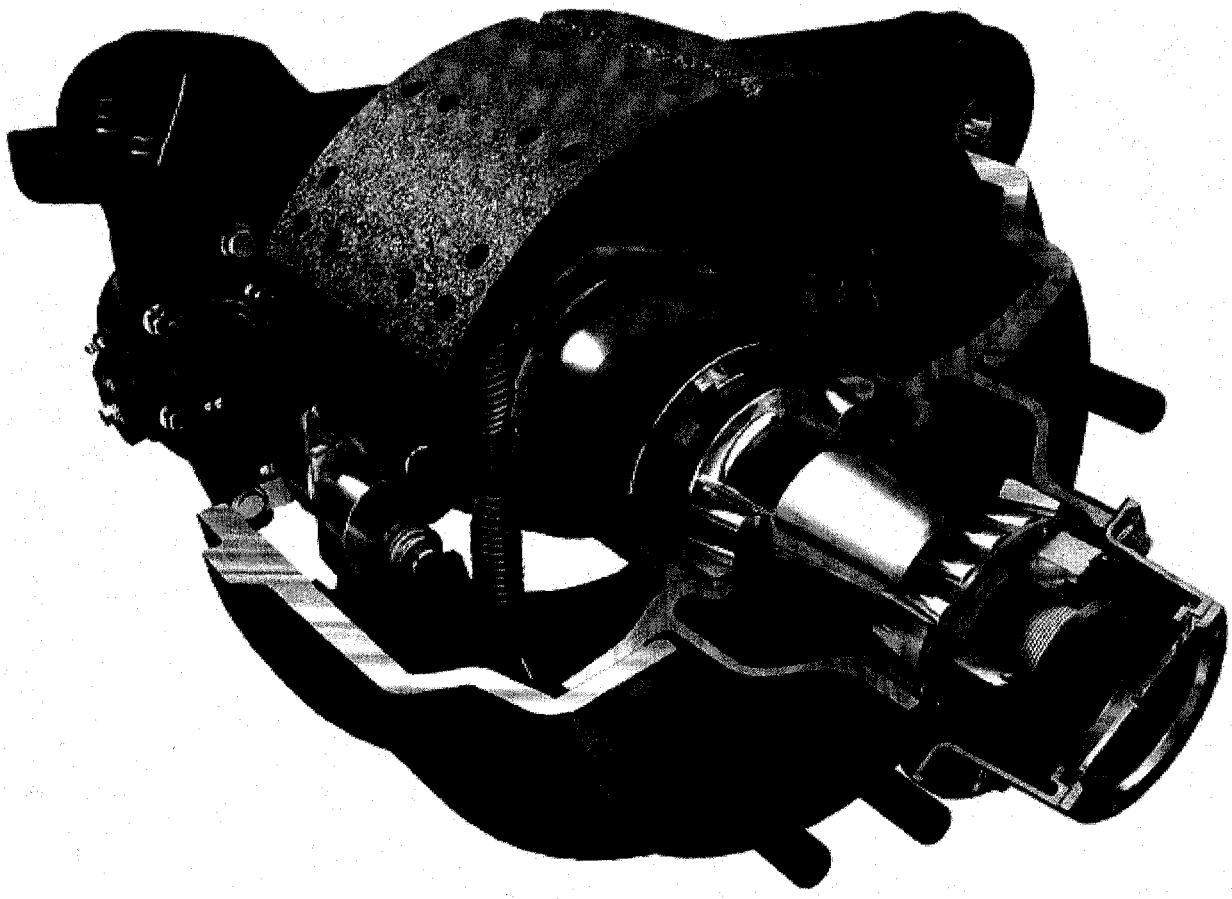
TECHNICAL PROCEDURE

HENDRICKSON EXTENDED-LIFE 3-YEAR™ (HXL3™) WHEEL END

SUBJECT: Wheel-end Maintenance Procedures

LIT NO: T72006
DATE: March 2013



HENDRICKSON

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CONVENTIONS APPLIED IN THIS DOCUMENT

This section explains techniques used in this document to convey important information, safety issues, how to contact Hendrickson and how to apply hyperlinks.

EXPLANATION OF SIGNAL WORDS

Hazard signal words (such as DANGER, WARNING or CAUTION) appear in various locations throughout this publication. Information accented by one of these signal words must be observed at all times. Additional notes are utilized to emphasize areas of procedural importance and provide suggestions for ease of repair. The following definitions comply with ANSI Z535.4 and indicate the use of safety signal words as they appear throughout the publication.

⚠**DANGER: INDICATES IMMEDIATE HAZARDS WHICH WILL RESULT IN SEVERE PERSONAL INJURY OR DEATH.**

⚠**WARNING: Indicates hazards or unsafe practices which could result in severe personal injury or death.**

⚠**CAUTION: Indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.**

NOTICE: Indicates hazards or unsafe practices which could result in damage to machine or equipment.

IMPORTANT: An operating procedure, practice or condition that is essential to emphasize.

⚠ Safety alert symbol used to indicate a condition exists that may result in personal injury or harm to individuals. It must be applied to DANGER, WARNING and CAUTION statements, which emphasize severity.

LINKS

Links are identified by a dark grey line under the linked text. Internal links allow the reader to jump to a heading, step or page in this document. External links open the website or document referenced.

GENERAL SERVICE NOTES

IMPORTANT: Special attention should be paid to the information included in EXPLANATION OF SIGNAL WORDS.

Before you begin:
Read, understand and comply with:

- All instructions and procedures.
- All signal word (CAUTION, WARNING and DANGER) statements to help avoid personal injury or property damage.
- Company's maintenance, service, installation and diagnostic practices.
- Vehicle manufacturer's safety instructions when working on the vehicle.
- Vehicle manufacturer's instructions for recommended practices not described in this manual.
- Local safety regulations.

DURING SERVICE:

- Work must be carried out by trained personnel.
- Sudden release of tensioned springs (e.g. the spring brake part of the brake chamber or the brake return spring) may cause injury.
- Use recommended tools only.
- Before releasing trailer back into service, perform operational checks and test the trailer to make sure brakes are working correctly.

Hendrickson reserves the right to make changes and improvements to its products and publications at any time. Consult the Hendrickson website (www.hendrickson-intl.com) for the latest version of this manual.

IMPORTANT SAFETY NOTICES

Proper maintenance, service and repair is important to the reliable operation of the suspension system and components. The procedures recommended by Hendrickson and described in this publication are methods of performing inspection, maintenance, service and repair.

The warnings and cautions should be read carefully to help prevent personal injury and to assure that proper methods are used. Improper maintenance, service or repair can cause damage to the vehicle and other property, personal injury, an unsafe operating condition or void the manufacturer's warranty.

Carefully read, understand and follow all safety related information within this publication.

⚠WARNING: DO NOT modify or rework parts. Use ONLY Hendrickson authorized replacement parts. Use of substitute, modified or replacement parts not authorized by Hendrickson may not meet Hendrickson's specifications. It can also result in failure of the part, loss of vehicle control and possible personal injury or property damage. Do not modify parts without written authorization from Hendrickson.

⚠WARNING: Always wear proper eye protection and other required PPE (personal protective equipment) when performing vehicle maintenance, repair or service.

⚠WARNING: Solvent cleaners can be flammable, poisonous and can cause burns. To help avoid serious personal injury, carefully follow the manufacturer's product instructions and guidelines and the following procedures:

- **WEAR proper eye protection**
- **WEAR clothing that protects your skin**
- **WORK in a well ventilated area**
- **DO NOT use gasoline, or solvents that contain gasoline. Gasoline can explode.**
- **HOT solution tanks or alkaline solutions must be used correctly. Follow the manufacturer's recommended instructions and guidelines carefully to help prevent personal accident or injury.**

⚠WARNING: Avoid creating dust. Dust from brake pads and/or parts is a possible cancer and lung disease hazard.

- **WHILE Hendrickson does not offer asbestos brake linings, long term affects of some non-asbestos fibers have not been determined. Current OSHA Regulations cover exposure levels to some components of non-asbestos linings but not all. The following precautions and considerations must be applied when handling these materials:**
- **COMPRESSED air or dry brushing must never be used for cleaning brake assemblies or work area.**
- **HENDRICKSON recommends that workers doing brake work must take steps to minimize exposure to airborne brake lining particles. Proper procedures to reduce exposure include working in well ventilated area, segregation of areas where brake work is done, use of local filtered ventilation systems or use of enclosed cells with filtered vacuums.**
- **RESPIRATORS approved by the Mine Safety and Health Administration (MSHA) or National Institute for Occupational Safety and Health (NIOSH) should be worn at all times during brake servicing.**
- **WORKERS must wash before eating, drinking or smoking; shower after working and should not wear work clothes home. Work clothes should be vacuumed and laundered separately with out shaking.**

- **OSHA Regulations regarding testing, disposal of waste and methods of reducing exposure for asbestos are set forth in 29 Code of Federal Regulations §1910.001. These Regulations provide valuable information which can be utilized to reduce exposure to airborne particles.**
- **MATERIAL Safety Data Sheets (MSDS) on this product, as required by OSHA, are available from Hendrickson.**

⚠CAUTION: A mechanic using a service procedure or tool which has not been recommended by Hendrickson must first satisfy himself that neither his safety nor the vehicle's safety will be jeopardized by the method or tool selected. Individuals deviating in any manner from the provided instructions assume all risks of consequential personal injury or damage to equipment.

⚠CAUTION: Brake lining contains non asbestos fibers. Wear approved eye protection and respirator when working on or near the brakes to prevent a possible health hazard.

NOTICE: When welding to or on the axle, take every caution to prevent bearing damage. When grounding welding equipment to axle, prevent current from passing through the wheel bearings

A connection that places a wheel bearing between the ground cable connection and the weld area can damage the bearing by electric arcing.

NOTICE: Accessory-type hubcaps, such as the chrome "top hat" style hubcap, increase wheel-end temperatures during operation and are not recommended for use on Hendrickson HLS®, HVS®, HUS®, HXL3™, HXL5™ or HXL7® extended-service wheel ends.

CONTACTING HENDRICKSON

Contact Hendrickson Trailer Technical Services for technical assistance as needed. To do so, several options are available.

Prior to contacting Technical Services, it may be best to have the following information about your Hendrickson suspension available (all that apply):

- Suspension ID Tag information (Refer to Hendrickson Lit. No. L977 *ID Guide*, page 2 for tag location and details):
  - Suspension model number
  - Suspension serial number
  - Approximate number of suspension miles.
- Vehicle VIN number. Refer to trailer OEM manual for VIN plate location.
  - Trailer Type (van, reefer, flat bed, etc...)
  - Manufacturer
  - VIN (vehicle identification number)
  - In-service date[1]
- If applicable, description of the system problem, part number and/or part description of the reported non-functioning part.
  - Date of failure
  - Where applicable: location of problem on suspension / trailer; e.g., road side, front axle, rear axle, curb side rear, etc
  - Symptoms-
    - » Systems, components or function effected by failure.
    - » When does failure occur?
    - » How often do they occur?
    - » Etc...
- What troubleshooting and/or measurements have been performed?
- What service data literature do you have or need?
- Digital photos of suspension and damaged areas.
- Special application approval documentation (if applicable).

EMAIL

For Hendrickson Trailer Technical Services, use the following e-mail address:

htts@hendrickson-intl.com

[1] If the in-service date is unknown or not available, the vehicle date of manufacture can be substituted.

PHONE

Contact Hendrickson directly in United States at 866-RIDEAIR (743-3247) or in Canada at 800-668-5360. From voice menu, select:

- Technical Services/Warranty for technical information.
- Other selections include:
  - Aftermarket Sales for replacement parts information and ordering.
  - Original Equipment Sales for parts inquires and ordering for trailer manufactures.

RELATIVE LITERATURE

If you suspect your version of this or any other Hendrickson manual is not "Up-to-Date", the most current version is free online at:

www.hendrickson-intl.com/literature/

Available Hendrickson documentation can be viewed or downloaded from this site. All Hendrickson online documentation are PDF files that require Adobe Acrobat Reader to open. This is a free application downloadable from Adobe's home page (http://get.adobe.com/reader/).

Other relative literature may include:

NAME	DESCRIPTION
A-29168	*Wheel Nut Installation Decal*
L496	*Standard Wheel End Maintenance Procedures*
L583	*Comprehensive Warranty Statement*
T70003	*HXL3™ Wheel-End ID Decal*
T77001	*PRECISION320™ Nut Compatibility*
T77002	*PRECISION240™ Nut Compatibility*
TMC	*Technology & Maintenance Council* publishes Recommended Practices (RP) for commercial transportation equipment through the American Trucking Association (ATA) (www.truckline.com).
RP 618	*Wheel Bearing Adjustment Procedures*
RP 622	*Wheel Seal and Bearing Removal, Installation and Maintenance*
RP 624	*Lubricant Fundamentals*
RP 631	*Recommended Wheel End Lubrication*
RP 640	*Alternate Wheel Bearing Adjustment Systems*
RP 644	*Wheel End Conditions Analysis Guide*
RP 656	*Hub and Spoke Wheel Fastener Maintenance*

NOTE: The above mentioned TMC RPs are for reference only. For like procedures, those in this document take precedence and must be followed when maintaining Hendrickson wheel end systems.

PREPARING TRAILER FOR SERVICE

NOTE: DO NOT service a suspension or any component that is under warranty without first CONTACTING HENDRICKSON Technical Services.

⚠WARNING: To prevent serious eye injury, always wear safety glasses when performing trailer maintenance and service.

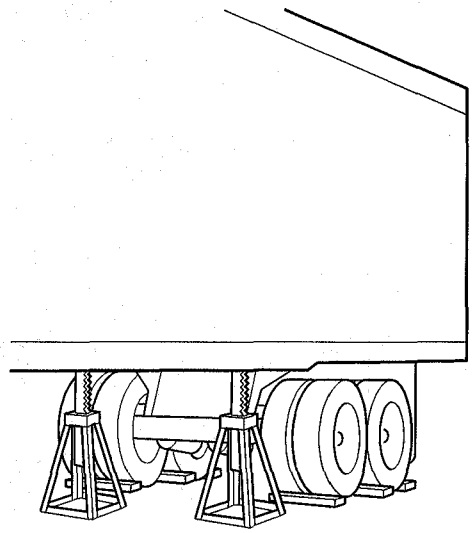

Figure 1: *Trailer preparation*

Before beginning any work on a trailer suspension system, the following steps help to ensure conditions are safe. Refer to GENERAL SERVICE NOTES on page 3.

1. Park trailer on a level, debris-free surface.
2. Set trailer parking brakes.
3. To prevent trailer from moving, chock wheels of an axle not being raised.
4. Exhaust air from the trailer suspension.
5. Release trailer parking brakes.
6. Using a jack, raise trailer until wheels clear the work surface.
7. Support raised trailer with trailer stands.

⚠WARNING: Do not work under a trailer supported only by jacks. Jacks can slip or fall over, resulting in serious personal injury.

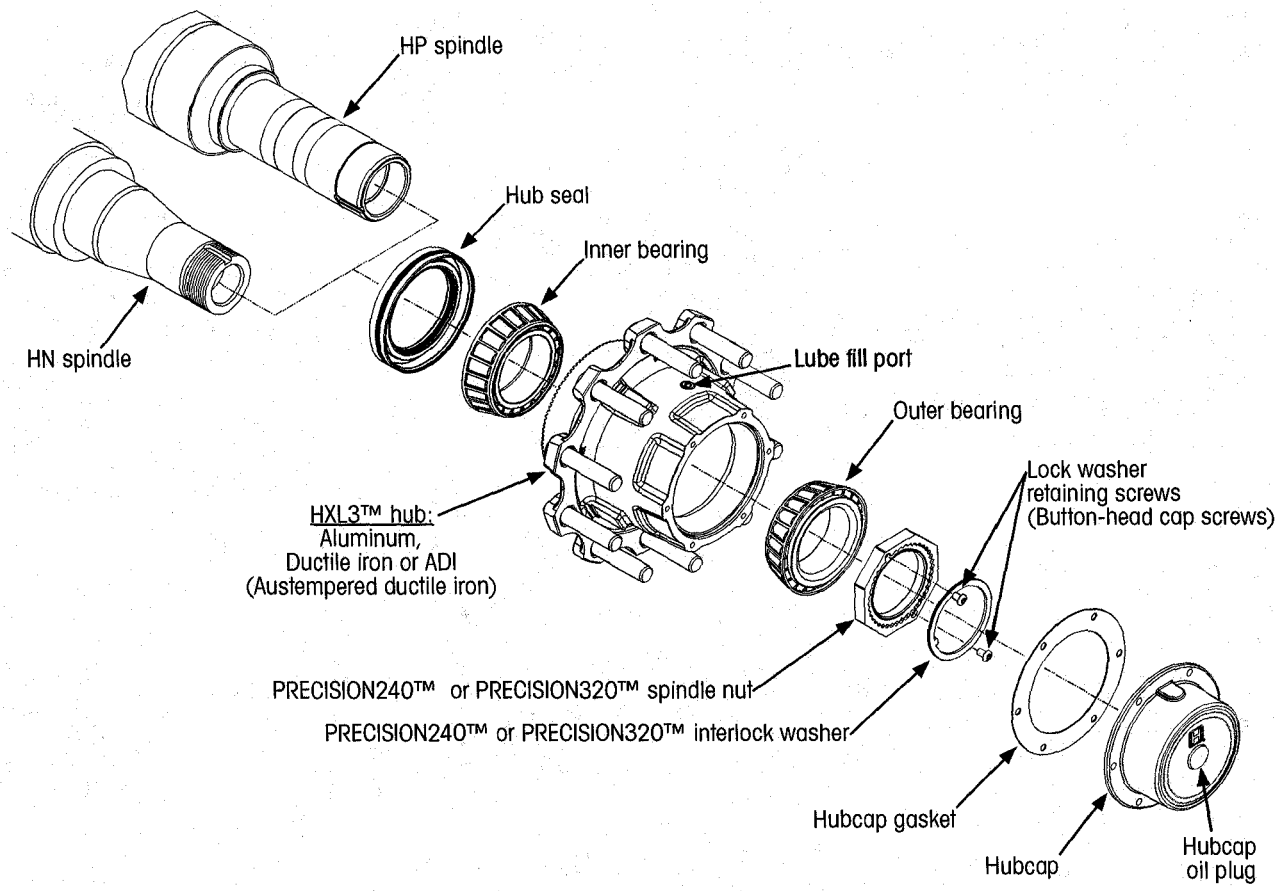

Figure 2: *Hendrickson Extended-Life 3-year System™ (HXL3™) wheel-end parts identification*

INTRODUCTION

The Hendrickson Extended-Life 3-year System™ (HXL3™) hub assembly (front cover and Figure 2) comes pre-assembled, adjusted, sealed and lubricated from Hendrickson. Because Hendrickson controls the assembly, internal cleanliness, bearing adjustment and seal installation in our facilities, we can offer premium performance and an extended-service warranty on these wheel-end assemblies.

The HXL3 wheel-end system is available with ductile iron, austempered ductile iron (ADI) or aluminum hub and are field serviceable with Hendrickson authorized components. However, **DO NOT** remove the hubcap or attempt any kind of field service without first CONTACTING HENDRICKSON Technical Services.

NOTE: Hendrickson recommends HP spindle type for super single tire applications. Refer to L846 *Wide Base Tire Configurations* for more details. The HN spindle design is not approved for use with any offset wheels.

TOOLS REQUIRED

The following tools may be required during the performance of some maintenance procedures:

TOOL		WHERE USED
Torque Wrench (10 - 200 ft. lbs. or 13 - 271 N•m)		To be used with sockets listed in this table.
HN	$3^{13}/_{16}$ inch socket	INSTALLING PRECISION SPINDLE NUT SYSTEM on page 13
	$^{5}/_{32}$ inch hex key	
HP	$4^{7}/_{8}$ inch socket	
	$^{3}/_{16}$ inch hex key	
$^{1}/_{2}$ inch socket		INSTALL HUBCAP on page 14
$^{1}/_{4}$ or $^{5}/_{16}$ inch hex key		Lube fill port plug (Figure 2)
Dial Indicator, with mounting stand (resolution to 0.0001", 0.002 mm)		End-play measurement (Figure 5 on page 9)
Hub SF Grease Dam		PREPARE AND INSTALL HUB on page 12

Table 1: *List of required tools*

IMPORTANT: Torque cannot be properly applied with an ordinary wrench. A calibrated torque wrench must be used to tighten fasteners to specified values with even distribution of applied forces.

INSPECTION

At regular intervals, the HXL3™ hub assembly should be checked for seal leaks and smooth rotation.

⚠WARNING: Prior to performing inspection procedures, help ensure conditions are safe by following steps in section PREPARING TRAILER FOR SERVICE.

NOTE: The frequency at which inspections are recommended is based on an average trailer usage of 100,000 miles (160,000 km) per year. Higher usage would require more frequent inspections. Refer to L578 *Inspection and Lubrication* for more details.

Inspections should be performed:

- **Daily** pre-operation check. This would include a general walk around to check for signs of obvious damage, wear or other abnormalities.
- **Every month**, visually inspect back of hub and hubcap gasket for leakage. Refer to the section titled CHECKING FOR SEAL LEAKS for complete inspection details.
- **Every three to four months**:
  - Perform monthly inspection.
  - Check for smooth rotation.
    - » Refer to the section titled CHECKING FOR SMOOTH ROTATION for details.
    - » If assistance is required or the hub feels rough, sounds noisy or does not rotate freely, refer to CONTACTING HENDRICKSON Technical Services department for further assistance.
- **During brake service** - at this time, wheels are removed making it easy to perform quarterly inspections.

Refer L578 for additional recommended suspension inspection procedures.

CHECKING FOR SEAL LEAKS

The HXL3 hub assembly is filled with lube types, such as: SAE 80W-90 gear oil, SAE 75W-90 synthetic gear oil, etc., synthetic oil at the factory during the assembly process. Oil is contained in the hub by the hub seal where leakage can occur (Figure 2 on page 7).

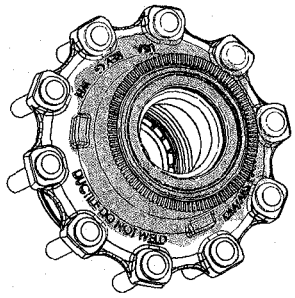

Figure 3: *Check back side of hub for leaking oil*

To check for leaks, look at the inboard side of the hub, (Figure 3). A small amount of oil may be visible at the hub seal. **This is a normal occurrence and does not necessarily indicate a seal leak**. Wipe clean

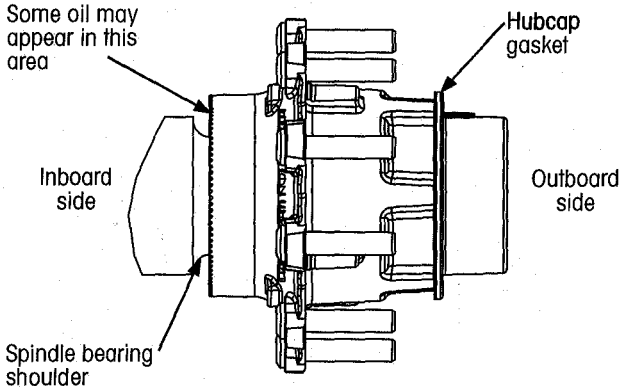

Figure 4: *Spindle bearing shoulder*

A small amount of oil may also appear at the spindle bearing shoulder to hub joint and hubcap gasket (Figure 4). **This is also normal and does not necessarily indicate a leak**. It should be wiped clean to minimize any accumulation of dirt.

NOTICE: Pressure or steam washing should be avoided in this area as water could be forced past the seal, degrade lubricant performance and corrode bearings.

If the hub seal or gasket is leaking, a large quantity of oil will be present in the areas of the hub, spindle hubcap and wheel. If found, refer to CONTACTING

HENDRICKSON Technical Services for guidance on how to proceed.

CHECKING FOR SMOOTH ROTATION

Many factors can effect smoothness of rotation. Primary causes include:

- Bearing wear
- Damaged hub seal
- Debris

NOTE: A reasonable assessment can be performed without removing tires and rims. However, this procedure is best performed with hub only as shown in Figure 6.

1. **Ensure** trailer is secure per PREPARING TRAILER FOR SERVICE on page 6.
2. **Disengage** brakes and remove brake drum (recommended).
3. While maintaining physical contact, **slowly rotate** hub in both directions at least five revolutions.
4. **During rotation**, ensure smooth and quiet rotation. Bearings should move smoothly. Feel for any resistance in movement. Any debris in bearings should be felt or heard as it moves over rollers in bearings.

IMPORTANT: If bearings feel rough, sound noisy, or do not rotate freely, do not place the suspension back into service. Refer to CONTACTING HENDRICKSON Technical Services for guidance.

CHECKING END PLAY

This procedure must be performed when:

- **After** CONTACTING HENDRICKSON Technical Services for a wheel-end issue and having been advised to do so.
- Installing hub and required during INSPECTING INSTALLATION on page 14, Step 3.

1. If not already done so:
   A. **Perform** PREPARING TRAILER FOR SERVICE on page 6
   B. **Remove** wheel (tires and rims).
   C. **Drain** oil from wheel end.
   D. **Remove** hubcap and discard gasket.
   E. **Disengage brakes and remove brake drum** (recommended).

IMPORTANT: End play can be checked with brake drum installed or removed (preferred). If installed, **make sure all brake drum wheel fasteners are installed and tightened to manufacturers specifications** before checking end play.

2. **Ensure** hub hubcap mounting surface and end of spindle are clean and totally free of any burrs or debris.

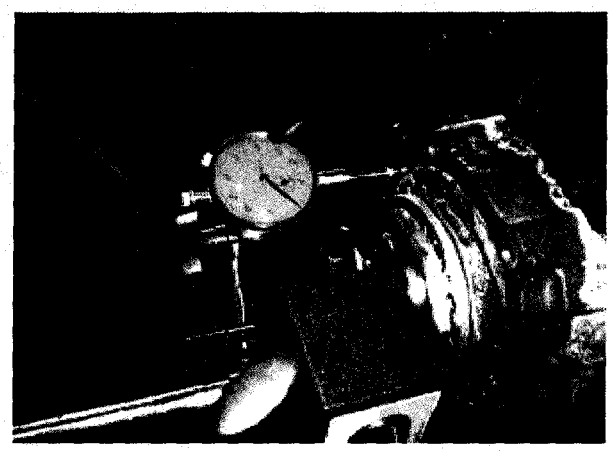

Figure 5: *Checking end play*

3. **Rotate** hub **at least 5 revolutions** to ensure bearings are fully seated.

NOTE: The hub MUST be rotated before performing end play measurement. Rotation works the rollers into their fully seated positions against the bearing cone shoulder. **Failure to rotate hub will result in a false end play reading.**

4. **Attach** dial indicator (Table 1) with magnetic base to flat surface at end of spindle (Figure 5).
5. **Adjust dial indicator** so its pointer line of action is parallel to spindle axis and touches hub's hubcap mounting surface. Make sure the plunger contacts the hub on a surface that is smooth and fully machined. Any regions with scratches, gouges or non-cleanup should be avoided.
6. **Check** indicator for free movement in both directions. Lightly **push and pull** on indicator arm to verify plunger is free to move at least .005" in each direction. If indicator bottoms out, readjust until it is free to move .005" in both directions.

7. **Zero** the indicator.

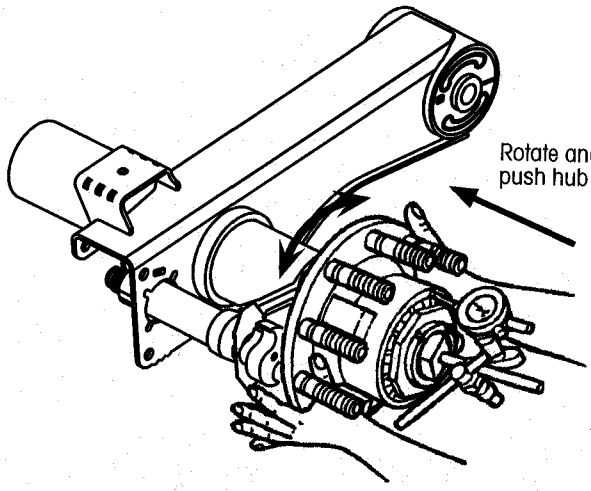

Figure 6: *Checking inward end-play*

8. **Grasp** hub, as shown in Figure 6, and **push** the hub inward **while rotating** hub slightly in both directions (15 - 30° between two holes) until the dial indicator reading remains constant. **Record** reading.

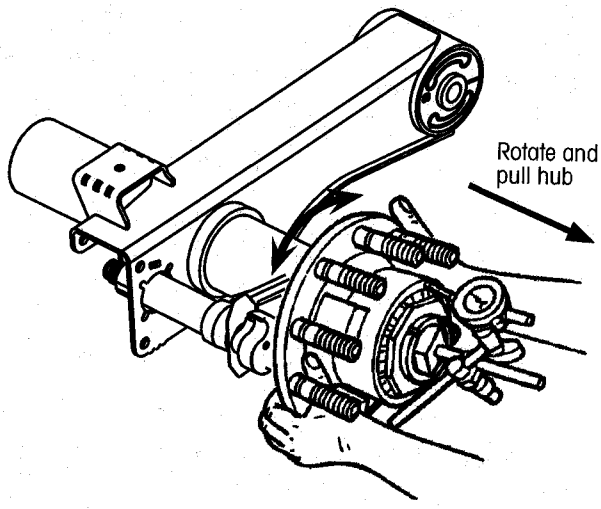

Figure 7: *Checking outward end-play*

9. While still grasping hub (Figure 7), **pull** hub outward **while rotating** hub slightly in both directions (15 - 30° between two holes) until dial indicator reading remains constant. **Record** reading.

10. End play is the total movement of the indicator. **Calculate** difference between recorded values of Step 8 and Step 9 to determine end play, **record** value.

IMPORTANT: End play must be between 0.001" (0.0254 mm) and 0.005" (0.0127 mm). If subsequent readings are necessary, the hub must be rotated at least 5 revolutions to reseat the bearings (refer to Step 3).

A. If checking end play after installation, return to INSPECTING INSTALLATION on page 14, Step 3.

B. If end play is **less than 0.005"** (0.127 mm), no bearing adjustment is necessary. If the precision spindle nut, interlock washer, and retaining screws are securely in place, go to INSTALL HUBCAP on page 14.

C. If end play is **more than 0.005"** (0.127 mm). Refer to CONTACTING HENDRICKSON on page 5 for guidance on required next steps. Select Technical Services from the menu choices given.

IMPORTANT: DO NOT place the suspension back into service without correcting the problem.

NOTE: Repeated push-pull motions can dislodge the bearing rollers from their fully seated position and result in a false end play reading less than the actual end play in the wheel end. If subsequent readings are necessary, hub must be rotated at least 5 revolutions to reseat the bearings.

11. Check to ensure:

A. Adjusting spindle nut is secure

B. Lock washer and tang are properly seated

C. Outer jam nut and retaining set screw are securely in place (Figure 8 on page 11).

D. If not already done so, perform CHECKING FOR SEAL LEAKS on page 8.

12. Go to INSTALL HUBCAP on page 14.

REMOVING AND INSTALLING HUB

IMPORTANT: To ensure continued warranty, **DO NOT** perform the following procedures without obtaining prior authorization from Hendrickson Trailer Technical Services. Refer to CONTACTING HENDRICKSON for contact information.

NOTE: In order to maintain warranty status, CONTACTING HENDRICKSON is recommended before removing the hubcap and disturbing the precision spindle nut.

Removal of hubcap fasteners and/or hubcap (the old gasket must be discarded and replaced with new, torque fasteners to 15±3 ft. lbs., 20±2 N•m) is allowed when:

- Attaching hubometer bracket.
- Performing a TIREMAAX installation.

⚠**WARNING: Prior to performing maintenance procedures, ensure conditions are safe. Refer to PREPARING TRAILER FOR SERVICE on page 6.**

HUB REMOVAL

Only after receiving proper authorization from Hendrickson Technical Services, use the following procedure to remove the HXL3® hub assembly:

1. **Remove** tire / wheel assembly.
2. **Disengage** brakes and remove brake drum.
3. To **catch** draining oil, place a clean container under the hubcap.
4. **Remove** hubcap bolts and **remove** hubcap, discard gasket.
5. Allow time for oil to **drain** from wheel end.
6. Properly **dispose** of the removed and used oil.
7. Using a hex key (TOOLS REQUIRED on page 7), **remove button-head cap screws** from interlock washer Figure 8.
8. **Remove** interlock washer and precision spindle nut (Figure 2 on page 7).

NOTE: Pushing on edge of interlock washer near one of the screw holes will cause the opposite edge to tip away from the nut, allowing easy removal of interlock washer.

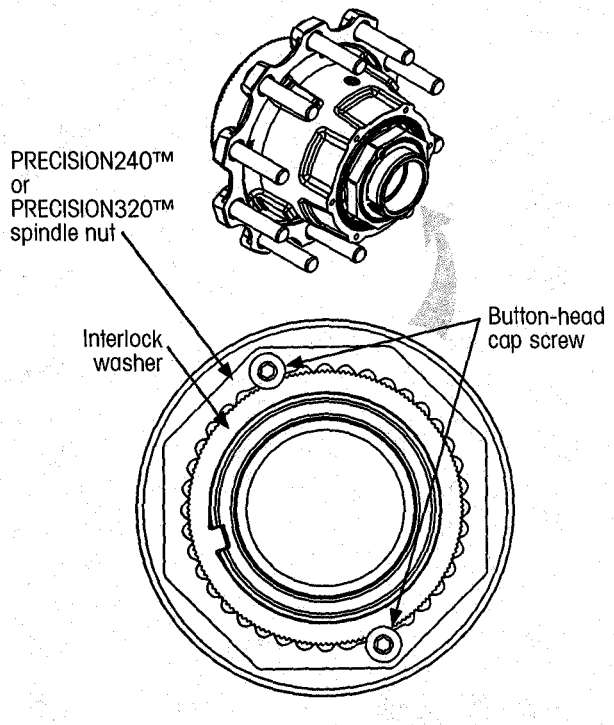

Figure 8: *Button-head cap screw on a PRECISION240™ or PRECISION320™ nut system*

9. **Carefully pull HXL3 hub assembly slightly** toward spindle end. A short quick motion should allow outer bearing to exit the hub. Be prepared to catch outer bearing if it slides off the end of the spindle. Otherwise, simply remove it.
10. **Remove hub from spindle.** The inner bearing is held in the hub by the hub seal and should come off with the hub.
11. **Remove** and **discard** hub seal:
    A. **If the seal is in the hub** - a pry bar can be used to carefully remove the seal from the hub bore. Damage to hub and hub surfaces must be avoided.
    B. **If the seal is on the spindle** - Using a brass, leather or other soft-faced mallet, drive the seal off the spindle by carefully striking the seal from the back side.

NOTICE: Any damage to the spindle's machined surfaces can effect wheel end performance.

SPINDLE PREPARATION

Before installing or re-installing the hub, follow this procedure to ensure spindle machined surfaces are clean and undamaged.

1. **Remove** old lubricant and thoroughly clean spindle.
2. **Inspect** machined spindle seal surface for nicks, scratches, burrs or marks. If needed, use crocus cloth or emery cloth to repair any damaged areas.
3. **Clean** spindle threads and keyway thoroughly with a wire brush to avoid false bearing adjustments and to avoid introduction of contaminants into the lubricant cavity.
4. **Thoroughly clean** spindle machined surfaces of rust, dirt, oil or any other contaminants that could damage the hub seal and cause it to leak.
5. **Lubricate** spindle with clean oil.

PREPARE AND INSTALL HUB

1. **Thoroughly clean** the hub bore of any dirt, oil, rust or any other substance that may be present.
2. **Remove** all sharp edges, nicks and burrs from seal bore, hubcap bore and hubcap mounting surface of the hub.
3. **Inspect** hub seal bore for roughness. If needed, use emery cloth to remove any burrs or old bore sealant, and wipe hub clean.
4. **Ensure** hubcap mounting surface is smooth and free of debris.
5. **Lubricate** inner bearing and install into hub (Figure 2 on page 7).

NOTE: A hub seal driver (Figure 9) is recommended for installing the seal and can be obtained from the seal manufacturer.

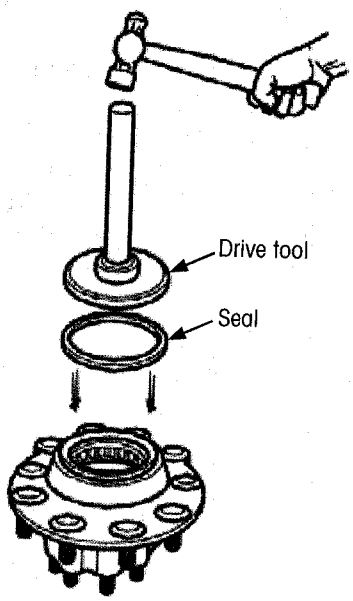

Figure 9: *Hub-mounted seal installation*

6. **Lubricate** seal according to seal manufacturer's recommendations, then place it on an installation tool.
   A. **Align seal** tool with hub seal bore.
   B. **Drive seal** until it bottoms out in the hub seal bore.
   C. **Rotate** installation tool and apply several light blows to ensure seal is properly seated.
   D. **Check** inner bearing to make sure it rotates freely.
7. **Slide** hub onto spindle, taking care not to damage seal.

NOTICE: The HUB SEAL CAN BE DAMAGED if:

- **HUB seal is improperly installed.**
- **HUB seal is rammed into the spindle bearing shoulder.**
- **HUB is not kept supported and aligned with spindle until the outer bearing and axle nut are installed.**

8. **Lubricate** outer bearing and install into hub.
9. While sliding hub onto spindle, oil is collected at spindle bearing shoulder inboard of hub. **Clean** as needed.

INSTALLING PRECISION SPINDLE NUT SYSTEM

Available precision spindle nut systems for HXL3™ include:

SPINDLE	NUT SYSTEM	TOOLS
HN	PRECISION240™	$3^{13}/_{16}$ inch socket
		$^{5}/_{32}$ inch hex key
HP	PRECISION320™	$4^{7}/_{8}$ inch socket
		$^{3}/_{16}$ inch hex key

Installation procedures are the same, but part and tool sizes (Table 1 on page 7 and above table) are different due to the difference in spindle thread diameters.

NOTICE: Failure to exactly follow the steps of this procedure could cause improper bearing seating, resulting in reduced bearing life.

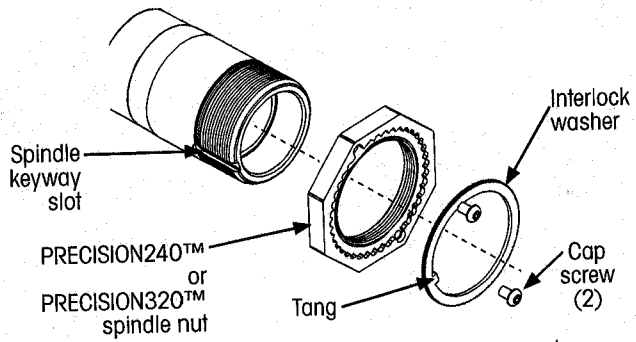

Figure 10: *Precision spindle nut system components*

⚠WARNING: FAILURE TO FOLLOW THESE INSTRUCTIONS COULD CAUSE WHEEL TO COME OFF AND CAUSE BODILY INJURY.

OVER-TIGHTENING NUT COULD CAUSE BEARINGS TO RUN HOT AND BE DAMAGED.

1. **Install precision spindle nut** (Figure 10) onto the spindle, toothed side out, and **hand-tighten**.
2. Simultaneously **rotate hub clockwise at least three revolutions**, while using a torque wrench to tighten precision spindle nut to 200 ft. lbs. (271 N•m) of torque.
3. **Back off** precision spindle nut 1 revolution.
4. **Rotate hub clockwise** at least one full revolution.
5. **Tighten** precision spindle nut to 50 ft. lbs. (68 N•m) of torque.
6. **Rotate hub clockwise** three full revolutions.
7. **Repeat** Step 5 and Step 6 three more times.

IMPORTANT: DO NOT rotate the hub at this point. Rotating the hub before installing the interlock washer can dislodge the precision spindle nut and cause improper bearing seating.

8. **Back-off nut** 1/8 turn.

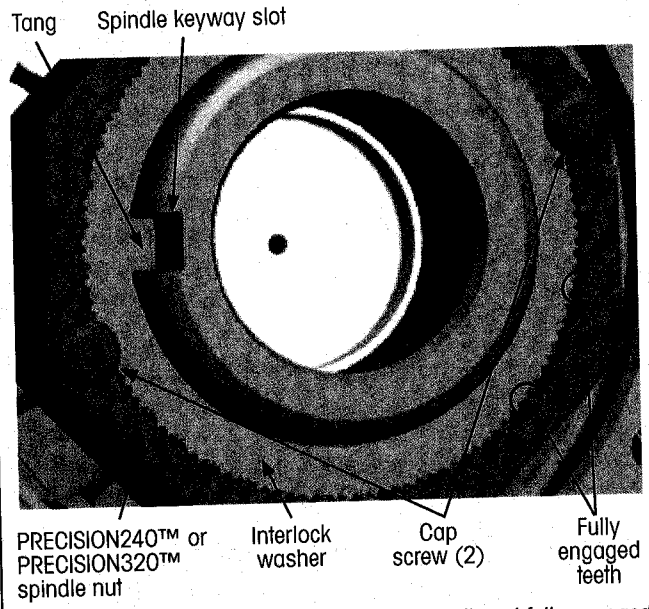

Figure 11: *Interlock washer and precision spindle nut fully engaged*

9. **Install interlock washer** into the precision spindle nut with the tang aligned and inserted in the spindle keyway as shown in Figure 10 and Figure 11.

   If washer and nut teeth do not align, **DO NOT ROTATE NUT**. Flip interlock washer over and reapply.

NOTE: The PRECISION240 and PRECISION320 interlock washer and nut are designed so that one side of the washer will always engage the spindle nut teeth without readjusting the nut.

IMPORTANT: Teeth between the interlock washer and precision spindle nut must fully engaged as shown in Figure 11. DO NOT ADJUST NUT TO ALIGN INTERLOCK WASHER.

10. **Install two button-head cap screws** (Figure 10) into the precision spindle nut until the heads of the screws just contact the face of the nut.

11. **Tighten cap screws** to:

SPINDLE TYPE	PRECISION NUT SYSTEM	CAP SCREW TORQUE	
		ft. lbs.	N•m
HN	PRECISION240™	10±2	13.5±2
HP	PRECISION320™	15±2	20±2

INSPECTING INSTALLATION

To ensure correct installation, follow these procedures:

1. Make sure **interlock washer is fully seated** in PRECISION240™ or PRECISION320™ spindle nut (Figure 11).

2. **Ensure** heads of both cap screws contact the nut face.

3. **Check end play** using CHECKING END PLAY on page 9.

   If end play is **between 0.001 and 0.005** inch (0.127 mm), continue with INSTALL HUBCAP.

   If excessive end-play (the precision spindle nut is too loose):

   A. **Remove** two cap screws and pull interlock washer away from nut, but not off spindle.

   B. **Tighten** precision spindle nut until next washer tooth is aligned.

   C. **Reassemble** interlock washer and button-head cap screws.

   D. **Return** to CHECKING END PLAY on page 9.

   If insufficient end-play (over clamped):

   A. **Remove** two cap screws and pull interlock washer away from nut, but not off spindle.

   B. **Back-off** precision spindle nut until next washer tooth is aligned.

   C. **Reassemble** interlock washer and button-head cap screws.

   D. **Return** to CHECKING END PLAY on page 9.

NOTE: If the above **steps have already been performed** and end play is still out of tolerance, return to HUB REMOVAL on page 11 to remove and reinstall hub. If difficulty continues, refer to CONTACTING HENDRICKSON on page 5.

INSTALL HUBCAP

After hub installation and inspection is complete, the hubcap can be installed.

IMPORTANT: Always install a new gasket when reinstalling hubcap.

NOTICE: Interference between precision spindle nut system and hubcap could occur if improper components are used. Use only genuine Hendrickson or Hendrickson approved replacement components. Refer to RELATIVE LITERATURE on page 6 or CONTACTING HENDRICKSON on page 5 as needed.

1. **Visually inspect** hubcap, hub mating surface, bolt holes and new gasket for:
   - Signs of damage
   - Debris, such as silicon gasket sealer
   - Burrs or sharp edges
   - Cracks

2. **Clean, repair or exchange** as needed.

3. **Align** hubcap and new gasket onto hub and **insert** bolts.

4. **Hand-tighten** bolts.

5. Using a star pattern, **torque** hubcap bolts to 15±3 ft. lbs. (20±4 N•m) torque.

NOTICE: Do not overtighten hubcap bolts. Overtightening will distort metal hubcap mounting flange, which will prevent hubcap from achieving a leak-free seal.

HUB LUBRICATION

SAE 75W-90 synthetic gear oil lubricant or SAE 80W / 90W gear oil is approved for use in the HXL3™ wheel-end hub. Refer to TMC RP 631 *Recommendations for Wheel End Lubrication* for more lubrication details.

1. **Remove** fill port plug (Figure 2 on page 7) on the side of the hub.
2. **Fill** wheel end with SAE 75W-90 synthetic gear oil lubricant or SAE 80W / 90W gear oil to "FULL" line on hubcap window.

NOTE: Allow sufficient time for oil to settle prior to final oil level check (it may be necessary to add oil more than once to adequately fill the wheel end)

3. **Re-insert** fill port plug and tighten to 22±2 ft. lbs. (30±3 N•m) torque.
4. **Spin hub** more than three revolutions to distribute oil.

ASSEMBLE BRAKES AND WHEELS

With hubcap installed, the hub assembly is complete. Follow these steps to complete the wheel-end assembly:

1. **Install** brake drum and wheel (tire and rim).
2. **Restore** trailer to normal operation.

TORQUE VALUES

Table 2 lists torque values for HXL3® wheel-end fasteners.

FASTENER	TORQUE	
	ft. lbs.	N•m
Hubcap Screws	15±3	20±4
Hub fill port plug	22±2	30±3
Hubcap fill port plug	7±2	9±3
PRECISION240® cap screws	10±2	13±2
PRECISION320® cap screws	15±2	20±2
Wheel Nuts [1,2]	475±225	644±25

[1] These fasteners are incrementally tightened according to procedures defined in this manual and superseded by OE documentation, where applicable.

[2] Re-torque all wheel nuts after 50 to 100 miles of service.

Table 2: *HXL3® Wheel-end fastener torque values*

REPLACING STUDS

Replacing studs is a common hub procedure. Refer to L496 *Standard Service Wheel End Maintenance Procedures* for information.

BRAKE DRUM AND WHEEL ASSEMBLY

Refer to same heading in L496 *Conventional Hub Maintenance Procedures* for this information.

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