


SAFETY FIRST



SAFETY FIRST


WEBB® WHEEL PRODUCTS, INC.

**INSTALLATION, SERVICE
AND
SAFETY INSTRUCTIONS
MANUAL**



HUBS



SPOKE WHEELS



BRAKE DRUMS

**Read and Understand
these installation, service
and safety instructions
before installing or servicing
this product.**

SAFETY FIRST


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Safety First:



The information in this manual is essential for the safe installation and maintenance of your Webb Wheel Products hub, spoke wheel, or brake drum. The manual must be read and understood before installing or maintaining the equipment, or other equivalent training must be provided.



"The employer shall instruct each employee in the recognition and avoidance of unsafe conditions and the regulations applicable to his work environment to control or eliminate any hazards or other exposure to illness or injury."
Ref: 29 CFR 1926.20 (b)(4)(a)(2)



It is understood that safety rules within individual companies vary. If a conflict exists between the material contained in this manual and the rules of a using company, the more stringent rules should take precedence.

Introduction

This manual is filled with time-saving and money-saving information for installing and maintaining your Webb spoke wheels, hubs, and brake drums. There is nothing, however, more important than the safety aids and warnings that are found throughout this document. The Safety Alert Symbol (at right) is used to identify topics of primary safety concern wherever they appear.



Webb spoke wheels, hubs and brake drums are designed with generous safety factors for their intended applications. Follow the instructions in this manual to assure long life and safe operation of your vehicle. This manual recognizes the fact that the truck and trailer applications are virtually unlimited in number and depend upon particular axle designs. Since specific application instructions are not possible, this manual endeavors to provide general principles which will aid technicians in solving particular installation, maintenance and operation problems.

It is important to observe while reading this manual that vehicle wheels involve a system. Such systems usually consist of an axle, hubs or spoke wheels, brake drums, brakes, rims or disc wheels, tires and operator. The brake drums and hubs or spoke wheels, which are components in the overall system, are the main focus of this manual.

Additional copies of this manual may be obtained at no cost by contacting our Sales Department at the address and phone number given below.

If after reviewing this manual, anything is unclear or technical problems are encountered, feel free to contact our Product Engineering Department. User experience provides the optimum feedback for designers and future mechanical practitioners. We, at Webb, solicit your comments and suggestions and give you our assurance that they will receive the most serious consideration.

If you believe that your vehicle has a defect which could cause a crash or could cause injury or death, you should immediately inform the National Highway Traffic Safety Administration (NHTSA) in addition to Webb Wheel Products, Inc.

If NHTSA receives complaints, it may open an investigation, and if it finds that a safety defect exists in a group of vehicles, it may order a recall and remedy campaign. However, NHTSA cannot become involved in individual problems between you, your dealer, or Webb Wheel Products, Inc.

To contact NHTSA, you may either call the Auto Safety Hotline toll-free at 1-800-424-9393 (or 366-0123 in Washington, DC area) or write to: NHTSA, US Department of Transportation, Washington, DC 20590. You can also obtain other information about motor vehicle safety from the Hotline.

Webb Wheel Products, Inc.

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(256) 739-6660
FAX#: (256) 739-6246

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I. Product Identification

This section gives general information and part diagrams for your Webb product. When using replacement parts, always order the listed Webb part number. By using Webb parts you get the assurance of correct fit and consistent quality.



Make certain the correct product has been chosen for your application. Incorrectly chosen or mis-matched parts will void your warranty and may result in loose wheels or other difficulties and can cause a crash. If you are unsure about the suitability of this product, check your Webb catalog or contact our Technical Services department at the address and telephone number on the back cover of this manual.

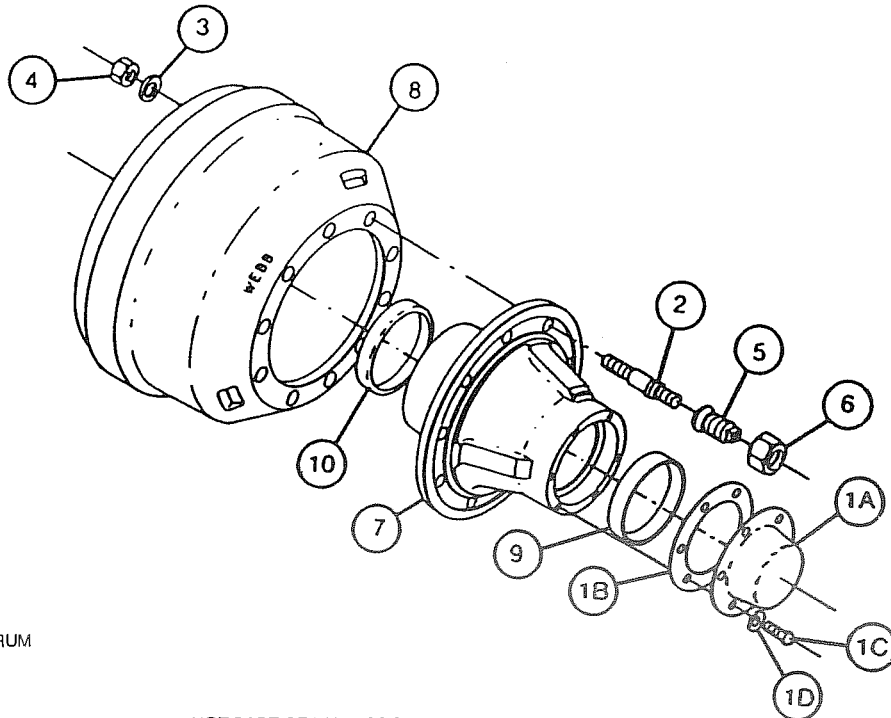
Your Webb hubs, spoke wheels, and brake drums are designed and manufactured for long life when properly applied, installed and maintained. Always use the recommended mating parts to maintain the long life and the generous safety factors inherent in the design.

HUB ASSEMBLY EXPLODED VIEW

TRAILER APPLICATIONS

FOR USE WITH BALL SEAT MOUNTED DISC WHEELS

HUB ASSEMBLY WITH INBOARD MOUNTED BRAKE DRUM

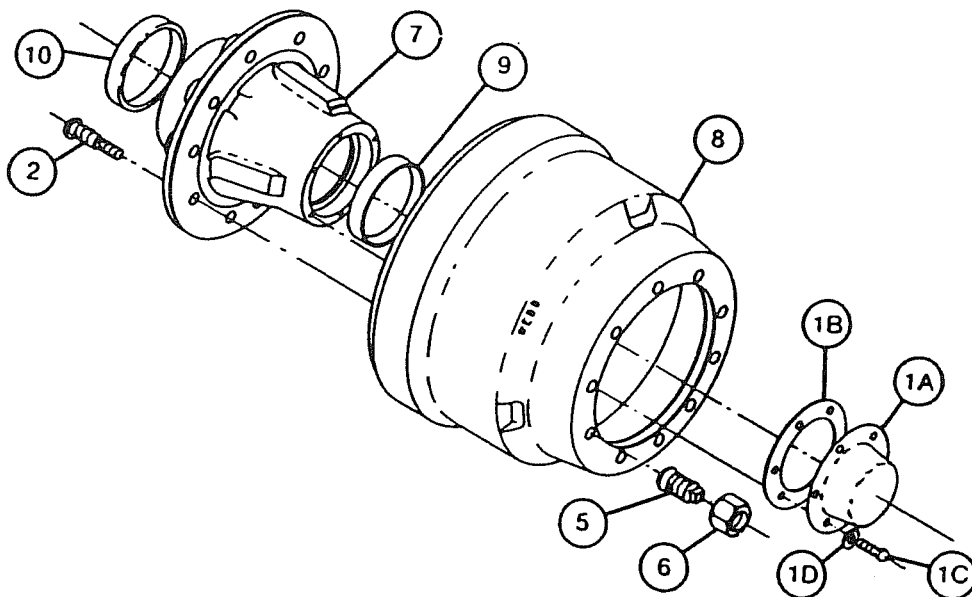


COMPONENTS

1. HUB CAP KIT *
 - 1A HUB CAP (GREASE)
 - 1B HUB CAP GASKET
 - 1C CAP SCREW
 - 1D LOCK WASHER
2. WHEEL STUD
3. FLAT WASHER
4. LOCK NUT
5. INNER CAPNUT
6. OUTER CAPNUT
7. HUB
8. INBOARD MOUNTED BRAKE DRUM
9. OUTER BEARING CUP
10. INNER BEARING CUP

* NOT PART OF HUB ASSEMBLY, ORDER SEPARATELY.

HUB ASSEMBLY WITH OUTBOARD MOUNTED BRAKE DRUM



COMPONENTS

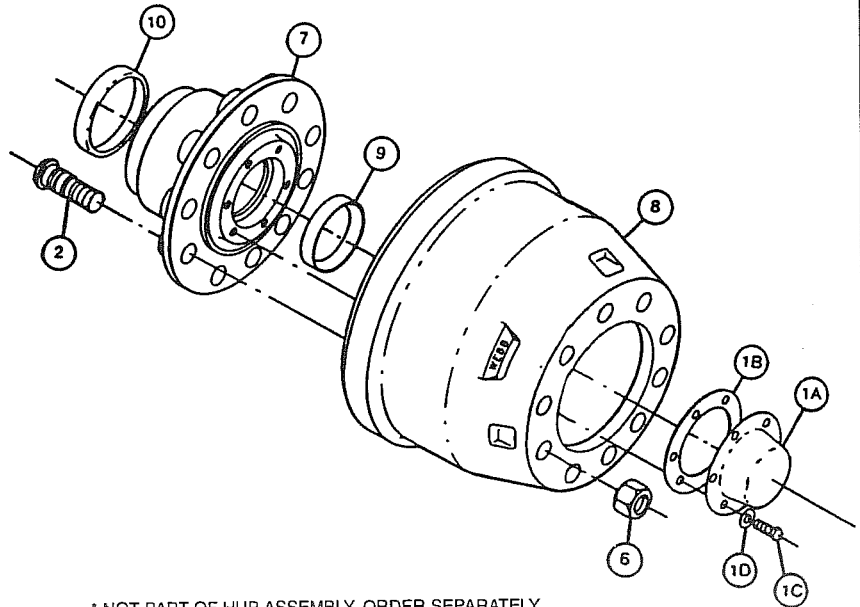
1. HUB CAP KIT *
 - 1A HUB CAP (GREASE)
 - 1B HUB CAP GASKET
 - 1C CAP SCREW
 - 1D LOCK WASHER
2. WHEEL STUD
5. INNER CAPNUT
6. OUTER CAPNUT
7. HUB
8. OUTBOARD MOUNTED BRAKE DRUM
9. OUTER BEARING CUP
10. INNER BEARING CUP

* NOT PART OF HUB ASSEMBLY, ORDER SEPARATELY.

HUB ASSEMBLY EXPLODED VIEW

TRUCK STEERING AXLE APPLICATIONS

FOR USE WITH BALL SEAT MOUNTED DISC WHEELS



COMPONENTS

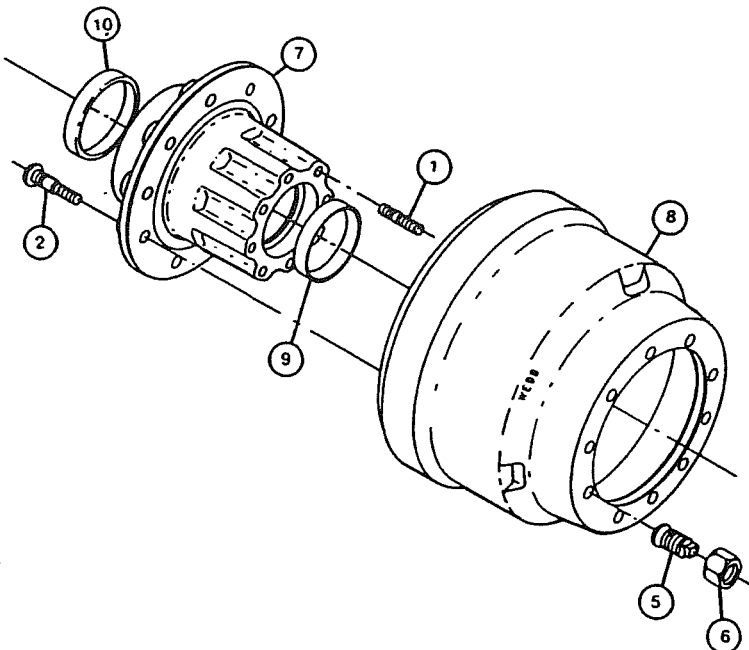
1. HUB CAP KIT *
 - 1A HUB CAP (GREASE)
 - 1B HUB CAP GASKET
 - 1C CAP SCREW
 - 1D LOCK WASHER
2. WHEEL STUD
6. OUTER CAPNUT
7. HUB
8. OUTBOARD MOUNTED BRAKE DRUM
9. OUTER BEARING CUP
10. INNER BEARING CUP

* NOT PART OF HUB ASSEMBLY, ORDER SEPARATELY.

HUB ASSEMBLY EXPLODED VIEW

TRUCK DRIVE AXLE APPLICATIONS

FOR USE WITH BALL SEAT MOUNTED DISC WHEELS



COMPONENTS

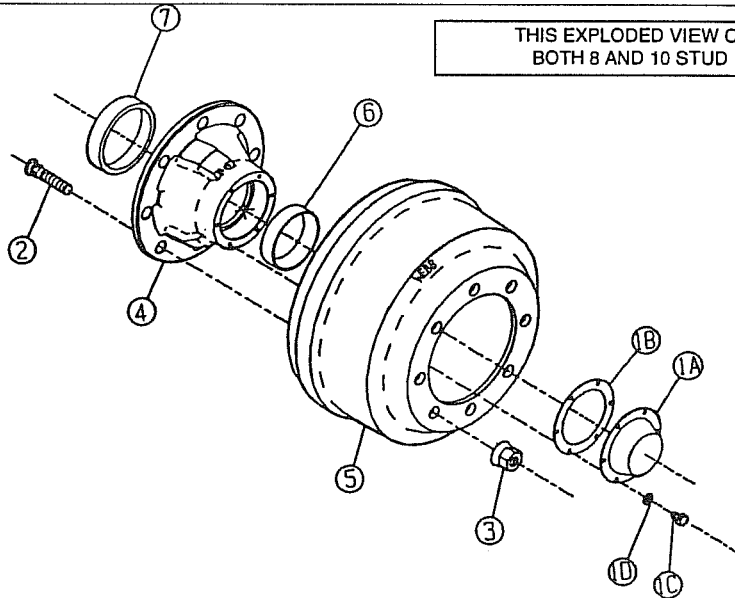
1. DRIVE STUD
2. WHEEL STUD
5. INNER CAPNUT
6. OUTER CAPNUT
7. HUB
8. OUTBOARD MOUNTED BRAKE DRUM
9. OUTER BEARING CUP
10. INNER BEARING CUP

HUB ASSEMBLY EXPLODED VIEW

TRAILER APPLICATIONS

FOR USE WITH HUB PILOTED DISC WHEELS

THIS EXPLODED VIEW COVERS
BOTH 8 AND 10 STUD HUBS



COMPONENTS

1. HUB CAP KIT *
 - 1A HUB CAP (GREASE)
 - 1B HUB CAP GASKET
 - 1C CAP SCREW
 - 1D LOCK WASHER
2. WHEEL STUD
3. FLANGE NUT
4. HUB
5. OUTBOARD MOUNTED BRAKE DRUM
6. OUTER BEARING CUP
7. INNER BEARING CUP

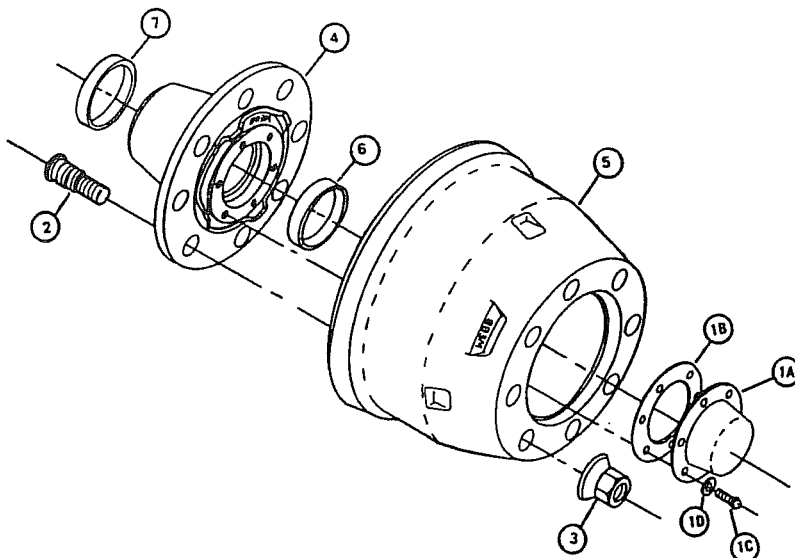
* NOT PART OF HUB ASSEMBLY, ORDER SEPARATELY.

HUB ASSEMBLY EXPLODED VIEW

TRUCK STEERING AXLE APPLICATIONS

FOR USE WITH HUB PILOTED DISC WHEELS

THIS EXPLODED VIEW COVERS
BOTH 8 AND 10 STUD HUBS



COMPONENTS

1. HUB CAP KIT *
 - 1A HUB CAP (GREASE)
 - 1B HUB CAP GASKET
 - 1C CAP SCREW
 - 1D LOCK WASHER
2. WHEEL STUD
3. FLANGE NUT
4. HUB
5. OUTBOARD MOUNTED BRAKE DRUM
6. OUTER BEARING CUP
7. INNER BEARING CUP

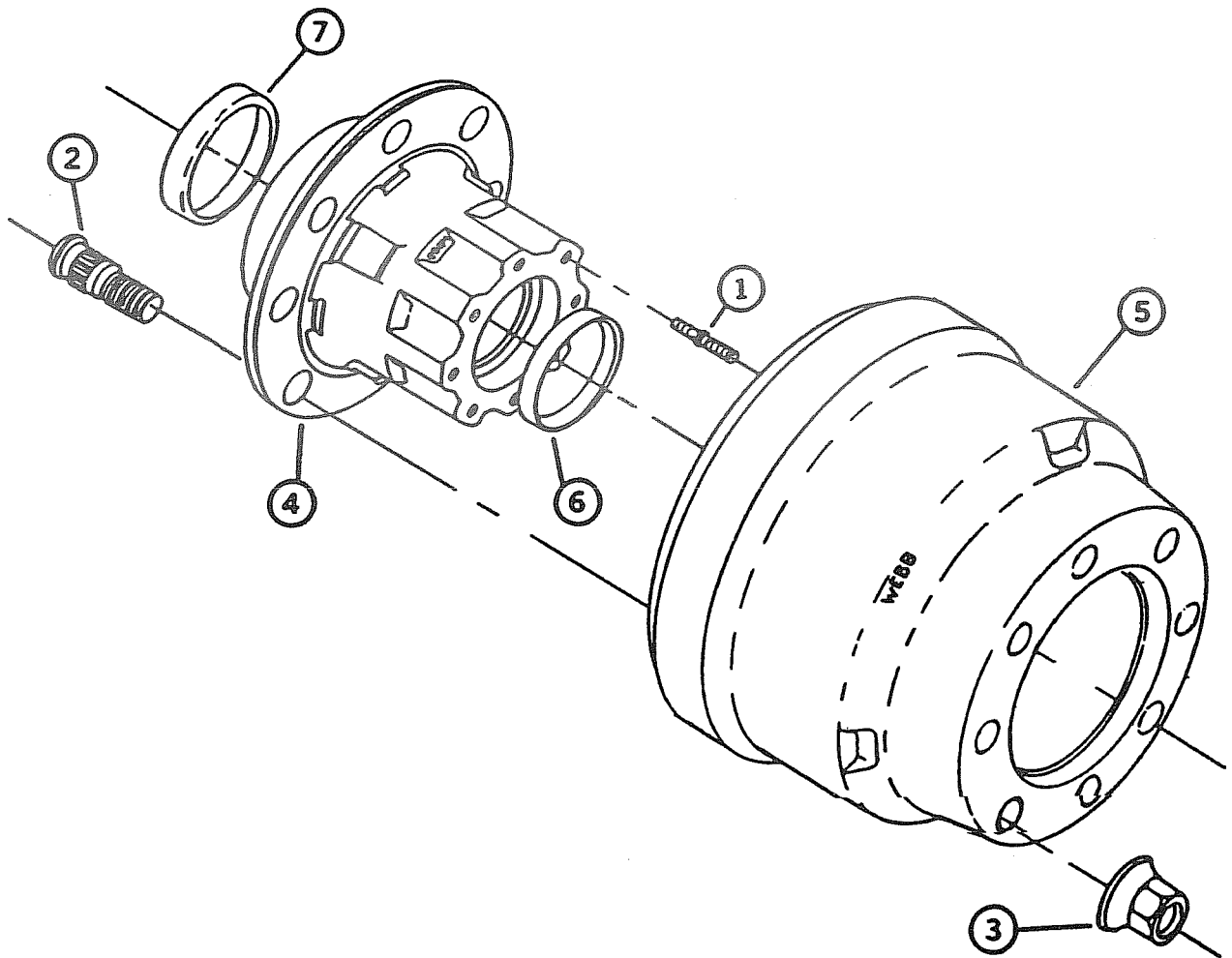
* NOT PART OF HUB ASSEMBLY, ORDER SEPARATELY.

HUB ASSEMBLY EXPLODED VIEW

TRUCK DRIVE AXLE APPLICATIONS

FOR USE WITH HUB PILOTED DISC WHEELS

THIS EXPLODED VIEW COVERS
BOTH 8 AND 10 STUD HUBS



COMPONENTS

1. DRIVE STUD
2. WHEEL STUD
3. FLANGE NUT
4. HUB
5. OUTBOARD MOUNTED BRAKE DRUM
6. OUTER BEARING CUP
7. INNER BEARING CUP

Webb Hub Capacity Ratings

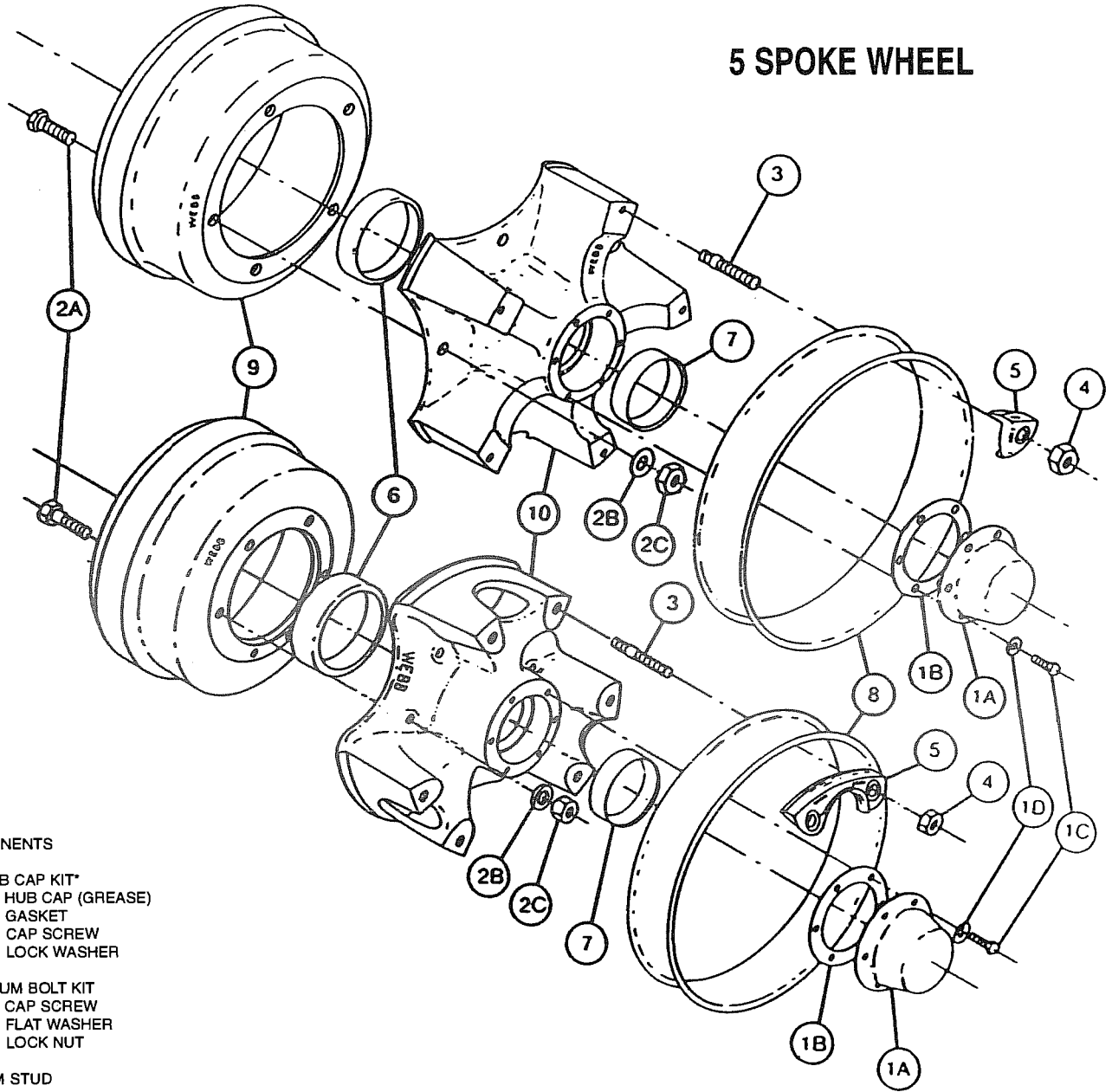
Wheel No.	Dynamic Capacity (lbs)	Wheel No.	Dynamic Capacity (lbs)
1001	12,500	2341	11,500
1005	9,000	2343	12,500
1006	9,000	2391	11,500
1020	12,500	2397	11,500
1051	12,500	2398	11,500
1056	11,000	2401	15,000 *
1099	11,500	2431	15,000
1220	12,500	2433	12,500
1221	12,500	2510	4,500
1251	12,500	2518	4,500
1256	11,000	2521	7,300
1320	12,500	2523	7,300
1329	12,500	2528	7,300
1331	12,500	2530	11,000
1391	11,500	2531	7,300
1521	7,300	2533	11,000
1528	7,300	2540	11,000
1530	11,000	2543	11,000
1539	10,000	2550	4,000
1540	11,000	2605	6,000
1550	4,000	2606	8,000
1605	6,000	2608	7,500
1606	8,000	2609	7,500
1609	7,500	2613	9,500
1610	9,500	2614	9,500
1622	12,500	2616	9,500
1623	12,500	2617	9,500
1699	11,500	2618	9,500
2023	12,500	2623	13,000
2024	12,500	2628	13,000
2025	12,500	2629	11,500
2027	12,500	2633	13,000
2028	12,500	2635	13,000
2033	12,500	2636	13,000
2091	11,500	2643	13,000
2099	11,500	2648	13,000
2321	12,500	2653	13,000
2323	12,500	2656	13,000
2324	12,500	2672	13,000
2325	12,500	2691	11,500
2327	12,500	2692	11,500
2328	12,500	2699	11,500
2329	12,500	2723	15,500 *
2333	12,500		

* This capacity rating based on hub piloted studs; ball seat studs reduce capacity rating to 13,000 lbs. per hub.

Dynamic capacity is given in pounds per wheel, which is equal to one-half the Gross Axle Weight Rating (GAWR). For static or creep conditions, consult the Webb Product Engineering Department for specific applications.

SPOKE WHEEL ASSEMBLY EXPLODED VIEW TRAILER APPLICATIONS

5 SPOKE WHEEL



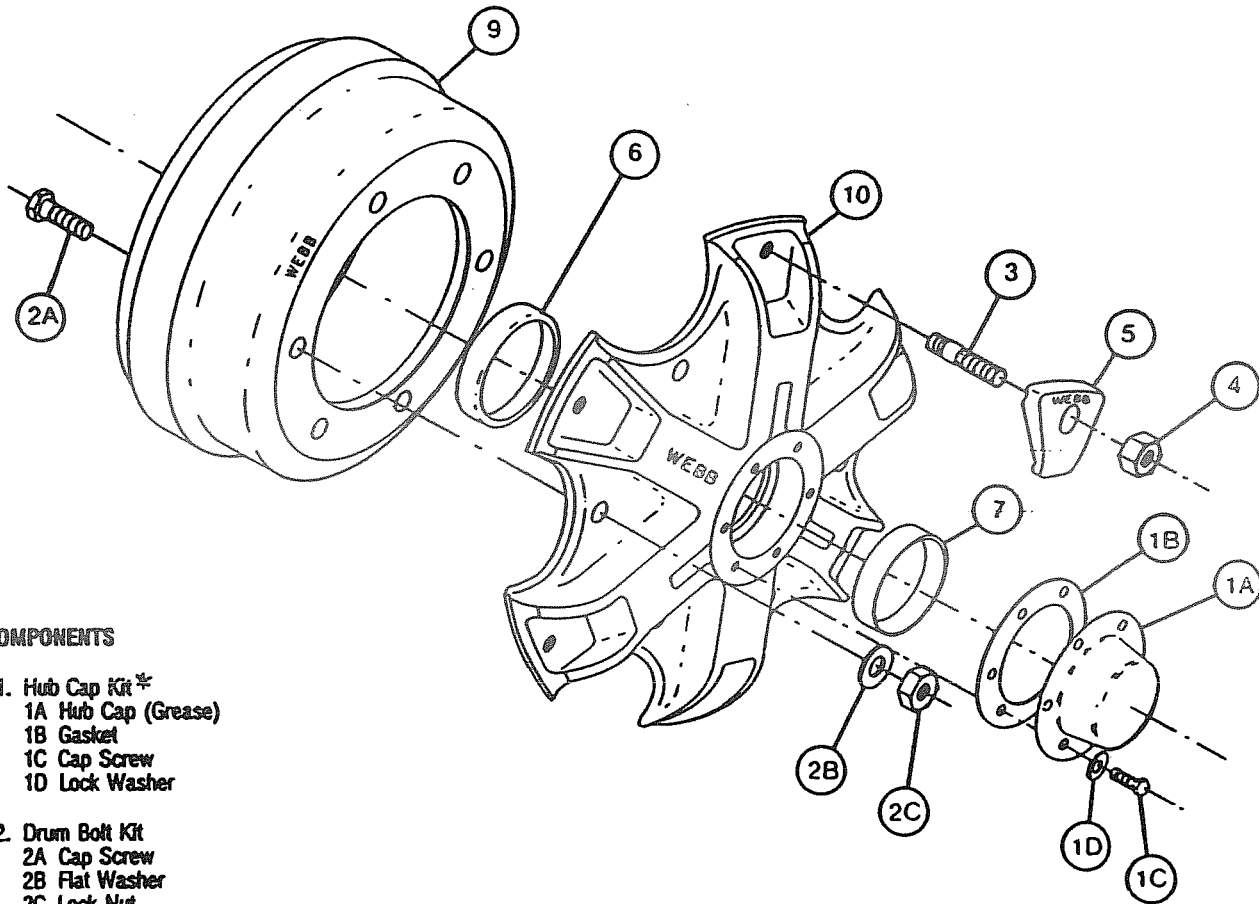
COMPONENTS

1. HUB CAP KIT*
1A HUB CAP (GREASE)
1B GASKET
1C CAP SCREW
1D LOCK WASHER
2. DRUM BOLT KIT
2A CAP SCREW
2B FLAT WASHER
2C LOCK NUT
3. RIM STUD
4. RIM NUT
5. RIM CLAMP
6. INNER BEARING CUP
7. OUTER BEARING CUP
8. RIM SPACER
9. BRAKE DRUM
10. SPOKE WHEEL

3 SPOKE WHEEL

* NOT PART OF WHEEL ASSEMBLY. ORDER SEPARATELY.

SPOKE WHEEL ASSEMBLY EXPLODED VIEW TRUCK STEERING AXLE APPLICATIONS

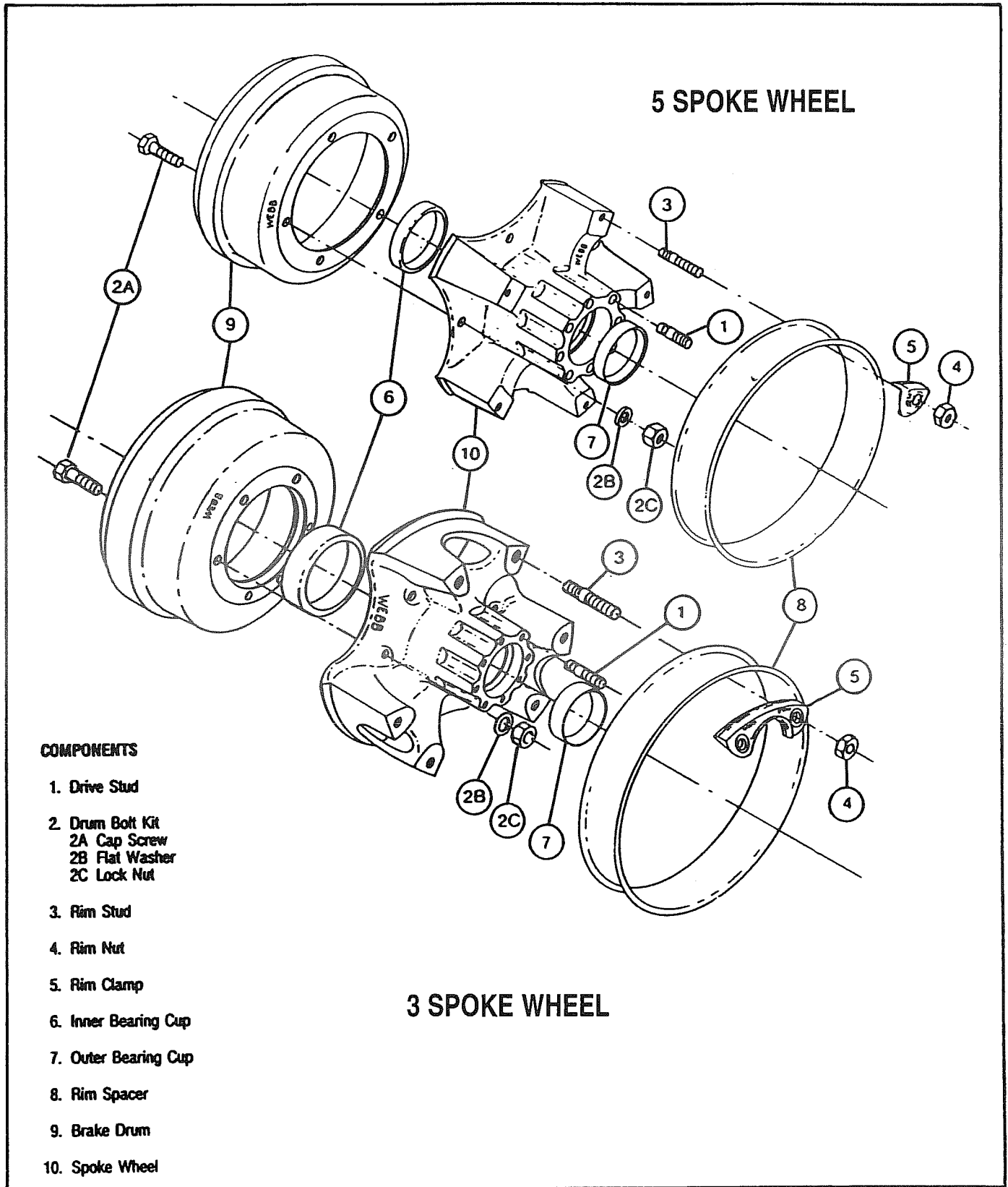


COMPONENTS

1. Hub Cap Kit*
 - 1A Hub Cap (Grease)
 - 1B Gasket
 - 1C Cap Screw
 - 1D Lock Washer
2. Drum Bolt Kit
 - 2A Cap Screw
 - 2B Flat Washer
 - 2C Lock Nut
3. Rim Stud
4. Rim Nut
5. Rim Clamp
6. Inner Bearing Cup
7. Outer Bearing Cup
9. Brake Drum
10. Spoke Wheel

* Not Part of Wheel Assembly, order separately.

SPOKE WHEEL ASSEMBLY EXPLODED VIEW TRUCK DRIVE AXLE APPLICATIONS



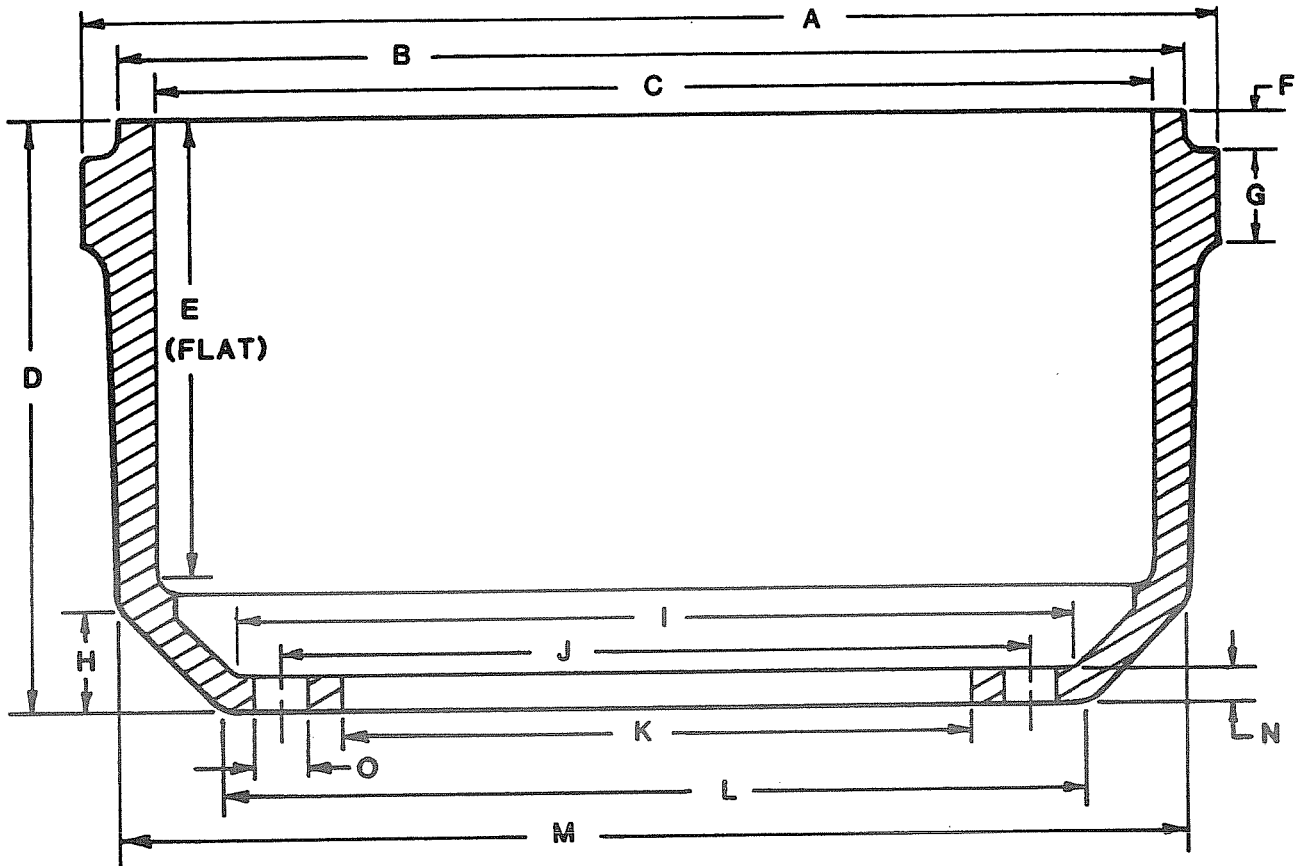
Webb Spoke Wheel Capacity Ratings

Wheel No.	Dynamic Capacity (lbs)
3450	9,500
3525	13,000
3550	13,000
3560	13,000
3562	13,000
5380	12,500
5382	12,500
5520	11,000
5580	12,500
5582	12,500
5680	12,500
5682	12,500
6375	7,500
7000	12,500
7015	12,500
7315	12,500
7320	12,500
7322	12,500

Wheel No.	Dynamic Capacity (lbs)
7510	9,000
7520	12,500
7522	12,500
7620	12,500
7622	12,500
8315	12,500
8320	12,500
8322	12,500
8520	12,500
8522	12,500
9560	7,300
9562	7,300
9660	11,000
9661	11,000
9662	11,000
9760	11,000
9762	11,000

Dynamic capacity is given in pounds per wheel, which is equal to one-half the Gross Axle Weight Rating (GAWR). For static or creep conditions, consult the Webb Product Engineering Department for specific applications.

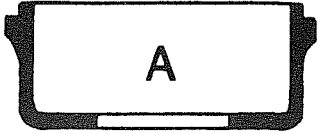
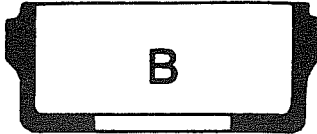
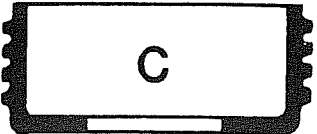

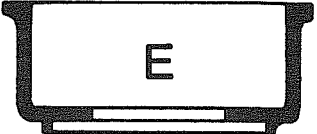
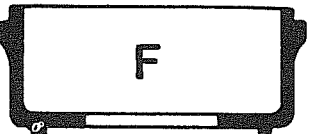

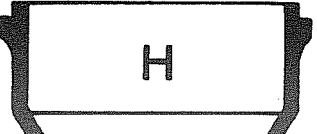
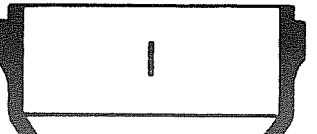
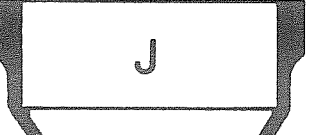

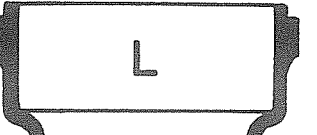
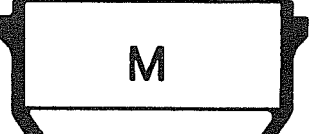
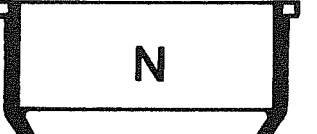
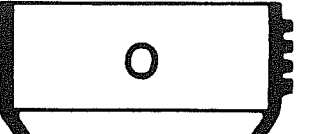
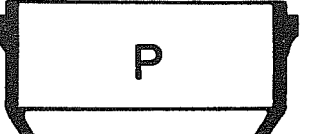
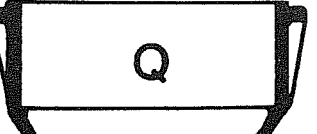
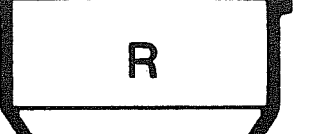
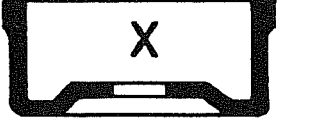
BRAKE DRUM – CROSS SECTION



- A. Overall Diameter of Drum
- B. Dust Shield Recess Diameter if Applicable
- C. Brake Face Diameter
- D. Overall Depth of Drum
- E. Width of Brake Surface Flat
- F. Depth of Dust Shield Recess
- G. Squeealer Band Thickness

- H. Distance from Outside of Backface to Start of Taper
- I. Inside Finished Diameter
- J. Bolt Circle Diameter
- K. Pilot Diameter
- L. Outside Finished Diameter
- M. Diameter at Taper
- N. Backplate Thickness
- O. Bolt Holes: Number and Size

BRAKE DRUM TYPES

 A	 B	 C
 D	 E	 F
 G	 H	 I
 J	 K	 L
 M	 N	 O
 P	 Q	 R
		 X

II. Hubs

A. Installation Instructions

Webb hubs are designed for specific axles, and may be used with other manufacturers' wheels and brakes. Be certain your hub is intended for use with your vehicle's axle. Refer to your Webb Spoke Wheel and Hub Catalog or contact our Product Engineering Department if you are unsure of the suitability of your application. Also, refer to the exploded view drawings provided on pages 2-7 of this manual when installing or servicing your hubs.

If the part number cannot be found on your vehicle's axle or it is illegible, do not assume its identification. Call our Product Engineering Department or the vehicle manufacturer for assistance.

Webb hubs are intended to be installed directly onto the vehicle's axle, and may use six, eight, or ten studs. The installation procedure depends on whether the disc wheels are ball seat mounted or pilot mounted.

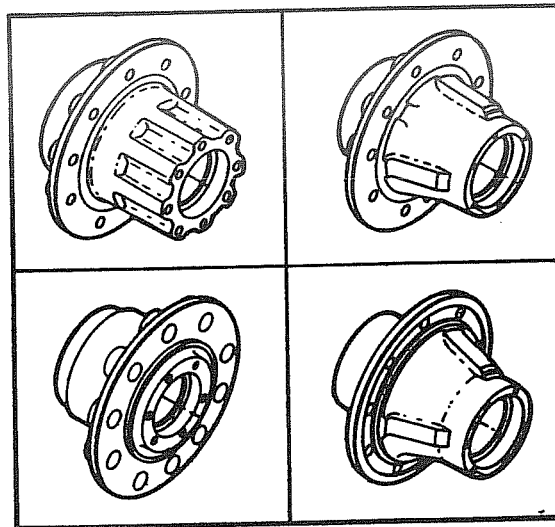


Figure II-1: Examples of Webb Hub Designs

1. Hub Installation

- a. Inspect the hub cavity and make certain the cavity is clean and free of loose particles that could contaminate the lubricant and damage the bearings or seal. Such small particles are typically abrasive and will significantly reduce the life of your bearings.
- b. Inspect the seal and seal surfaces in the hub and on the axle for nicks or dents that could damage the seal. Smooth the surfaces with emery cloth if such imperfections exist.
- c. Match the bearing cones with the bearing cups for correct fit and part number. The correct bearing cup and cone combination must be used to insure proper installation.



Always use the correct cup with its mating cone. Mixing parts may result in a loose wheel or significantly reduced product life and may result in a crash. Refer to the Webb Spoke Wheel and Hub Catalog for a complete listing of cup and cone combinations.



If the part number cannot be read on the cup or cone, discard it and replace it with a new part. Do not mix new cups with old cones or vice-versa. Doing so may significantly reduce your hub's performance, service life, and safety.

- d. Clean the mounting surfaces with a good grade commercial cleaner and soft rag, as illustrated in Figure II-2. Dry all component parts with a clean, absorbent cloth or paper. Lubricant will not adhere to surfaces wet with solvent, while some solvents may dilute the lubricant. All tools used in the installation should be clean and dry. If components are not clean or if contaminants are introduced into the system from your tools, your hub, axle and/or bearing life may be significantly reduced.

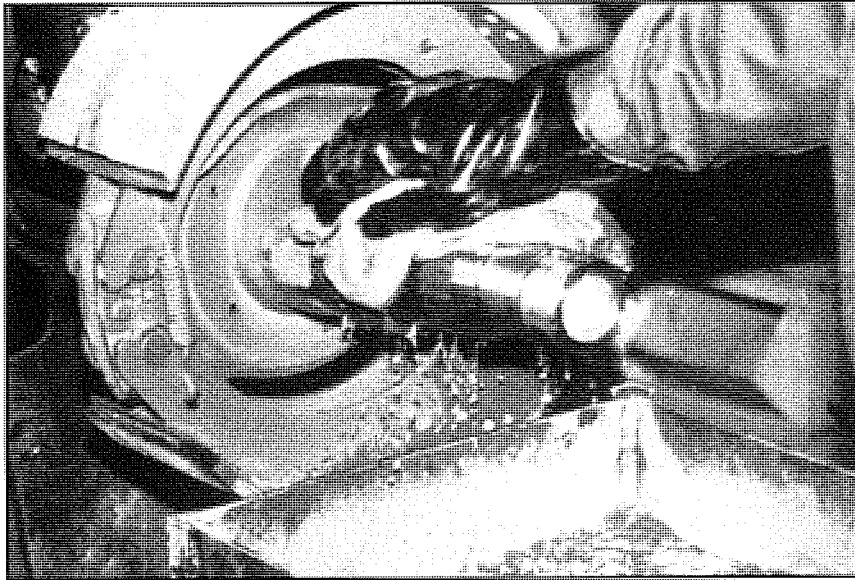


Figure II - 2 : Solvent Cleaning of Axle Spindle

- e. If the bearings are grease lubricated, pack the bearings with grease, using a pressure packer if available. Otherwise, pack the grease by hand, forcing the grease into the cavities between the rollers and cage from the large end of the cone. Pack the wheel or hub cavity between the bearing cups with grease to the level of the smallest diameter of the cups. Webb recommends the bearing grease to have the specifications listed in Figure II-3.

LUBRICATION

Grease	Oil
Soap Type -- Lithium Complex or Equivalent Dropping Point -- 446°F (230°C) Minimum Consistency -- NLGI No. 2 or No. 1 Additives -- Corrosion & Oxidation Inhibitors, EP Optional Base Oil -- Solvent Refined Petroleum Oil Base Oil Viscosity 150 cST Minimum Viscosity Index 80 Minimum Pour Point +14°F (-10°C) Maximum	Use only gear type oil. <ul style="list-style-type: none"> • Base stock from solvent refined, high viscosity-index petroleum oil. • Corrosion and oxidation inhibitors. • Extreme pressure (EP) additive. • Pour Point -10°C Maximum. Generally Use SAE 90 Viscosity Oil Which Meets or Exceeds API GL-5 Requirements. For Extreme Cold Weather use SAE 80 W. For Hot Climates Use SAE 140. <i>Note: Petroleum base synthetic oils and greases have shown satisfactory results. Synthetic lubricants must meet MIL-L-2105D. Check the axle specifications. Do not mix lubricants.</i>

Figure II-3: Recommended Lubricant Specifications. Do not deviate from these lubricant specifications, as this will void your warranty, and may compromise the product's service life.

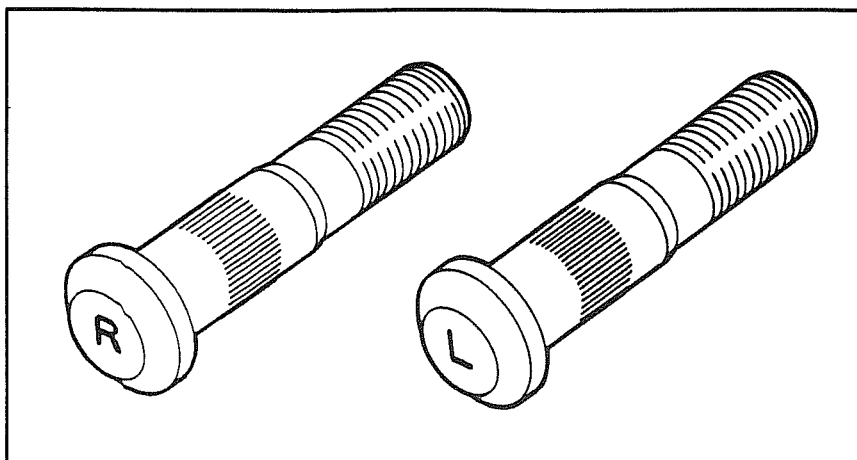


Figure II-4: Markings on studs to designate right hand (R) and left hand (L) studs. In addition, R studs have right-handed threads, and L studs have left-handed threads

- f. Refer to the seal manufacturer's instructions for installation of the inner bearing, cone, and seal. Depending on the type of seal being used, these may be installed in the hub or directly on the axle.
- g. Determine the type of thread on the studs of the hub. As shown in Figure II-4, studs are marked "R" or "L" to facilitate installation. Right hand (R) hubs (hubs with right hand threads on the studs) should be installed on the passenger side, or "curb" side of the vehicle. Left hand (L) hubs (hubs with left hand threads on the studs) should be installed on the operator's side, or the "street" side of the vehicle, as depicted in Figure II-5.



Be certain to attach the correct hand hub to the correct axle end. Failure to do so may cause loosening of the hub studs during operation, resulting in loss of a wheel.

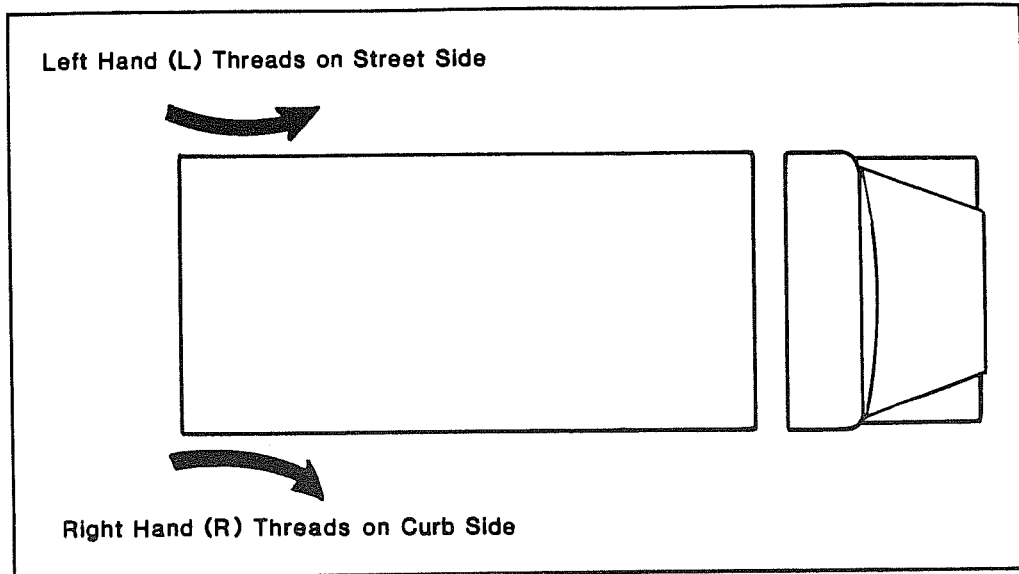


Figure II-5: Illustration of the proper installation of left-handed (L) and right-handed (R) threads onto a vehicle. The same orientation holds true for all axles and vehicles.

- h. Be sure the brakes are fully released and the brake adjustment backed off so there is no possibility of brake shoe drag interference with the bearing adjustment.



Make certain the vehicle or trailer is properly secured during installation. Shifting of the trailer may result in personal injury or death.

- i. Place the hub over the axle spindle, being careful to align the hub bore with the axle, as shown in Figure II-6. Use caution to make sure the seal is not damaged. Be sure to support the hub assembly until the outer bearing cone and spindle nut are installed (Section j, Page 20). Failure to do so may cause damage to the seal, and may significantly reduce the product's life.

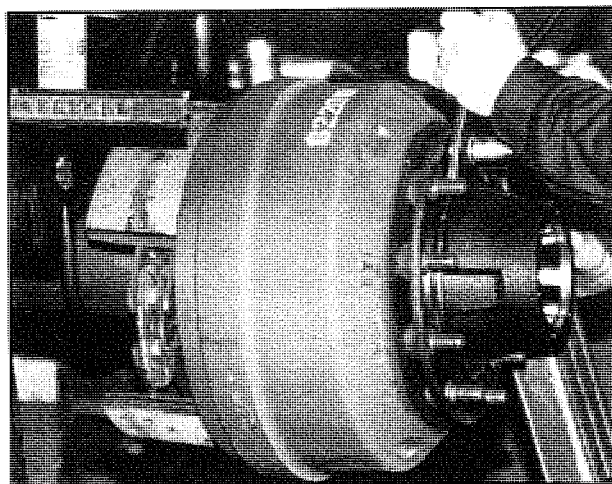


Figure II - 6 : Hub Placed Over Axle Spindle.

- j. Install the outer bearing cone and spindle nut. The procedures depend on whether your axle is a double nut type or single nut type axle. If your axle is a double nut type axle, perform the following operations:
1. Install the outer bearing cone and inner spindle nut (adjusting nut), tightening the nut until it is snug against the outer bearing cone, as shown in Figure II-7. The hub support may then be removed allowing the hub to rest on the bearings.

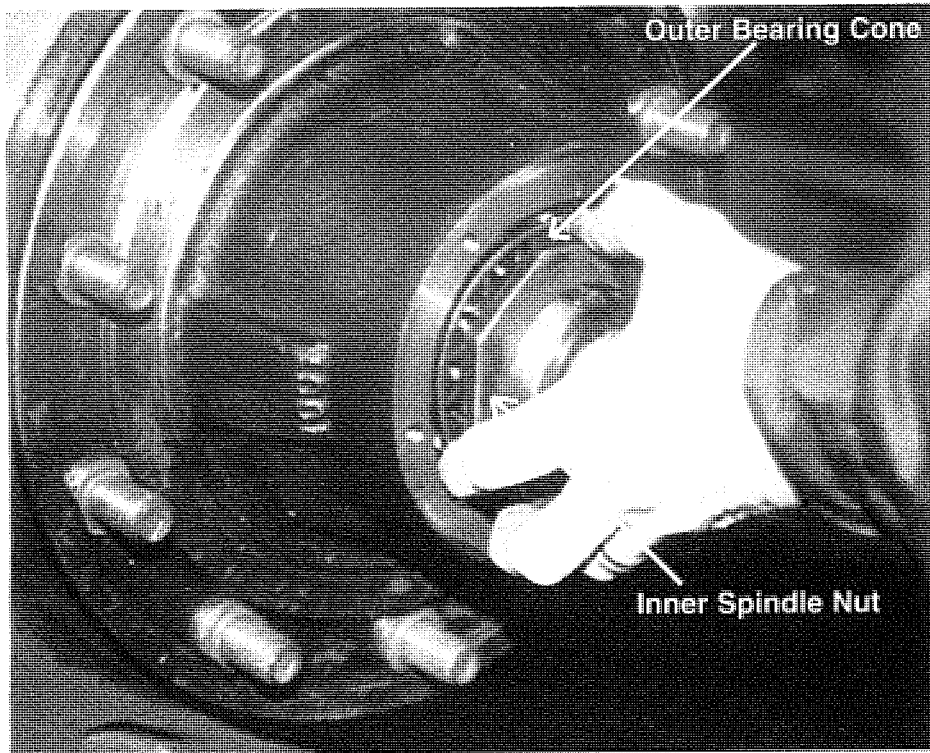


Figure II - 7 : Installation of outer bearing cone and inner spindle nut.

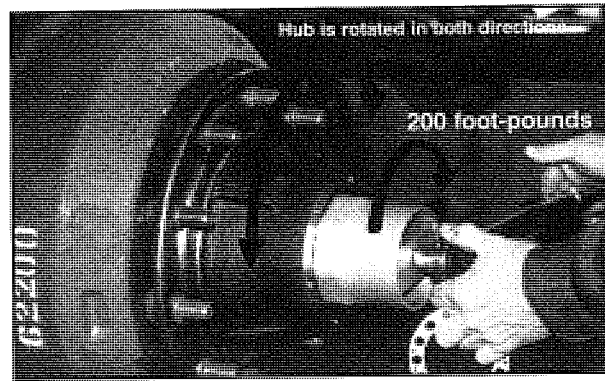


Figure II-8: Tightening of inner spindle nut to two hundred (200) foot pounds. Note that the hub is rotated in both directions as spindle nut is tightened.

2. Tighten the inner spindle nut (adjusting nut) to two hundred (200) foot-pounds of torque while rotating the hub in BOTH directions, as illustrated in Figure II-8.
3. Back off the inner spindle nut (adjusting nut) one full turn and rotate the hub. Retighten the inner spindle nut to fifty (50) foot-pounds while rotating the hub in BOTH directions.
4. Back off the inner spindle nut (adjusting nut) 1/2 turn for steer axles or 1/4 turn for drive and trailer axles, per Figure II-9.
5. Install the lock washer, the hub bearing tab lock washer (when required) and outer spindle nut (jam nut). Tighten the outer spindle nut (jam nut) to two hundred (200) to three hundred (300) foot-pounds for steer axles or three hundred (300) to four hundred (400) foot-pounds for drive or trailer axles. If the drive axle is a tang washer type, the jam nut torque is 200-275 foot-pounds.

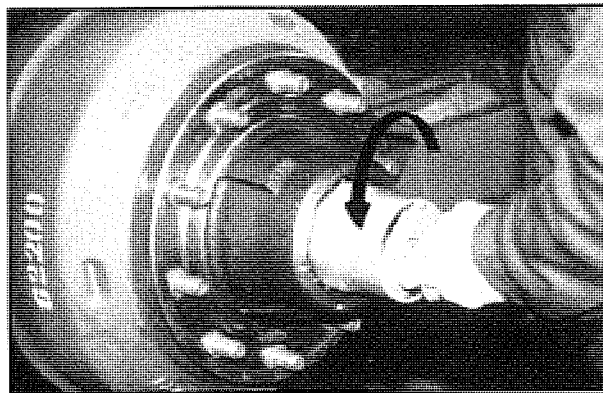


Figure II-9: Inner spindle nut is backed off 1/2 turn for steer axles or 1/4 turn for drive and trailer axles.

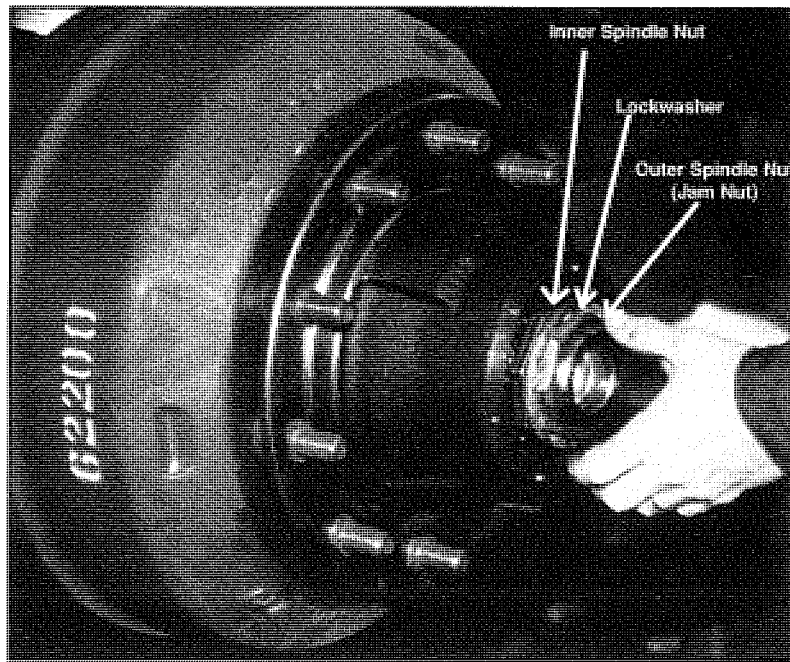


Figure II-10: Installation of outer bearing cone and inner spindle nut



Proper torque is important. Use a torque wrench to assure proper torque. Do not deviate from recommended torques. Doing so may result in loose wheels, which can cause a crash.

If your axle is a single nut type axle, perform the following operations:

1. Install the outer bearing cone, lock washer, and spindle nut.
2. Tighten the inner spindle nut (adjusting nut) to fifty (50) foot-pounds of torque while rotating the hub in BOTH directions, as is illustrated in Figure II-8.
3. Back off the spindle nut to the first slot or one-half castellation (about one-twelfth of a turn) as is illustrated in Figure II-9, and install the cotter pin.

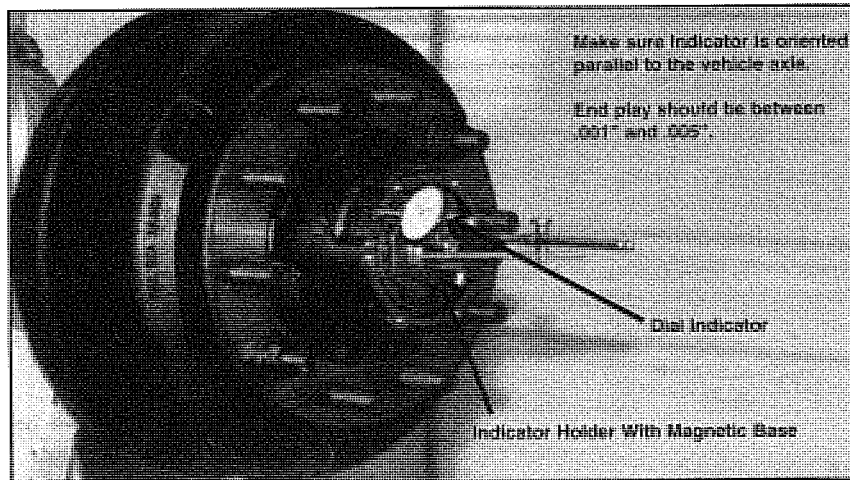


Figure II-11: Use of a dial indicator to check bearing adjustment.

- k. Check your bearing adjustment with a dial indicator, as shown in Figure II-11. Adjustment should be within 0.001 to 0.005 inch end play. When the bearing adjustment is correct, the hub should rotate freely without excess play. If the hub binds or shows excessive end play, repeat the proper portion of step j above.
- l. Install the hub cap with proper gasket, as seen in Figure II-12. Tighten the cap screws of the hub cap to fifteen (15) to twenty (20) foot-pounds of torque.

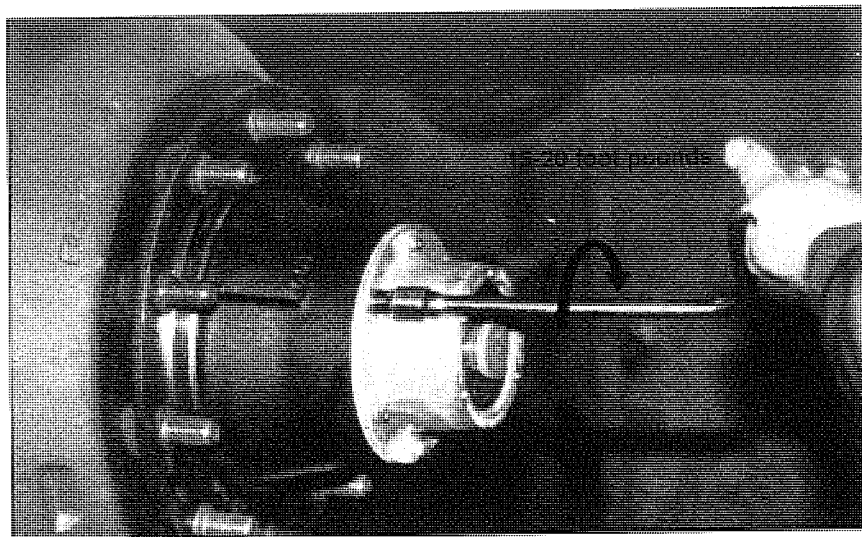


Figure II-12: Hub cap and gasket installed, and cap screws tightened to fifteen (15) to twenty (20) foot pounds.

- m. If the bearings are oil lubricated, remove the filler plug and fill the hub cavity to the recommended level with a gear type oil. Webb recommends the bearing oil to have the specifications listed in Figure II-3 (Page 17). Use of any other grade of oil may significantly reduce your product's life and will void your warranty. Replace the filler plug.
- n. For drive axle hub, carefully install the axle shaft and gasket as recommended by the axle manufacturer. If tapered drive flange wedges are required, install them over the drive studs. Use grade "C" locknuts or grade 8 hex nuts and tighten to the recommended torque.

THREAD SIZE	TORQUE REQUIREMENTS FOOT POUNDS	
	MINIMUM	MAXIMUM
1/2 - 20	80	90
9/16 - 18	140	145
5/8 - 18	175	185
3/4 - 16	250	275

- o. Readjust the brakes in accordance with the brake manufacturer's instructions.

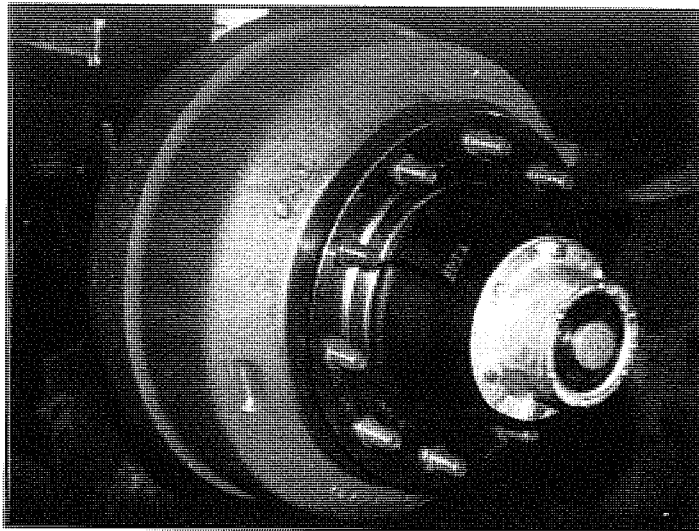


Figure II-13: Completed hub assembly.

2. Disc Wheel and Tire Assembly Mounting Instructions - Ball Seat Mount

Ball seat wheels have spherical chamfers or ball seats machined in each stud hole, and may utilize either steel or aluminum disc wheels. Inner and outer capnuts center the wheels by seating against the wheel's ball seats. A typical ball seat mount is illustrated in Figure II-14.



Use only the correct, matched parts when mounting disc wheels. Incorrect components can result in separation of the rim components.



Do not mix aluminum and steel disc wheels or aluminum wheel and steel disc wheel capnuts. This may result in incorrect components being used to secure the wheels, which can lead to loose wheels resulting in a crash.



Do not mix pilot mount disc wheels with ball seat disc wheels. Do not mix ball seat capnuts with pilot mount wheels. This may result in broken wheels or loss of a wheel, resulting in a crash. The differences between ball seat and pilot mounts are illustrated in Figure II-18.

It is imperative for the safety and life of your vehicle that disc wheels and tire assemblies be correctly installed and fasteners properly torqued. To assure proper installation, perform the following operations:



Do not use heat to remove capnuts. If heat is used to remove a nut, the stud nut and outer wheel must be replaced.

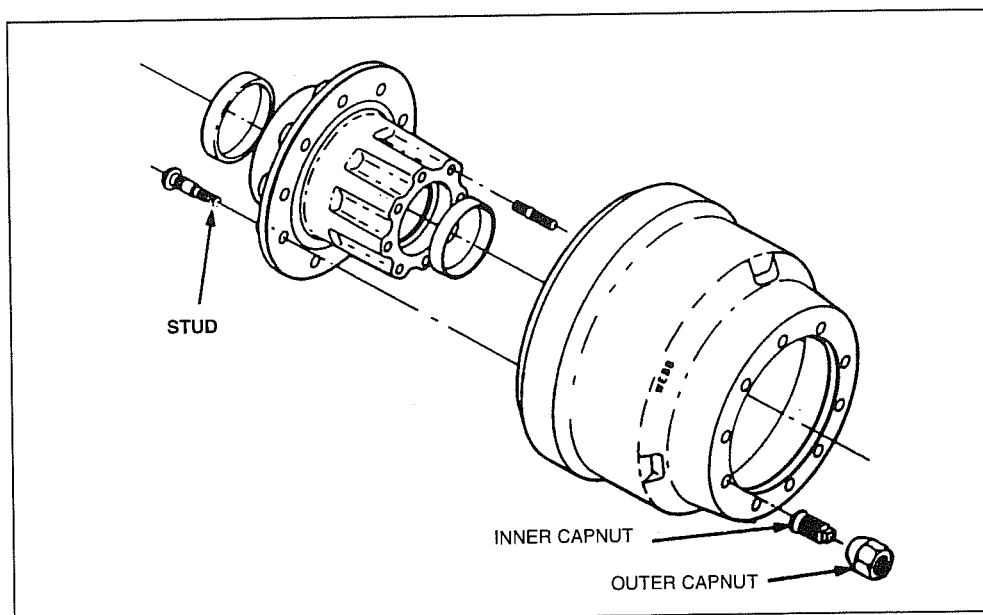


Figure II-14: Typical ball seat mount hub assembly



- a. Use the correct capnuts to match your wheels. Failure to do so may lead to loose wheels or significantly reduced product life, and may result in a crash. Before proceeding with the installation of the disc wheel make certain you are using the proper capnuts by reading the following:
1. For steel disc wheels with a ball seat mount, Webb recommends the use of dual wheel stud standout of 1.31" to 1.44". Webb also recommends the use of steel wheel inner capnuts (Webb part numbers 107082 RH and 107083 LH) and outer capnuts (Webb part numbers 178910 RH and 178921 LH).
 2. For aluminum disc wheels with a ball seat mount, Webb recommends the use of dual wheel stud standout of 1.31" to 1.44". Webb also recommends the use of aluminum inner wheel capnuts grade 8 strength (Webb part numbers 105988 RH and 105989LH) and outer capnuts of grade 8 strength (Webb part numbers 178910 RH and 178921 LH).
 3. Do not use grade 5 strength inner capnuts with aluminum disc wheels, as aluminum wheels require high strength capnuts to support the preloads and design loads. Use only the recommended capnuts to maximize the service life and safety of your aluminum disc wheels.
 4. Some hub assemblies for ball seat mount aluminum disc wheels use a long stud mount of 1.75" to 1.87". Webb does not recommend the use of long stud standout because of the lack of standardization and possible improper installation. If your hub has long standout, use only Webb grade 8 strength inner capnut 105988 RH or 105989 LH for aluminum disc wheels. The long stud standout must not be used with dual steel disc wheels.



- b. Before proceeding, make certain that all tires are matched to within 3/4 inch of the same rolling circumference per the tire manufacturer's instructions. Do not use tires that do not meet this criterion. Doing so may result in unstable operation and significantly reduced service life.
- c. Always correctly match disc wheel parts. Failure to use properly matched parts could result in serious injury. Consult the disc wheel manufacturer's literature for the correct parts for your tire and disc wheel.



- d. The disc wheel must be correctly installed and nuts tightened to recommended torque to assure maximum service life and maximize safety. Assemble the disc wheel and tire in accordance with the disc wheel manufacturer's instructions and OSHA Standard 29 CFR 1910.177. "Servicing Multi-Piece and Single Piece Rim Wheels". Failure to do so may result in serious injury or death.
- e. Make sure that all mounting surfaces are clean and free of rust, dirt or excessive paint. A wire brush may be used to clean these surfaces. Freshly painted wheels must have ample time to dry. Wet paint will be compressed under the wheel nut clamping force and result in loose wheels.



Assembling dirty or rusty components can prevent the wheel from seating properly which can result in unstable operation and cause an accident.

- f. If an outboard mount drum assembly is being used, remove and discard the two shipping nuts.
- g. Position the inner disc wheel over the studs, being careful not to damage the stud threads. Make sure that the disc wheel is flat against the mounting surface and that there is clearance between the disc wheel taper and brake drum.
- h. Install the inner capnuts on the studs and tighten to fifty (50) foot-pounds using the sequence illustrated in Figure II-15. Make certain that the left-handed threads are installed on the driver or "road" side of the vehicle and the right-handed threads are installed on the passenger or "curb" side of the vehicle. If this is not the case, the hub has been installed incorrectly, and must be corrected. Reinstall the hubs per the instructions given in section II.A (Page 15).

If air wrenches are used, they must be periodically calibrated in both directions for proper torque output. Use a hand torque wrench to check the air wrench output. If output is not correct, take the necessary steps to adjust output.

BALL SEAT DISC WHEELS

TORQUE SPECIFICATIONS

6 AND 10 STUD HUBS

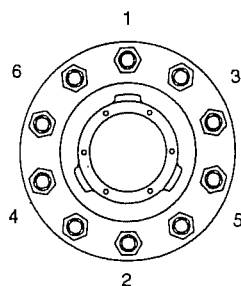
RECOMMENDED TORQUE: 450 - 500 Ft. Lb.

INNER CAP NUTS --

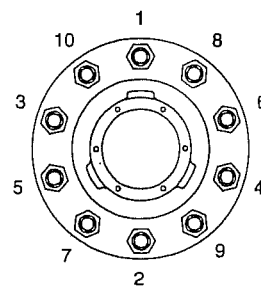
First, tighten Cap Nuts to 50 ft. lb. using sequence shown. Then tighten Cap Nuts to recommended torque - 450-500 ft. lb. DRY

OUTER CAP NUTS --

First, tighten Cap Nuts to 50 ft. lb. using sequence shown. Then tighten Cap Nuts to recommended torque - 450-500 ft. lb. DRY




6 STUD



10 STUD


Recheck Torque after first 50 to 100 miles of service.

Figure II - 15: Torque specifications for six and ten stud ball seat hubs.

 Be certain to attach the correct hand thread to the correct axle end. Failure to do so may cause loosening of the capnuts during operation, resulting in loss of a wheel.

- i. Tighten the inner capnuts to full torque of four hundred fifty (450) to five hundred (500) foot-pounds using the same sequence illustrated in Figure II-15.

Heavy duty ball seat nuts use 1 5/16-12 threads and 1 5/16-12 threads. These require 750-900 foot-pound torque.

 Proper capnut torque is important. Use a torque wrench to assure proper torque, as shown in Figure II-16. Insufficient torque can cause stud breakage and damage ball seats. Overtorque can overstress the studs and strip the threads. Do not deviate from recommended torques. Doing so may result in loose wheels, which can cause a crash.

Do not use a lubricant on the threads or ball seat. Lubricant changes the torque value and can overstress the studs. All torque values are for dry threads and dry ball seats.

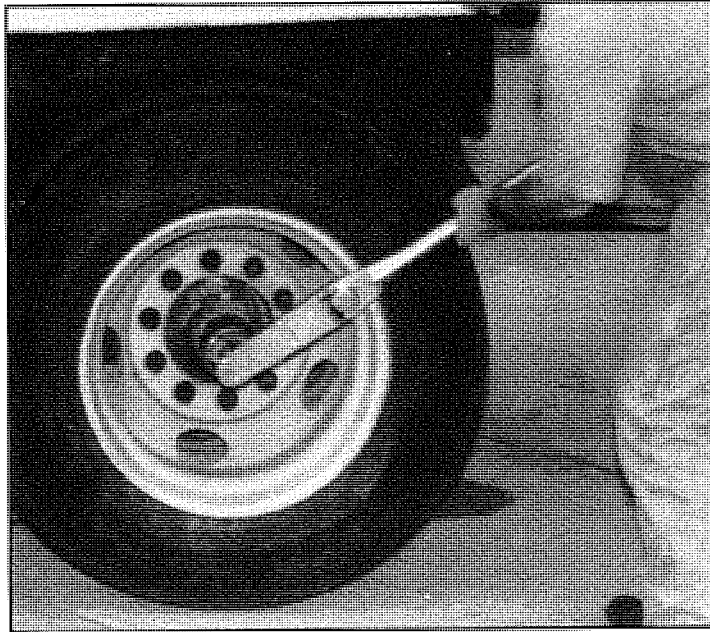


Figure II - 16: Use of a torque wrench to assure proper torque.

- j. Position the outer disc wheel over the capnuts being careful not to damage the inner capnut threads. Be sure the valve stems for both the inner and outer tire are accessible.
- k. Install the outer capnuts and tighten to fifty (50) foot-pounds using the sequence in Figure II-15. Then tighten to full torque of four hundred fifty (450) to five hundred (500) foot-pounds using the same sequence.

Heavy duty ball seat nuts use 1 5/16-12 threads. These require 750-900 foot-pounds torque.



Proper capnut torque is important. Use a torque wrench to assure proper torque as shown in Figure II-16. Insufficient torque can cause stud breakage and damage ball seats. Overtorque can overstress the studs and strip the threads. Do not deviate from recommended torques. Doing so may result in loose wheels, which can cause a crash.

If air wrenches are used, they must be periodically calibrated in both directions for proper torque output. Use a hand torque wrench to check the air wrench output. If output is not correct, take the necessary steps to adjust output.

- l. For both new installations and reinstallations, the parts will seat naturally and the torque will drop after the first fifty (50) to one hundred (100) miles of operation. Check the capnuts for proper torque after this interval and retighten them as follows:
 - a) Loosen the outer capnuts
 - b) Retighten the inner capnuts per step h (Page 28).
 - c) Retighten the outer capnuts per step i above.

After the first fifty (50) to one hundred (100) miles of operation, refer to section II.B. Service Instructions for capnut maintenance procedures and intervals.

3. Disc Wheel and Tire Assembly Mounting Instructions - Pilot Mount

Pilot mount wheels have stud holes that are reamed straight through the wheel. Pilot bosses machined on the hub fit tightly to the center hole of the disc wheel. Pilot mount wheels may be steel or aluminum. Pilot mount wheels are secured with flange nuts, as shown in Figure II-17.



Use only the correct, matched parts when assembling disc wheels. Incorrect components can result in separation of the rim components which can result in a crash.



Do not mix pilot mount disc wheels with ball seat disc wheels. Do not mix ball seat capnuts with pilot mount wheels. This may result in broken wheels or loss of a wheel, resulting in a crash. The differences between ball seat and pilot mounts are illustrated in Figure II-18.



Do not use heat to remove the flange nuts. If heat is used to remove a nut, the stud, nut and outer wheel must be replaced.



It is imperative for the safety and life of your vehicle that rim/disc wheels and tire assemblies be correctly installed and fasteners properly torqued. To assure proper installation, perform the following operations:

- a) Use the correct flange nuts to match your wheels. Failure to do so may lead to loose wheels or significantly reduced product life, and may result in a crash. Before proceeding with the installation of the disc wheel make certain you are using the proper flange nuts. The pilot mounting uses M22 x 1.5 or M20 x 1.5 metric threads. The stud stand out is at least 2.16". All metric studs have right-hand threads.

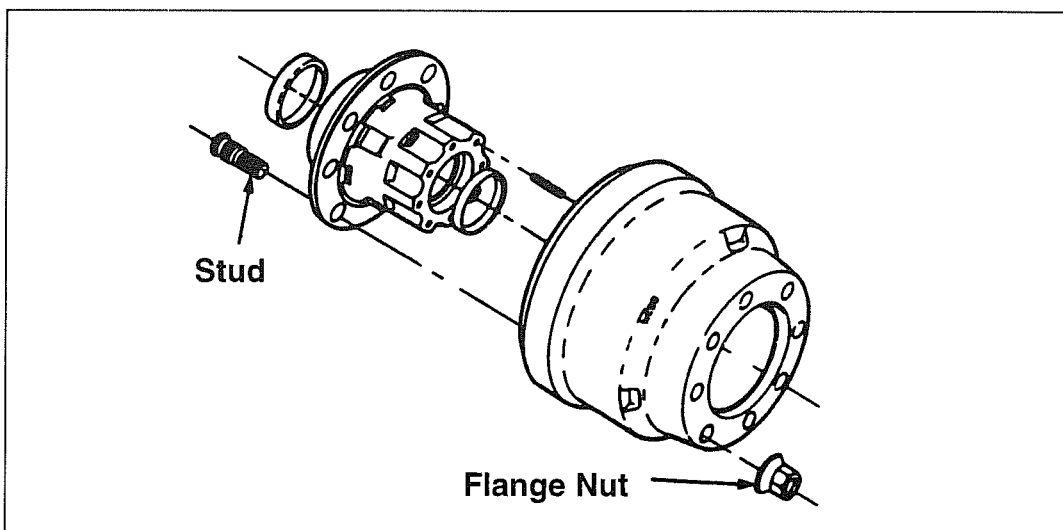


Figure II-17: Typical pilot mount hub assembly.

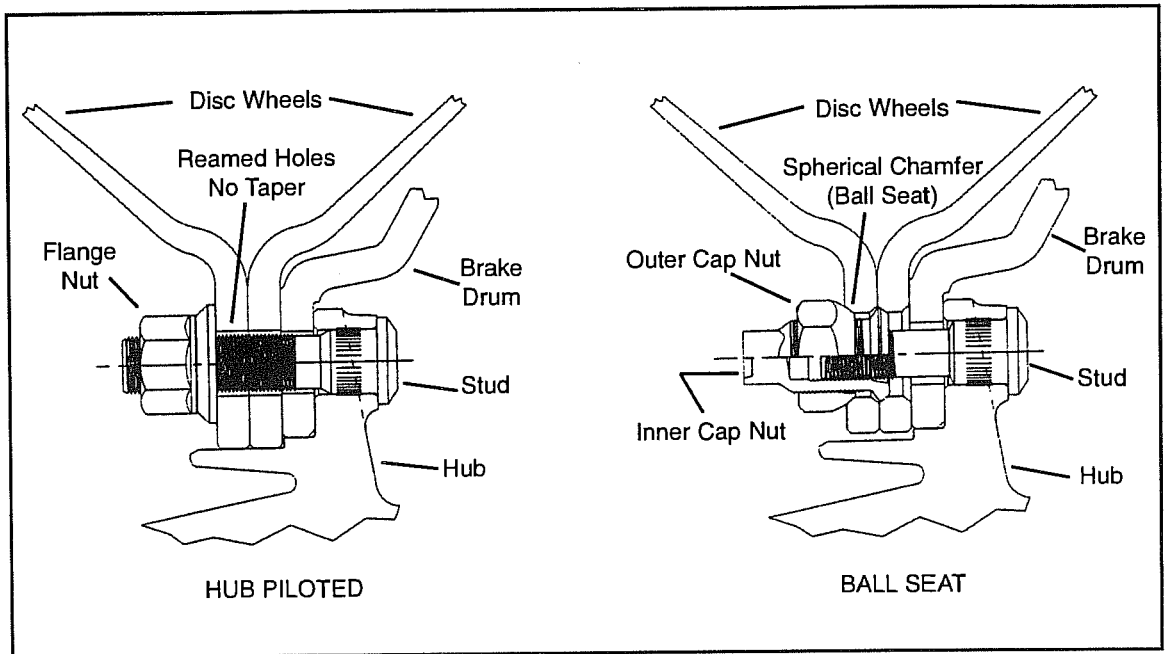


Figure II-18: Illustration of hub piloted and ball seat mounting.



- b. Before proceeding, make certain that all tires are matched to within 3/4 inch of the same rolling circumference per the tire manufacturer's instructions. Do not use tires that do not meet this criterion. Doing so may result in unstable operation and significantly reduced service life.



- c. Always correctly match disc wheel parts. Failure to use properly matched parts could result in serious injury. Consult the disc wheel manufacturer's literature for the correct parts for your tire and disc wheel.



- d. The disc wheel must be correctly installed and nuts tightened to recommended torque to assure maximum service life and maximize safety. Assemble the disc wheel and tire in accordance with the disc wheel manufacturer's instructions. Failure to do so may result in serious injury or death.

- e. **Make sure that all mounting surfaces are clean and free of rust, dirt or excessive paint. A wire brush may be used to clean these surfaces. Freshly painted wheels must have ample time to dry. Wet paint will be compressed under the wheel nut clamping force and result in loose wheels.**



Assembling painted, dirty or rusty components can prevent the wheel from seating properly which can result in unstable operation and cause an accident.

- f. Remove and discard the two shipping nuts (if used) prior to installing the disc wheel. Rotate the hub so that one pilot pad is at top center or at the 12:00 position.
- g. Position the inner disc wheel over the studs and wheel pilot pads, being careful not to damage the stud threads. Make sure that the disc wheel is flat against the mounting surface and that there is clearance between the disc wheel taper and brake drum.
- h. Position the outer disc wheel over the studs and wheel pilot pads being careful not to damage the threads. Be sure the valve stems for both the inner and outer tire are accessible.
- i. On two piece flange nuts, apply a drop of oil between the nut and the washer and on the threads of the nuts. Do not get lubricant on the mounting face of the drum or wheel.
- j. Install the two piece flange nuts and tighten to fifty (50) foot-pounds in the sequence illustrated in Figure II-19. Starting at the top will help insure that the drum and wheels seat properly on their pilots.
- k. Check both disc wheels to be sure they are properly seated on the hub assembly. If they are not, loosen the flange nuts and return to step i above.

PILOT MOUNT DISC WHEELS

TORQUE SPECIFICATIONS

8 AND 10 STUD HUBS

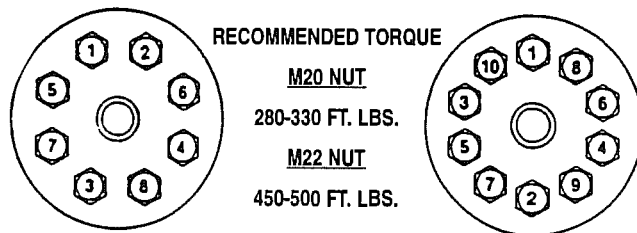
All threads are right hand metric.

First, tighten Flange Nuts to 50 ft. lb. using sequence shown.

Check disc wheels for proper positioning on pilots and proper seating against flange.

Then, tighten Flange Nuts to recommended torque using sequence shown.

TIGHTENING SEQUENCE



**RECHECK TORQUE AFTER
FIRST 50 TO 100 MILES OF SERVICE.**

Figure II-19: Torque specifications for eight and ten stud pilot mount hubs.

1. Tighten the flange nuts to full torque (M22 nut: 450-500 foot-pounds)(M20 nut: 280-330 foot-pounds) using the same sequence illustrated in Figure II-19.



Proper torque is important. Use a torque wrench to assure proper torque, as shown in Figure II-16. Insufficient torque can cause stud breakage and damage wheel pilots. Overtorque can overstress the studs and strip the threads. Do not deviate from recommended torques. Doing so may result in loose wheels, which can cause a crash.

It is recommended that a preventative maintenance program be established to periodically check for wear, damage, proper nut torque, wheel alignment, cracks, and leaks. Such a program will help ensure maximum performance, service life and safety from our product.

- m. For both new installations and reinstallations, the parts will seat naturally and the torque will drop after the first fifty (50) to one hundred (100) miles of operation. Check the flange nuts for proper torque after this interval and retighten them following the sequence illustrated in Figure II-19.

After the first fifty (50) to one hundred (100) miles of operation, refer to Section II.B.
- Service Instructions for flange nut maintenance procedures and intervals.

B. Service Instructions

It is recommended that a preventative maintenance program be established to periodically check for wear, damage, proper nut torque, wheel alignment, cracks, and leaks. Such a program will help ensure maximum performance, service life and safety from our product.



Make a visual check as often as possible for loose nuts, cracks and leaks. If such conditions exist, the structural integrity of the wheel may be compromised, and may result in catastrophic failure. If such conditions are discovered, promptly service or replace the damaged part.

1. Bearings

To ensure the performance, safety and service life of your hub, follow the following recommended maintenance procedures:

1. The frequency of lubricant changes depends upon individual operating conditions, speed and loads. It is recommended that the hub bearing lubricant be changed every 25,000 miles of operation but not less than twice a year to prevent excessive wear. Inspect the lubricant removed for foreign material such as metal shavings or other small abrasive particles. If such particles exist, carefully inspect the bearings for wear or damage as described in paragraph 3 below.



Small particles, when suspended in a lubricant bath, can quickly wear bearing surfaces. If excessive wear or damage takes place, the bearing will be unable to support operating loads. If such wear occurs, replace the bearings and change the lubricant immediately. Failure to do so may result in a locked or loose wheel, resulting in an accident.

2. Whenever the bearing lubricant is changed, check bearing adjustment end play with a dial indicator, as shown in figure II-11 (Page 23). End play should be 0.001 to 0.005 inches. If the bearings are out of adjustment, they should be inspected for wear or damage, as described in section 3 below.



If excessive wear or damage takes place, the bearing will be unable to support operating loads. If such wear occurs, replace the bearing cup and cone immediately. Failure to do so may result in a locked or loose wheel, resulting in an accident.

3. To inspect the bearings for wear or damage,
 - a. Remove the hub assembly and bearing cones from the axle spindle.
 - b. Clean all old lubricant from the hub cavity, bearings and hub cap with a good grade of commercial cleaner and a stiff brush.



Do not use a steel brush or air hose in the cleaning operation, as these may cause small abrasive particles to become entrained in the lubricant and may result in significantly reduced service life, performance, and safety.

- c. Wipe all parts dry with a clean, absorbent cloth or paper. Make sure all of the tools to be used are clean and dry.
- d. Inspect the bearing cups, bearing cones, and axle spindle for damage or wear. Should a bearing cone require replacement, it is recommended that the bearing cup also be replaced to prolong the life of the bearing.



If excessive wear or damage takes place, the bearing will be unable to support operating loads. If such wear occurs, replace the bearing cup and cone immediately. Failure to do so may result in a locked or loose wheel, resulting in an accident.

- e. Reinstall the hub on the axle in accordance with the instructions given in section II.A (Page 15) of this manual. Be sure to use a new seal and wiper ring in the reinstallation to assure proper lubricant containment.

2. Hubs

a. Hubs Using Ball Seat Mounted Disc Wheels

- 1. Between each usage, and at least daily, visually check for loose capnuts and cracks. One indication of loose capnuts is the presence of rust streaks coming from holes. If such conditions exist, make repairs immediately. Failure to do so may result in a loose wheel, resulting in an accident.
- 2. The capnut torque should be checked:
 - a. After the first 50 to 100 miles of operation for new installations and re-installations.
 - b. Whenever the bearings are serviced, and
 - c. Every 10,000 miles or at the vehicle's scheduled maintenance, whichever comes first. Individual fleet experience may dictate shorter intervals or allow longer intervals.

To check the capnut torque, perform the following operations:

- a. Loosen the outer capnuts.
- b. Check the inner capnut torque in the tightening direction. The correct torque is between four hundred fifty (450) and five hundred (500) foot-pounds. If this is not the case, retighten the inner capnuts using the sequence illustrated in Figure II-15 (Page 28).



Proper capnut torque is important. Use a torque wrench to assure proper torque. Insufficient torque can cause stud breakage and damage ball seats. Overtorque can overstress the studs and strip the threads. Do not deviate from the recommended torques. Doing so may result in loose wheels, which can cause an accident.

If air wrenches are used, they must be periodically calibrated in both directions for proper torque output. Use a hand torque wrench to check the air wrench output. If output is not correct, take the necessary steps to adjust output.

- c. Retighten the outer capnuts to fifty (50) foot-pounds torque in the sequence illustrated in Figure II-15 (Page 28).
- d. Tighten the outer capnuts to full torque of four hundred fifty (450) to five hundred (500) foot-pounds torque using the same sequence.



Proper capnut torque is important. Use a torque wrench to assure proper torque. Insufficient torque can cause stud breakage and damage ball seats. Overtorque can overstress the studs and strip the threads. Do not deviate from the recommended torques. Doing so may result in loose wheels, which can cause an accident.

b. Hubs Using Pilot Mounted Disc Wheels



1. Between each usage, and at least daily, visually check for loose flange nuts and cracks. If such conditions exist, make repairs immediately. Failure to do so may result in a loose wheel, resulting in an accident.

2. The flange nut torque should be checked.
 - a. After the first 50 to 100 miles of operation for new installations and re-installations.
 - b. Whenever the bearings are serviced, and
 - c. Every 10,000 miles or at the vehicle's scheduled maintenance, whichever comes first. Individual fleet experience may dictate shorter intervals or allow longer intervals.
3. Check the flange nut torque by tightening the nut to full torque (M22 nut: 450-500 foot-pounds) (M20 nut: 280-330 foot-pounds) following the sequence illustrated in Figure II-19 (Page 32).



Proper flange nut torque is important. Use a torque wrench to assure proper torque. Insufficient torque can cause stud breakage and damage wheel pilots. Overtorque can overstress the studs and strip the threads. Do not deviate from the recommended torques. Doing so may result in loose wheels, which can cause an accident.

If air wrenches are used, they must be periodically calibrated in both directions for proper torque output. Use a hand torque wrench to check the air wrench output. If output is not correct, take the necessary steps to adjust output.

3. Rims/Disc Wheels and Tires



- a. Always exhaust all air from a single tire and from both tires of a dual assembly prior to removing any rim components or any wheel/hub components such as nuts or clamps. Remove the valve cores and run a piece of wire through the stem to make sure it is not plugged.

Be sure all pressurized air is removed from the tire before proceeding by deforming the tire wall by hand. If any pressurized air remains in the tire and any damage has been sustained by the rims, the tire may explode and may result in serious personal injury or death



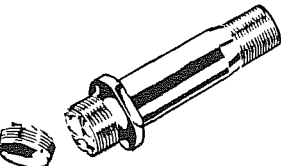
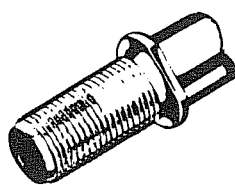
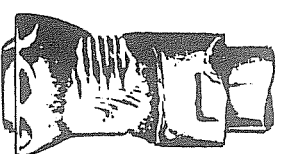
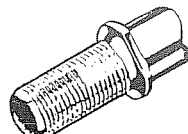
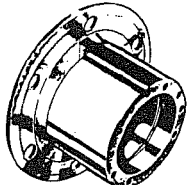

- b. Follow the tire manufacturer's and rim or disc wheel manufacturer's maintenance and service instructions. Failure to do so may significantly reduce your vehicle's service life, performance and safety.
- c. A useful guide poster for mounting and demounting procedures is available from the Department of Transportation. It can be obtained at no charge from:
General Services Department
U.S. Department of Transportation
National Highway Traffic Safety Administration
400 7th Street S.W.
Washington, D.C. 20590



- d. Perform all operations associated with the rims in accordance with OSHA Standards 29 CFR 1910.177, "Servicing Multi-Piece and Single Piece Rim Wheels". Failure to do so may result in serious injury or death.

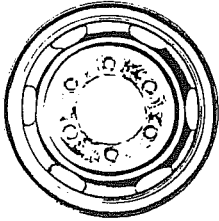
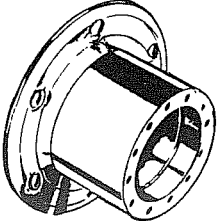
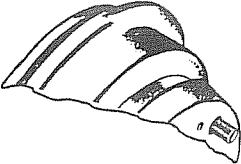
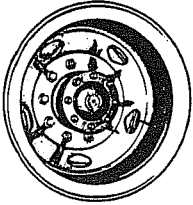
4. Trouble Shooting

a. Hubs Using Ball Seat Mounted Disc Wheels

Example	Problem	Cause	Solution
	Broken Studs	<ol style="list-style-type: none"> 1. Loose Capnuts 2. Overloading 	Replace the broken stud and the stud on each side of the broken stud. If more than two studs are broken, replace the entire set.
	Stripped threads on studs or capnut	Excessive torque	Replace stud and/or capnut and retorque to specifications as described in section II.A.2 (Page 28).
	Damaged inner or outer capnuts	<ol style="list-style-type: none"> 1. Loose wheel 2. Overloading 	Replace capnuts. Check for proper stud standout section II.A.2. (Page 26) and retorque to specifications as described in section II.A.2 (Page 28)
	Damaged threads on stud or capnut	Sliding wheel on threads	Replace studs or capnuts per installation instructions in section II.A.2 (Page 26).
	Worn mounting face on hub	<ol style="list-style-type: none"> 1. Loose capnuts 2. Overloading 	Replace hub following assembly procedures in section II.A.1 (Page 16). When re-assembling inboard mounted brake drum to hub, tighten back nuts to specifications in section IV. (Page 57)
	Uneven tire wear	<ol style="list-style-type: none"> 1. Improper tire alignment 2. Loose bearing adjustment 3. Loose or worn suspension bushings 4. Low tire pressure 	<p>Align tire per wheel service instructions in this manual (section II.B.2 on page 53)</p> <p>Check bearing for wear and replace or re-adjust as required.</p> <p>Check with suspension manufacturer.</p> <p>Inflate to recommend pressure.</p>

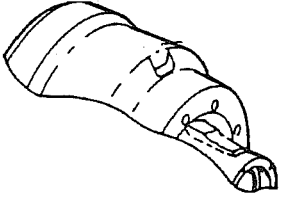
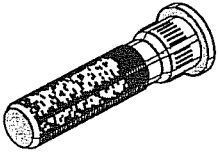
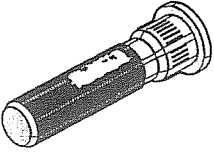
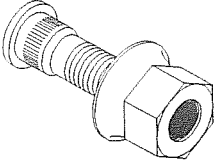
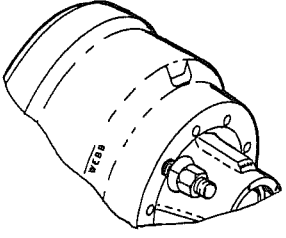
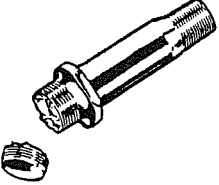
4. Trouble Shooting

a. Hubs Using Ball Seat Mounted Disc Wheels (Continued)

Example	Problem	Cause	Solution
	Worn or elongated stud holes	1. Loose capnuts 2. Overloading	Replace hub following assembly procedures in section II.A.1 (Page 16). When reassembling inboard mounted brake drum to hub, tighten nuts to specifications in section IV.
	Damaged stud groove	Loose backnuts	Replace hub following assembly procedures in section II.A.1 (Page 16). When reassembling inboard mounted brake drum to hub, tighten back nuts to specifications in section IV (Page 57).
	Stud standout wrong	Improper stud or wrong brake drum	Replace studs or drum. Recommended standout is 1.31 to 1.44 inches. When changing from composite to cast drum, studs may have to be changed.
	Rust streaks	Loose capnuts	Following torque specifications given in section II.A.2 (Page 28).

4. Trouble Shooting

b. Hubs Using Pilot Mounted Disc Wheels

Example	Problem	Cause	Solution
	Damaged wheel pilots	<ol style="list-style-type: none"> 1. Loose flange nuts 2. Overloading 	Replace the hub following assembly procedures in Section II.A.1 (Page 16).
	Stripped threads on studs or flange nuts	Excessive torque on flange nut	Replace stud and/or flange nut and retorque to specifications as described in section II.A.3 (Page 32).
	Damaged threads on stud	Sliding wheel on threads	Replace studs or flange nuts per installation instructions in section II.A (Page 32).
	No threads beyond nut	Improper stud for brake drum and disc wheel combination	Replace studs or drum. When changing from composite to cast drum, studs may have to be changed.
	Loose Flange nuts	<ol style="list-style-type: none"> 1. Incorrect torque 2. Excess paint on disc wheels 3. Failure to tighten 	<p>Follow the torque specifications given in section II.A.3 (Page 32).</p> <p>Clean disc wheels and mounting surfaces and inspect for damage. Replace damaged parts and reinstall.</p> <p>Follow maintenance instructions given in section II.B.2 (Page 36).</p>
	Broken Studs	<ol style="list-style-type: none"> 1. Loose Flange Nuts 2. Overloading 3. Overtorque 	Replace the broken stud and the stud on each side of the broken stud. If more than two studs are broken, replace the entire set.

III. Spoke Wheels

Webb spoke wheels are designed for specific axles, and may be used with other manufacturer's rims and brakes. Be certain your spoke wheel is acceptable for use with your vehicle's axle. Refer to your Webb Spoke Wheel and Hub Catalog or contact our Technical Services Department if you are unsure of the suitability of your application. Also refer to the exploded view drawings given on pages 9-11 of this manual when installing or servicing your spoke wheels.

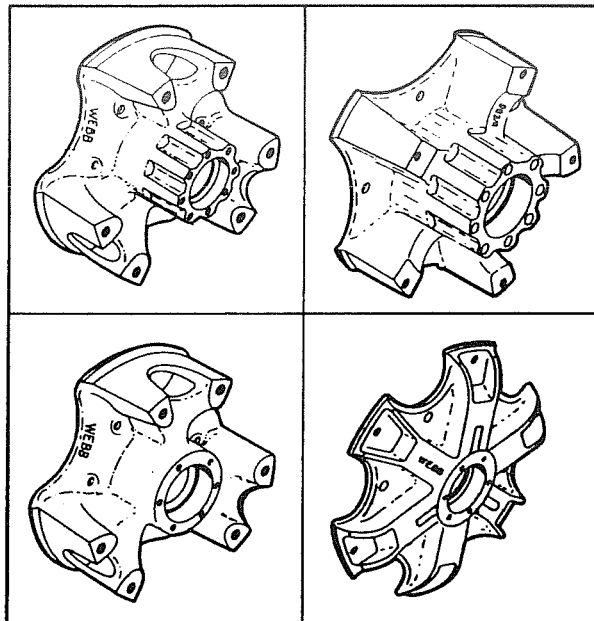


Figure II-1: Examples of Webb spoke wheel designs.

A. Installation Instructions

1. Installation of the wheel on the axle

- a. Install the brake drum to the wheel in accordance with the manufacturer's instructions. Installation instructions for Webb brake drums are given in section IV.A (Page 56) of this manual.
- b. Inspect the hub cavity and make certain the cavity is clean and free of loose particles that could contaminate the lubricant and damage the bearings or seal. Such small particles are typically abrasive and will significantly reduce the life of your wheel.
- c. Inspect the seal and seal surfaces in the hub and on the axle for nicks or dents that could damage the seal. Smooth the surfaces with emery cloth if such imperfections exist.
- d. Match the bearing cones with the bearing cups for correct fit and part number. The correct bearing cup and cone combination must be used to insure proper installation.



Always use the correct cup with its mating cone. Mixing parts may result in a loose wheel or significantly reduced product life and may result in a crash. Refer to the Webb Wheel and Hub Catalog for a complete listing of cup and cone combinations.



If the part number cannot be read on the cup or cone, discard it and replace it with a new part. Do not mix new cups with old cones or vice-versa. Doing so may significantly reduce your wheel's performance, service life, and safety.

- e. Clean all component parts with a good grade of commercial cleaner, as shown in Figure III-2, and dry with a clean, absorbent cloth or paper. Lubricant will not adhere to surfaces wet with solvent, and these solvents may dilute the lubricant. All tools used in the installation should be clean and dry. If components are not clean, or if contaminants are introduced to the system through the tools, your axle and/or wheel life may be significantly reduced.

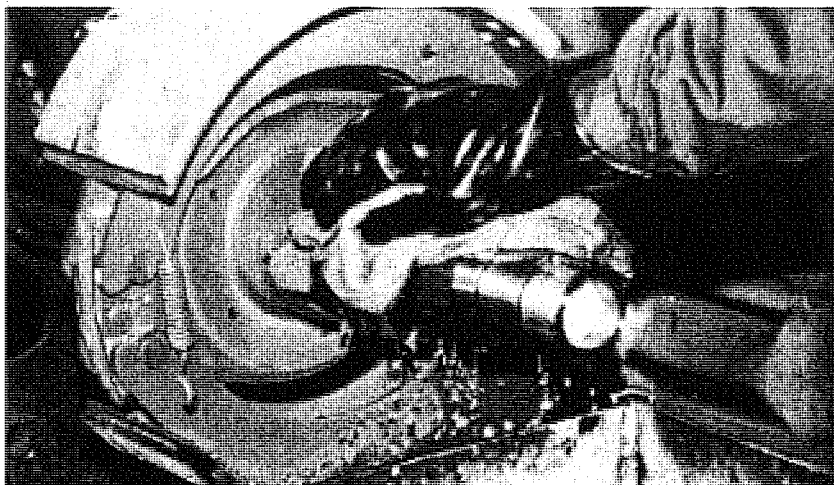


Figure III-2: Cleaning of components with commercial solvent.

- f. If the bearings are grease lubricated, pack the bearings with grease, using a pressure packer if possible. Otherwise, pack the grease by hand, forcing the grease into the cavities between the rollers and cage from the large end of the cone. Pack the wheel or hub cavity between the bearing cups with grease to the level of the smallest diameter of the cups. Webb recommends the bearing grease to have the specifications listed in Figure II-3 (Page 17).
- g. Refer to the seal manufacturer's instructions for installation of the inner bearing, cone, and seal. Depending on the type of seal being used, these may be installed either on the wheel or directly on the axle.
- h. Be sure the brakes are fully released and the brake adjustment backed off so there is no possibility of brake shoe drag interference with the bearing adjustment. Install the tires and rims on the wheel before adjusting the wheel bearings. Failure to do this may result in improper wheel bearing adjustment. See Section III.A.2. starting on page 47.

Make certain the vehicle or trailer is properly secured during installation. Shifting of the trailer may result in personal injury or death.

- i. Place the wheel over the axle spindle, being careful to align the wheel bore with the axle, as shown in Figure III-3. Use caution to make sure the seal is not damaged. Be sure to support the wheel assembly until the outer bearing cone and spindle nut are installed (section j below). Failure to do so may cause damage to the seal, and may significantly reduce the product's life.

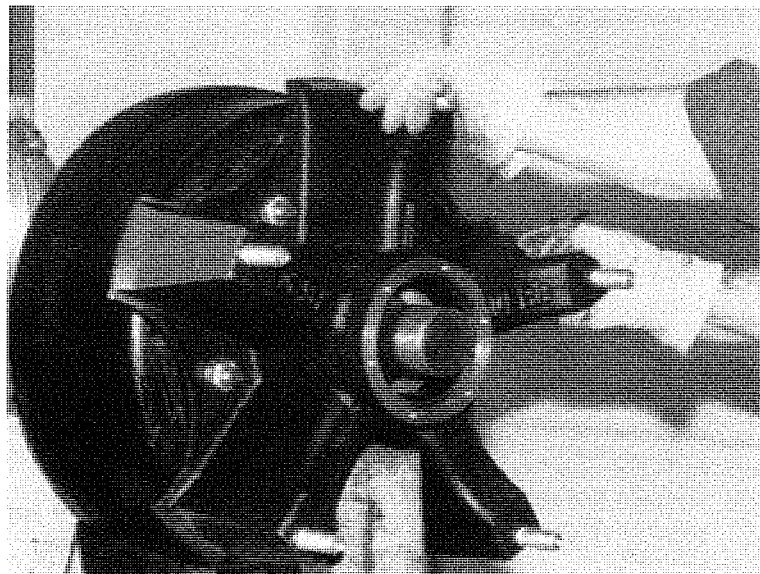


Figure III-3: Installation of spoke wheel assembly onto the axle.

- j. Install the outer bearing cone and spindle nut. The procedures depend on whether your axle is a double nut type or single nut type axle. If your axle is a double nut type axle, perform the following operations:
1. Install the outer bearing cone and inner spindle nut (adjusting nut), tightening the nut until it is snug against the outer bearing cone. The wheel support may then be removed allowing the wheel to rest on the bearings.
 2. Tighten the inner spindle nut (adjusting nut) to two hundred (200) foot-pounds of torque while rotating the wheel in BOTH directions, as illustrated in Figure III-4.
 3. Back off the inner spindle nut (adjusting nut) one full turn and rotate the wheel. Retighten the inner spindle nut to fifty (50) foot-pounds while rotating the wheel in both directions.

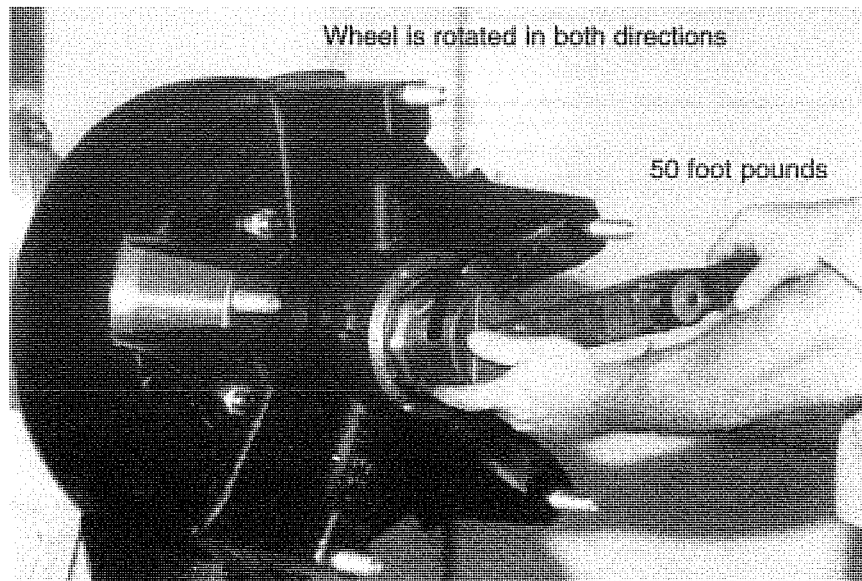


Figure III-4: Tightening of inner spindle nut.

4. Back off the inner spindle nut (adjusting nut) 1/2 turn for steer axles or 1/4 turn for drive axles.
5. Install the lock washer, the wheel bearing tab lock washer (when required) and outerspindle nut (jam nut). Tighten the outer spindle nut (jam nut) to 200-300 foot-pounds for steer axles or 300-400 foot-pounds for drive or trailer axles. If the drive axle is the tang washer type, the jam nut torque is two hundred 200-275 foot-pounds.



Proper torque is important. Use a torque wrench to assure proper torque, as shown in Figure III-5.

If your axle is a single nut type axle, perform the following operations:

1. Install the outer bearing cone, lock washer, and spindle nut.
2. Tighten the spindle nut (adjusting nut) to fifty (50) foot-pounds of torque while rotating the wheel in BOTH directions.
3. Back off the spindle nut to the first slot or one-half castellation (about one-twelfth of a turn) and install the cotter pin.

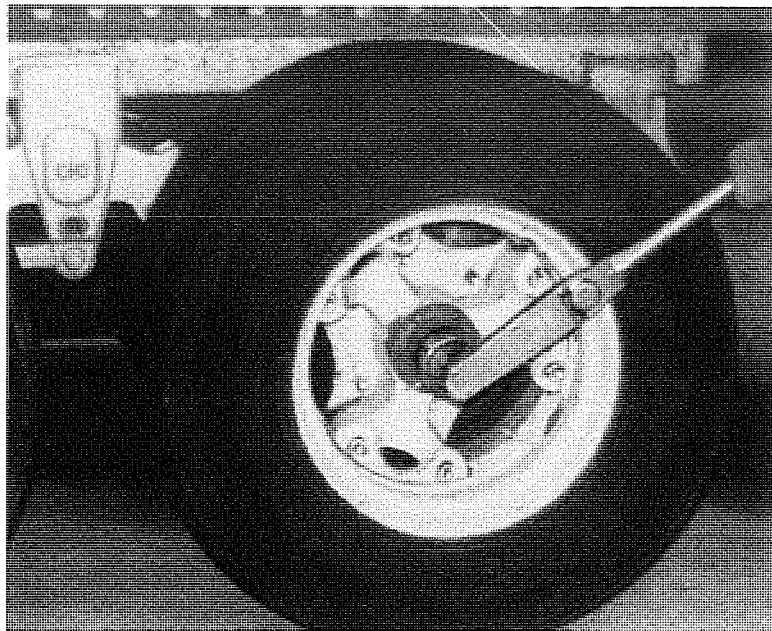


Figure III-5: Use of a torque wrench to assure proper torque.

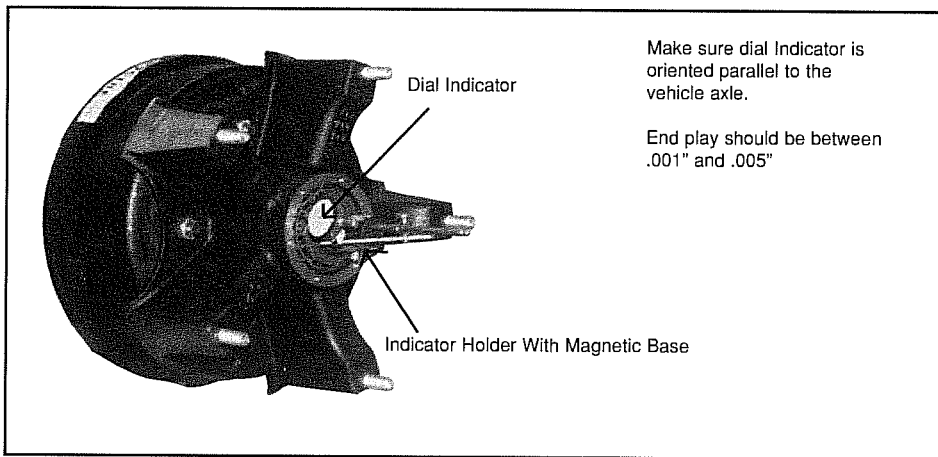


Figure III-6: Use of a dial indicator to check bearing adjustment.

- k. Check your bearing adjustment with a dial indicator, as shown in figure III-6. Adjustment should be within 0.001 to 0.005 inch end play. When the bearing adjustment is correct, the wheel should rotate freely without excess play. If the wheel binds or shows excessive end play, repeat the proper portion of step j (Page 44).
- l. Install the hub cap with proper gasket. Tighten the cap screws of the hub cap to fifteen (15) to twenty (20) foot-pounds of torque.
- m. If the bearings are oil lubricated, remove the filler plug and fill the hub cavity to the recommended level with gear type oil. Webb recommends that the oil have the specifications given in Figure II-3. Replace the filler plug.
- n. For drive axle wheels, carefully install the axle shaft and gasket as recommended by the axle manufacturer. If tapered drive flange wedges are required, install them over the drive studs. Use grade "C" locknuts or grade 8 hex nuts and tighten to the recommended torque.

THREAD SIZE	TORQUE REQUIREMENTS FOOT POUNDS	
	MINIMUM	MAXIMUM
1/2 - 20	80	90
9/16 - 18	140	145
5/8 - 18	175	185
3/4 - 16	250	275

- o. Readjust the brakes in accordance with the brake manufacturer's instructions.

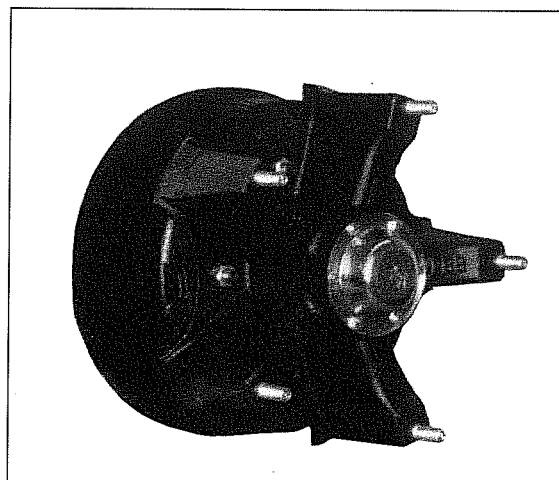


Figure III-7: Completed spoke wheel assembly.

2. Rim and Tire Assembly Mounting Instructions



It is imperative for the safety and life of your vehicle that rim and tire assemblies be correctly installed and fasteners properly torqued. To assure proper installation, perform the following operations:



- a. Before proceeding, make certain that all tires are matched to within 3/4 inch of the same rolling circumference per the tire manufacturer's instructions. Do not use tires that do not meet this criterion. Doing so may result in unstable operation and significantly reduced service life.



- b. Always correctly match rim parts. Failure to use properly matched parts could result in serious injury. Consult the rim manufacturer's literature for correct parts. Assemble the demountable rim and tire in accordance with the rim manufacturer's instructions and OSHA Standard 29 CFR 1910.177, "Servicing Multi-Piece and Single Piece Rim Wheels". Failure to do so may result in serious injury or death.



- c. The rims must be correctly installed, the rim clamps must match the rim spacer width, and the nuts must be tightened to recommended torque to assure maximum service life and maximize safety. To assure this is the case, assemble the rim and tire in accordance with the rim manufacturer's instructions. Failure to do so may result in serious injury or death.

- d. Make sure that all mounting surfaces are clean and free of rust, dirt or excessive paint. A wire brush may be used to clean these surfaces.

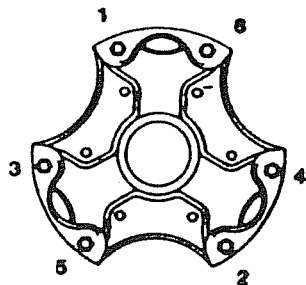


Assembling dirty or rusty components can prevent the wheel from seating properly which can result in unstable operation and cause an accident.

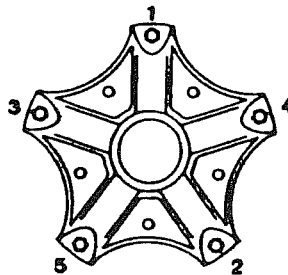
- e. Install the rim after the tire is inflated in a safety cage. Slide the inside rim over the wheel so the 28° mounting surfaces mate. Be sure the valve stem is pointing out and is centered between two spokes. NOTE: 8.50" and wider tube type rims may require special spoke size wheels and spacer bands.

SPOKE WHEELS

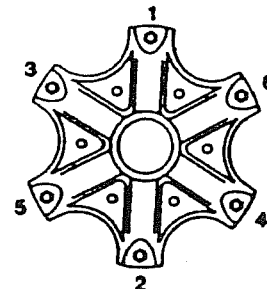
RECOMMENDED TORQUE DRY: 200 - 260 Ft. Lbs.



TIGHTEN CLAMPS
EVENLY
IN THIS ORDER



TIGHTEN CLAMPS
EVENLY
IN THIS ORDER



RECHECK RIM NUT TORQUE AFTER FIRST 50 - 100 MILES OF SERVICE

Figure III-8: Torque specifications for spoke wheels.

- f. Inspect the rim spacer. If the spacer is damaged, replace with a new spacer.
- g. Slide the rim spacer over the wheel and against the inner rim.
- h. Slide the outer rim over the wheel. Be sure the valve stem is pointing in and is centered between the same spokes as the inner valve stem.
- i. Install the rim clamps and nuts. Lightly tighten the rim nuts until they are properly seated. Be sure to use the correct rim clamp for the wheel and rim spacer width. Check the Webb Spoke Wheel and Hub Catalog for correct combinations.
- j. After they are properly seated, tighten the rim nuts one-quarter turn at a time, in the order illustrated in figure III-8, until they are tightened to two hundred (200) to two hundred sixty (260) foot-pounds of torque.

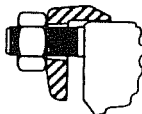
Note that the rim clamp does not have to heel against the face of the spoke. If the rim clamp does have a heel, the heel must not bottom out before reaching eighty percent (80%) of the recommended torque. Heel-less clamps and heel type clamps are illustrated in Figure III-9.



Proper nut torque is important. Use a torque wrench to assure proper torque, as shown in Figure III-5. Insufficient torque can lead to rim slippage, and may result to the loss of a wheel. Overtorque can deform the rim spacer and damage the back flange, as shown in Figure III-10, and also may lead to the loss of a wheel. Do not deviate from recommended torques.

If air wrenches are used, they must be periodically calibrated for proper torque output. Use a hand torque wrench to check the air wrench output. If output is not correct, take the necessary steps to adjust output.

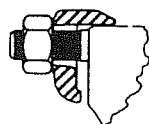
Recheck Rim Nut Torque after first 50 to 100 miles of service.



HEEL-LESS CLAMP

Heel-less clamps do not depend on a fulcrum at the bottom of the clamp to produce the force to wedge the rims.

Heel of clamp does not touch wheel



HEEL TYPE CLAMP

Gap permissible but not required — if gap exceeds 1/4" or if clamp bottoms out before reaching 80% of recommended torque, check to insure that proper clamps and spacer are being used.

IMPORTANT: DO NOT OVERTORQUE! Rim Clamp Does Not Have to Heel. Overtorquing Can Deform Rim Spacer and Damage Back Flange.

Figure III-9: Illustration of heel type and heel-less type rim clamps.

- k. Check your rim alignment by placing a block of wood or other object on the floor and rotate the wheel. If the variation exceeds 1/16" for the front wheels or 1/8" for the rear wheels, the rim is not properly mounted. To correct the problem, loosen the nut on the side with the greatest deviation and tighten the nuts opposite to this nut. Recheck the torque as described in step j.

- l. On dual wheel applications, check the space between the tire side walls near ground level with the load applied. Both the proper and incorrect conditions are shown in Figure III-11. If the side walls are in contact, review your application, especially spacer selection. Do not place the vehicle into service if the tire walls contact. Contact our Technical Services Department at the address and telephone number listed on the back page of this manual if the problem persists.

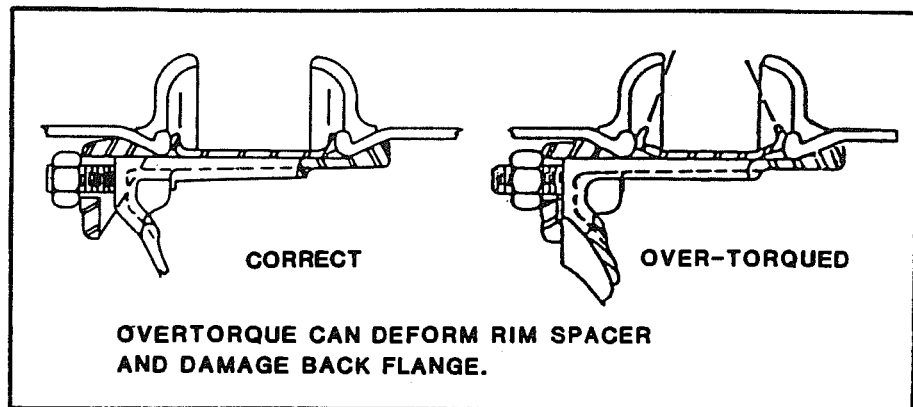


Figure III-10: Effects of overtorque on rim spacer and back flange.

- m. During the first fifty (50) to one hundred (100) miles of operation, the parts will seat naturally and the torque will drop. Check the nuts for proper torque after this interval and retighten them to 200 to 260 foot-pounds.

After the first fifty (50) to one hundred (100) miles of operation, refer to Part B - Service Instructions for maintenance procedures and intervals.

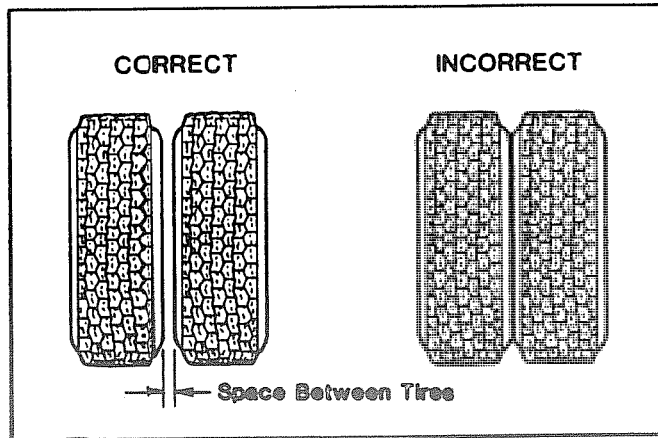


Figure III-11: Proper and improper tire side wall clearance for dual wheel applications. If the side walls are in contact, an improper or damaged spacer has been installed.

B. Service Instructions

It is recommended that a preventative maintenance program be established to periodically check for wear, damage, proper nut torque, wheel alignment, cracks, and leaks. Such a program will help ensure maximum performance, service life and safety from our product.



Make a visual check at least daily for loose nuts, rim movement, cracks and leaks. If such conditions exist, the structural integrity of the wheel may be compromised, and may result in catastrophic failure. If such conditions are discovered, promptly service or replace the damaged part.

It is recommended that a torque check be made as part of a vehicle's scheduled maintenance program or at 10,000 miles whichever ever comes first. Individual fleet experience may dictate shorter intervals or allow longer intervals.

1. Bearings

To insure the performance, safety and service life of your wheel. Follow the following recommended maintenance procedures:

1. The frequency of lubricant changes depends upon individual operating conditions, speed and load. It is recommended that the wheel bearing lubricant be changed every 25,000 miles of operation but not less than twice a year to prevent excessive wear. Inspect the lubricant removed for foreign material such as metal shavings or other small abrasive particles. If such particles exist, carefully inspect the bearings for wear or damage as described in section 3 below.



Small particles when suspended in a lubricant bath, can quickly wear bearing surfaces. If excessive wear or damage takes place, the bearing will be unable to support operating loads. If such wear occurs, replace the bearings immediately. Failure to do so may result in a locked or loose wheel, resulting in an accident.

2. Whenever the bearing lubricant is changed, check bearing adjustment end play with a dial indicator. End play should be 0.001 to 0.005 inches. If the bearings are out of adjustment, they should be inspected for wear or damage, as described in section 3 below.



If excessive wear or damage takes place, the bearing will be unable to support operating loads. If such wear occurs, replace the bearing cup and cone immediately. Failure to do so may result in a locked or loose wheel, resulting in an accident.

3. To inspect the bearings for wear or damage.
 - a. Remove the wheel assembly and bearing cones from the axle spindle.

- b. Clean all old lubricant from the wheel cavity, bearings and hub cap with a good grade of commercial cleaner and a stiff brush.



Do not use a steel brush or air hose in the cleaning operation, as these may result in small abrasive particles to become entrained in the lubricant and may result in significantly reduced service life, performance, and safety.

- c. Wipe all parts dry with a clean, absorbent cloth or paper. Make sure all of the tools to be used are clean and dry.

- d. Inspect the bearing cups, bearing cones, and axle spindle for damage or wear. Should a bearing cone require replacement, it is recommended that the bearing cup also be replaced to prolong the life of the bearing.



If excessive wear or damage takes place, the bearing will be unable to support operating loads. If such wear occurs, replace the bearing cup and cone immediately. Failure to do so may result in a locked or loose wheel, resulting in an accident.

- e. Reinstall the wheel on the axle in accordance with the instructions given in section III.A of this manual. Be sure to use a new seal and wiper ring in the reinstallation to assure proper lubricant containment.

2. Wheels and Tires

- a. On dual wheel applications, check the clearance between the tire side walls near ground level with the load applied. The proper and improper conditions are illustrated in Figure III-11. If the side walls are in contact, the spacer may be damaged and may need replacement. In addition, the tires and rims will be unreliable and should be replaced as well. Follow the applicable instructions given in section III.A of this manual, making sure all air has been exhausted from the tires as described in b below.
- b. Always exhaust all air from a single tire and from both tires of a dual assembly prior to removing any rim components or any disc/wheel components such as nuts or clamps. Remove the valve cores and run a piece of wire through the stem to make sure it is not plugged.



Be sure all pressurized air is removed from the tire before proceeding by deforming the tire wall by hand. If any pressurized air remains in the tire and any damage has been sustained by the rims, the tire may explode and may result in serious personal injury or death.

- c. Check the rim nut torque every 10,000 miles, or at the vehicles scheduled maintenance, whichever occurs first. The recommended torque is two hundred (200) to two hundred sixty (260) foot-pounds for 3/4" studs. Individual fleet experience may dictate shorter intervals or allow longer intervals.



Proper rim nut torque is important. Use a torque wrench to assure proper torque. Insufficient torque can lead to back flange breakage, and may result in the loss of a rim. Overtorque can overstress the back flange, and also may lead to the loss of a rim. Do not deviate from recommended torques

If air wrenches are used, they must be periodically calibrated for proper torque output. Use a hand torque wrench to check the air wrench output. If output is not correct, take the necessary steps to adjust output.

- d. Check the tire alignment by placing a block or wood or other object on the floor and rotate the wheel to check the wheel position. If the variation exceeds 1/16" for the front wheels or 1/8" for the rear wheels, the rim is not properly mounted. To correct the problem, loosen the nut on the side with the greatest deviation and tighten the nuts opposite to this nut. Recheck the torque as described in the installation instructions.

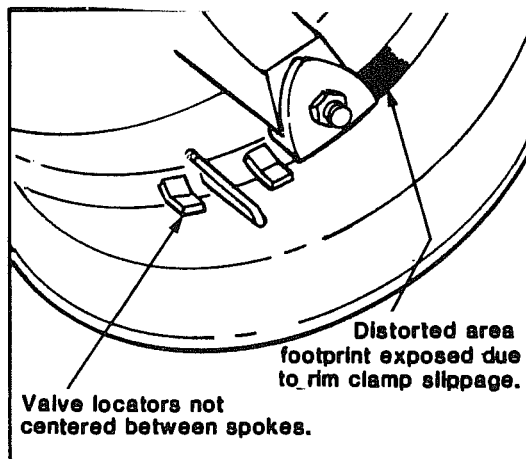


Figure III-12: Typical wear patterns associated with rim slippage.

- e. Check for rim slippage, typified by the illustration in Figure III-12. If rim slippage is indicated, it may be possible that an under-torque or overtorque condition exists. It is recommended that the rim spacer be replaced when rim slippage is indicated because of the difficulty in determining damage to rim spacers due to improper torque. To replace the rim spacer, follow the pertinent instructions given in section III.A in this manual. When replacing the rim spacer, check the mounting surfaces for excessive wear. If excessive wear exists, the wheel will need to be replaced.
- f. Check the rim clamps for wear as in Figure III-13. The end of the wedge portion should be at least one-sixteenth of an inch. If this is not the case, install new rim clamps per the installation instructions given in section III.A of this manual.

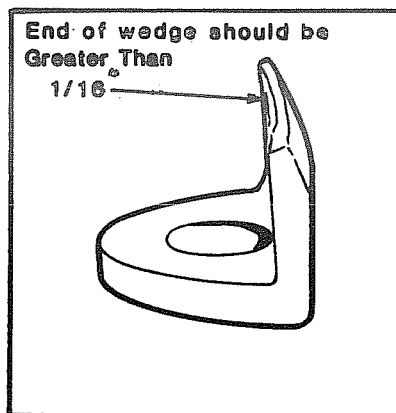


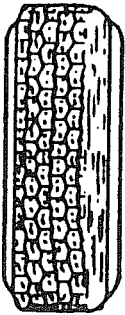
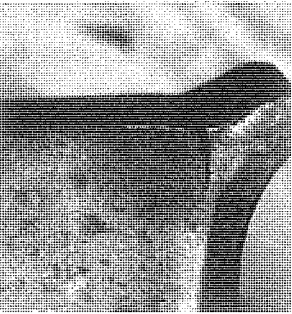
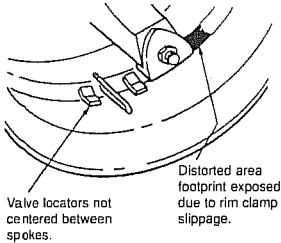
Figure III-13: Minimum dimensions for rim clamp wedge portion.



- g. Follow the tire manufacturer's and rim or disc wheel manufacturer's maintenance and service instructions. Failure to do so may significantly reduce your vehicle's service life, performance and safety.
- h. A useful guide poster for mounting and demounting procedures is available from the Department of Transportation. It can be obtained at no charge from:
 - General Services Department
 - U.S. Department of Transportation
 - National Highway Traffic Safety Administration
 - 400 7th Street S.W.
 - Washington, D.C. 20590

3. Trouble Shooting

Spoke Wheels

Example	Problem	Cause	Solution
	<p>Uneven tire wear</p>	<ol style="list-style-type: none"> 1. Improper tire alignment 2. Loose bearing adjustment 3. Loose or worn suspension bushings 4. Low tire pressure 	<p>Align tire per wheel service instructions in this manual (section II.B.2 on page 53)</p> <p>Check bearing for wear and replace or re-adjust as required.</p> <p>Check with suspension manufacturer.</p> <p>Inflate to recommend pressure.</p>
	<p>Broken back flange</p>	<ol style="list-style-type: none"> 1. Improper rim clamp 2. Overload 3. Over or under torque on rim clamp nut 	<p>Replace wheel following the Wheel Installation instructions in this manual (section III.A on page 42), making sure that proper torque is used.</p> <p>Correct operating conditions. Replace the wheel following the Wheel Installation instructions in this manual (section III.A on page 42), making sure that proper torque is used.</p> <p>Replace wheel. See Wheel Installation instructions (section III.A on page 48) for correct torque and sequence.</p>
 <p>Valve locators not centered between spokes.</p> <p>Distorted area footprint exposed due to rim clamp slippage.</p>	<p>Rim Slipping</p>	<ol style="list-style-type: none"> 1. Improper rim nut torque 2. Collapsed rim spacer 3. Incorrect rim spacer width and/or incorrect rim clamps being used 	<p>Replace rim spacer in accordance with the installation instructions given in section III.A (page 42), of this manual</p> <p>Replace rim spacer in accordance with the instructions given in section III.A (page 42) of this manual.</p> <p>Replace rim spacer. See the Webb Spoke Wheel and Hub Catalog for the correct spacer and clamp combination.</p>

IV. Brake Drums and Rotors

A. Installation Instructions

Webb brake drums and rotors are designed for specific applications, and sometimes may be used with other manufacturer's wheels and hubs. An incorrect brake drum or rotor will not allow the spoke wheel or hub assembly to function properly. Refer to our Webb Spoke Wheel and Hub Catalog to be certain your brake drum or rotor is proper for the assembly being installed. If you are using a Webb brake drum or rotor with another manufacturer's wheel or hub, refer to the interchange section of the Webb Brake Drum Catalog to make certain the Webb brake drum or rotor is interchangeable with the original manufacturer's brake drum. If you have any questions or problems, feel free to contact our Product Engineering Department at the address and telephone number listed on the back cover of this manual. Also refer to the drawings given on pages 13-14 of this manual when installing or servicing your brake drums or rotors.

The installation procedure for your brake drum or rotor will depend on the design of your hub or spoke wheel.

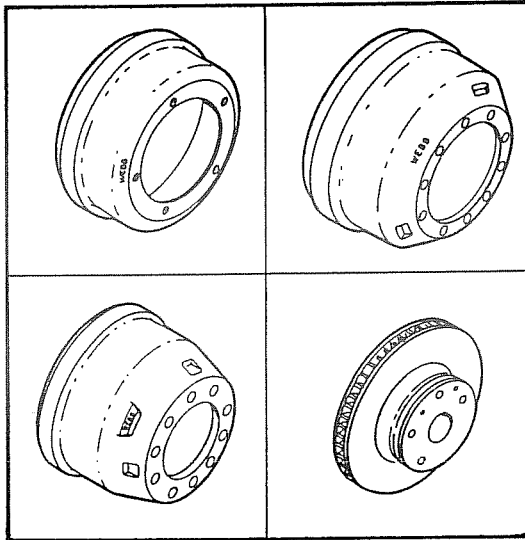


Figure IV-1: Examples of Webb brake drum and rotor designs.

1. Hubs with Inboard Mounted Brake Drum or Rotor and Shoulder Studs.

- a. All hub components (bearing cups) should be inserted into the hub prior to attaching the brake drum. Be sure to use the correct stud length. The use of an incorrect stud will not allow the hub to function properly. Consult our Webb Spoke Wheel and Hub Catalog for the proper stud for each application.

- b. Make sure the shoulder on the stud fits into the groove cut into the hub and insert the shoulder stud through the hub. Be sure to support the hub flange when inserting the studs to guard against bending the flange. Make sure the stud shoulder seats firmly against the bottom of the groove cut in the hub. If the stud shoulder does not fit into the hub groove or the hub flange is distorted, the hub will not be able to function properly. Recheck your interchange and contact our Product Engineering Department if the problem persists.
- c. The hub must be clean and free of corrosion at the brake drum mounting surface. Clean the hub with the proper tools and wire brush if required. Take care to not damage the pilot or brake drum mounting pads.
- d. Place the hub on a flat surface with the hub cap end down. Place the brake drum or rotor on the hub aligning the mounting holes. Make sure the drum or rotor pilot size matches the hub pilot and that the brake drum or rotor is resting flat against the hub mounting face. There should be no interference between the brake drum or rotor pilot chamfer and the corner radius on the hub. If interference exists, the brake drum or rotor will not be able to function properly. Recheck your interchange and contact our Product Engineering Department if the problem persists.
- e. Place a hardened flat washer and a locknut on each stud. Failure to utilize a hardened flat washer will lead to uneven stress distribution and may significantly reduce your product's life. Tighten the locknut in accordance with the assembly torque specifications given in Figure IV-2.



Proper torque is important. Use a torque wrench to assure proper torque. Insufficient torque can lead to studs turning in the hub. Overtorque can overstress the studs and strip the threads. Do not deviate from the recommended torques.

If air wrenches are used, they must be periodically calibrated for proper torque output. Use a hand torque wrench to check the air wrench output. If output is not correct, take the necessary steps to adjust output.

THREAD SIZE		TORQUE REQUIREMENTS	
		FOOT POUNDS	
		MINIMUM	MAXIMUM
5/8-18 (Tapped Holes)	Rotate Bolt	150	200
5/8-18 (Through Holes)	Rotate Nut	150	175
3/4-10	Rotate Nut	250	275
3/4-16 (Wheels)	Rotate Nut	275	300
3/4-16 (Hubs)	Rotate Nut	100	225
1 -14	Rotate Nut	175	225

Figure IV-2: Brake Drum or Rotor assembly torque specifications for mounting bolts.

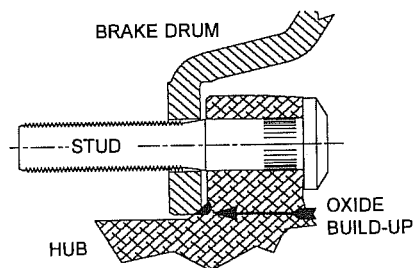
- f. Install the hub assembly in accordance with the hub manufacturer's instructions. If you are installing a Webb hub, follow the instructions given in section II.A (Page 16) of this manual.

2. Hubs with Inboard Mounted Brake Drum or Rotor and Serrated Studs

- a. All hub components (bearing cups) should be inserted into the hub prior to attaching the brake drum. Be sure to use the correct stud length. The use of an incorrect stud will not allow the hub to function properly. Consult our Webb Spoke Wheel and Hub Catalog for the proper stud for each application.
- b. The hub must be clean and free of corrosion at the brake drum mounting surface. Clean the hub with the proper tools and wire brush if required. Take care not to damage the pilot or brake drum mounting pads.
- c. Place the hub on a flat surface with the hub cap end down. Place the brake drum or rotor on the hub aligning the mounting holes. Make sure the drum or rotor pilot size matches the hub pilot and that the brake drum or rotor is resting flat against the hub mounting face. There should be no interference between the brake drum pilot chamfer and the corner radius on the hub. If interference exists, the brake drum will not be able to function properly. Recheck your inter change and contact our Product Engineering Department if the problem persists.
- d. Insert the serrated stud down through the brake drum and into the hub. You may use a press to insert the serrated stud. If a press is not used to insert the stud, you may force the studs into the hub by tapping them with a hammer until they are flush against the back plate of the brake drum. In any case, support the hub flange when inserting the studs to guard against excessive flexing of the flange. Take care to avoid damaging the stud, brake drum, or rotor or hub assembly when inserting the serrated stud.
- e. Install the hub assembly in accordance with the hub manufacturer's instructions. If you are installing a Webb hub, follow the instructions given in section II.A (Page 16) of this manual.

3. Hubs with Outboard Mounted Brake Drum and Serrated Studs

- a. All hub components (bearing cups) should be inserted in to the hub prior to attaching the brake drum. Be sure to use the correct stud length. The use of an incorrect stud will not allow the hub to function properly. Consult our Webb Spoke Wheel and Hub Catalog for the proper stud for each application.
- b. Place the hub on a flat surface with the hub cap end down. Insert the serrated stud down through the hub. You may use a press to insert the serrated stud. If a press is not used to insert the stud, you may force the studs into the hub by tapping them with a hammer until they are flush against the back of the hub. In any case, support the hub flange when inserting the studs to guard against excessive flexing of the flange. Take care to avoid damaging the stud or hub assembly when inserting the serrated stud.
- c. Install the hub assembly in accordance with the hub manufacturer's instructions. If you are installing a Webb hub, follow the instructions given in section II.A (Page 16) of this manual.
- d. Corrosion or foreign material in the drum pilot can cause the brake drum to crack, possibly leading to complete brake drum failure. Corrosion or foreign material must be completely removed prior to installing the replacement brake drum. On aluminum hubs the corrosion can look like a machined chamfer between the pilot diameter and the flange. This material can be hard and must be carefully removed and the pilot cleaned with a wire brush. Be careful not to damage the hub pilot when removing the corrosion.



- e. Place the drum over the hub and brake shoes being careful not to damage the threads on the studs. Make sure the drum seats flat against the hub flange and mates properly with the hub pilot. There should be no interference between the brake drum pilot chamfer and the corner radius on the hub. If interference exists, the hub will not be able to function properly. Recheck your interchange and contact our Product Engineering Department if the problem persists.

4. Spoke Wheels with Brake Drum Bolt and Lock Nut

- a. Spoke wheels require high strength bolts to support the necessary preloads and operating forces. Be sure to use only Webb replacement parts to assure proper operation and service life.
- b. Place the wheel on a flat surface with the hub cap end down.
- c. Place the brake drum or rotor on the wheel aligning the mounting holes. Make sure the brake drum or rotor contacts the wheel only at the mounting pads. There should be clearance between the spoke and the brake drum or rotor. If this is not the case, the brake drum or rotor will not be able to function properly. Recheck your interchange and contact our Technical Service Department if the problem persists.
- d. Insert the mounting bolt down through the brake drum or rotor and through the web between the spokes.
- e. Place the hardened flat washer and locknut on the bolt and tighten until the flat washer is flush against the wheel. Use only a Grade C locknut and harden flat washer. Failure to do so will result in uneven stress distribution and may significantly reduce the product's service life.
- f. Tighten the lock nut, holding the bolt stationary, in accordance with the torque specifications given in Figure IV-2 (Page 57).



Proper torque is important. Use a torque wrench to assure proper torque. Insufficient torque can lead to bolt breakage. Overtorque can overstress the bolts and strip the threads. Do not deviate from the recommended torques.

- g. You are now ready to place the spoke wheel and brake drum or rotor assembly on the axle. Follow the instructions given in section III.A (Page 41) of this manual.

5. Spoke Wheels with Drilled and Tapped Drum Bolt Holes

- a. Spoke wheels require high strength bolts to support the necessary preloads and operating forces. Be sure to use only Webb replacement parts to assure proper operation and service life.
- b. Spoke wheels with drilled and tapped drum bolt holes require adhesive locking material applied to the drum bolt threads to prevent the bolt from loosening during operation. Use only the Webb brake drum bolt (Webb part number 96218). This has a special locking epoxy which prevents the bolt from loosening during service. Failure to use this bolt with adhesive locking material may result in loose brake drums and could result in an accident.
- c. Place the wheel on a flat surface with the hub cap end down.
- d. Place the brake drum on the wheel aligning the mounting holes. Make sure the brake drum contacts the wheel only at the mounting pads. There should be clearance between the spoke and the brake drum. If this is not the case, the brake drum will not be able to function properly. Recheck your interchange and contact our Product Engineering Department if the problem persists.
- e. Insert the drum bolt through the drum into the wheel turning the bolt. If the assembly originally had a washer under the bolt head, use only a hardened washer. Failure to do so will result in uneven stress distribution, which may significantly reduce the product's service life.
- f. Tighten the drum bolt to the torque specifications given in Figure IV-2 (Page 57).



Proper torque is important. Use a torque wrench to assure proper torque. Insufficient torque can lead to bolt breakage. Overtorque can overstress the bolts and strip the threads. Do not deviate from the recommended torques.

- g. You are now ready to place the spoke wheel and brake drum assembly on the axle. Follow the instructions given in section III.A (Page 41) of this manual.

B. Service Instructions



It is recommend that a preventative maintenance program be established to periodically check for wear, damage and leaks. Such a program is essential to ensure maximum performance, safety and service life from Webb brake drums. In addition, consult your truck or trailer manufacturer's maintenance manual for proper maintenance of the braking mechanism.



When replacing linings or brake drums, always replace the same component on both sides of the axle. Failure to do so will result in uneven braking load on the axle and may significantly reduce the performance, service life and/or safety of your vehicle.

The following procedures are suggested as a means of obtaining maximum service and to determine the need for component replacement.

1. Brake Drums and Rotor Service Instructions

1. Clean and inspect the brake drums or rotors whenever relining the brakes. To be suitable for further service, the brake drum or rotor should pass the following checks (see the troubleshooting section for examples of each):
 - a. The brake surface should be free of scoring, excessive heat checks and free of cracks.
 - b. The brake surface diameter should be within the maximum diameter cast or stamped on the drum or above the minimum thickness cast on the rotor.
 - c. The mounting holes and pilot must be round and true.
 - d. The mounting surface must be clean and flat.



If any of the above conditions are not met, the brake drum or rotor should be replaced. Failure to replace the brake drum or rotor will result in an unreliable braking system, and may lead to an accident.

2. It may be desirable to turn or resurface the braking surface to remove small heat checks or other surface defects resulting from normal use. The following should be noted when turning the brake drum or rotor:
 - a. The maximum diameter cast into the back plate portion of the brake drum is the diameter at which the brake drum should be discarded and is no longer suitable for service. If any portion of the brake surface exceeds the maximum diameter it must be discarded. The maximum diameter is 0.120" over the nominal new diameter unless stated otherwise on the casting. The maximum diameter cast into the brake drum supercedes all published information.

The information cast into the brake drum is typified in Figure IV-3. If you cannot locate the maximum diameter information, or you are unsure about the maximum diameter, feel free to contact our Product Engineering Department at the address and telephone number given on the back cover of this manual.

The minimum thickness cast into a rotor is the thickness at which the rotor should be discarded and is no longer suitable for service. If any portion of the rotor is thinner than the minimum thickness it must be discarded. The minimum thickness cast into the rotor supercedes all published information.

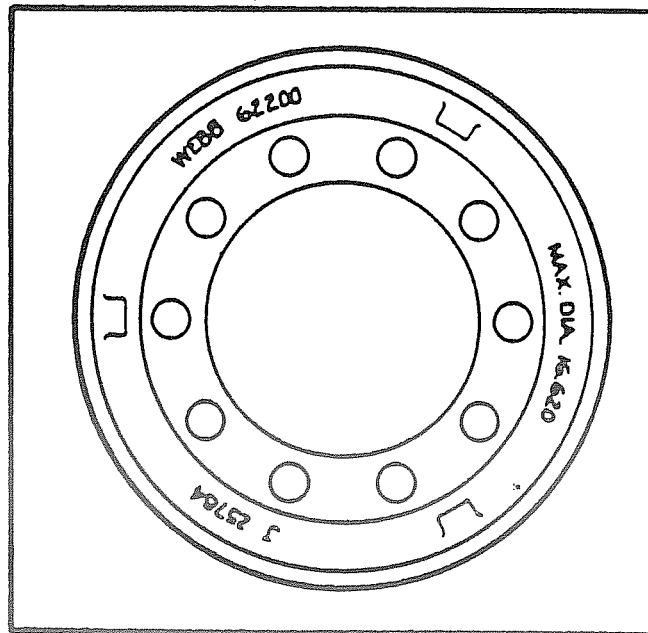


Figure IV-3: Typical information cast into brake drum.

- b. When resurfacing a drum, allow at least 0.040 inches under the maximum diameter for additional wear. This usually means the drum may be turned a total of 0.080 over the brake surface diameter of a new brake drum.



Do not turn a brake drum beyond 0.040 inches under the maximum diameter stamped or cast on the brake drum. Doing so will result in a weaker brake drum and may result in an accident. Doing so will also void the warranty. Immediately replace any brake drum whose braking surface diameter exceeds the maximum diameter dimension.



Do not turn a rotor beyond 0.040 inches over the minimum thickness cast on the rotor. Doing so will result in a weaker rotor and may result in an accident. Doing so will also void the warranty. Immediately replace any rotor whose braking surface thickness is less than the minimum thickness dimension.

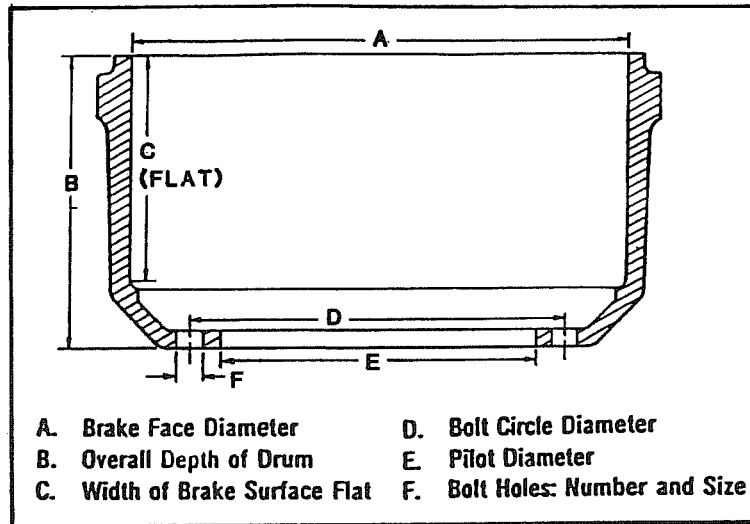


Figure IV-4: Minimum information necessary for brake drum interchange determination.

3. Replacement of the brake drum or rotor is required if any of the following conditions exist:
 - a. The brake drum or rotor is cracked.
 - b. The brake surface is heat checked, grooved or worn beyond the rebore limit or the maximum diameter/minimum thickness.
 - c. The back plate is cracked.
 - d. The bolt holes are elongated.
 - e. The brake drum or rotor is known to have been severely overheated.
 - f. The brake drum is out-of-round or the rotor has thickness variations.



If any of the above conditions are met, the brake drum or rotor should be replaced. Failure to replace the brake drum or rotor will result in an unreliable braking system, and may lead to an accident.

When selecting a Webb replacement drum or rotor, refer to the Webb Brake Drum Catalog to determine the proper replacement drum or rotor for your application. If the Webb Brake Drum Catalog is not available, feel free to contact our Engineering Department with the manufacturer and part number for the drum or rotor to be replaced. Otherwise, provide our Product Engineering Department with the dimensions illustrated in Figure IV-4 above.



Brake drums or rotors should be replaced in pairs to achieve the same braking power on both wheels and maintain an even braking load on the axle. Failure to replace both brake drums on an axle will result in uneven braking load on the axle and may significantly reduce the performance, service life and/or safety of your vehicle.

4. To replace your brake drum or rotor, follow the following procedures:




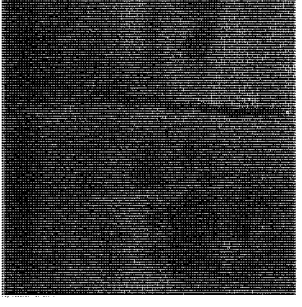




- a. Remove the brake drum or rotor to be replaced.
- b. Make sure all mounting surfaces on the spoke wheel or hub are clean and all foreign material is removed. Cleanliness of mounting surfaces is important for proper brake drum attachment. Failure to properly clean the surfaces will cause the parts to seat improperly, and may cause loose brake drum or rotor, resulting in an accident.
- c. Assemble the brake drum to the hub or spoke wheel in accordance with the procedures given in section IV.A beginning on page 56 of this manual.
- d. Make sure the brakes are fully released and the adjusters are fully backed off.
- e. Place the hub or spoke wheel assembly on the axle and adjust the bearing as described in the proper section of this manual (Section II.A (Page 15) for hub assemblies, Section III.A (Page 41) for spoke wheels).
- f. Inspect the lining location on the brake surface. On wedge brakes, the lining should overhang the drum braking surface at the open end to ease drum removal.
- g. Adjust the brakes. Brake adjustments should be made when the brake drums or rotors are cold and the brakes are fully released.

Brakes with standard slack adjusters can be adjusted by raising the axle until the wheel can be turned freely. If the slack adjuster has a positive lock mechanism, depress the locking sleeve to disengage it. Turn the adjusting screw until the brakes begin to drag, then back off the adjustment until the wheel turns freely. When the adjustment is completed, position the adjusting screw nut so that it engages the locking sleeve. In the case of the ball indent type, the ball should engage the indent on the plunger shaft.

Brakes with automatic slack adjusters require an initial manual adjustment. Refer to the brake manufacturer's literature for the adjustment procedure.


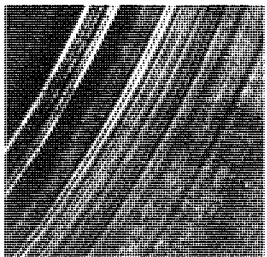
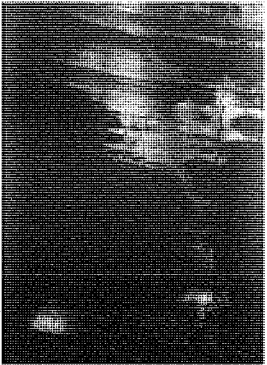

2. Trouble Shooting

Brake Drums

Example	Problem	Cause	Solution
	Cracked brake drum (New)	Mishandling	Replace brake drum.
	Cracked brake drum (Used)	Heat checks connect together and grow through drum section.	Replace brake drum. Check brake balance, brake return springs, brake adjustment, and lining type within vehicle combination.
	Cracked brake drum (Used, low mileage)	Improper shoe contact	Replace brake drum. Shoes must contact the drum at the center of the shoe.
	Light heat check	Normal condition.	Does not impair brake performance. Brake drum may be turned with normal limit. See maintenance instructions regarding turning of brake surface (section IV.B.) (Page 62)
	Heavy heat check	Imbalanced brake system, dragged brakes or driver abuse. Caused by constant heating and cooling of brake surface.	Replace brake drum. Check brake balance, brake return springs, brake adjustment, and lining type within vehicle combination.
	Fine grooves	Abrasive material or poor quality brake lining	Rebore brake drum within normal limits or replace the drum and lining. See maintenance instructions regarding turning of brake surface Section IV.B (Page 62).

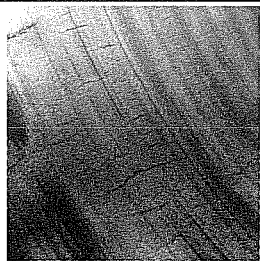

2. Trouble Shooting (continued)

Brake Drums

Example	Problem	Cause	Solution
	Grooves coinciding with rivet holes	Loose rivets or bolts or foreign material collecting in rivet holes	Rebore brake drum within normal limits or replace. Use rivet hole plugs. See maintenance instructions regarding turning of brake surface Section IV.B (Page 62).
	Grooves along edges of lining	Abrasive material collecting at edges of lining	Dust shield may cause or cure this problem. Rebore brake drum within normal limits. See maintenance instructions regarding turning of brake surface Section IV.B (Page 62).
	Blue or discolored brake surface	Excessive heat from dragging brakes or brake imbalance between tractor and trailer	Rebore brake drum within normal limits or replace. Look for weak or broken return springs or binding brake actuation system. See maintenance instructions regarding turning of brake surface (section IV.B, Page 62). Check brake balance.
	Heat spotted or hard spots in brake surface	High localized heating and cooling cycles	Grind hard spot and rebore brake drum within normal limits. See maintenance instructions regarding turning of brake surface Section IV.B (Page 62.)

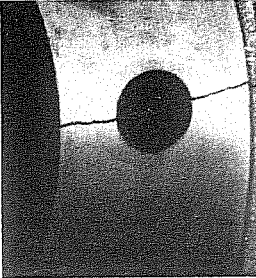
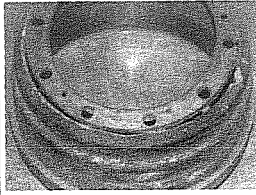
2. Trouble Shooting (continued)

Brake Drums

Example	Problem	Cause	Solution
Photo Not Required For Explanation	Out-of-round: balance	Balance weight has fallen off or a balanced drum was not specified	Replace brake drum. Specify balanced brake drums when ordering replacement.
Photo Not Required For Explanation	Out-of-round: variation in diameter	Heat distortion	Rebore brake drum within normal limits or replace. See maintenance instructions regarding turning of brake surface Section IV.B (Page 62).
	Out of round: concentricity	Improper: fit to pilot or improper seating on wheel or hub	Clean all mounting surfaces. Check for correct fit and clearance to wheel.
	Excessive wear	Abrasive material between lining and drum or poor quality lining	Check maximum diameter and rebore within limit or replace. See maintenance instructions regarding turning of brake surface Section V.B (Page 62).
	Grease stained drums	Leaking oil seal or improper lubrication of brake components	Repair source of oil or grease leak, clean the brake drums and replace the linings.
	Polished brake surface	<ol style="list-style-type: none"> 1. Normal condition for non-asbestos lining 2. Improperly cured brake lining 	Remove glaze with emry cloth or rebore drum within normal limits. See maintenance instructions regarding turning of brake surface Section VII.B (Page 62)

2. Trouble Shooting (continued)

Brake Drums

Example	Problem	Cause	Solution
<p style="text-align: center;">Photo Not Required For Explanation</p>	<p>Faded or diminished brake power.</p> <p>Noise, chatter or pulsating during brake application.</p>	<p>High temperature in brake system, improperly adjusted brakes or inferior brake lining.</p> <p>Heat spotted drums, grease stained drums, loose brake drum or brake components</p>	<p>Check brake drum, brake lining condition, brake adjustment, and brake balance. Avoid operating conditions or loads which create excessive brake temperature.</p> <p>The brake drum should be removed and checked for one or more of these conditions and the appropriate action (as described in this section) should be taken to resolve the condition.</p>
	<p>Crack between the pilot and a bolt hole.</p>	<p>Improper handling.</p> <p>Installation on dirty hub</p>	<p>Replace brake drum.</p> <p>Replace brake drum. Clean the hub prior to installing replacement brake drum. See page 59</p>
	<p>Mounting flange separated from hoop section of the brake drum</p>	<p>Installation on dirty hub.</p> <p>Wheel hitting the drum.</p>	<p>Replace the brake drum. Clean the hub prior to installing replacement brake drum. See page 59.</p> <p>Wrong application. Replace brake drum with correct part number.</p>

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LIMITED WARRANTY

Webb Wheel Products, Inc. (Seller) hereby warrants to the original purchaser of its products, that it will replace or repair, at its option, all products of its manufacture found to be defective in material and workmanship, without charge. This shall be Buyer's exclusive remedy for Seller's liability hereunder.

This warranty is limited to those products which fail in normal use and service because of defects in material and workmanship, with all such products being subject to inspection of material and workmanship by an authorized representative of Seller, within a reasonable period after a claim is made. Seller will not accept the return of any goods without its prior written consent.

Seller's liability to Buyer, or anyone claiming through or on behalf of Buyer, with respect to any claim or loss arising out of the products or alleged to have resulted from actual act or omission of Seller, whether negligent or otherwise, and whether in tort, contract, or otherwise, including failure to deliver, delay in delivery, or breach of warranty, shall be limited to an amount equal to the purchase price of the goods or part thereof with respect to which such liability is claimed or, where appropriate and at the option of Seller to replacement of the goods or part thereof. In no case will Seller be liable for any bodily injury, death, or property damage resulting from or in any way arising out of the products or their use or manufacture. **IN NO EVENT SHALL SELLER BE LIABLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES, LAWSUITS, OR EXPENSES ARISING OUT OF ANY SALE, CONTRACT OR TRANSACTION WITH BUYER.**

Seller will not be liable for any failure or damages caused by abuse of its products, improper installation, improper application or use, fire, accidents or results thereof, improper maintenance or acts of God.

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This instruction manual is intended to familiarize owners with the installation, maintenance and safety procedures associated with your Webb spoke wheels, hubs and brake drums.

This manual should be kept available to operating, installation and maintenance personnel.

A person who has not read and understood all operating and safety instructions is not qualified to install or repair this equipment.

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If after reviewing this manual, anything is unclear or technical problems are encountered, feel free to contact our Engineering Department.

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