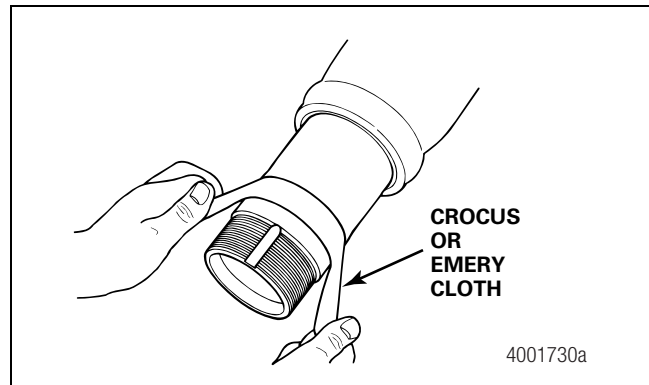


Figure 3.21

⚠ CAUTION

Remove all debris from the joint between the hub and axle backup collar. If debris is trapped in this joint, it could create a condition in which clamp on the hub is lost resulting in damage to components.

3. Use your finger to verify that the hub side of the axle backup collar and the edge of the hub that contacts the backup collar are clear of debris. Figure 3.22 and Figure 3.23.

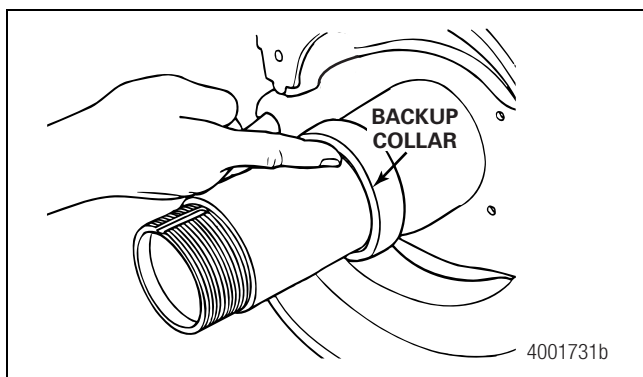


Figure 3.22

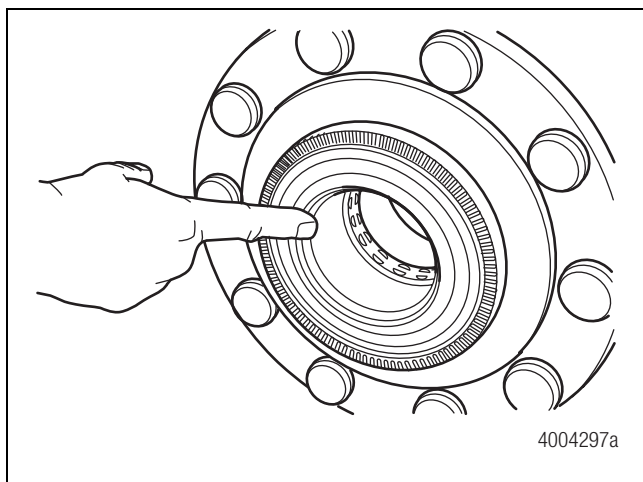


Figure 3.23

4. Prepare the spindle and hub as follows.

- **If the wheel end uses a spindle O-ring, Meritor part number 5X-1329, to seal the hub-spindle joint:** Use the following procedure.

A. Apply a light coating of bearing grease to the O-ring. Figure 3.24.

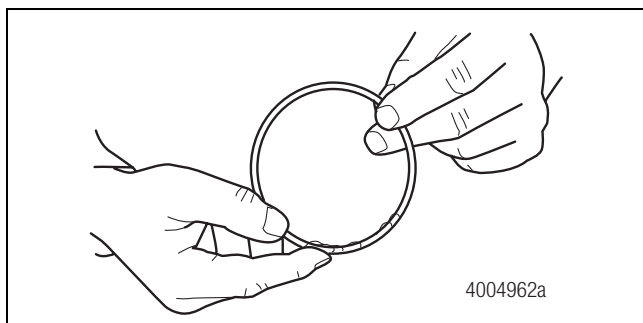


Figure 3.24

B. Slide the O-ring onto the spindle. Figure 3.25. The O-ring must be positioned so it rests at the corner radius of the backup collar. Figure 3.26.

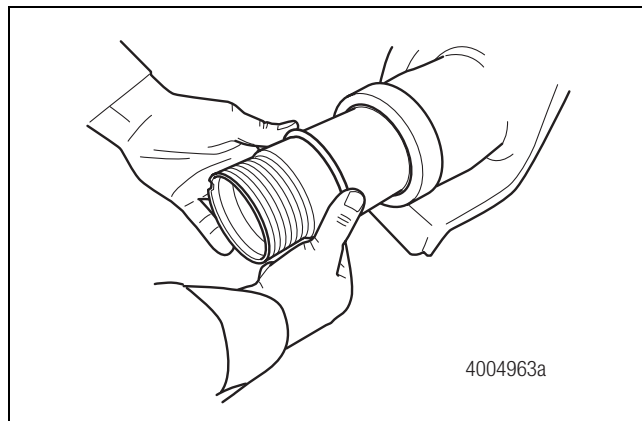


Figure 3.25

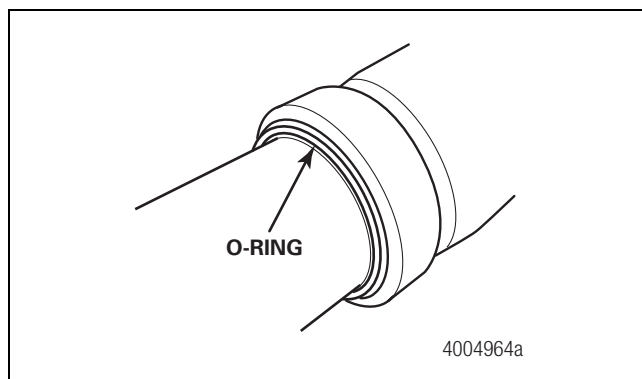


Figure 3.26

C. Apply a light coating of bearing grease to the hub bore. The entire hub bore which comes in contact with the spindle should be covered. This grease will help reduce spindle wear, assist in hub removal, and help seal the hub-spindle joint. Figure 3.27.

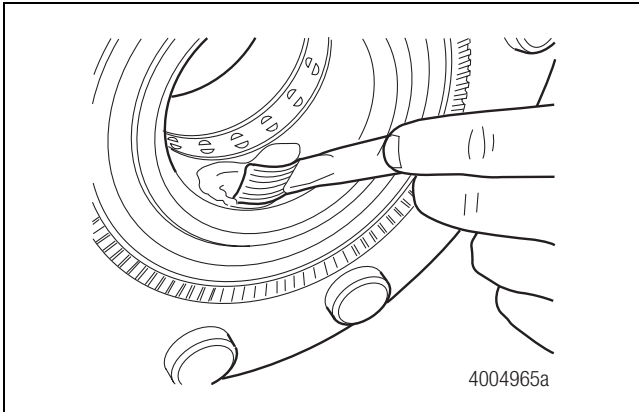


Figure 3.27

- **If the hub assembly does not use a spindle O-ring:** Apply a light coating of bearing grease to the axle spindle bearing journals and the hub side of the backup collar. This grease will help reduce spindle wear, assist in hub removal, and help seal the hub-spindle joint. Figure 3.28.

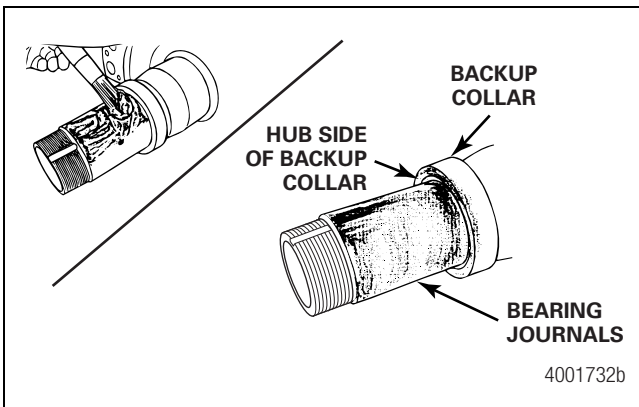


Figure 3.28

⚠ WARNING

You must align the hub bore straight to the axle spindle to help avoid dislodging the clip inside the hub bore. If the clip becomes dislodged, the hub will disassemble, which will contaminate the interior of the hub and void the warranty. Do not attempt to rebuild a hub that has disassembled. If the hub disassembles, you must install a new hub to avoid serious personal injury and damage to components.

⚠ CAUTION

Do not force the hub onto the axle spindle. The hub can jam on the spindle. Damage to components can result.

5. Carefully align the hub bore to the axle spindle and slide the hub straight onto the axle spindle. The hub is correctly installed when it bottoms-out against the spindle backup collar. When you install the hub, it is normal for a small bead of grease to appear at the hub-spindle backup collar joint. Figure 3.29 and Figure 3.30.
- **If the hub becomes jammed:** Carefully remove the hub so the clip in the hub bore is not dislodged and repeat the installation step by aligning the hub bore to the spindle.

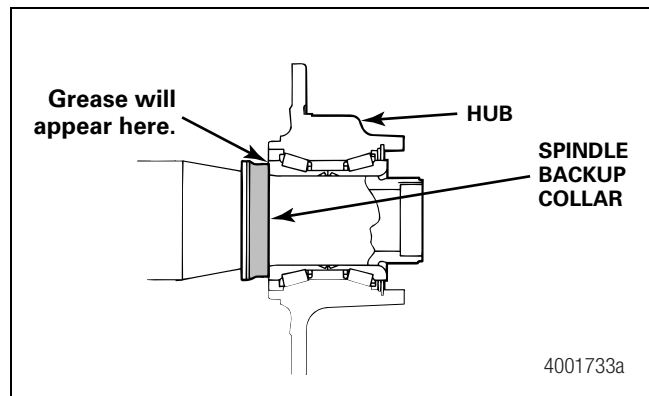


Figure 3.29

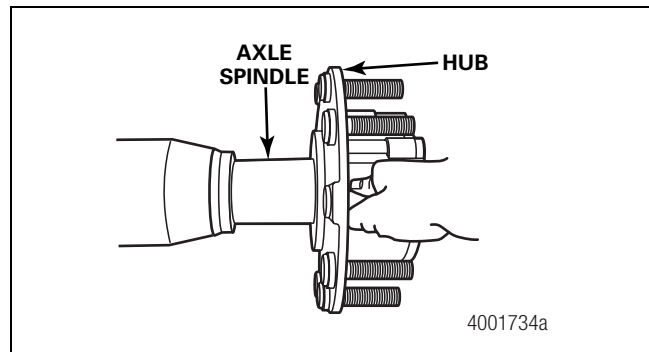


Figure 3.30

6. Install the inner washer, if provided. Figure 3.31.

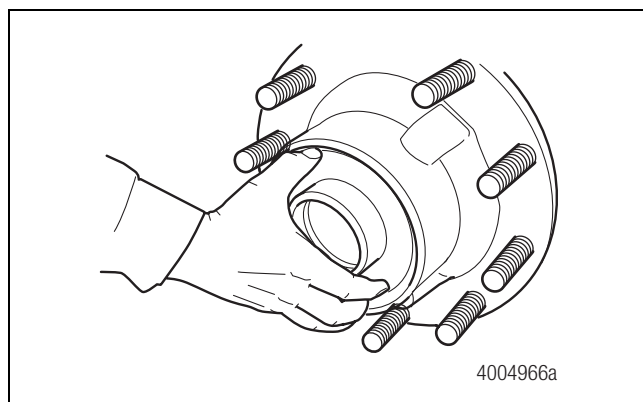



Figure 3.31

⚠ WARNING

The hub must be rotated while the spindle nut is tightened to the correct torque specification. The nut can loosen if it is not tightened correctly. The bearings may not seat correctly if the hub is not rotated. Serious personal injury and damage to components can result.

- Use a torque wrench to tighten the inner nut to 700-750 lb-ft (952-1020 N•m) while rotating the hub a minimum of five complete turns. Because of the high torque values required, using a torque multiplier is helpful. Take care when you install the inner nut to ensure the socket does not damage the hub outer seal. Figure 3.32. 

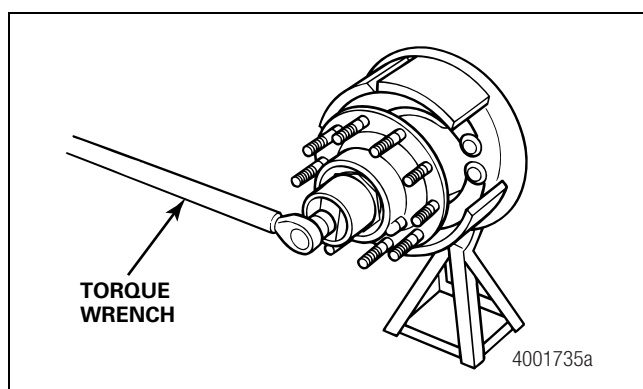



Figure 3.32

- Check the hub to verify that it rotates freely.
 - If the hub assembly does not rotate freely:** Perform the hub inspection procedures in Section 2 of this manual.

- Install a new tabbed lock washer. Do not reinstall a used lock washer. Verify the tab is correctly inserted into the spindle keyway.
- Use a torque wrench to tighten the outer nut to 250-300 lb-ft (340-408 N•m). 
- Use a tool to bend two lock washer tabs over the opposite flats of the outer nut. Keep the tool securely on the tabs. If the tool slips off the tabs, you could damage the hub outer seal. Figure 3.33.

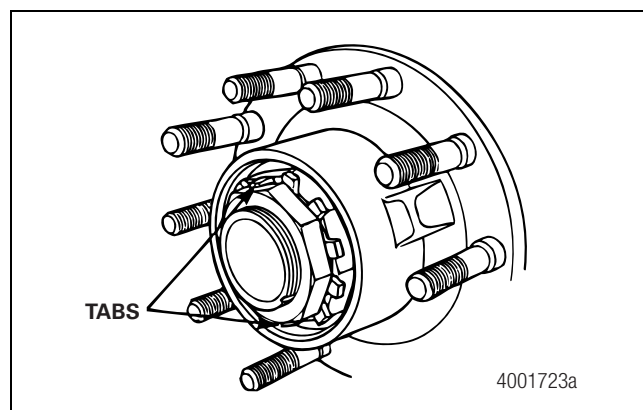


Figure 3.33

- Lightly lubricate the hubcap O-ring and the hubcap threads with bearing grease. Figure 3.34.

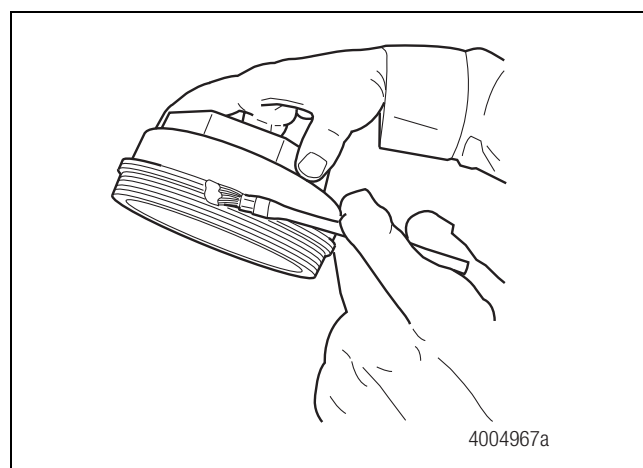



Figure 3.34

- Install the hubcap and tighten it to 50-75 lb-ft (68-102 N•m). Figure 3.35. 

3 TB Series

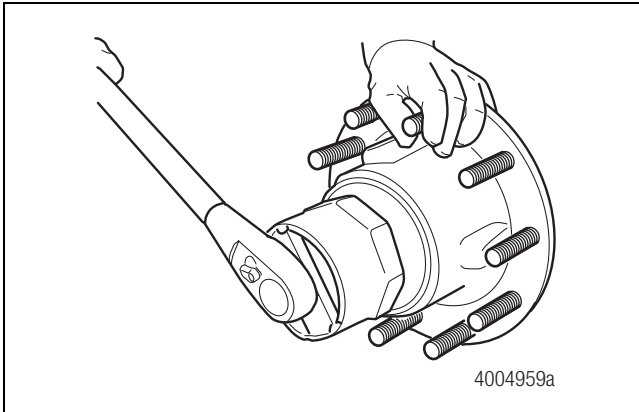


Figure 3.35

14. Install the brake drum and the tire and wheel assembly.
Figure 3.36.

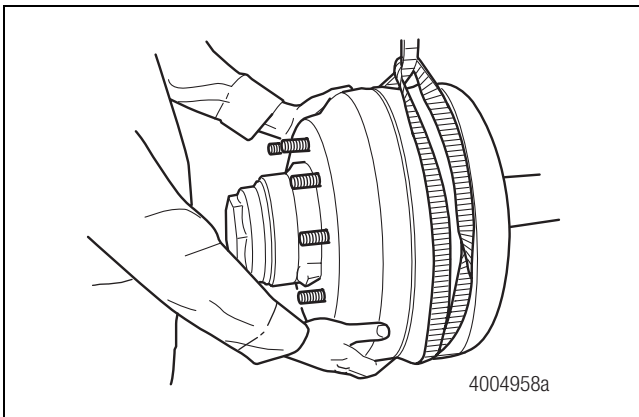


Figure 3.36

15. Adjust the brakes.

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.

Verify that there is only one O-ring used between the spindle collar and the cartridge bearing.

⚠ 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.

Description

TL Series trailer axles feature unitized hub assemblies fully assembled at the factory for simple installation and reduction of wheel-end maintenance. Figure 4.1.

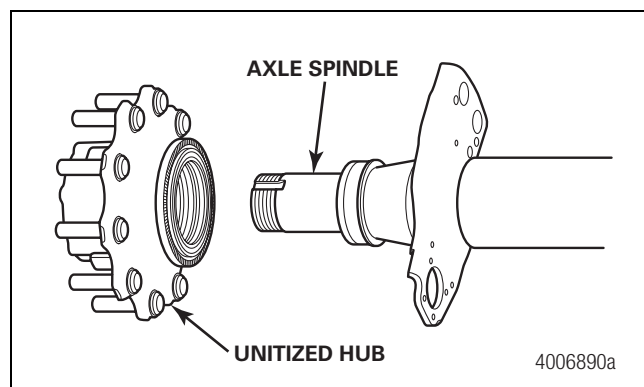


Figure 4.1

TL Series unitized hubs provide the following features.

- Built with a factory-installed bearing cartridge that is pressed into the hub. This cartridge is non-serviceable and cannot be removed from the hub.
- Built with factory-installed inner and outer seals
- Built with the correct lubricant installed at the factory to the correct levels
- Built with bearings that are automatically adjusted as the retention hardware is tightened
- Anti-seize grease applied between the spindle and the cartridge bearing

These features eliminate the need for adjusting bearings, installing seals and installing lubricant in the field. These features also greatly reduce the need for periodic maintenance and the possibility of incorrect maintenance being performed in the field.

Identification

TL Series trailer axles can be identified as follows.

- The axle model number will have the letter L at the second position; for example, TL 4670 QH 2000.
- The axle spindles are straight and shorter than conventional spindles. Figure 4.2, Figure 4.3 and Figure 4.4.
- The hub is a one-piece assembly containing non-serviceable bearings, primary seals and lubricant. Primary seals are located on the inboard and outboard sides of the hub. Figure 4.5 and Figure 4.6.
- The non-serviceable bearing cartridge is held in place by a heavy-duty snap ring visible from the outboard side of the hub. Figure 4.5.
- The hubcap is a stamped steel bolt-on design with embossed semi-circles on the face and no provisions for adding lubricant. Figure 4.7.
- The hubcap has a decal on the side with warranty and service information. Figure 4.8.
- The retention hardware consists of a two-piece system including a spindle nut and a retaining washer. Figure 4.9.

4 TL Series

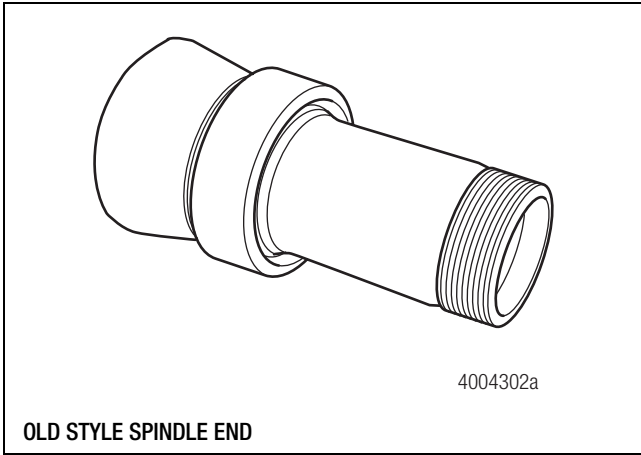


Figure 4.2

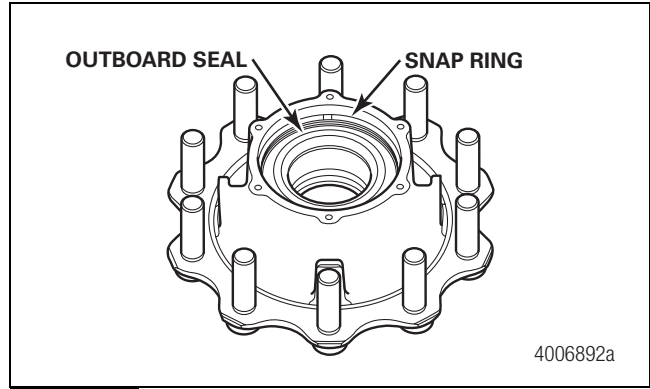


Figure 4.5

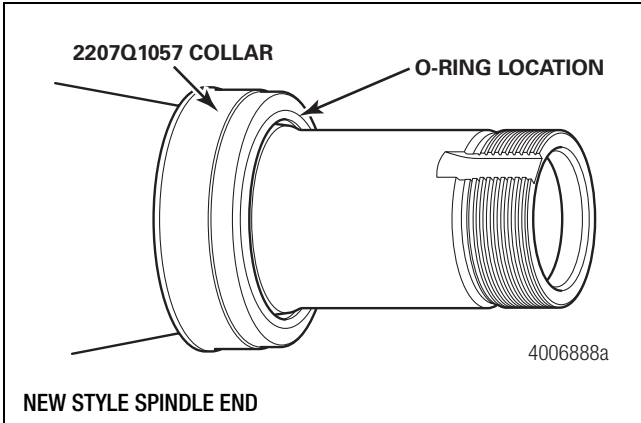
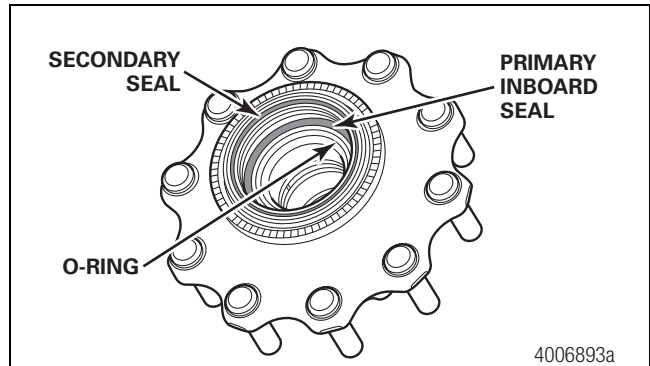


Figure 4.3



A secondary seal is required on axles produced prior to 2005. Some axles produced after 2005 may be sealed with an O-ring installed in the cartridge bearing and do not require the secondary seal.

Figure 4.6

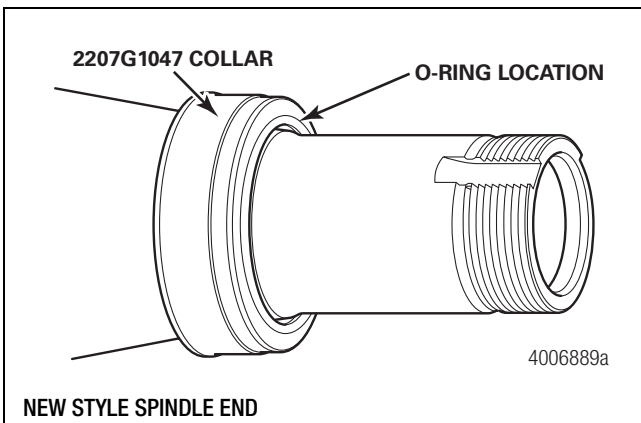


Figure 4.4

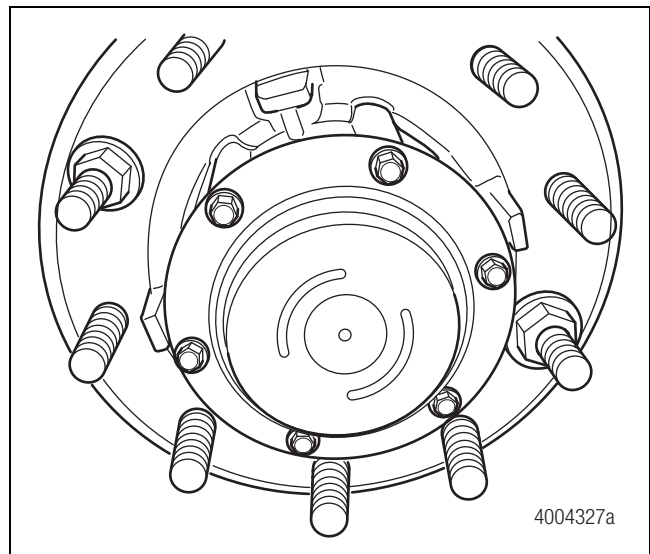


Figure 4.7

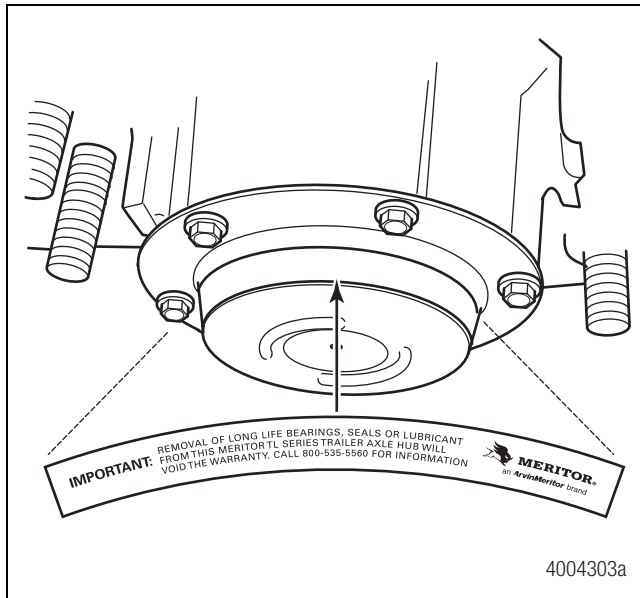


Figure 4.8

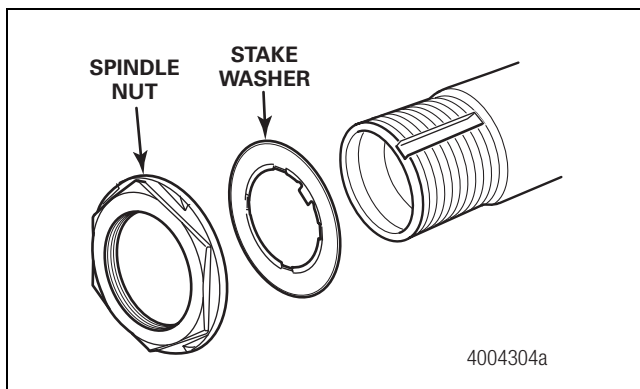


Figure 4.9

Hub Bearing Inspection Procedures

Inspect the Wheel Ends

NOTE: Inspection information can also be found in Technical Bulletin TP-0860, Procedures and Intervals to Inspect the Wheel Ends and Tighten the Spindle Nuts on Meritor TL Series Trailer Axles with Unitized Wheel Ends. Refer to the Service Notes page on the front inside cover of this manual to obtain this publication.

Perform the following procedure for **each** wheel end on the trailer.

1. Wear safe eye protection.

2. Park the trailer on a level surface. Use a jack to raise the trailer until all of the trailer tires are off the ground. Place safety stands under the trailer frame or axles. Do not use a jack to support the trailer.
3. Rotate the wheel assembly to check for signs of unusual resistance or roughness from the bearing. Listen for a low-pitched grinding sound as you rotate the assembly. Use care to determine whether sounds heard are coming from the bearing and not from the brake components or dust cover.
 - **If unusual resistance or noise is detected:** Perform the Detailed Hub Inspection procedure.
4. Grasp the tire and wheel-end assembly at the 12 and six o'clock positions. Check for vertical and horizontal movement. With your hands, apply approximately 50 lb (23 kg) of force to the assembly. You should not feel or see any looseness or movement. Figure 4.10.
 - **If you feel or see movement at the tire circumference:** Proceed to the Detailed Hub Inspection procedure.
 - **If no movement is detected:** Proceed to the Quick Clamp Load Check procedure.

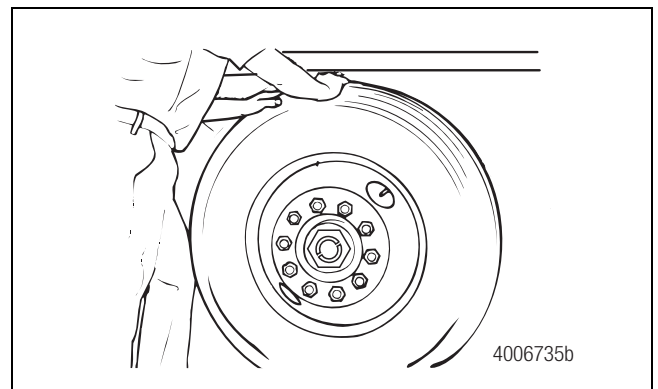


Figure 4.10

Quick Clamp Load Check

1. Remove the hubcap.
2. Use a screwdriver to release the stakes from the stake washer flange. Figure 4.11.

4 TL Series

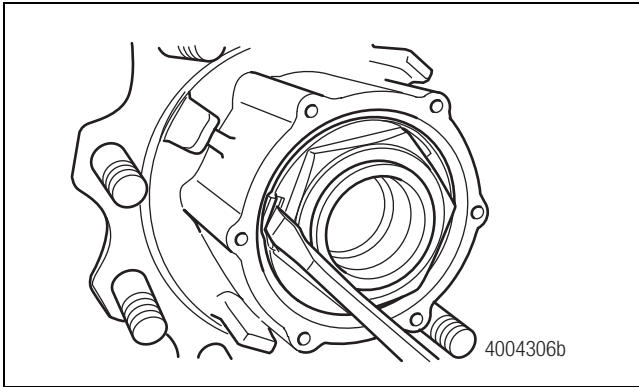



Figure 4.11

3. Remove the spindle nut and stake washer.
4. Install a new stake washer (part number AM21225514).
5. Install the spindle end nut onto the spindle.
 - **If the nut is damaged:** Install a new spindle end nut (part number AM21225405) onto the spindle.

⚠ WARNING

You must rotate the hub **COUNTERCLOCKWISE** while you tighten the spindle nut to the specified torque. If you do not rotate the hub during the tightening procedure, the spindle nut can loosen, and the bearing may not seat correctly, which can cause the wheel to separate from the vehicle during operation. Serious personal injury and damage to components can result.

NOTE: Disregard the torque values embossed into the outer face of the spindle nut. Tighten the nut to the values specified in Step 6 below.

6. Tighten the spindle end nut to **810-850 lb-ft (1100-1150 N•m)** while rotating the wheel and hub **COUNTERCLOCKWISE**. Do not back off the nut after tightening. Re-clamp and mark the spindle nut position relative to the spindle. For future service, use the marks to show if the nut has rotated. 
7. Rotate the wheel assembly to check for signs of unusual resistance or roughness from the bearing. Listen for a low-pitched grinding sound as you rotate the assembly. Use care to determine whether sounds heard are coming from the bearing and not from the brake components or dust cover.
 - **If unusual resistance or noise is detected:** Replace the hub. Refer to Replace the Hub for correct procedures.

8. Grasp the tire and wheel-end assembly at the 12 and six o'clock positions. Check for vertical and horizontal movement. With your hands, apply approximately 50 lb (23 kg) of force to the assembly. You should not feel or see any looseness or movement. Figure 4.10.

- **If you feel or see movement at the tire circumference:** Proceed to the Detailed Hub Inspection procedure.

NOTE: You must stake the stake washer to the spindle nut in **three** positions.

9. Use a hammer and staking tool to stake the stake washer to the spindle nut in **three** positions. Bend the washer to the stake profile as shown. Figure 4.12 and Figure 4.13.

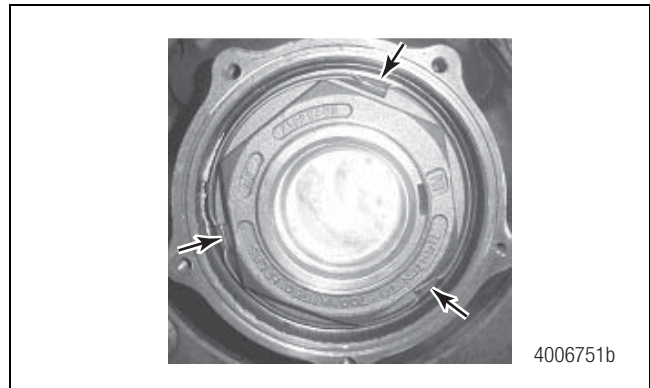


Figure 4.12

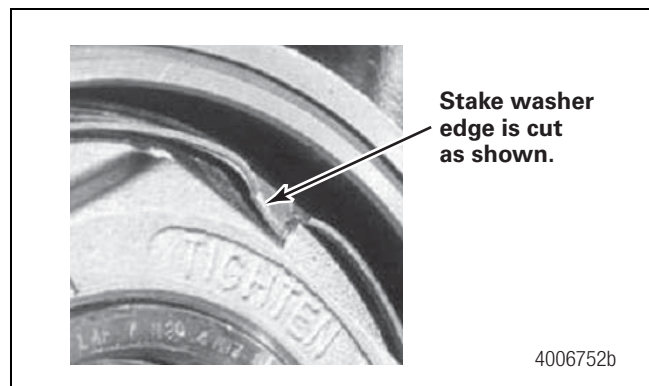



Figure 4.13

10. Clean the hub end surface and hubcap flange prior to reassembly of the hubcap.

11. Install the hubcap with a new gasket (part number 2208-B-1172). Install new hubcap capscrews. Tighten the hubcap capscrews in a crisscross pattern to 15-30 lb-ft (20-40 N-m). 

Detailed Hub Inspection

1. Follow the wheel manufacturer's instructions to remove the tire, wheel assembly and brake drum.
2. If necessary, remove the hubcap.
 - **If this is not the first inspection:** Check the mark on the spindle nut and spindle to see if the nut has moved.
 - **If the mark has moved, then the nut was not previously tightened enough:** Clean the threads.
3. Attach the magnetic base of the dial indicator to the spindle. Touch the dial indicator stem to the hubcap mounting surface. Figure 4.14.

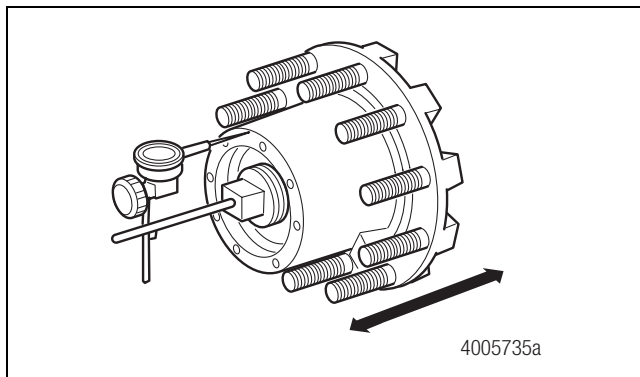


Figure 4.14

4. Set the dial indicator to ZERO. Do not rotate the wheel end. Place your hands at the nine and three o'clock positions.
5. Push the unitized wheel end straight IN. Note the reading. Then pull the wheel end straight OUT. Note the reading.
 - **If the total movement of the dial indicator is less than 0.003-inch (0.08 mm):** Follow instructions 2 through 11 in the Quick Clamp and Load Inspection procedure.
 - **If the total movement is 0.003-inch (0.08 mm) or greater:** Proceed to the Thread Inspection procedure.

Thread Inspection

Perform the following procedure for each wheel end on the trailer with end play at the hub greater than 0.003-inch (0.08 mm) or wheel movement greater than 0.04-inch (1 mm).

1. Use a screwdriver to release the stakes from the stake washer flange. Figure 4.15.

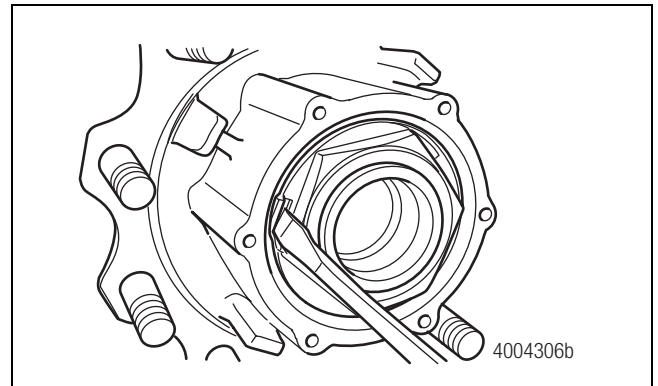


Figure 4.15

2. Remove the spindle nut from the spindle end. Figure 4.16.

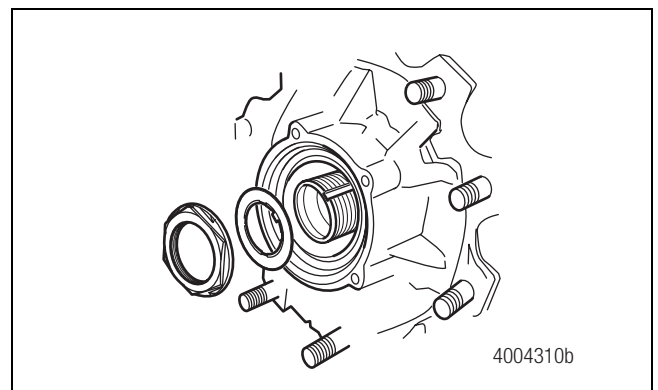


Figure 4.16

3. Check the spindle threads. Figure 4.17.
 - **If the threads are not free running, and a limit of two threads are damaged:** Repair the threads with a thread file (Snap-On® tool, 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.

4 TL Series

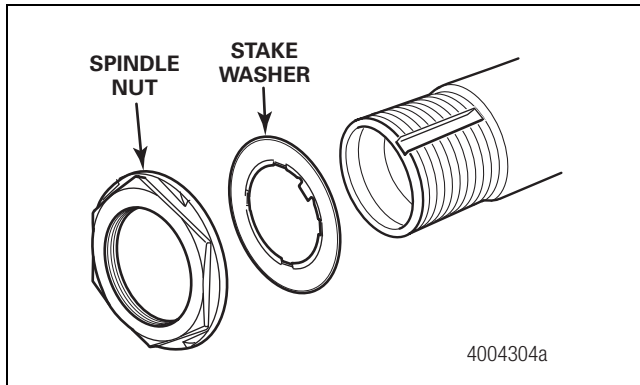



Figure 4.17

4. Clean the spindle threads and nut threads.
5. Install a new stake washer (part number AM21225514).
6. Install the spindle end nut onto the spindle.
 - **If the nut is damaged:** Install a new spindle end nut (part number AM21225405) onto the spindle.

NOTE: Disregard the torque values embossed into the outer face of the spindle nut. Tighten the nut to the values specified in Step 7 below.

7. Tighten the spindle end nut to 810-850 lb-ft (1100-1150 N•m) while rotating the wheel and hub in a COUNTERCLOCKWISE direction. Do not back off the nut after tightening. Mark the nut location relative to the spindle. Figure 4.18. 

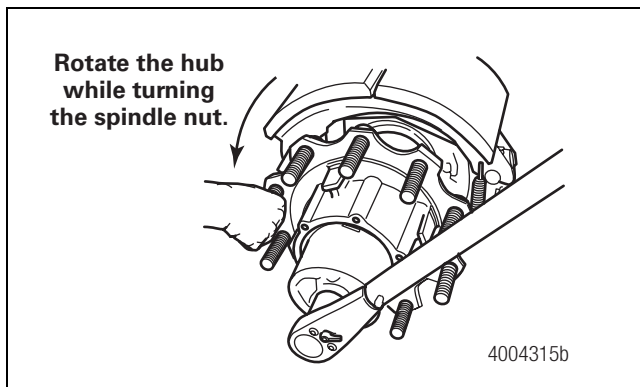


Figure 4.18

8. Check for wheel-end movement to ensure the wheel end rotates freely as described in the inspection procedure. Verify end play is less than 0.003-inch (0.08 mm) by following Steps 3, 4 and 5 of the Detailed Hub Inspection procedure.

- **If end play is greater than 0.003-inch (0.08 mm):** Replace the hub. Refer to Replace the Hub for correct procedures.

NOTE: You must stake the stake washer to the spindle nut in **three** positions.

9. Use a hammer and staking tool to stake the stake washer to the spindle nut in **three** positions. Figure 4.19 and Figure 4.20.

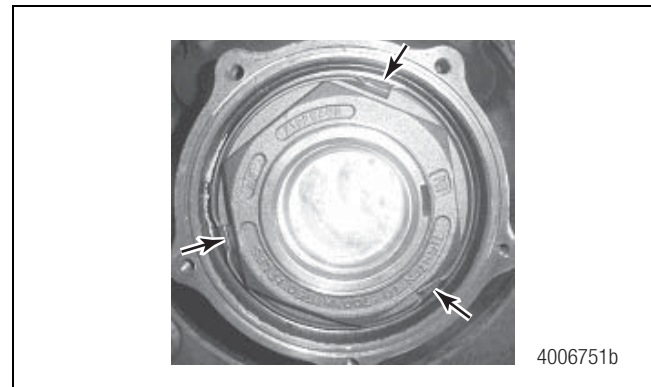


Figure 4.19

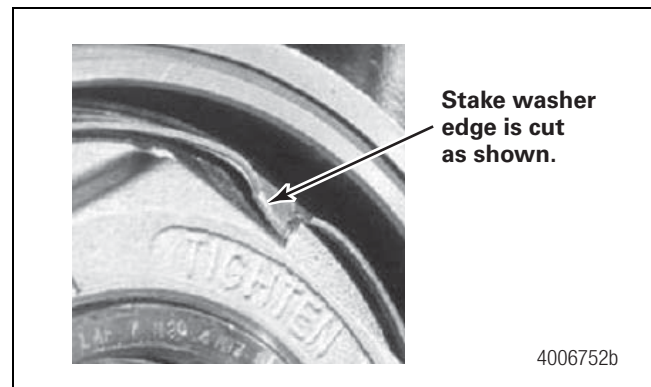


Figure 4.20

10. Clean the hub end surface and hubcap flange prior to reassembly of the hubcap.
11. Install the hubcap with a new gasket (part number 2208-B-1172). Install new hubcap capscrews. Tighten the hubcap capscrews in a crisscross pattern to 15-30 lb-ft (20-40 N•m). 

Remove the Unitized Hub

Under normal operating conditions, you are not required to remove the TL Series unitized hubs from the axle spindle. However, maintenance procedures, such as replacing damaged wheel studs or rotors, require that you remove the hub.

CAUTION

A unitized hub is permanently sealed and lubricated as an assembly. Do not attempt to remove the hub bearings, primary seals or lubricant. You cannot service or reinstall these components back into a unitized hub. Damage to components can result. Removal of long-life bearings, primary seals or lubricant from the Meritor TL Series unitized hub will void the warranty.

1. Park the trailer on a level surface.
2. Use a jack to raise the trailer until the tires are off the ground. Place safety stands under the trailer frame or axles. Figure 4.21.

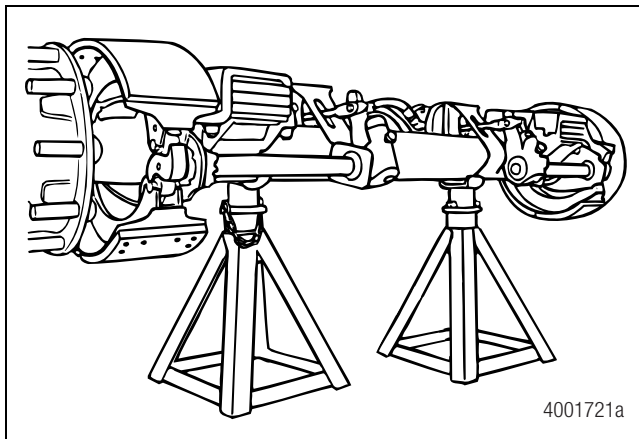


Figure 4.21

WARNING

Do not attempt to remove the tire and wheel, and hub and drum, as an assembly from the spindle. The clip inside the hub bore can dislodge, and the hub can disassemble. If the hub disassembles, you must install a new factory-sealed hub to avoid serious personal injury and damage to components.

3. Remove the tire and wheel assembly. Figure 4.22.

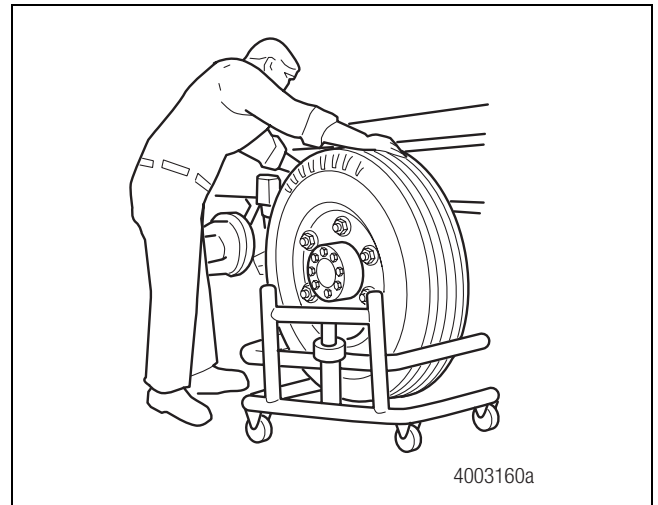


Figure 4.22

4. Release the brakes and remove the brake drum. Figure 4.23.

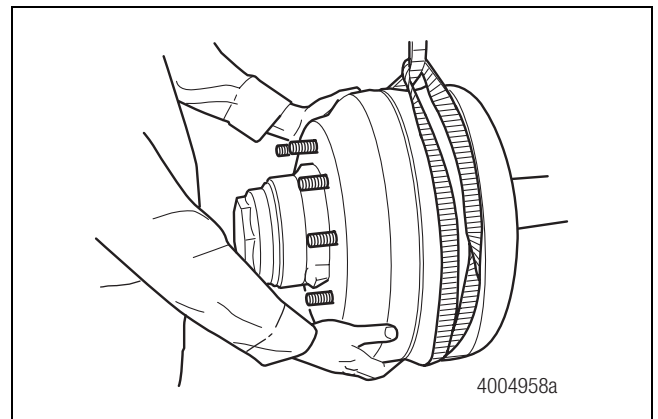


Figure 4.23

5. Remove the hubcap and hubcap gasket. Figure 4.24.

4 TL Series

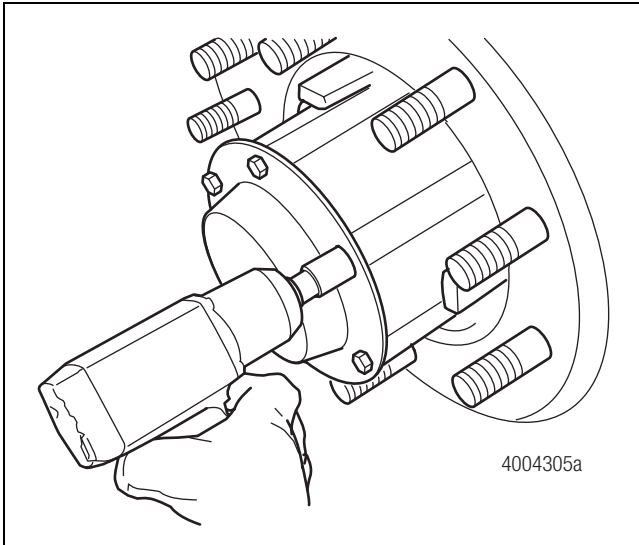


Figure 4.24

6. 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 4.25.

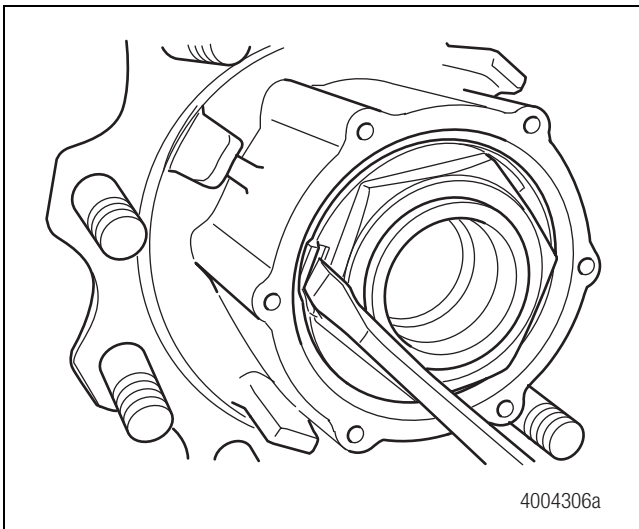


Figure 4.25

⚠ CAUTION

Wear protective gloves when you remove the spindle nut and retaining washer. Sharp edges on the washer can result in personal injury.

7. Remove the spindle nut and retaining washer. Because of the high installation torque, a torque multiplier may be useful in removing the spindle nut. Figure 4.26.

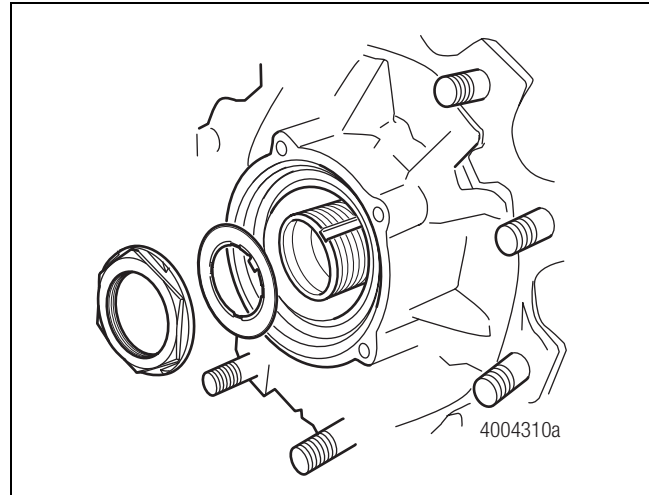


Figure 4.26

⚠ 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.

8. Normally you will need to use a puller to remove the hub from the axle spindle. On a conventional wheel end, removing the outer bearing allows the hub to drop relative to the axle and break the oil seal free of the oil seal collar. The non-serviceable unitized hub keeps this equipment in line and a hub puller is normally needed to break the hub free of the spindle.
 - A. Install a metal plate onto the end of the spindle. Figure 4.27.
 - B. Attach a three-pronged puller to the hub. Figure 4.27.
 - C. While holding the puller screw stationary, spin the hub to break it free from the axle. Figure 4.27.
 - D. Remove the puller from the axle.

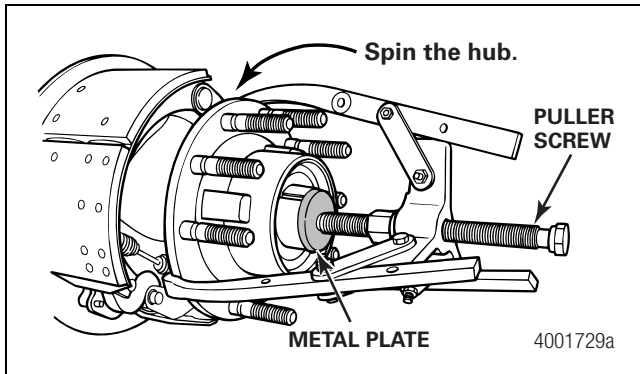


Figure 4.27

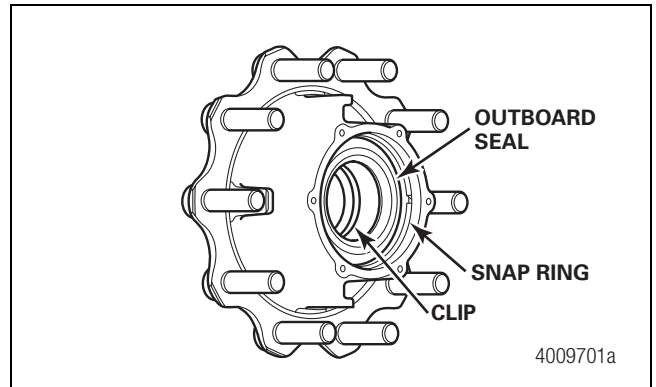


Figure 4.29

⚠ WARNING

When you remove the hub from the axle spindle, carefully pull the hub off the spindle as straight as possible to help avoid dislodging the clip inside the hub bore. If the clip becomes dislodged, the hub will disassemble, which will contaminate the interior of the hub and void the warranty. Do not attempt to rebuild a hub that has disassembled. If the hub disassembles, you must install a new hub to avoid serious personal injury and damage to components.

9. Pull the hub as straight as possible off the spindle to avoid dislodging the clip inside the hub bore. Figure 4.28 and Figure 4.29.

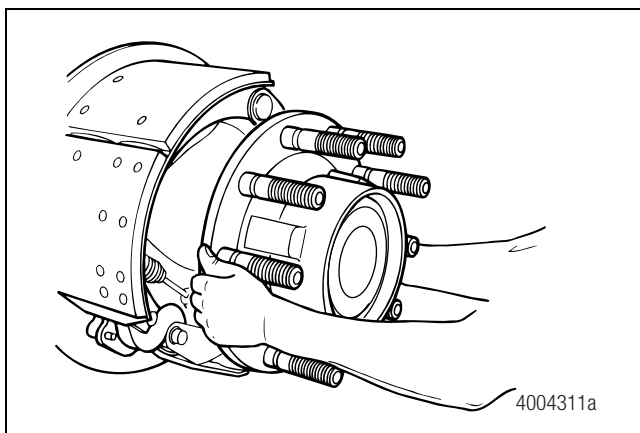


Figure 4.28

10. Remove the secondary oil seal from the hub. When you remove the secondary seal, you must protect the interior of the unitized hub with a plate. Figure 4.30.

The secondary seal at the back of the hub must be replaced whenever the hub is removed from the spindle. Do not confuse this seal with the primary inner and outer hub seals that are integral to the unitized hub and cannot be serviced.

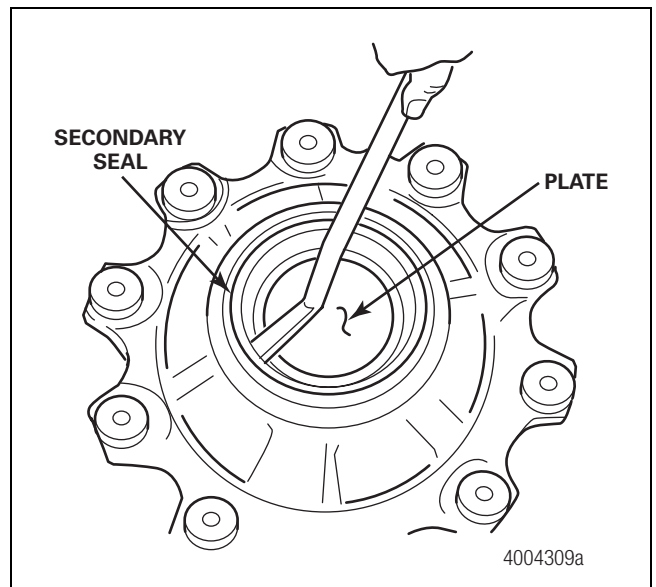


Figure 4.30

Install the Unitized Hub

⚠️ WARNING

You must follow the installation procedures outlined below when you install a unitized hub. Wheel separation, damage to components and serious personal injury can result if you do not carefully follow these procedures.

Do not attempt to remove the tire and wheel, and hub and drum, as an assembly from the spindle. The clip inside the hub bore can dislodge, and the hub can disassemble. If the hub disassembles, you must install a new factory-sealed hub to avoid serious personal injury and damage to components.

⚠️ CAUTION

Do not use solvents to clean the hub bore. Solvents can enter the hub and contaminate the lubricant. Damage to components can result.

1. Clean the axle spindle and hub bore by wiping them with a clean rag. Figure 4.31 and Figure 4.32.

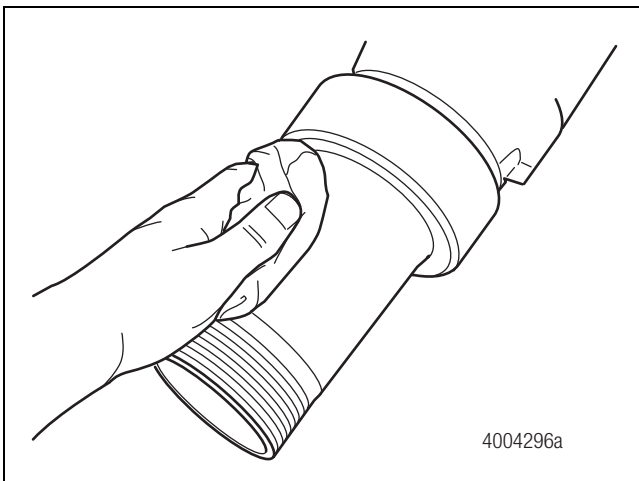


Figure 4.31

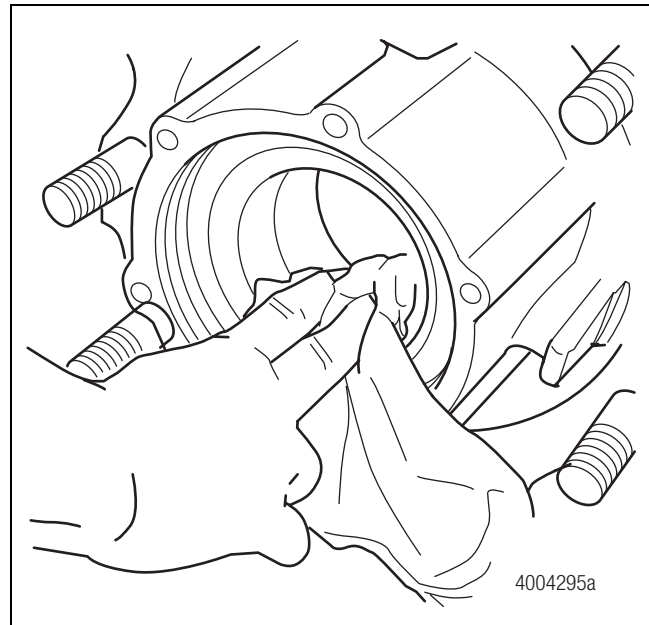


Figure 4.32

2. Check the axle spindle, axle collar and hub bore for scratches, nicks or marks. Repair them with a crocus or emery cloth. Figure 4.33.

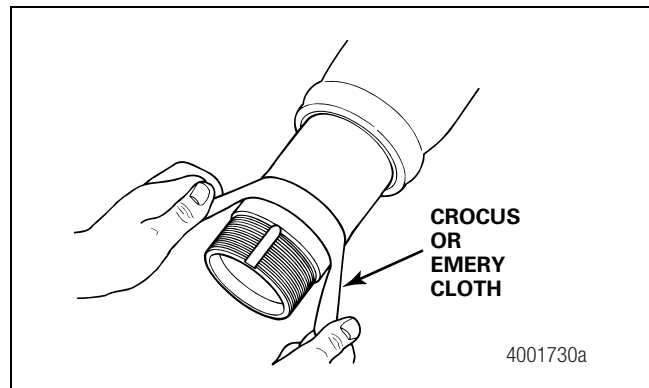


Figure 4.33

⚠️ CAUTION

Remove all debris from the joint between the hub and axle backup collar. If debris is trapped in this joint, it could create a condition in which clamp on the hub is lost resulting in damage to components.

3. Check the spindle threads. Refer to the Thread Inspection procedure in this section.

4. Use your finger to verify that the hub side of the axle backup collar and the edge of the hub that contacts the backup collar are clear of debris. Figure 4.34 and Figure 4.35.

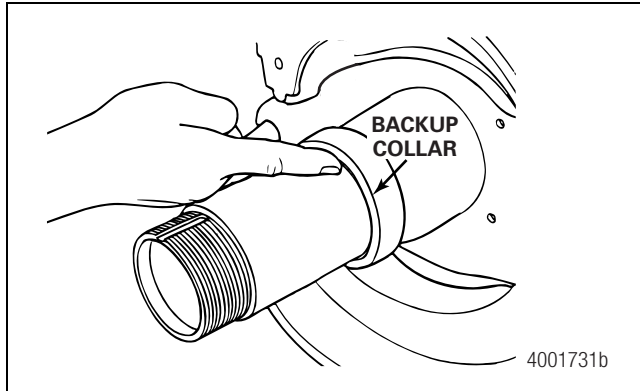


Figure 4.34

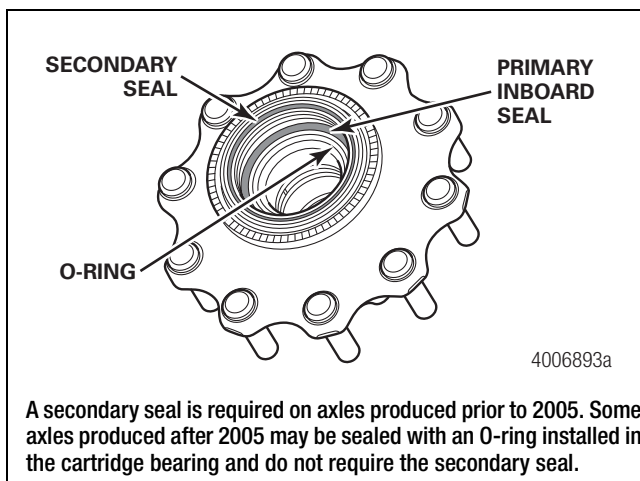


Figure 4.35

5. If the hub was originally equipped with a secondary seal, install a new one. Figure 4.36.
 - A. Install the seal on the correct driver with the “oil side” mark facing the interior of the hub.
 - B. Locate the nose of the driver into the bore of the inner bearing cone.
 - C. Drive the seal fully into the hub. The seal must remain square to the hub at all times. The seal will bottom out on the inner hub shoulder and the outer face will remain outside of the hub when the seal is fully installed.

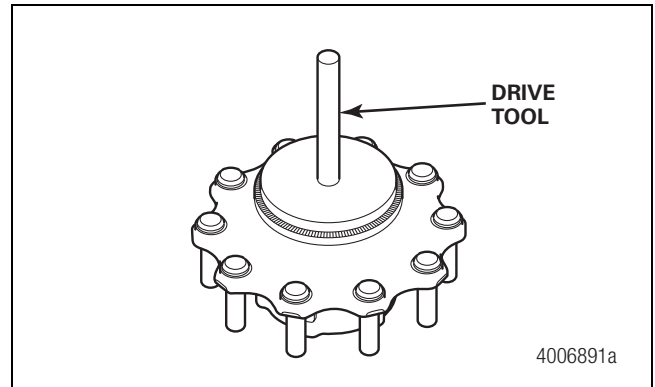


Figure 4.36

NOTE: O-Ring and Non O-Ring Style Replacement Hub Assemblies

There are two styles of hub assemblies used for replacement: O-ring style and non O-ring style. O-ring style replacement hub assemblies will come with the required O-ring already pre-installed onto the hub. Non O-ring style replacement hub assemblies will not have an O-ring installed or supplied with it. You should not obtain an O-ring and install it on a non O-ring style hub.

6. Inspect the inboard side of the replacement hub assembly to determine if it is an O-ring style hub or non O-ring style hub.
 - If the bearing has a machined groove on the inside corner as shown in Figure 4.37: It is an O-ring style hub. An O-ring, part number 1205Q2747, is required.
 - If the bearing does not have a machined groove as shown in Figure 4.38: It is a non O-ring style hub. No O-ring is required.

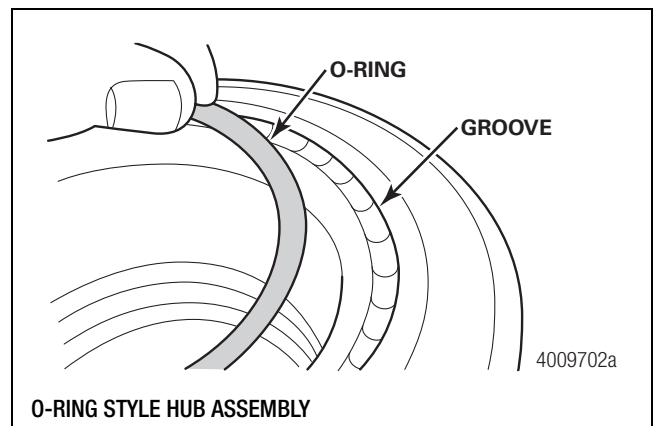


Figure 4.37

4 TL Series

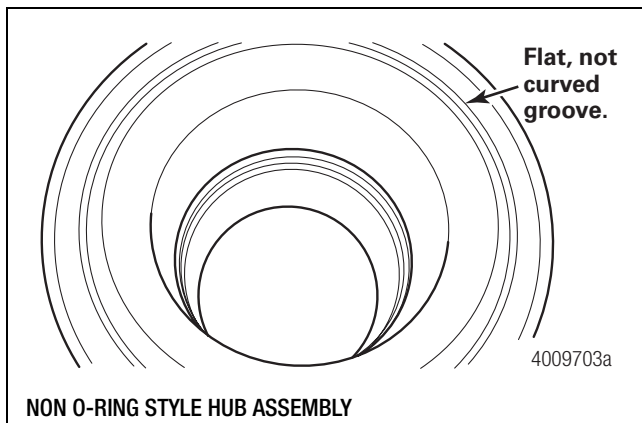


Figure 4.38

⚠ CAUTION

Do not install an O-ring on a hub assembly that does not require one. Using an O-ring without the appropriate machine groove on the bearing will cause the O-ring to seat incorrectly against the spindle shoulder, resulting in loss of clamp load, sealing and eventual damage to the wheel end.

- If you are installing an O-ring style hub, ensure the O-ring, part number 1205Q2747, is correctly seated in the machined groove prior to installing the hub.
 - If the O-ring is missing or comes loose during handling: Reinstall the O-ring on the hub. Hold the O-ring firm in one location in the machined groove. Using your fingers, lightly guide the O-ring around the groove until it is completely seated. Figure 4.39 and Figure 4.40.

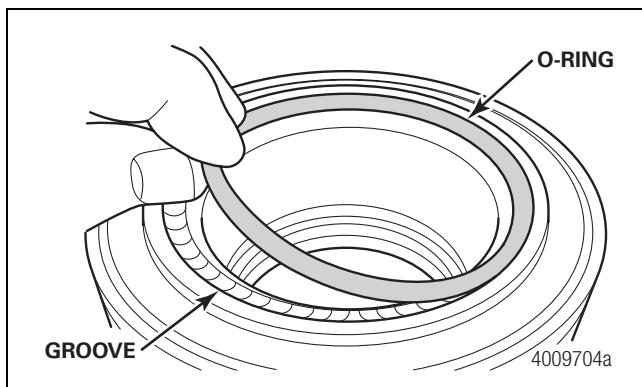


Figure 4.39

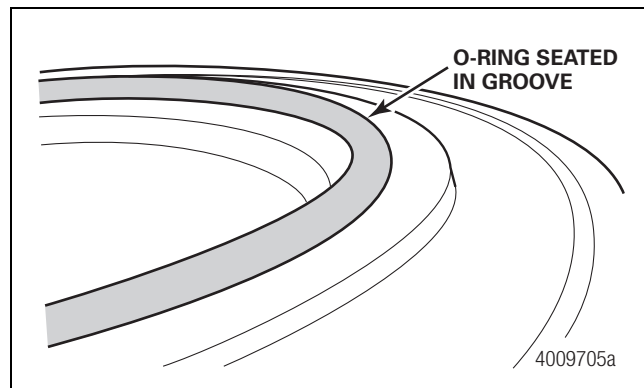


Figure 4.40

- Remove any existing O-ring that may be on the spindle.
- Apply a light coating of bearing grease to the hub bore. The entire hub bore which comes in contact with the spindle should be covered. This grease will help reduce spindle wear, assist in hub removal, and help seal the hub-spindle joint. Figure 4.41.

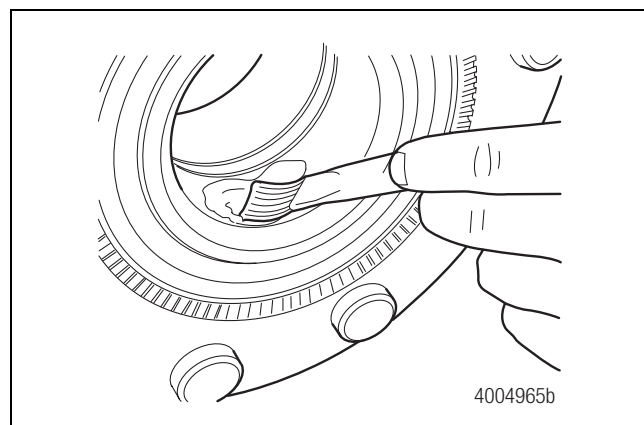


Figure 4.41

- Apply a suitable anti-seize compound (Optimol White Paste T or similar) to the spindle before remounting the hub. Application of anti-seize compound will help reduce spindle wear, assist in hub removal, and help seal the hub-spindle joint.

⚠ WARNING

You must align the hub bore straight to the axle spindle to help avoid dislodging the clip inside the hub bore. If the clip becomes dislodged, the hub will disassemble, which will contaminate the interior of the hub and void the warranty. Do not attempt to rebuild a hub that has disassembled. If the hub disassembles, you must install a new hub to avoid serious personal injury and damage to components.

⚠ CAUTION

Do not force the hub onto the axle spindle. The hub can jam on the spindle. Damage to components can result.

11. Carefully align the hub to the axle spindle and slide the hub straight onto the axle spindle taking care not to damage the secondary seal. Figure 4.42.
 - **If the hub becomes jammed:** Carefully remove the hub from the spindle so the clip in the hub bore is not dislodged and repeat the installation step by aligning the hub bore to the spindle.

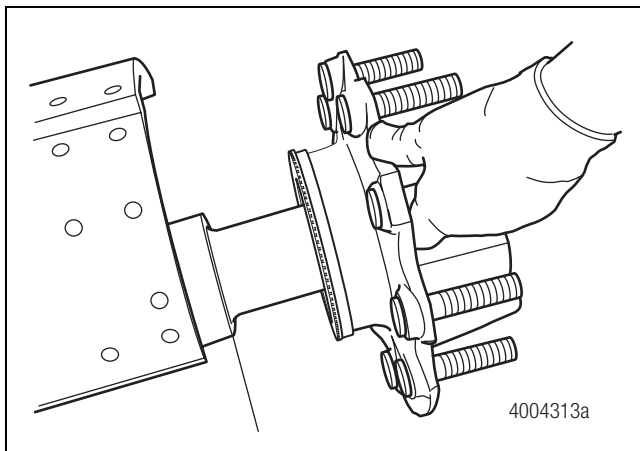


Figure 4.42

Install the Spindle Nut and Retaining Washer

1. Check the back of the washer to see if there is an indent from the cartridge bearing.
 - **If there is a groove on the washer:** Replace the washer.
2. Use bearing grease to lightly lubricate the face of the retaining washer that contacts the spindle nut.
3. Ensure the spindle threads and nut threads are clean.

4. Install a new stake washer (part number AM21225514), or the existing washer if it is not worn or damaged, onto the spindle. Figure 4.43.

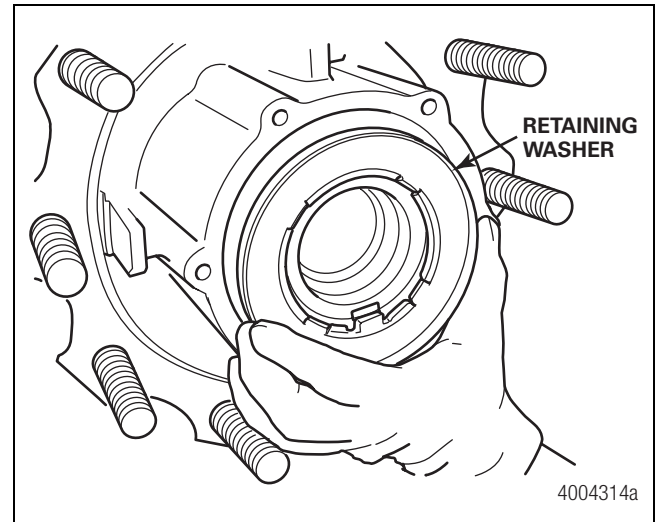


Figure 4.43

5. Install the spindle end nut (part number AM21225405) onto the spindle.

⚠ WARNING

You must rotate the hub **COUNTERCLOCKWISE** while you tighten the spindle nut to the specified torque. If you do not rotate the hub during the tightening procedure, the spindle nut can loosen, and the bearing may not seat correctly, which can cause the wheel to separate from the vehicle during operation. Serious personal injury and damage to components can result.

NOTE: Disregard the torque values embossed into the outer face of the spindle nut. Tighten the nut to the values specified in Step 6 below.

6. Tighten the spindle end nut to 810-850 lb-ft (1100-1150 N•m) while rotating the wheel and hub in a **COUNTERCLOCKWISE** direction. Do not back off the nut after tightening. Mark the nut location relative to the spindle. Figure 4.44. **🔧**

4 TL Series

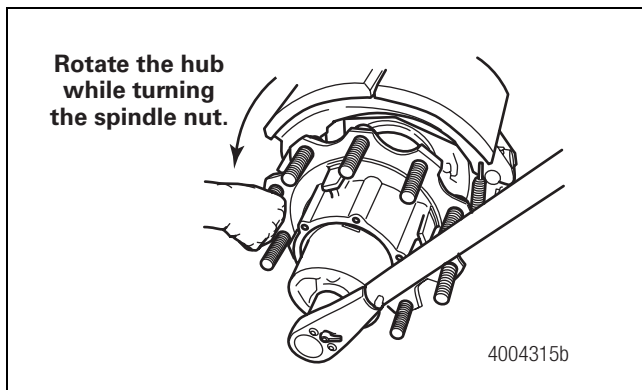


Figure 4.44

7. Check for wheel-end movement to ensure the wheel end rotates freely as described in the inspection procedure. Verify end play is less than 0.003-inch (0.08 mm) by following Steps 3, 4 and 5 of Detailed Hub Inspection in this section.

- **If end play is greater than 0.003-inch (0.08 mm):**
Replace the hub. Refer to the procedures in this section.

NOTE: You must stake the stake washer to the spindle nut in **three** positions.

8. Use a hammer and staking tool (part number AM21225831) to stake the stake washer to the spindle nut in **three** positions. Figure 4.45 and Figure 4.46.

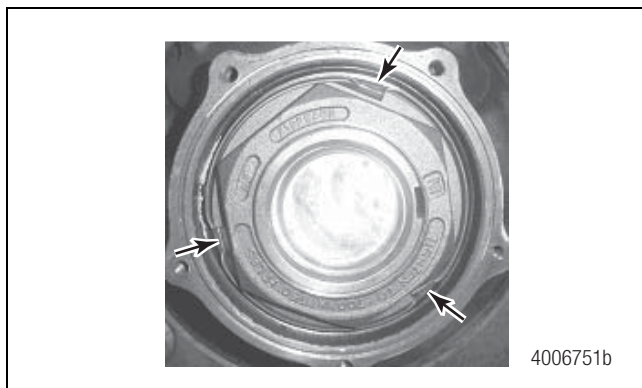


Figure 4.45

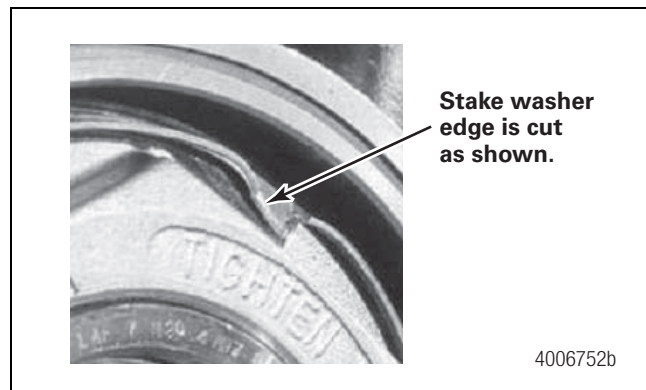



Figure 4.46

9. Install the hubcap with a new gasket (part number AM2208P1160). Tighten the hubcap capscrews in a crisscross pattern to 10-15 lb-ft (13-20 N•m). 
10. Install the brake drum and the tire and wheel assembly. Figure 4.47.

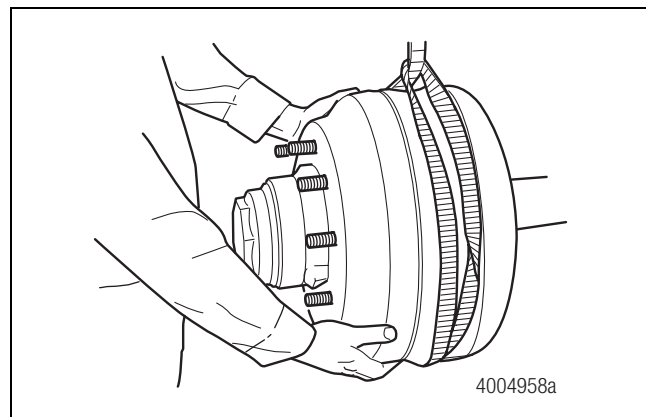


Figure 4.47

11. Adjust the brakes.

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.

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

Remove and Install the Studs

1. Follow the instructions in this manual to remove the unitized hub.
2. Support the INBOARD side of the hub flange perpendicular to the press cylinder.
3. Use the press cylinder to push on the threaded end of the stud to force it out of the hub flange. Figure 5.1.

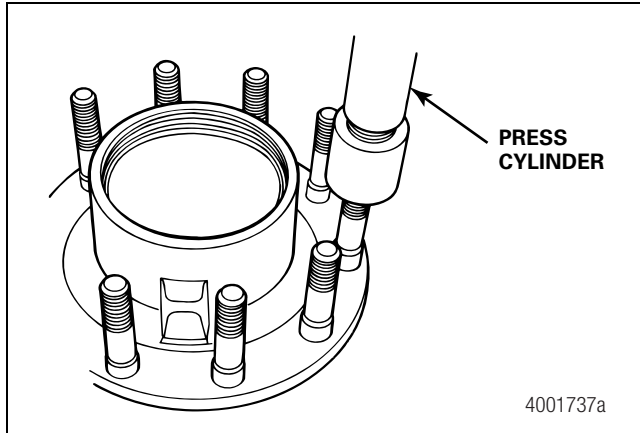


Figure 5.1

4. Turn the hub over. Support the OUTBOARD side of the hub flange perpendicular to the press cylinder.
5. Install a Meritor serrated wheel stud into the hub. Use the press cylinder to push on the stud head, applying no more than 10,000 pounds (44 500 N) of force to seat the new stud. Verify that the bolt head is fully seated against the wheel flange.
6. Follow the instructions in this manual to install the hub.

Brakes

Service Brakes Without Removing Hubs

Trailer axles equipped with unitized wheel-end systems and cam brakes feature outboard-mounted drums and bolt-on bushings at the brake spider. These components allow you to remove all brake equipment including the shoes, camshaft bushings and camshaft without removing the hub. Figure 5.2. This is important because unitized wheel-end systems require that the hub not be disturbed in order to receive the extended wheel-end warranty.

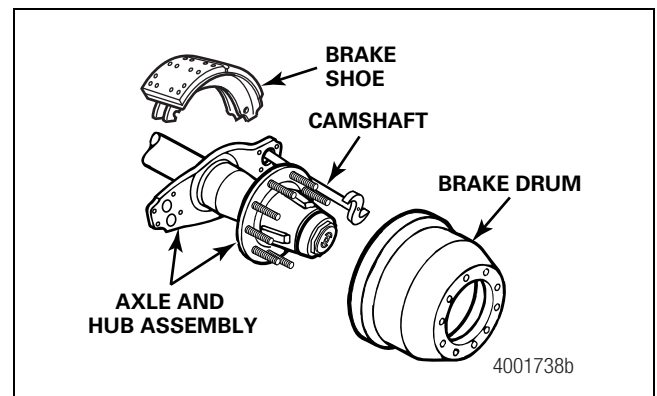


Figure 5.2

To remove all brake equipment without removing the hub, proceed as follows.

1. Remove the brake drum, slack adjuster and brake shoes using procedures in Maintenance Manual 14, Trailer Axles. To obtain this publication, refer to the Service Notes page on the front inside cover of this manual.
2. Remove the snap ring at the INBOARD side of the bolt-on bushing. Remove the four capscrews from the bolt-on bushing. Figure 5.3.

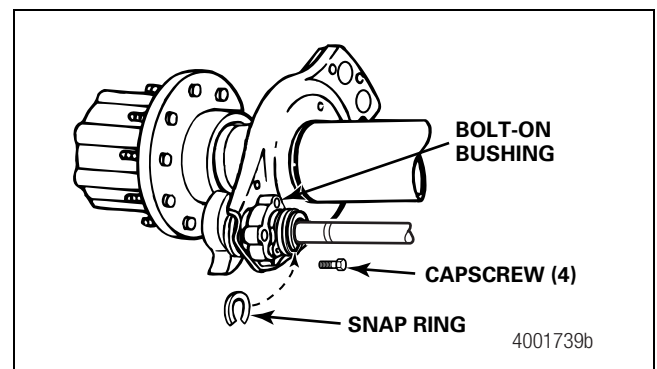


Figure 5.3

5 Component Service

3. Use a screwdriver to pry the bolt-on bushing out of the spider retainer hole. The bushing has recesses to help you remove it. Figure 5.4.

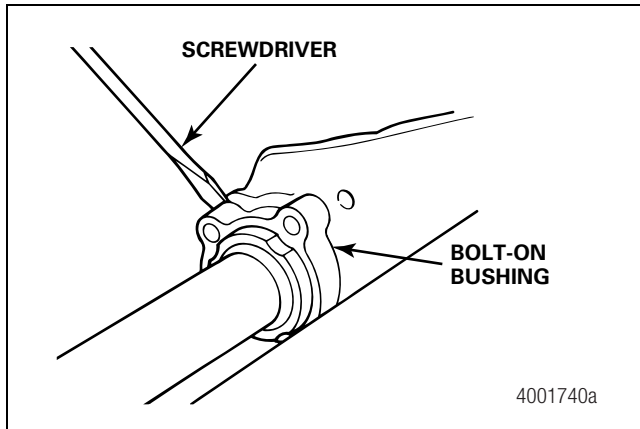


Figure 5.4

4. Move the camshaft head AWAY from the axle, so that the camshaft head clears the hub flange. Figure 5.5.

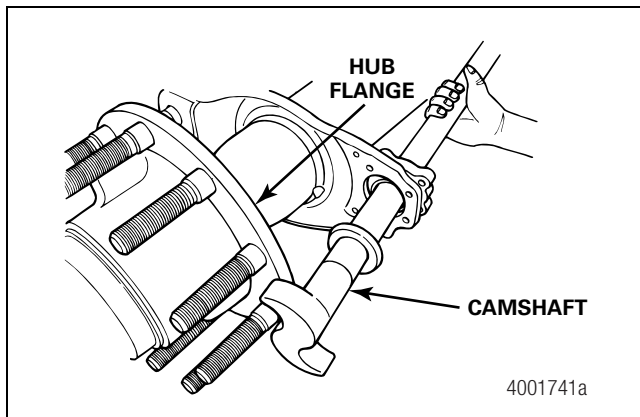



Figure 5.5

5. Pull the camshaft from the bushing.
6. Install the new brake components.
7. Return the camshaft head into the correct position.
8. Seat the bolt-on bushing into the spider using the capscrews. Tighten the capscrews to 25-30 lb-ft (34-41 N•m). 
9. Install the snap ring at the INBOARD side of the bolt-on bushing.

Meritor Heavy Vehicle Systems, LLC

2135 West Maple Road

Troy, MI 48084 USA

866-OnTrac1 (668-7221)

meritor.com

Copyright 2011
Meritor, Inc.

Printed in USA

Revised 09-11
Maintenance Manual MM-0420 (16579)

