SERVICE MANUAL SECTION

CF 500, CF 600 Wheels and Tires

Truck Model: CF 500

Truck Model: CF 600

Unit Code: 27DAU

Unit Code: 27DAV

S17002

12/04/2006

Table of Contents

Wheel Bearing Adjustment

For Wheel Bearing Adjustment procedure, refer to S03014 — CF 500, CF 600 Suspension.

Safety Information

NOTE: Read the following before starting the service procedure.

The information contained in this International Service Manual Section was current at the time of printing and is subject to change without notice or liability.

You must follow your company safety procedures when you service or repair equipment. Be sure to understand all of the procedures and instructions before you begin work on the unit.

International uses the following types of notations to give warning of possible safety problems and to give information that will prevent damage to the equipment being serviced or repaired.

WARNING: A warning indicates procedures that must be followed exactly. Personal injury or possible death can occur if the procedure is not followed.

CAUTION: A caution indicates procedures that must be followed exactly. If the procedure is not followed, damage to equipment or components can occur.

NOTE: A note indicates an operation, procedure or instruction that is important for correct service.

Some procedures require the use of special tools for safe and correct service. Failure to use these special tools when required can cause injury to service personnel or damage to vehicle components.

This service manual section is intended for use by professional technicians, NOT a "**do-it-yourselfer**." It is written to inform these technicians of conditions that may occur on some vehicles, or to provide information that could assist in the proper service of a vehicle. Properly trained technicians have the equipment, tools, safety instructions, and know-how to do a job properly and safely. If a condition is described, DO NOT assume that the service section applies to your vehicle. See your International Truck Dealer for information on whether this service section applies to your vehicle.

Wheels and Tires

Speci?cations

Table 1 General Speci?cations

Item	Speci?cation
Cleaners — Wheel	
Custom Bright Metal Cleaner	
Liquid Soap	
Tire In?ation	
Tires	See safety certi?cation sticker located on driver door jamb.

Table 2 Torque Speci?cations

Description	Nm	lbf-ft
M14 wheel bolts	210	155
M14 wheel bolts (loaded vehicle)	224	165
M22 wheel bolts	610	450
M22 wheel bolts (loaded vehicle)	624	460
Spare tire carrier bolts	20	15

Description and Operation

WARNING: Do not mix different types of tires, such as radial, bias or bias-belted, on the same vehicle except in emergencies. Vehicle handling can be seriously affected and can result in loss of control.

Factory-installed tires and wheels are designed to operate satisfactorily with loads up to and including

full-rated load capacity when in?ated to recommended in?ation pressures.

Tire In?ation Information

WARNING: An in?ated tire and rim can be very dangerous if incorrectly used, serviced or maintained. To avoid serious injury, never attempt to rein?ate a tire which has been run ?at or seriously underin?ated without ?rst removing the tire from the wheel assembly for inspection. Do not attempt to add air to tires or install new tires or wheels without ?rst taking precautions to protect persons and property.

The vehicle is equipped with an all-steel radial tire. All-steel radial tires utilize steel cords in the sidewalls, and also require increased in?ation pressures of up to 85 psi. As such, they cannot be treated like normal light truck tires. Tire service, including adjusting tire pressure, must be carried out by personnel trained, supervised and equipped according to Federal Occupational Safety and Health Administration (OSHA) regulations. For example, during any procedure involving tire in?ation, the technician or individual must utilize a remote in?ation device, and make sure that all persons are at a safe distance.

Tire and Wheel Runout

Excessive radial and lateral runout of a wheel and tire assembly can cause roughness, vibration, wheel tramp, tire wear and steering wheel tremor.

Before checking runout, and to avoid false readings caused by temporary ?at spots in the tires, check runout only after the vehicles has been driven far enough to warm the tires. For additional information, refer to Noise, Vibration and Harshness in S10019.

Safety Precautions

CAUTION and SAFETY FIRST are bywords when handling truck tires. Careful attention to the safety precautions that follow can prevent crippling injuries or even death. Make it a rule to respect the terri?c force contained in an in?ated tire.

Wheels must be correctly maintained. Incorrectly maintained wheels can adversely affect the life of the tire and the wheel. When in?ated, a tire is potentially very destructive. Accidents are caused by careless handling and inexperience.

Follow the safety precautions in this section and obtain safety literature from your wheel and rim distributor, wheel and rim manufacturer, NHTSA or OSHA. For additional questions, consult the distributor or manufacturer directly.

The load carrying requirements of each vehicle should be determined before selecting the correct tire/wheel combination. Always remember that the weakest weight carrying component of the vehicle (tire, wheel, axle, bearings, etc.) determines the overall maximum and safe load carrying capacity for the vehicle.

WARNING: Never run the engine with one wheel off the ground, for example, when changing a tire. The wheel(s) resting on the ground could cause the vehicle to move.

WARNING: The tire and wheel must always be correctly matched. It is very important to determine the size of each component before any assembly operations commence. Failure to adhere to these instructions can result in an explosive separation and cause serious bodily injury or death.

WARNING: Aftermarket aerosol tire sealants are extremely ?ammable. Always question the customer to make sure these products have not been used.

WARNING: Aftermarket wheel assemblies may not be compatible with the vehicle. Use of incompatible wheel assemblies can result in equipment failure and possible injury. Use only approved wheel assemblies.

WARNING: Use only wheels and wheel nuts that have been designed for current model year International® trucks. Aftermarket wheels or wheel nuts may not ?t or function correctly and can cause personal injury or damage the vehicle.

WARNING: Always wear safety goggles or a face shield when carrying out any work with tire and wheel assemblies.

CAUTION: Do not clean aluminum wheels with steel wool, abrasive-type cleaners or strong detergents. Use Custom Bright Metal Cleaner or equivalent meeting International® speci?cations.

CAUTION: Reduce the air pressure as much as possible by pushing the valve core plunger in prior to removing the valve core. Avoid working in a position in which the face or body is directly over a tire in which there is pressure.

When carrying out any inspection or repair procedures on wheels and tires, follow the preceding safety precautions.

WARNING: Each individual axle, wheel and tire has its own maximum weight and in?ation rating. Do not overin?ate or overload beyond the capacity of the lowest rated component of the system.

Rims and wheels are designed to sustain their rated load using the maximum tire size recommended for that rim width by the Tire and Rim Association.

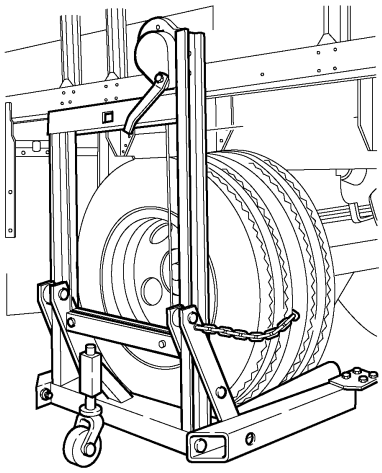
WARNING: An in?ated tire and wheel can be very dangerous if misused or worn out. Many accidents, some fatal, have resulted from incorrect handling and operation of truck wheels and tires. It is of the utmost importance that the precautions described on these pages be carefully followed by all persons servicing truck wheels, to avoid personal injuries and costly damage.

WARNING: The tire and wheel must always be correctly matched. It is very important to determine the size of each component before any assembly operations commence. Failure to adhere to these instructions can result in an explosive separation and cause serious bodily injury or death.

WARNING: Never mount a smaller diameter tire on a larger diameter wheel. When installing new tires, always match the tire size to the wheel size. Incorrect matching can cause the tire bead to break during mounting or in?ation propelling both the tire and wheel into the air with enough force to in?ict property damage, serious injury or death.

When installing new tires, use the same size, load range and construction type as originally installed on the vehicle. When installing new wheels, use original equipment manufacturer's wheels or equivalent available from the International dealer with equivalent capacity, width, offset and mounting con?guration as those originally installed on the vehicle. Use of incorrect tires and wheels can adversely affect ride, handling, load carrying capacity, bearing life, tire clearance to body and chassis components, vehicle ground clearance, vehicle width and brake cooling.

Prepare for any tire repair operation in a safe and ef?cient way. In servicing all tires, use caution not to drop them (or the wheels) on the feet, hands or body, or heavily on the ?oor. Truck tires are heavy and a wheel jack or equivalent should be used to maneuver tires.



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WARNING: Excessively corroded or cracked wheels can be dangerous. De?ate tires on corroded or cracked wheels prior to removal of wheels from the vehicle.

WARNING: Never position body in front of the wheel during de?ation. Always keep eyes away from the valve when de?ating tires.

De?ating a tire correctly is very important for safety. First, reduce the pressure as much as possible by depressing the valve core plunger. Only then should the valve core be removed to completely de?ate the tire before removal from the vehicle or disassembly. On duals, de?ate both tires completely.

Demounting tires from the wheels requires special care. Use only standard tire mounting tools and equipment. The use of makeshift tools to force tires on or off the wheels is dangerous and must be avoided.

Always lubricate tire beads to make sure the tire beads are sealed on the rim. Use a rubber lubricant meeting speci?cations.

Make sure all the air is out before removing the tires from the wheels. Use special care when using tire irons. Grip the tire irons ?rmly and keep them free of oil and grease. They can slip and ?y with tremendous force.

WARNING: When painting used wheels, do not use excessive amounts of paint. This can cause the wheel nuts to loosen, which can lead to premature failure or loose wheels, resulting in serious, perhaps fatal, injury.

WARNING: When painting any wheel, always allow the paint to dry thoroughly. If the paint is not dry when the wheels are mounted, torque values will not be maintained because of the paint being forced out. Excess paint thickness will cause the wheels to loosen. Retighten the wheel nuts after 80-160 km (50-100 miles) when newly painted wheels are installed on the vehicle.

WARNING: Always wear safety goggles or a face shield when carrying out any work with tire and wheel assemblies.

WARNING: Always wear safety goggles or a face shield when carrying out any buf?ng operation.

Tires and wheels often require a buf?ng operation before being mounted, once the regular service has been completed.

WARNING: Avoid hammering with a steel hammer; you can damage the rim. Any hammering can dislodge particles. Never hammer on an in?ated assembly.

WARNING: Always in?ate the tire in an OSHA-approved portable tire safety cage. This is an important safeguard against incorrect assembly, inadvertently mismatched parts and other assembly errors. Remember, an in?ated tire contains potentially explosive energy and assemblies can be propelled if there is a sudden release of air. In emergency situations, where a safety cage or a portable safety device is not available, use the vehicle's spare wheel and tire assembly.

WARNING: Stand clear when using a safety cage or an OSHA-approved restraining device. Always use a clip-on air chuck with a remote valve and pressure gauge. Do not rest any part of the body against the device during in?ation. If the components are not seated correctly and an explosive separation occurs, the air blast or movement of the restraining device can cause injury.

Place the wheel and tire assembly in the safety cage and in?ate to a maximum of 10 pounds. Check to see that the beads are correctly seated. Continue to in?ate to recommended pressure.

Use only accurate, tested gauges to make sure of correct air pressure. Check all gauges regularly with a master gauge.

Never attempt to short-cut the above procedures.

WARNING: Correct precautions should always be taken when jacking a vehicle up to prevent personal injury or damage to the vehicle:

- **A. Always block one axle with wheel chocks to prevent unexpected movement.**
- **B. Always use correct heavy-duty jack stands.**
- **C. Manually cage parking brake chambers when working on the rear axle.**
- **D. Apply the parking brake when working on the front axle.**

WARNING: Do not exceed maximum tire in?ation pressures. This is determined by the size and ply rating of the tire, but is not to exceed the maximum cold in?ation pressure listed for the wheel even if the tire is approved for a higher load or in?ation. It is also important to maintain uniform in?ation so that weight is equally sustained.

WARNING: Do not run the vehicle on one tire of a dual assembly. When there is loss of air in a dual tire, the carrying capacity is reduced and the load must be sustained by the other tire. In?ate both tires to balanced, recommended pressures before further operation.

WARNING: Thumping or simply looking at the tire does not give an accurate pressure reading. Periodically check your air pressure gauge for accuracy and use it to check tire pressure.

WARNING: Never run the engine with one wheel off the ground, for example, when changing a tire. The wheel(s) resting on the ground could cause the vehicle to move.

WARNING: Aftermarket aerosol tire sealants are extremely ?ammable. Always question the customer to make sure these products have not been used.

WARNING: Aftermarket wheel assemblies may not be compatible with the vehicle. The use of incompatible wheel assemblies can result in equipment failure and possible injury. Use only approved wheel assemblies.

WARNING: Use only wheels and wheel nuts that have been designed for current model year International® vehicles. Aftermarket wheels or wheel nuts may not ?t or function correctly and can cause personal injury or damage the vehicle.

When carrying out any inspection or repair procedures on wheels and tires, follow the preceding safety precautions.

Wheels and Tires Diagnosis and Testing

Inspection and Veri?cation

WARNING: Never run the engine with one wheel off the ground, for example, when changing a tire. The wheel(s) resting on the ground could cause the vehicle to move.

WARNING: Do not balance the wheels and tires while they are mounted on the vehicle. Possible tire disintegration or differential failure could result, causing personal injury and extensive component damage. Use off-vehicle wheel and tire balancer only.

Make sure to follow the warnings when carrying out inspection and veri?cation.

Road Test

Verify the customer concern by carrying out a road test on a smooth road. If any vibrations are apparent, go to Noise, Vibration and Harshness in S10019.

To maximize tire performance, inspect for signs of incorrect in?ation and uneven wear, which may indicate a need for balancing, rotation or front suspension alignment.

Correct tire pressure and driving techniques have an important in?uence on tire life. Heavy cornering, excessively rapid acceleration and unnecessary sharp braking increases tire wear.

Replacement tires must follow the recommended:

- tire sizes
- speed rating
- load range
- radial construction type

Use of any other tire size or type can seriously affect:

- ride
- handling
- speedometer/odometer calibration
- vehicle ground clearance
- tire clearance between the body and chassis
- wheel bearing life
- brake cooling

Install new wheels when:

- bent
- cracked
- dented
- heavily rusted
- leaking
- they have elongated wheel hub bolt holes.
- they have excessive lateral or radial runout.

Wheel and tire assemblies are attached by 8 integral 2-piece swiveling wheel nuts.

It is mandatory to use only the tire sizes recommended on the tire chart attached to the vehicle. Larger or smaller tires can damage the vehicle, affect durability and require changing the speedometer calibration. Make sure wheel size and offsets match those recommended for the tire in use.

1. Inspect for signs of uneven wear that may indicate a need for balancing, rotation, front suspension alignment, damaged tie rod or steering components.

2. Check tires for:

- cuts
- stone bruises
- abrasions
- blisters
- embedded objects

3. Tread wear indicators are molded into the bottom of the tread grooves. Install a new tire when the indicator bands become visible.

Symptom Chart

Table 3 Symptom Chart

Condition	Possible Sources	Action
Tires show excess wear on edge of tread	A. Underin?ated tires. B. Vehicle overloaded. C. High-speed cornering. D. Incorrect wheel alignment.	A. ADJUST air pressure in tires. B. RETURN vehicle — NOTIFY customer of overload condition. C. RETURN vehicle — NOTIFY customer of cause of condition. D. SET toe to speci?cation. REFER to Suspension System in S03014.
Tires show excess wear in center of tread	Tires overin?ated.	ADJUST air pressure.
Other excessive tire wear problems	A. Incorrect tire pressure. B. Loose or leaking shock absorbers. C. Front end out of alignment. D. Front wheel bearings out of adjustment. E. Loose, worn or damaged suspension components. F. Wheel and tire assembly out of balance. G. Excessive lateral or radial runout of wheel or tire. H. Incorrect tire rotation intervals.	A. ADJUST pressure. B. TIGHTEN or INSTALL new as necessary. C. ALIGN front end. REFER to Suspension System in S03014. D. REFER to Suspension System in S03014 for inspection procedure. E. REFER to Suspension System in S03014. F. BALANCE wheel and tire assembly. G. REFER to Noise, Vibration and Harshness in S10019. H. ADVISE customer of condition.
Wobble or shimmy	A. Damaged wheel bearings. B. Loose or damaged suspension components. C. Bent wheel. D. Damaged tire. E. Loose wheel nuts.	A. REFER to Suspension System in S03014. B. INSTALL new as necessary. C. INSTALL new as necessary. D. INSTALL new as necessary. E. TIGHTEN to speci?cation.

Table 3 Symptom Chart (cont.)

Condition	Possible Sources	Action
High-speed shake	• Wheel hub face/pilot/bolt circle runout. • Tires/wheels. • Wheel bearings. • Suspension/steering linkage. • Engine. • Transmission. • Brake disc.	REFER to Noise, Vibration and Harshness in S10019.
Vehicle vibration	• Driveline — engine. • Tires.	REFER to Noise, Vibration and Harshness in S10019.

Removal and Installation

Wheel and Tire – Single — Removal

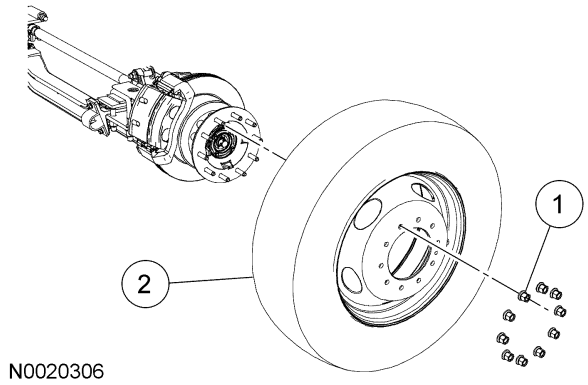


Figure 2
1. Wheel nuts
2. Wheel assembly

WARNING: Use only the integral 2-piece swiveling wheel nuts. Do not attempt to use cone-shaped 1-piece wheel nuts on these vehicles. If used, cone-shaped 1-piece wheel nuts can come loose in vehicle operation. Do not attempt to use past model wheels, which have cone-shaped wheel hub bolt nut seats, on this vehicle. Do not attempt to use present design wheels and wheel nuts on past model wheel hubs. Attempted use of intermixed wheels can lead to damage to the wheel mounting system and could result in wheels coming loose.

1. Remove the wheel cover, if equipped.

CAUTION: Do not use heat to loosen a seized wheel nut. Heat can damage the wheel and wheel bearings.

NOTE: Do not remove the wheel nuts at this time.

2. With the weight of the vehicle still on the tires, loosen the wheel nuts.
3. Raise the vehicle until the wheel and tire assembly clears the ?oor. For additional information, refer to Jacking and Lifting in S10019.

4. Remove the wheel nuts.
5. Remove the wheel and tire assembly.

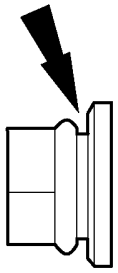
Wheel and Tire – Single — Installation

WARNING: When a wheel is installed, always remove any corrosion, dirt or foreign material present on the mounting surfaces of the wheel, or the surface of the front disc brake hub and rotor, that contacts the wheel. Installing wheels without correct metal-to-metal contact at the wheel mounting surfaces can cause the wheel nuts to loosen and the wheel to come off while the vehicle is in motion, resulting in loss of control.

1. Position the wheel and tire assembly on the vehicle.

CAUTION: Do not apply motor oil to the wheel nut threads or the wheel stud threads.

2. On all 2-piece ?at wheel nuts, apply one drop of motor oil between the ?at washer and the nut. If corrosion exists, or the integral 2-piece swiveling wheel nut does not rotate freely, install new swiveling wheel nuts as necessary.
   - Install the wheel nuts loosely.



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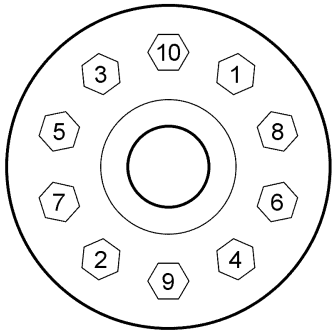
3. Turn the wheel until one wheel nut is at the top of the wheel hub bolt circle. Tighten the wheel nut until snug. Tighten the remaining wheel nuts, in the sequence shown, until snug.



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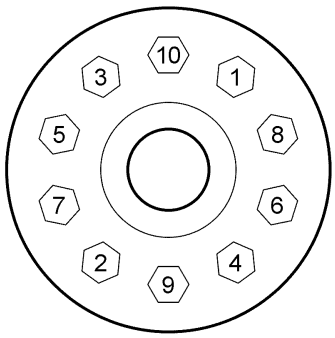
4. Lower the vehicle.

CAUTION: Failure to tighten the wheel nuts in the sequence shown can result in high wheel and tire runout, which will speed up the development of brake roughness, shudder and vibration.

CAUTION: Torque speci?cations are for nut and bolt threads that are free of dirt and rust. Use only International-recommended replacement fasteners.

5. With the weight of the vehicle on the tires, tighten the wheel nuts to 210 Nm (155 lb-ft) in the sequence shown.



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6. Install the wheel cover, if equipped.
7. Advise the customer that the wheel nuts need to be retightened at 800 km (500 miles) after wheel change or any other time the wheel nuts have been loosened. This is required to permit the wheel clamping system to seat correctly so that the wheel nuts will hold a uniform clamp load and remain fully tightened.

Wheel and Tire – Dual — Removal

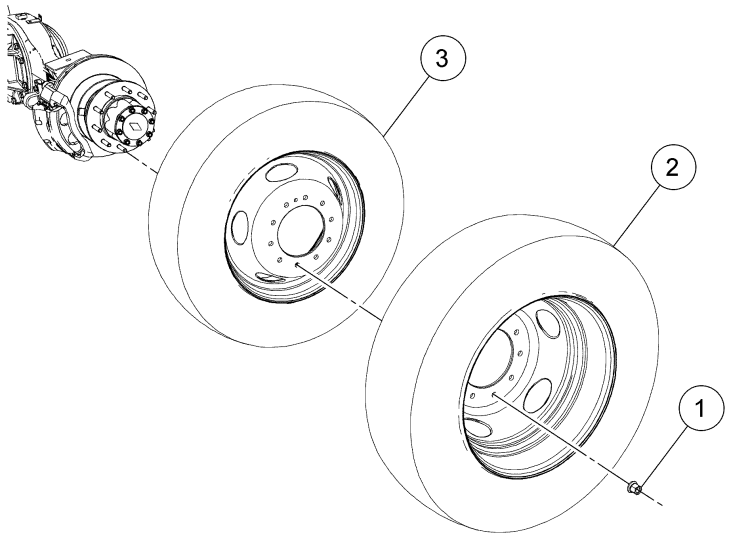

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Figure 6

1. Wheel nuts
2. Outside wheel assembly
3. Inside wheel assembly

WARNING: Use only the integral 2-piece swiveling wheel nuts. Do not attempt to use cone-shaped 1-piece wheel nuts on these vehicles. If used, cone-shaped 1-piece wheel nuts can come loose in vehicle operation. Do not attempt to use past model wheels, which have cone-shaped wheel hub bolt nut seats, on this vehicle. Do not attempt to use present design wheels and wheel nuts on past model wheel hubs. Attempted use of intermixed wheels can lead to damage to the wheel mounting system and could result in wheels coming loose.

1. Remove the wheel cover, if equipped.

CAUTION: Do not use heat to loosen a seized wheel nut. Heat can damage the wheel and wheel bearings.

NOTE: Do not remove the wheel nuts at this time.

2. With the weight of the vehicle still on the tires, loosen the wheel nuts.
3. Raise and support the vehicle. For additional information, refer to Jacking and Lifting in S10019.
4. Remove the wheel nuts.
5. Remove the outer wheel and tire assembly.
6. Remove the inner wheel and tire assembly.

Wheel and Tire – Dual — Installation

CAUTION: On the chassis, it is imperative that the stamped indents located on the tire bead portion of the wheels are placed as close to 180 degrees from each other while still allowing access to the valve stem on the inside wheel. Failure to correctly install the wheel and tire assemblies can result in a vibration condition.

1. Install the inner and outer wheel and tire assemblies.

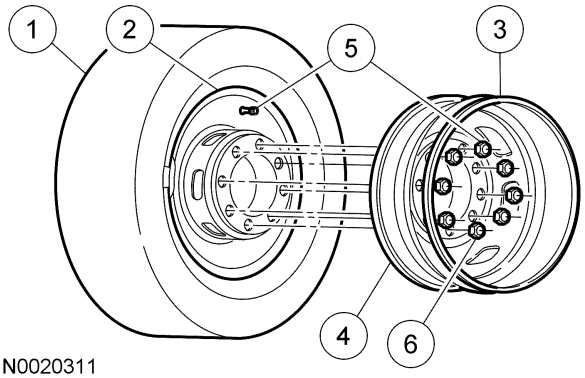

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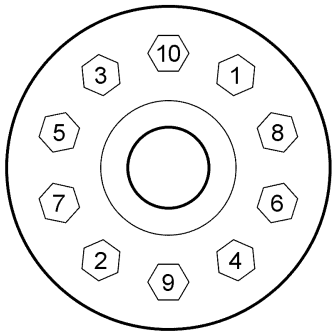
Figure 7

1. Position the inner wheel and tire assembly onto the axle.
2. Note the location of the alignment mark.
3. Position the outer wheel and tire assembly.
4. Position the alignment mark on the outer wheel and tire assembly as close to 180 degrees away from the alignment mark on the inner wheel and tire assembly.
5. The valve stem on the inner wheel and tire assembly must be aligned with one of the 5 hand holes in the outer wheel and tire assembly.
6. Install the wheel nuts hand-tight. Do not tighten the wheel nuts to speci?cation at this time.

2. Lower the vehicle.

CAUTION: Failure to tighten the wheel nuts in the sequence shown can result in high wheel and tire runout, which will speed up the development of brake roughness, shudder and vibration.

3. With the weight of the vehicle on the tires, tighten the wheel nuts in the sequence shown.
   - Tighten M14 wheel nuts to 210 Nm (155 lb-ft).
   - Tighten M22 wheel nuts to 624 Nm (460 lb-ft).



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4. Install the wheel cover, if equipped.
5. Advise the customer that the wheel nuts need to be retightened at 800 km (500 miles) after wheel change or any other time the wheel nuts have been loosened. This is required to permit the wheel clamping system to seat correctly so that the wheel nuts will hold a uniform clamp load and remain fully tightened.