SUSPENSION

Tires and Wheels - Escalade, Suburban, Tahoe, Yukon

SPECIFICATIONS

FASTENER SPECIFICATIONS

Application	Specification	
	Metric	English
Spare Tire Hoist Retaining Bolt	50 N.m	37 lb ft
Wheel Nuts	190 N.m	140 lb ft

ADHESIVES, FLUIDS, LUBRICANTS, AND SEALERS

Application	Type of Material	GM Part Number	Canadian Part Number
Aluminum Wheel	Adhesive/Sealant	12378478	88900041
Aluminum Wheel	3MÂ® General Purpose Cleaner	08984	-
Wheel	Mounting Lubricant	12345884	88863415
Wheel to Hub	Lubricant	1051344	993037

DIAGNOSTIC INFORMATION AND PROCEDURES

TIRE DIAGNOSIS - IRREGULAR OR PREMATURE WEAR

Tire Wear

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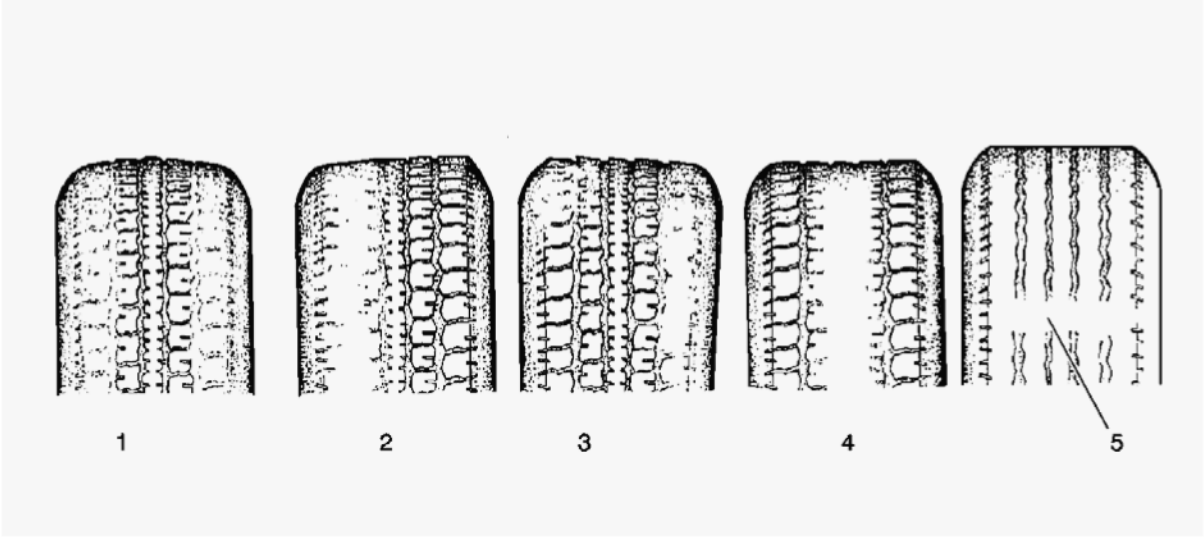

Fig. 1: Identifying Types Of Tire Wear
Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
1	Under-Inflation, Hard Cornering, Lack of Regular Rotation
2	Incorrect Wheel Alignment, Hard Cornering, Lack of Regular Rotation
3	Incorrect Wheel Alignment
4	Over-Inflation, Heavy Acceleration, Lack of Regular Rotation
5	Normal Wear to the Wear Indicator

Inspection Procedure

1. Inspect the front tire wear.
2. Inspect the rear tire wear.
3. Rotate the tires if any of the following conditions exist:
   - The amount of time or mileage since the last tire rotation matches the maintenance schedule.
   - The outer tread blocks are worn more than the middle tread blocks (1).
   - The outer tread blocks are worn more than the inner tread blocks (2).
   - The middle tread blocks are worn more than the outer tread blocks (4).

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4. Measure the wheel alignment if any of the following conditions exist:
    - The tread blocks have feathered edges (3).
    - The outer tread blocks are worn more than the inner tread blocks (2).
    - The inner tread blocks are worn more than the outer tread blocks (2).
5. Inspect the struts or the shock absorbers if the tire tread exhibits a cupped appearance (3).

TIRE DIAGNOSIS - WADDLE COMPLAINT

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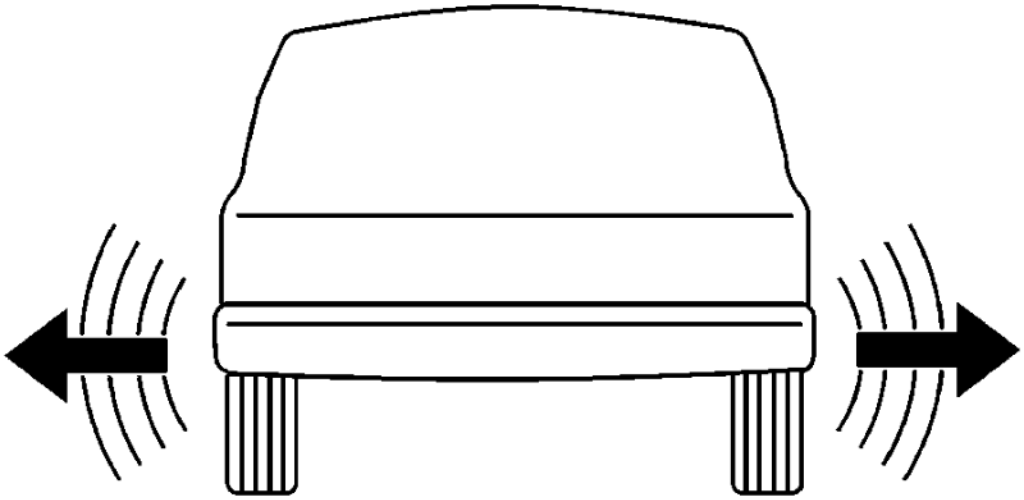

Fig. 2: Identifying Tire Wobble/Waddle
Courtesy of GENERAL MOTORS COMPANY

Tire waddle is a side to side movement at the front of the vehicle and/or the rear of the vehicle. Tire waddle can be caused by the following conditions:

- A steel belt not being straight within the tire

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- Excessive lateral runout of the tire
- Excessive lateral runout of the wheel

The tire waddle is most noticeable at a low speed of about 8-48 km/h (5-30 mph). Tire waddle may appear as ride roughness at 80-113 km/h (50-70 mph). Tire waddle may appear as a vibration at 80-113 km/h (50-70 mph).

Inspection Procedure

1. Raise and support the vehicle with safety stands. Refer to **Lifting and Jacking the Vehicle** .

   WARNING: Wear gloves when inspecting the tires in order to prevent personal injury from steel belts sticking through the tire.

2. Perform the following preliminary inspection:
   1. Mark the tire with a crayon in order to note the start and the stop position.
   2. Rotate each tire and wheel by hand.
   3. Inspect the tire for bulges or bent wheels. Replace as necessary.
3. Use tire substitution in order to identify the faulty tire. Perform the following steps for a tire substitution check:
   1. Use a comparable tire in order to replace each tire, one at a time.
   2. Test drive the vehicle.
   3. If the problem is tire or wheel related, you will eliminate the problem when you remove the faulty tire from the vehicle.

WHEEL MOUNTING SURFACE CHECK

Replace any wheels that are bent or dented, or have excessive lateral or radial runout. Wheels with runout greater than specified may cause objectionable vibrations.

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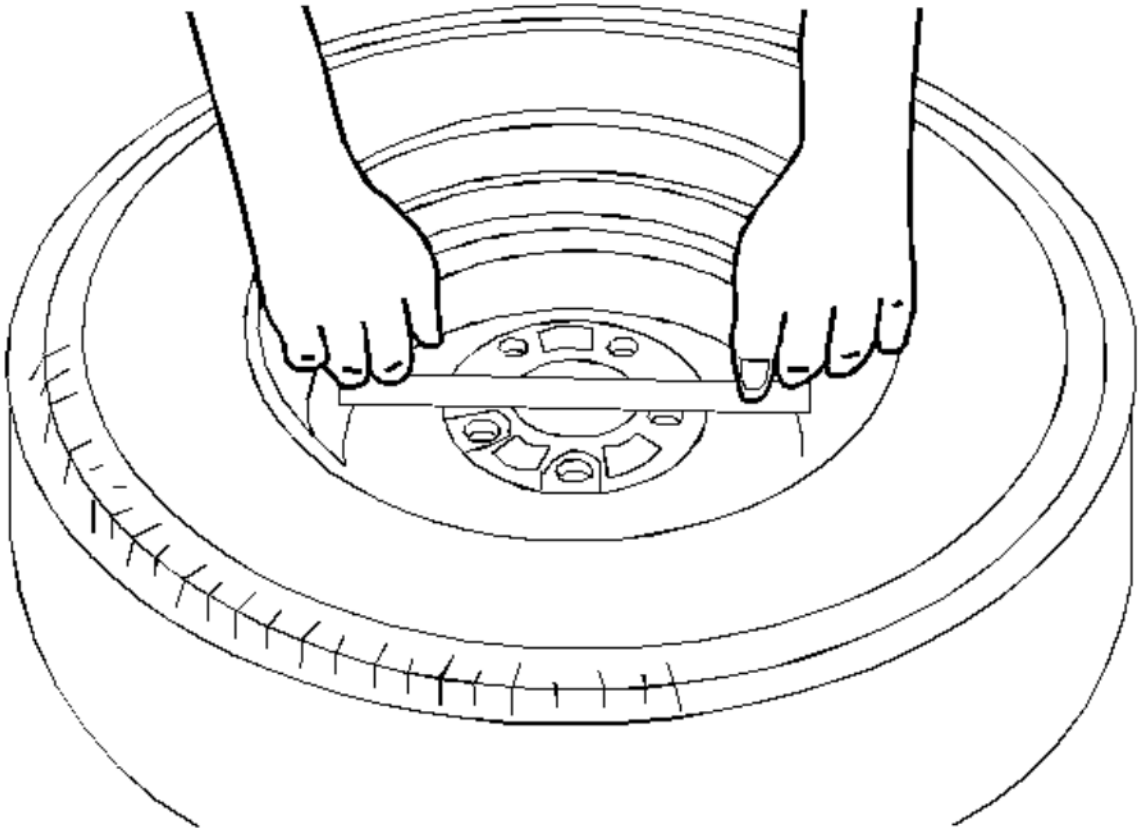

Fig. 3: Checking Wheel Mounting Surface
Courtesy of GENERAL MOTORS COMPANY

1. Thoroughly clean the wheel mounting surface with a clean shop towel and denatured alcohol, or equivalent.
2. Use a straight edge 203-229 mm (8-9 in) long. Place the straight edge on the wheel inboard mounting surface. Try to rock the straight edge up

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and down within the mounting surface.

3. For aluminum flat-mount wheels, repeat the procedure in step 2 on at least 3-4 different positions on the inboard mounting surface.

   If you can rock the straight edge, the mounting surface is bent and you must replace the wheel.

4. Inspect the mounting wheel/nut holes for damage caused from over-torquing the wheel/nuts. Inspect for collapsed wheel/nut bosses. Inspect for cracked wheel bosses.

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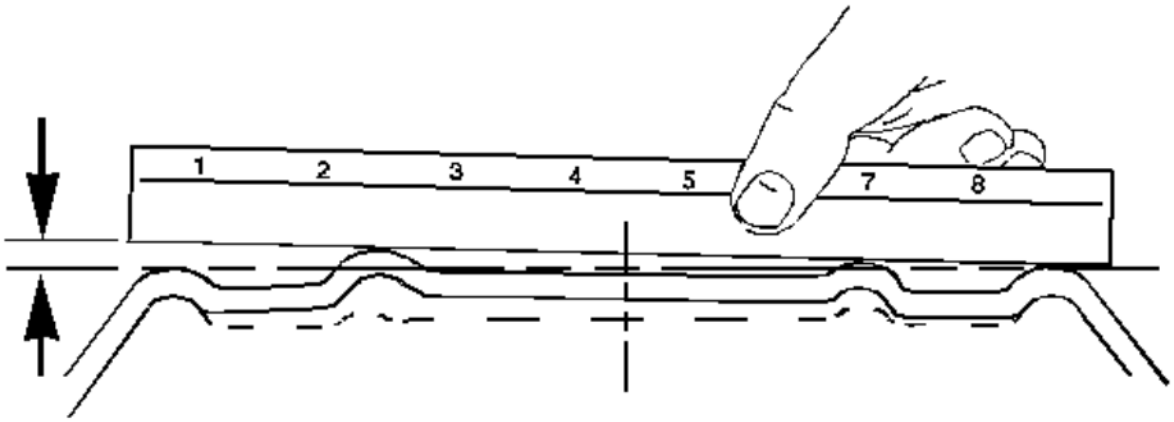

Fig. 4: Inspecting Wheel Inboard Mounting Surface
Courtesy of GENERAL MOTORS COMPANY

5. For steel wheels, repeat the procedure in step 2 on at least 3-4 different positions on the inboard mounting surface.
    - The outer mounting ring is designed to be raised slightly above the inner mounting ring.

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- If you can rock the straight edge, the mounting surface is bent and you must replace the wheel.

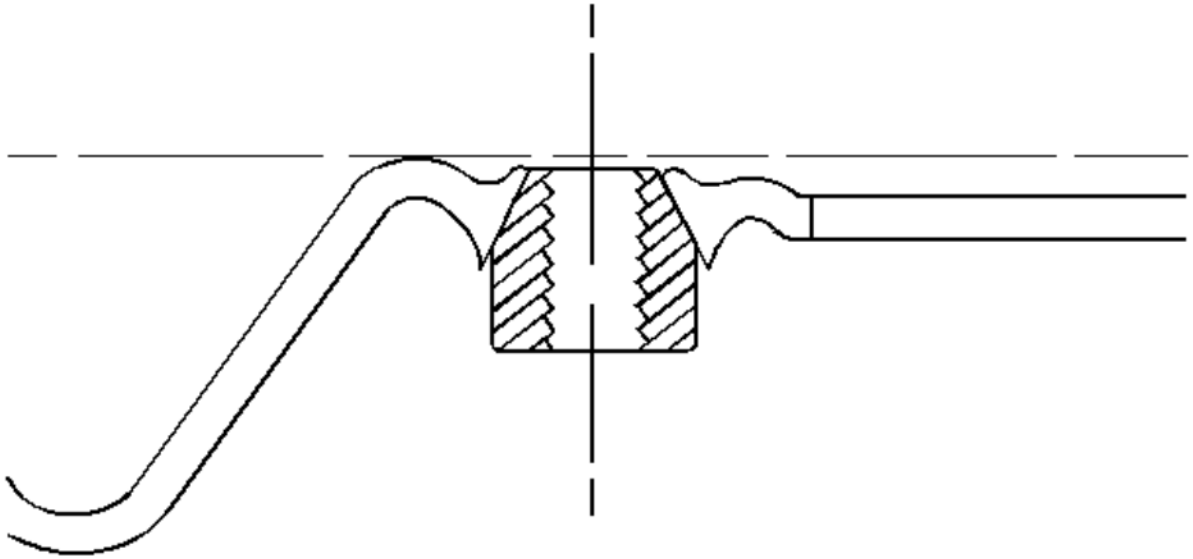

Fig. 5: Inspecting Mounting Wheel/Nut Holes For Damage Caused From Over-Torquing The Wheel/Nuts
Courtesy of GENERAL MOTORS COMPANY

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6. Inspect the mounting wheel/nut holes for damage caused from over-torquing the wheel/nuts. Inspect for collapsed wheel/nut bosses. Inspect for cracked wheel bosses.

CAUTION: **The use of non-GM original equipment wheels may cause:**

- **Damage to the wheel bearing, the wheel fasteners and the wheel**
- **Tire damage caused by the modified clearance to the adjacent vehicle components**
- **Adverse vehicle steering stability caused by the modified scrub radius**
- **Damage to the vehicle caused by the modified ground clearance**
- **Speedometer and odometer inaccuracy**

NOTE:

- **Replacement wheels must be equivalent to the original equipment wheels in the following ways:**
  - **The load capacity**
  - **The wheel diameter**
  - **The rim width**
  - **The wheel offset**
  - **The mounting configuration**
- **A wheel of the incorrect size or type may affect the following conditions:**
  - **Wheel and hub-bearing life**
  - **Brake cooling**
  - **Speedometer/odometer calibration**
  - **Vehicle ground clearance**
  - **Tire clearance to the body and the chassis**

7. Replace the wheel if the wheel is bent.
8. Replace the wheel if the wheel/nut boss area is cracked.

Identify steel wheels with a 2 or 3-letter code stamped into the rim near the valve stem. Aluminum wheels have the code, the part number, and the manufacturer identification cast into the back side of the wheel.

RADIAL TIRE LEAD/PULL CORRECTION

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Step	Action	Yes	No
DEFINITION: Lead/pull is the deviation of the vehicle from a straight path on a level road with no pressure on the steering wheel.			
1	Did you perform the Vehicle Leads/Pull diagnostic table?	Go to **Step 2**	Go to **Vehicle Leads/Pulls**
2	Road test the vehicle to verify the complaint. Select a smooth level surface to perform the test. Does the condition exist?	Go to **Step 3**	System OK
3	1. Cross-switch the front tire/wheel assemblies. Refer to **Tire and Wheel Removal and Installation (6-Lug Wheel)Tire and Wheel Removal and Installation (8-Lug Wheel)**. 2. Road test the vehicle on a smooth level surface. Does the vehicle still lead/pull?	Go to **Step 4**	System OK
4	Does the vehicle lead/pull in the opposite direction?	Go to **Step 5**	Go to **Wheel Alignment Measurement**
5	1. Cross-switch the left front tire/wheel assembly with the left rear tire/wheel assembly. Refer to **Tire and Wheel Removal and Installation (6-Lug Wheel)Tire and Wheel Removal and Installation (8-Lug Wheel)**. 2. Road test the vehicle on a smooth level surface. Does the vehicle still lead/pull?	Go to **Step 6**	Go to **Step 7**
6	1. Cross-switch the right front tire/wheel assembly with the right rear tire/wheel assembly. Refer to **Tire and Wheel Removal and Installation (6-Lug Wheel)Tire and Wheel Removal and Installation (8-Lug Wheel)**. 2. Road test the vehicle on a smooth level surface. Does the vehicle still lead/pull?	Go to **Wheel Alignment Measurement**	Go to **Step 8**
7	Replace the left rear tire. Refer to **Tire Dismounting and Mounting**. Is the repair complete?	Go to **Step 9**	-
8	Replace the right rear tire. Refer to **Tire Dismounting and Mounting**. Is the repair complete?	Go to **Step 9**	-

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Step	Action	Yes	No
9	Verify proper vehicle operation. Does the original condition still exist?	Go to **Step 1**	System OK

REPAIR INSTRUCTIONS

ALUMINUM WHEEL POROSITY REPAIR

1. Remove the tire and wheel. Refer to **Tire and Wheel Removal and Installation (6-Lug Wheel)Tire and Wheel Removal and Installation (8-Lug Wheel)**.
2. Inflate the tire to the manufactures specified pressure as stated on the tire.
3. Submerge the tire/wheel into a water bath in order to locate the leak.
4. Inscribe a mark on the wheel in order to indicate the leak areas.
5. Inscribe a mark on the tire at the valve stem in order to indicate the orientation of the tire to the wheel.
6. Remove the tire from the wheel. Refer to **Tire Dismounting and Mounting**.

NOTE: **Do not damage the exterior surface of the wheel.**

7. Use number 80 grit sandpaper to scuff the inside of the rim surface at the leak area.
8. Use general purpose cleaner to clean the leak area.
9. Apply 3 mm (0.12 in) thick layer of adhesive/sealant to the leak area. Refer to **Adhesives, Fluids, Lubricants, and Sealers**.
10. Allow for the adhesive/sealant to dry.
11. Align the inscribed mark on the tire with the valve stem on the wheel.
12. Install the tire to the wheel. Refer to **Tire Dismounting and Mounting**.
13. Pressurize the tire to 276 kPa (40 psi).
14. Submerge the tire/wheel into a water bath in order ensure the leak is sealed.
15. Inflate the tire to the specified pressure as stated on the tire placard.
16. Balance the tire and wheel. Refer to **Tire and Wheel Assembly Balancing - Off Vehicle** .
17. Install the tire and wheel. Refer to **Tire and Wheel Removal and Installation (6-Lug Wheel)Tire and Wheel Removal and Installation (8-Lug Wheel)**.

ALUMINUM WHEEL REFINISHING

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Aluminum Wheel Refinishing Guidelines

WARNING: **To avoid personal injury when exposed to plastic media blast, hand and/or lathe sanding dust, primer, color coat, and clearcoat, you must work in a properly ventilated area, wearing an approved respirator, eye protection, earplugs and protective gloves and clothing.**

Evaluating Damage

NOTE:

- **Inspect the wheel for corrosion, scrapes, gouges, etc. Damage MUST NOT be deeper than what can be sanded or polished off.**
- **Inspect the wheel for cracks. If cracks are found, discard the wheel.**
- **ALL wheels with bent rim flanges must not be repaired or refinished.**
- **The re-machining and the re-clear coating of aluminum wheels is not recommended in the dealer environment due to concerns of repair durability.**
- **Do not use any re-machining process that removes aluminum. This could affect the dimensions and function of the wheel.**

Aluminum Wheel Refinishing General Recommendations/Options

- Painted aluminum wheels use a primer, color coat, and clearcoat procedure. If the paint is damaged, refinishing is possible. As with polished wheels, all original coatings must be removed first. Media blasting is recommended. (See option number 1).
- If the clearcoat is damaged, it is possible to refinish with clearcoat only, however, the required refinishing process cannot be performed in the dealer environment. Refer to Refinishers Responsibility (Repair option number 2).
- Re-plating of chrome-plated aluminum wheels is not recommended.

Repair Option Number 1

Material Required/Information Resources

- The Paint Manufacturer's Color Book
- Refer to the latest GM Approved Refinish Materials Booklet (GM 4901 MD-2005) for specific products for aluminum refinishing.
- To access the booklet, go to www.gmgoodwrench.com. Click on GM Collision Parts. Click on GM Technical Repair Information, select Paint Shop.
- A Color Compatibility chart is also at this site defining what colors are used on what models.

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NOTE: **Chemical strippers are not recommended.**

- Refer to specific Paint Manufacturers for refinish procedures and process pertaining to "Aluminum Refinishing".

  The procedure requires the wheel surface to be plastic media blasted to remove old paint or clearcoat.

General Color Selection

- If the wheels being painted were previously clearcoated aluminum, and a painted aluminum look is desired, using Corsican Silver WAEQ9283 for a fine "aluminum-like" look, or Sparkle Silver WA9967 for a very bright look. Body color is another option to the customer that may also be used.
- Some specific colors may be recommended on certain models.
- If painting wheels that were previously clearcoated aluminum, it is recommended that all 4 wheels and their center caps be refinished to maintain color uniformity.

General Refinishing Procedures - Removal

1. Remove the wheels from the vehicle. The tires may remain mounted on the wheels.
2. Remove the balance weights and mark their locations on the tire.
3. Remove excess grease, etc. from the wheels with wax and grease remover.
4. Have the wheels plastic media blasted to remove the clearcoat.

NOTE: **MASK OFF ALL MOUNTING SURFACES, whenever a wheel is refinished. The mounting surface and the wheel nut contact surfaces must not be painted or clearcoated. Coating these surfaces could affect the wheel nut torque.**

5. Clean and mask and paint the wheels.

General Refinishing Procedures - Installation

1. Unmask the wheels.
2. Clean all wheel mounting surface of any corrosion, overspray, or dirt.

NOTE: **When re-balancing a tire on an aluminum wheel, coated balance weights must be used in order to reduce the chance of future cosmetic damage.**

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3. Install NEW coated balance weights at marked locations.

NOTE: **Use a torque stick on an impact wrench, or a torque wrench to consistently and uniformly fasten the wheel to the specified torque for the vehicle. The star pattern must be followed.**

4. Install wheels on vehicle.

Repair Option Number 2 - Outside Companies

- Some outside companies are offering wheel refinishing services. One such company, Transwheel Corporation (800-892-3733), provides this service with GM guidelines. Other companies may also exist.
- Any process that re-machines or otherwise remanufactures the wheel should not be used.
- The wheel ID must be recorded and follow the wheel throughout the process to assure that the same wheel is returned. The refinisher must permanently ID stamp the wheel and warrant the painted/clearcoated surfaces for a minimum of one year or the remainder of the new vehicle warranty, whichever is longer.
- Paint and/or clearcoat must not be present on the following surfaces, the nut chamfers, the wheel mounting surfaces and the wheel pilot hole.
- A refinishers responsibility includes inspecting for cracks using the Zyglo system or the equivalent. Any cracked wheels must not be refinished. No welding, hammering or reforming of any kind is allowed. A plastic media blast may be used for clean up of the wheel. Hand and/or lathe sanding of the machined surface and the wheel window is allowed. Material removal, though, must be kept to a minimum.

TIRE AND WHEEL REMOVAL AND INSTALLATION (6-LUG WHEEL)

Special Tools

- **CH-41013** Rotor Resurfacing Kit
- **CH-42450-A** Wheel Hub Resurfacing Kit

For equivalent regional tools, refer to **Special Tools**.

Removal Procedure

1. Raise and support the vehicle. Refer to **Lifting and Jacking the Vehicle** .
2. Remove the wheel center cap, if equipped.

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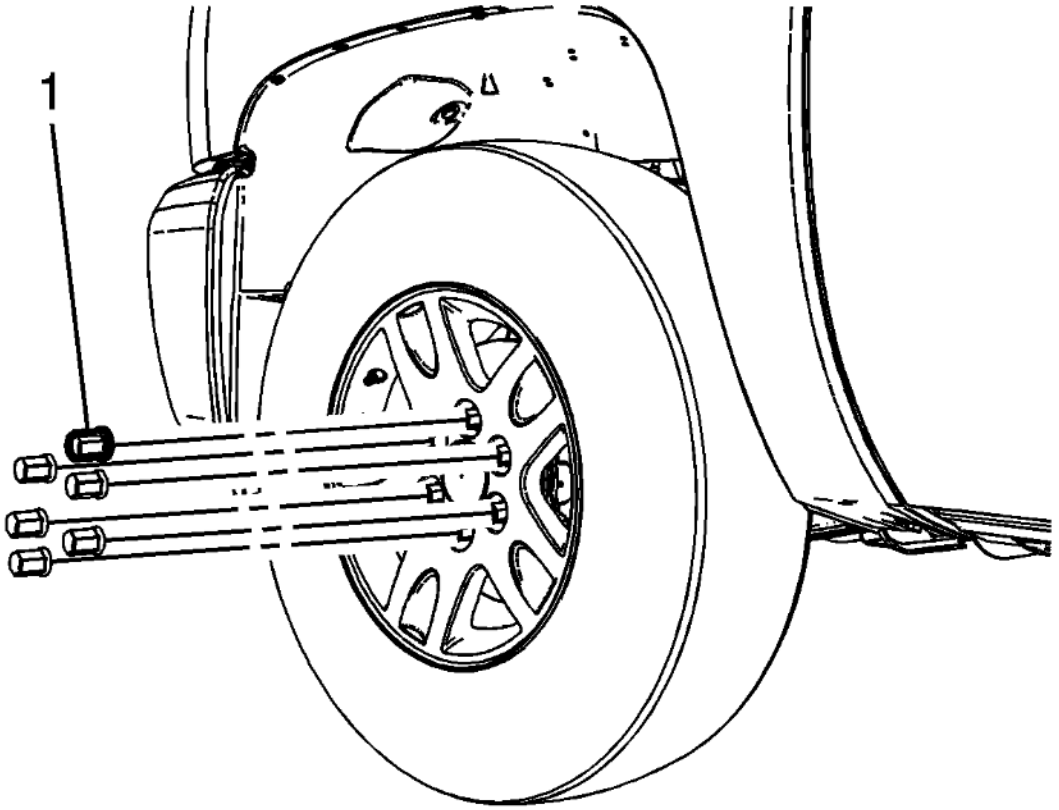

Fig. 6: Wheel Nut Caps
Courtesy of GENERAL MOTORS COMPANY

3. Remove the wheel nut caps (1), if equipped.

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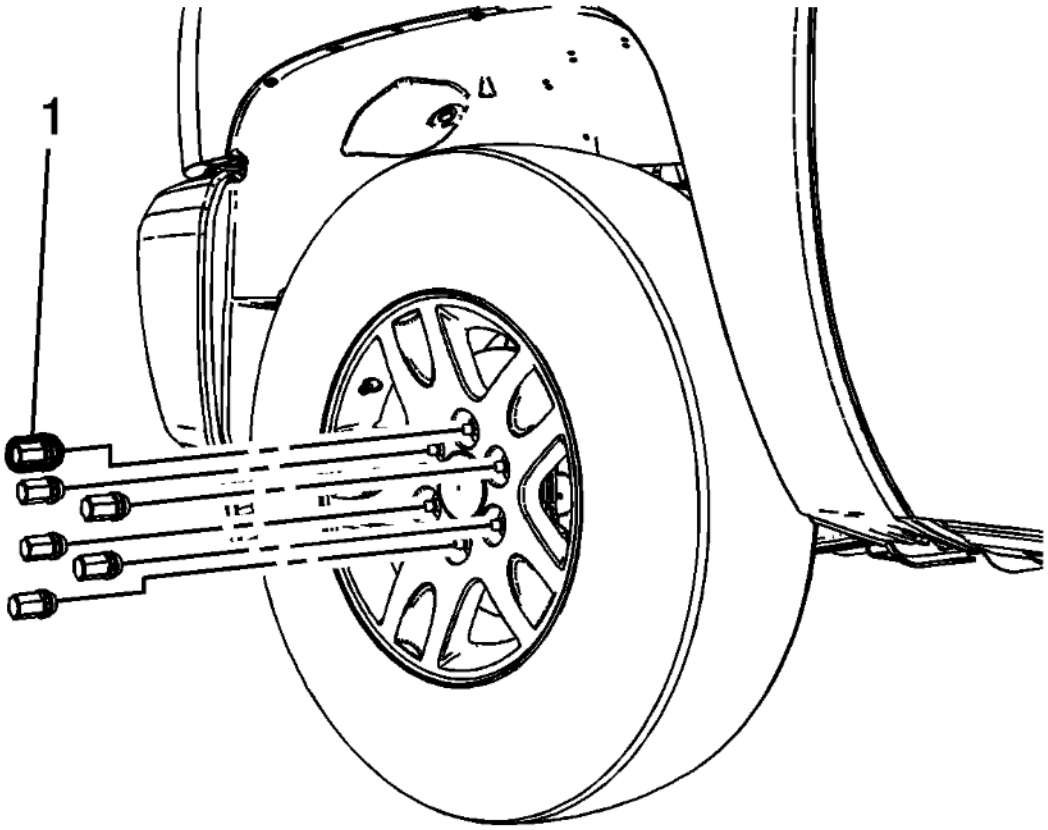

Fig. 7: Wheel Nuts
Courtesy of GENERAL MOTORS COMPANY

4. Remove the wheel nuts (1).

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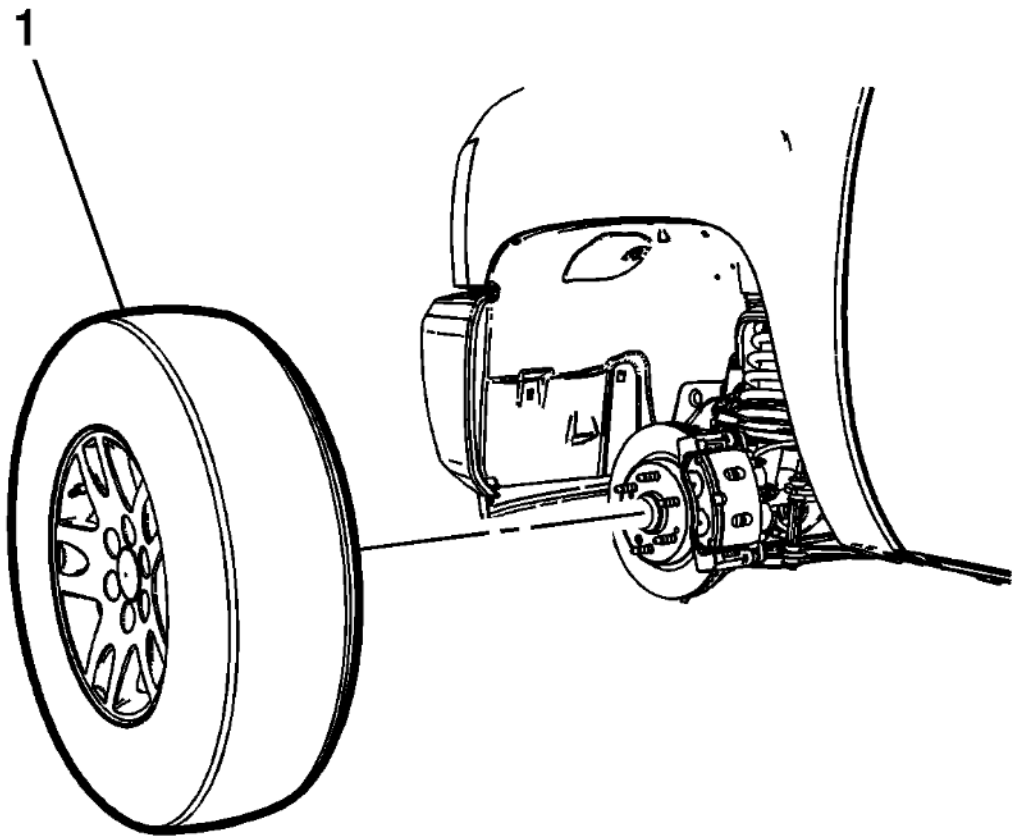

Fig. 8: Tire & Wheel Assembly
Courtesy of GENERAL MOTORS COMPANY

5. Remove the tire and wheel assembly (1).

WARNING: If penetrating oil gets on the vertical surfaces between the wheel and the rotor or drum it could cause the wheel to work loose as the vehicle is driven, resulting in loss of control and an injury accident.

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CAUTION: **Removing the wheel may be difficult because of foreign materials or a tight fit between the wheel and the hub/rotor. Slightly tap the tire side wall with a rubber mallet in order to remove the wheel. Failure to follow these instructions may result in damage to the wheel.**

CAUTION: **Never use heat to loosen a tight wheel bolt or nut. This can shorten the life of wheel and damage wheel bearings.**

6. If the tire and wheel assembly is difficult to remove or cannot be removed, perform the following steps:
   - Hand install the wheel nuts.
   - Loosen the wheel nuts 2 complete turns.
   - Lower the vehicle.
   - Rock the vehicle from side to side.
   - Repeat the procedure if necessary.
7. When the tire and wheel assembly loosens, raise and support the vehicle. Refer to **Lifting and Jacking the Vehicle** .
8. Remove the wheel nuts.
9. Remove the tire and wheel assembly.

Installation Procedure

WARNING: **Before installing the wheels, remove any buildup of corrosion on the wheel mounting surface and brake drum or disc mounting surface. Installing wheels with poor metal-to-metal contact at the mounting surfaces can cause wheel nuts to loosen. This can cause a wheel to come off when the vehicle is moving, causing loss of control and possibly personal injury.**

NOTE: **Do not use power grinding tools to clean the brake rotor or drum to wheel mating surfaces.**

1. Using a wire brush or wire wheel, clean the wheel to brake rotor or drum mating surface.
2. Using the **CH-41013** Rotor Resurfacing Kit, clean the rotor or drum to wheel contact area.
3. Using the **CH-42450-A** Wheel Hub Resurfacing Kit, clean the surfaces around the wheel studs.
4. Clean the threads of the wheel studs.
5. If the threads of the wheel stud are damaged, replace the wheel stud. Refer to **Wheel Stud Replacement (Light Duty)** **Wheel Stud Replacement (Heavy Duty)** , or **Wheel Stud Replacement (1500)** **Wheel Stud Replacement (Heavy Duty)** .
6. After cleaning all of the wheel and brake rotor or drum contact areas, use brake cleaner or denatured alcohol to remove any dirt and debris

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from the wheel nuts and the brake rotor or drum.

7. Inspect and clean the contact areas of the wheel. Refer to **Wheel Mounting Surface Check**.

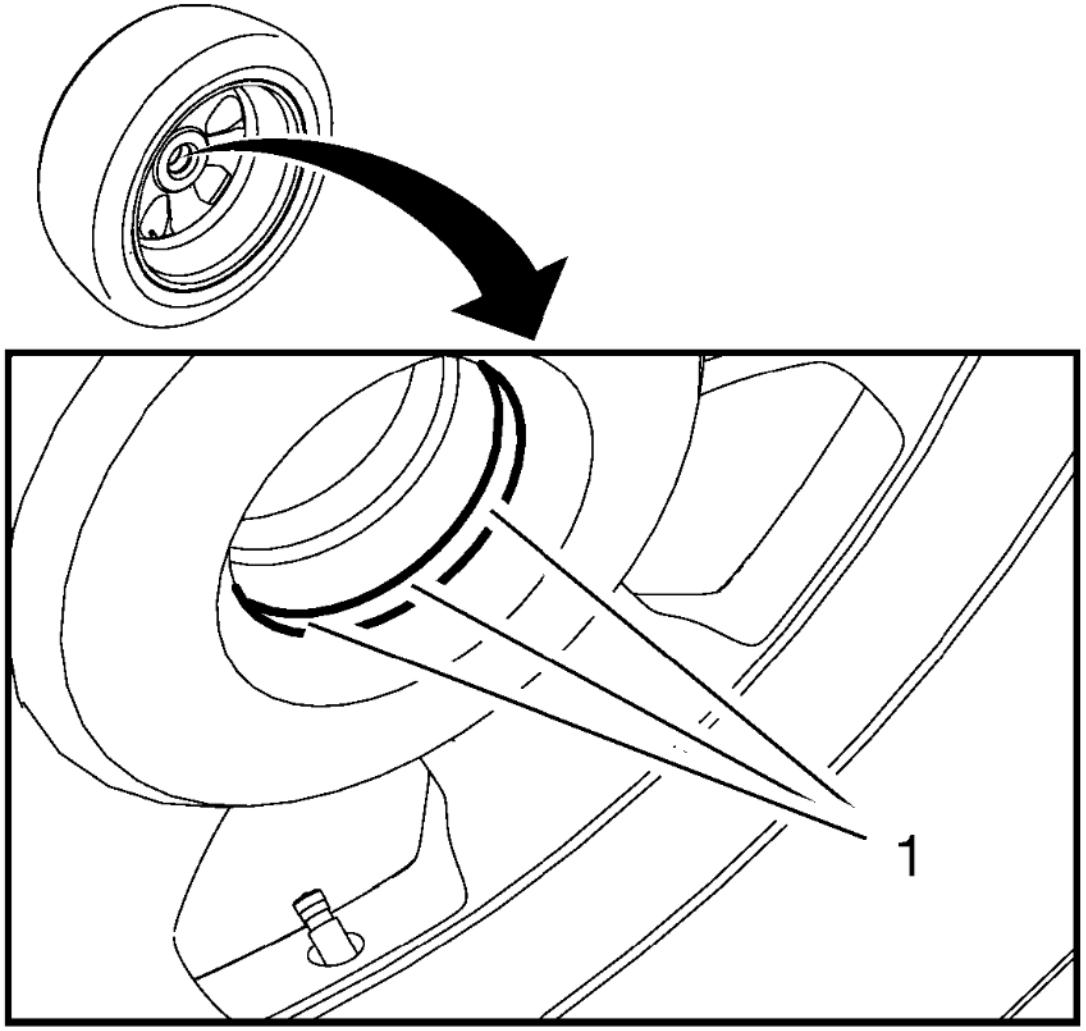

Fig. 9: Rim Inner Center Seat
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8. Apply a small amount of lubricant to the inner diameter of the wheel hub pilot hole (1) where it contacts the wheel hub flange. Refer to **Adhesives, Fluids, Lubricants, and Sealers**.

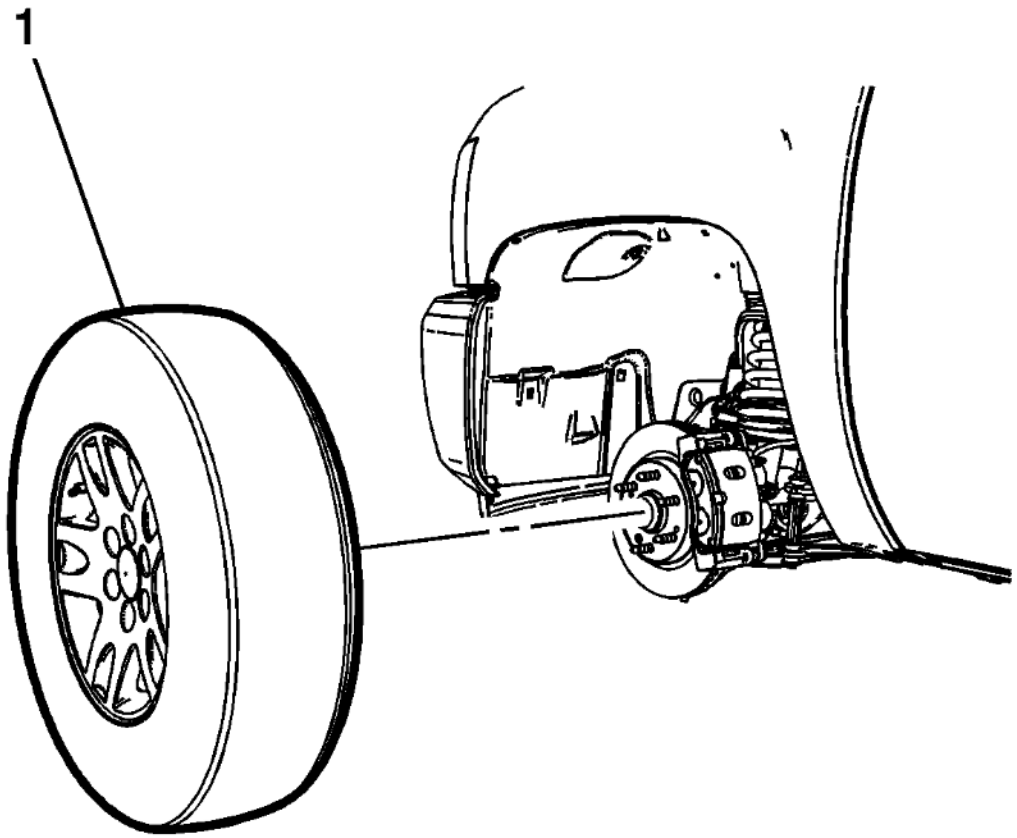

Fig. 10: Tire & Wheel Assembly
Courtesy of GENERAL MOTORS COMPANY

9. Install the tire and wheel assembly (1).

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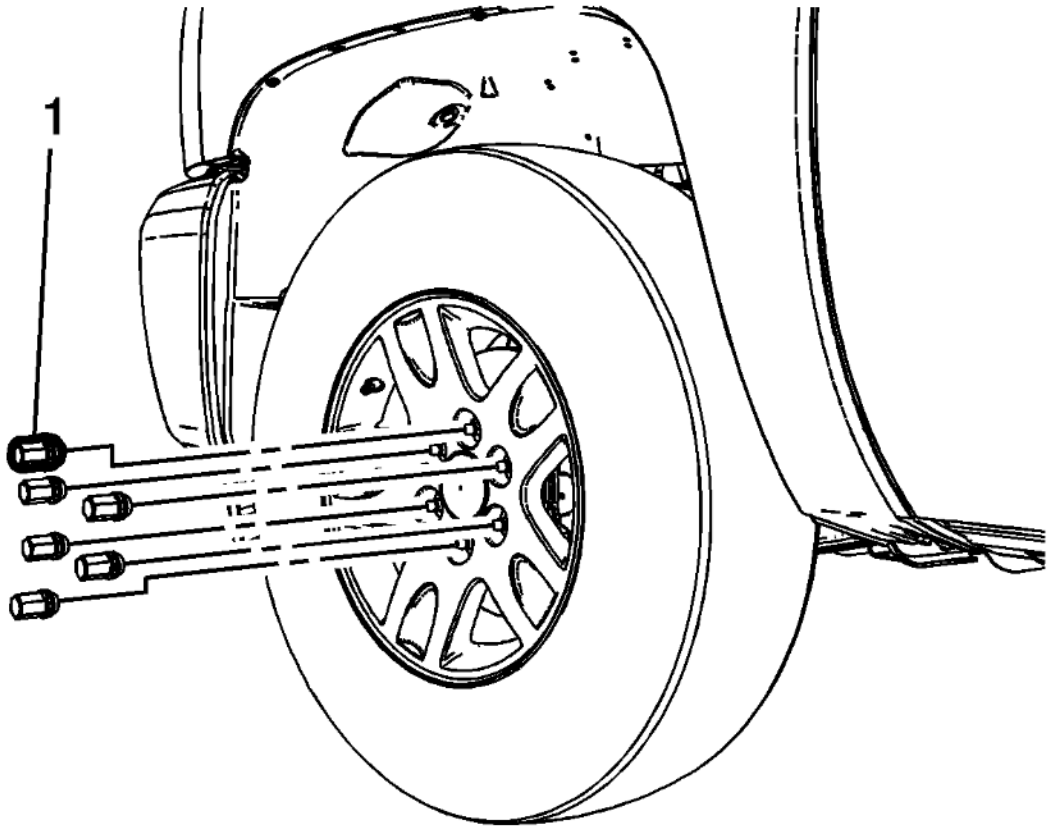

Fig. 11: Wheel Nuts
Courtesy of GENERAL MOTORS COMPANY

WARNING: **Never grease or lubricate wheel nuts, studs and mounting surfaces. Wheel nuts, studs, and mounting surfaces must be clean and dry. Tightening the lubricated parts can cause damage to the wheel studs. This can cause a wheel to come off when the vehicle is moving, causing loss of control and possibly personal injury.**

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10. Hand install the wheel nuts (1).

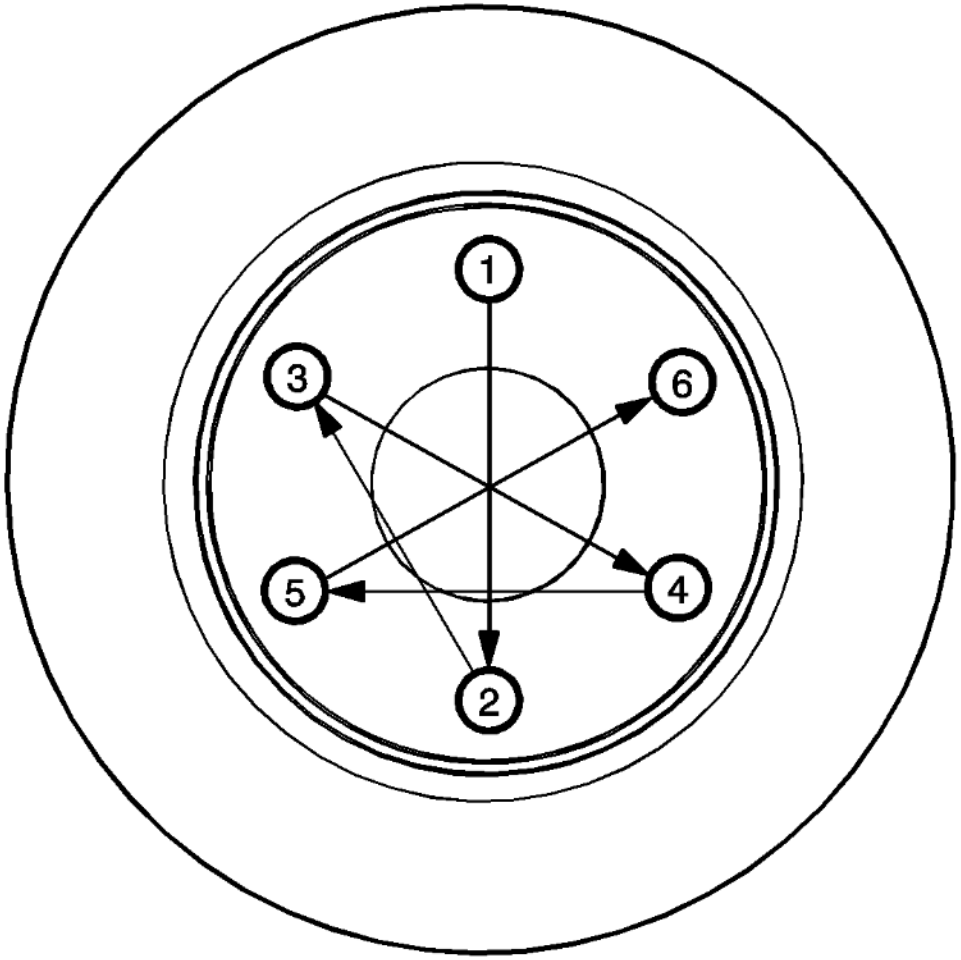

Fig. 12: Wheel Nut Tightening Sequence
Courtesy of GENERAL MOTORS COMPANY

CAUTION: Improperly tightened wheel bolts or nuts can lead to brake pulsation and rotor damage. In order to avoid expensive brake repairs, evenly tighten the wheel bolts or nuts to the proper torque specification.

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CAUTION: **Refer to Fastener Caution .**

11. Using a torque wrench and the appropriate socket, alternately and evenly tighten the wheel nuts to 190 N.m (140 lb ft) in the sequence illustrated.

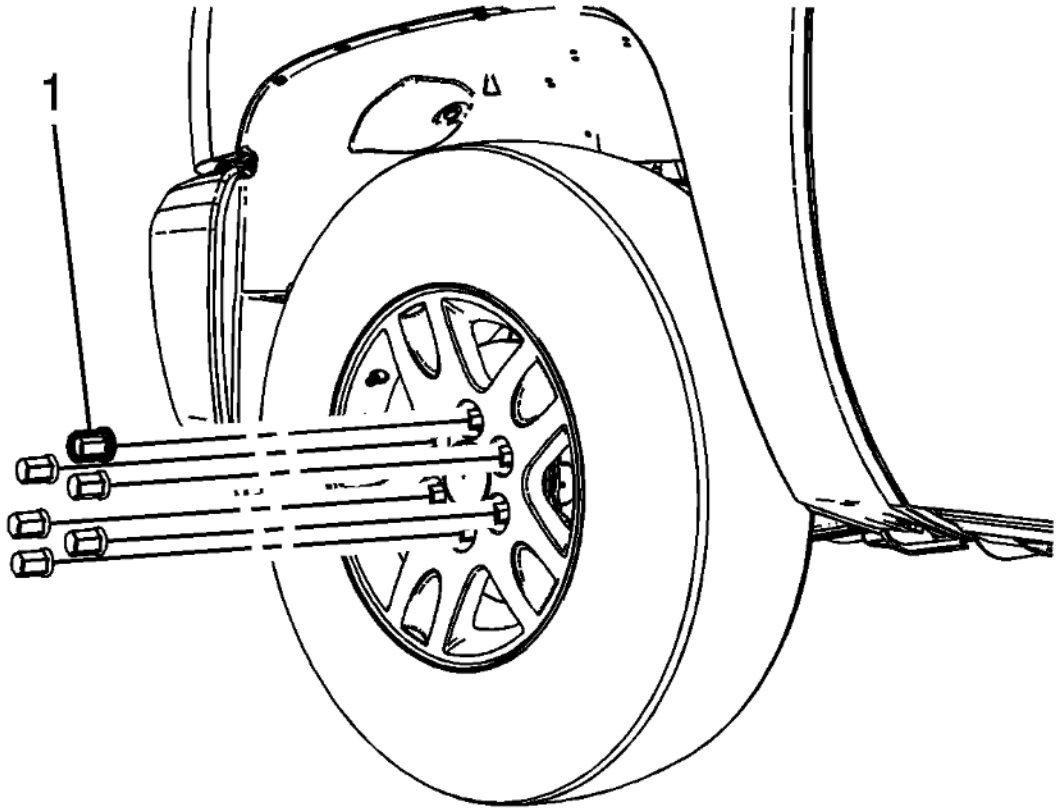

Fig. 13: Wheel Nut Caps
Courtesy of GENERAL MOTORS COMPANY

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12. Install the wheel nut caps (1), if equipped.
13. Install the wheel center cap, if equipped.

TIRE AND WHEEL REMOVAL AND INSTALLATION (8-LUG WHEEL)

Special Tools

- **CH-41013** Rotor Resurfacing Kit
- **CH-42450-A** Wheel Hub Resurfacing Kit

For equivalent regional tools, refer to **Special Tools**.

Removal Procedure

1. Raise and support the vehicle. Refer to **Lifting and Jacking the Vehicle** .

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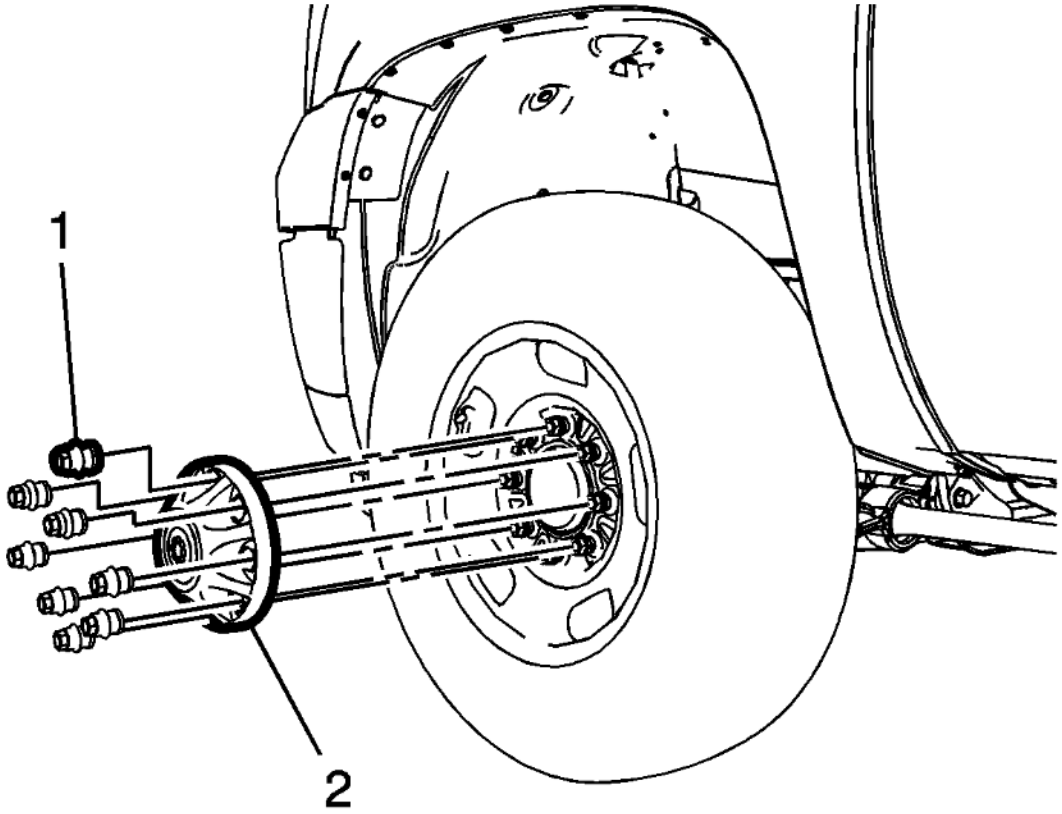

Fig. 14: Wheel Nut Cap & Wheel Center Cap
Courtesy of GENERAL MOTORS COMPANY

2. Remove the wheel nut caps (1), if equipped.
3. Remove the wheel center cap (2), if equipped.

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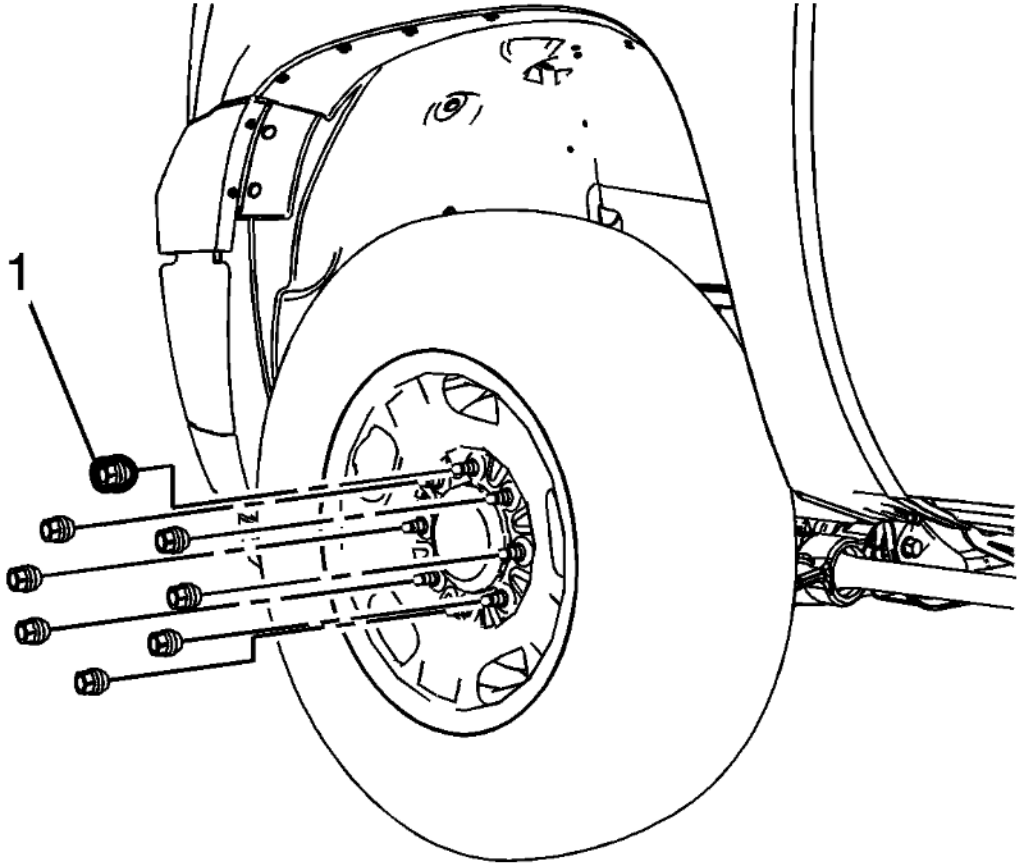

Fig. 15: Wheel Nuts
Courtesy of GENERAL MOTORS COMPANY

4. Remove the wheel nuts (1).

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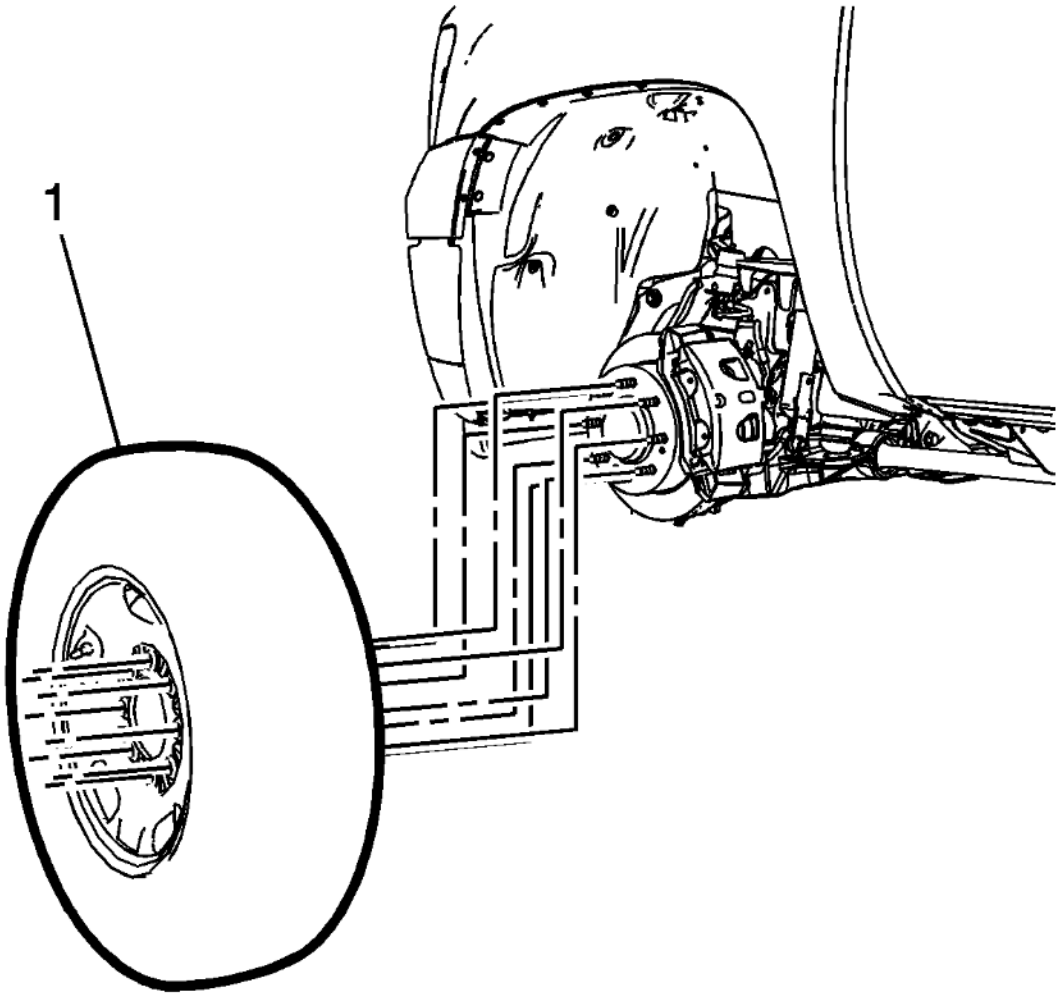

Fig. 16: Tire & Wheel Assembly
Courtesy of GENERAL MOTORS COMPANY

5. Remove the tire and wheel assembly (1).

WARNING: If penetrating oil gets on the vertical surfaces between the wheel and the rotor or drum it could cause the wheel to work loose as the vehicle is driven, resulting in loss of control and an injury accident.

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CAUTION: **Removing the wheel may be difficult because of foreign materials or a tight fit between the wheel and the hub/rotor. Slightly tap the tire side wall with a rubber mallet in order to remove the wheel. Failure to follow these instructions may result in damage to the wheel.**

CAUTION: **Never use heat to loosen a tight wheel bolt or nut. This can shorten the life of wheel and damage wheel bearings.**

6. If the tire and wheel assembly is difficult to remove or cannot be removed, perform the following steps:
   - Hand install the wheel nuts.
   - Loosen the wheel nuts 2 complete turns.
   - Lower the vehicle.
   - Rock the vehicle from side to side.
   - Repeat the procedure if necessary.
7. When the tire and wheel assembly loosens, raise and support the vehicle. Refer to **Lifting and Jacking the Vehicle** .
8. Remove the wheel nuts.
9. Remove the tire and wheel assembly.

Installation Procedure

WARNING: **Before installing the wheels, remove any buildup of corrosion on the wheel mounting surface and brake drum or disc mounting surface. Installing wheels with poor metal-to-metal contact at the mounting surfaces can cause wheel nuts to loosen. This can cause a wheel to come off when the vehicle is moving, causing loss of control and possibly personal injury.**

NOTE: **Do not use power grinding tools to clean the brake rotor or drum to wheel mating surfaces.**

1. Using a wire brush or wire wheel, clean the wheel to brake rotor or drum mating surface.
2. Using the **CH-41013** Rotor Resurfacing Kit, clean the rotor or drum to wheel contact area.
3. Using the **CH-42450-A** Wheel Hub Resurfacing Kit, clean the surfaces around the wheel studs.
4. Clean the threads of the wheel studs.
5. If the threads of the wheel stud are damaged, replace the wheel stud. Refer to **Wheel Stud Replacement (Light Duty)** **Wheel Stud Replacement (Heavy Duty)** , or **Wheel Stud Replacement (1500)** **Wheel Stud Replacement (Heavy Duty)** .
6. After cleaning all of the wheel and brake rotor or drum contact areas, use brake cleaner or denatured alcohol to remove any dirt and debris

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from the wheel nuts and the brake rotor or drum.

7. Inspect and clean the contact areas of the wheel. Refer to **Wheel Mounting Surface Check**.

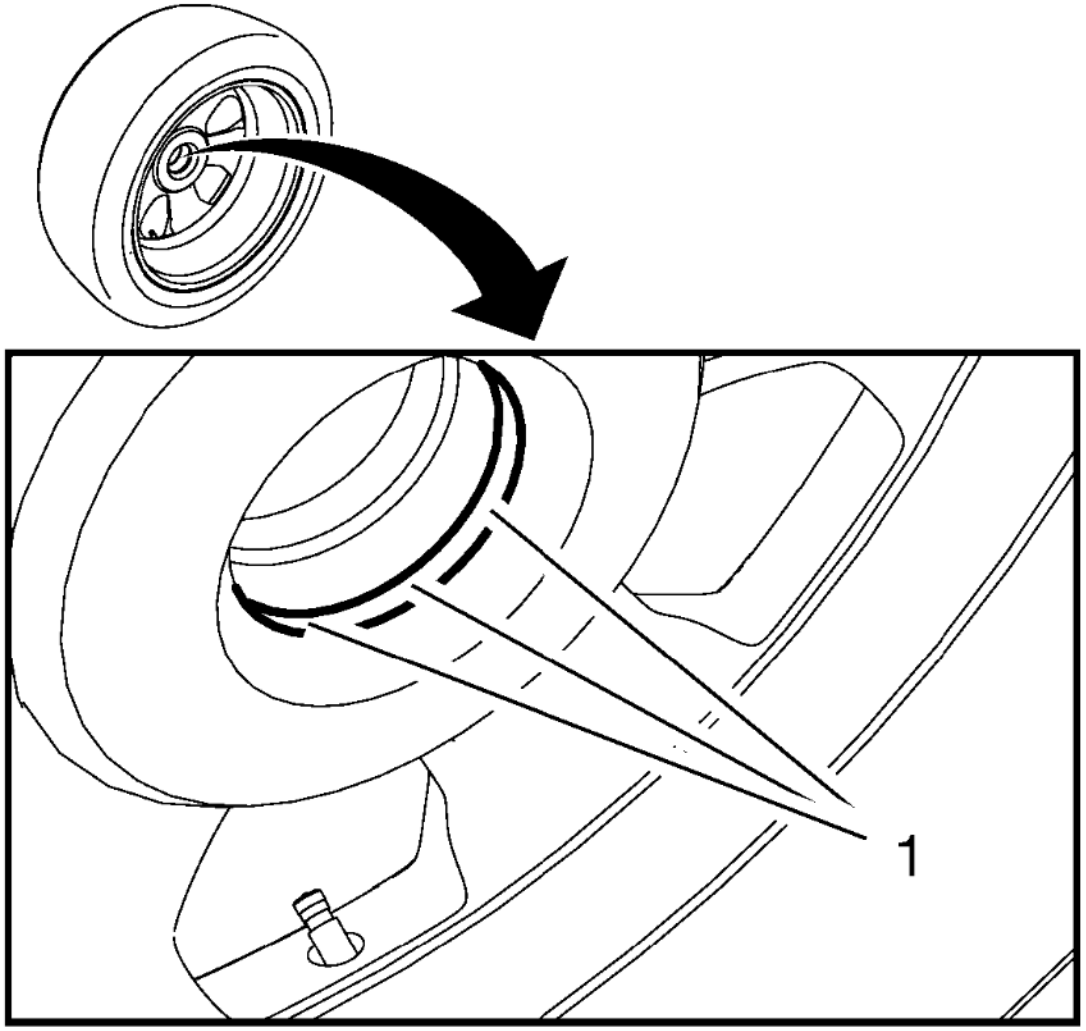

Fig. 17: Rim Inner Center Seat
Courtesy of GENERAL MOTORS COMPANY

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8. Apply a small amount of lubricant to the inner diameter of the wheel hub pilot hole (1) where it contacts the wheel hub flange. Refer to **Adhesives, Fluids, Lubricants, and Sealers**.

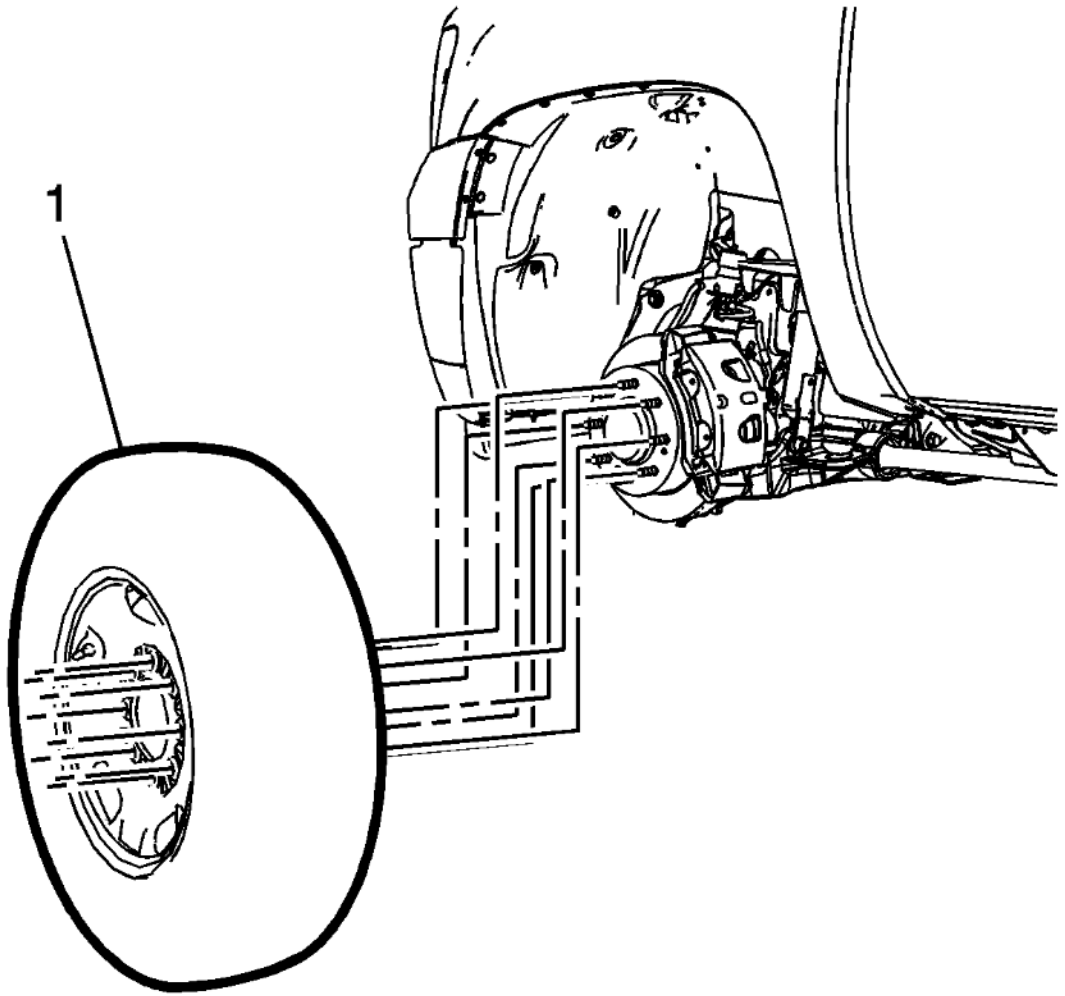

Fig. 18: Tire & Wheel Assembly
Courtesy of GENERAL MOTORS COMPANY

9. Install the tire and wheel assembly (1).

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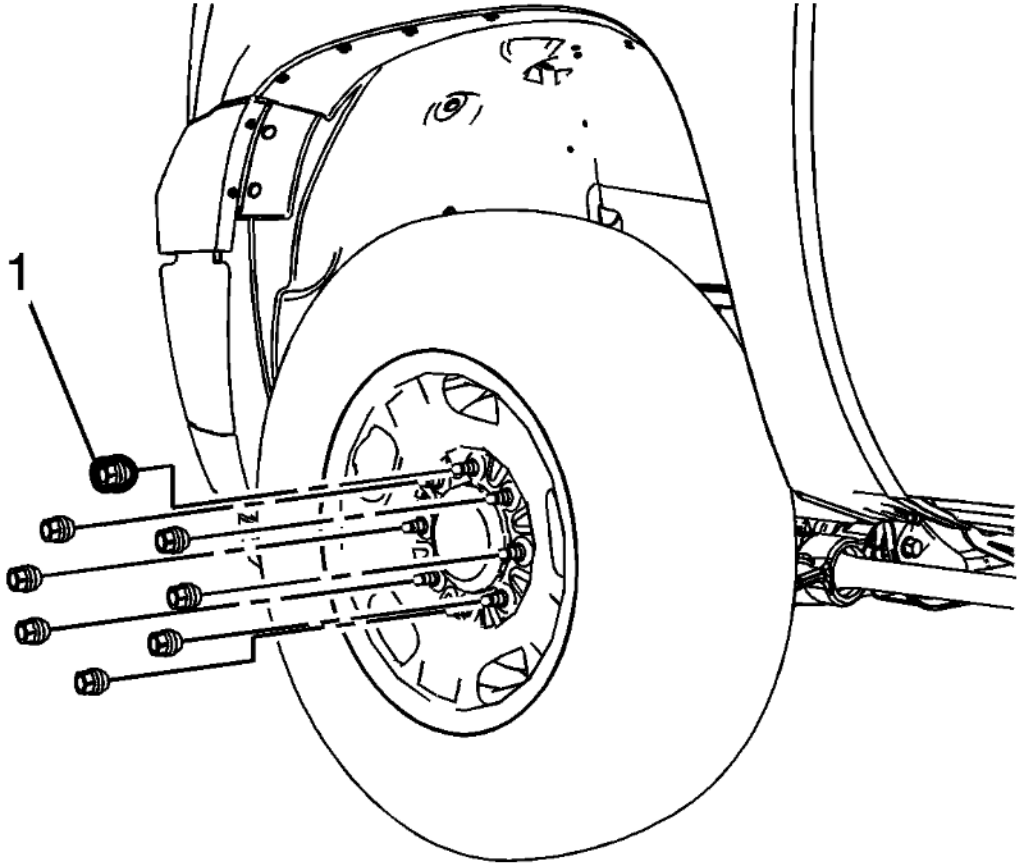

Fig. 19: Wheel Nuts
Courtesy of GENERAL MOTORS COMPANY

WARNING: **Never grease or lubricate wheel nuts, studs and mounting surfaces. Wheel nuts, studs, and mounting surfaces must be clean and dry. Tightening the lubricated parts can cause damage to the wheel studs. This can cause a wheel to come off when the vehicle is moving, causing loss of control and possibly personal injury.**

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10. Hand install the wheel nuts (1).

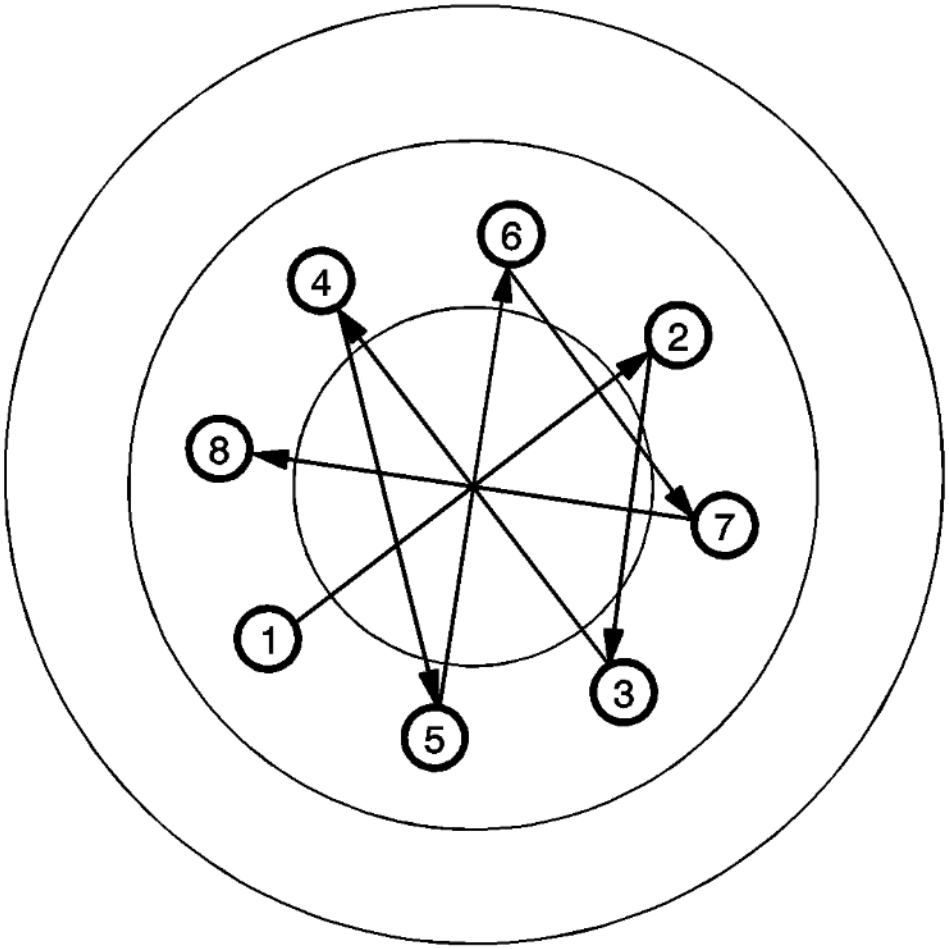

Fig. 20: Wheel Nut Tightening Sequence
Courtesy of GENERAL MOTORS COMPANY

CAUTION: **Improperly tightened wheel bolts or nuts can lead to brake pulsation and rotor damage. In order to avoid expensive brake repairs, evenly tighten the wheel bolts or nuts to the proper torque specification.**

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CAUTION: **Refer to Fastener Caution .**

11. Using a torque wrench and the appropriate socket, alternately and evenly tighten the wheel nuts to 190 N.m (140 lb ft) in the sequence illustrated.

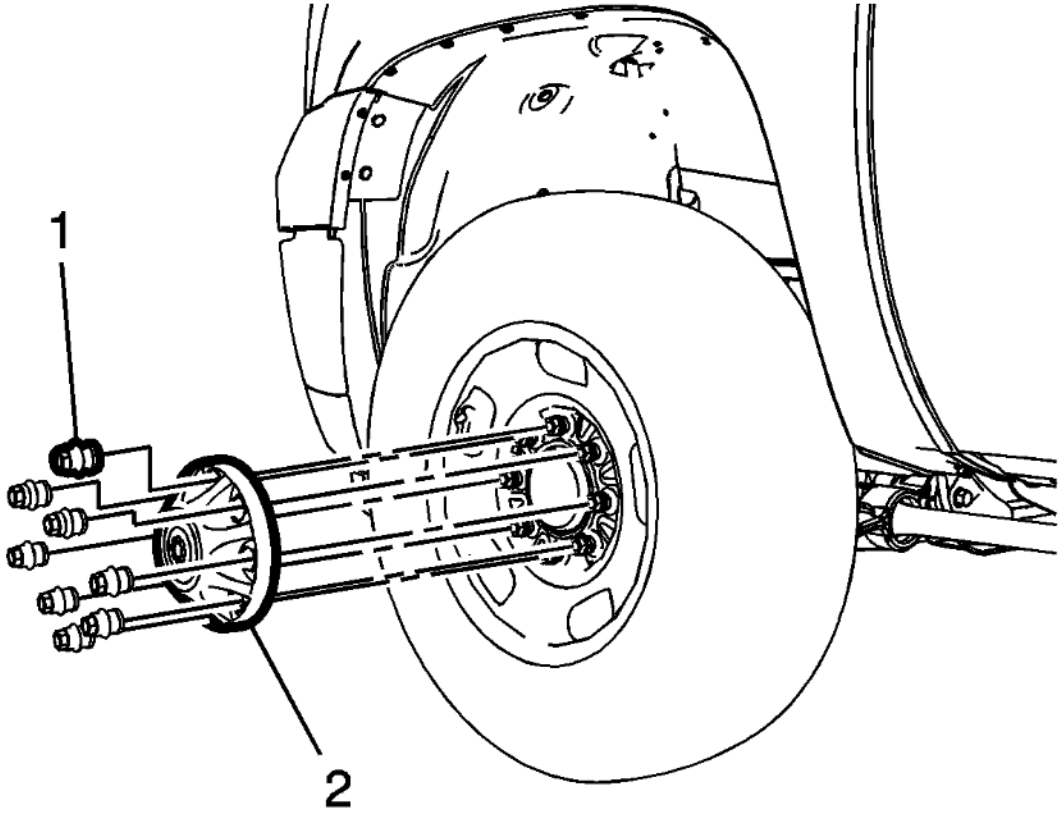

Fig. 21: Wheel Nut Cap & Wheel Center Cap
Courtesy of GENERAL MOTORS COMPANY

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12. Install the wheel nut caps (1) and center cap (2), if equipped.

WHEEL SPOKE TRIM INSERT REPLACEMENT (W/ Q7L)

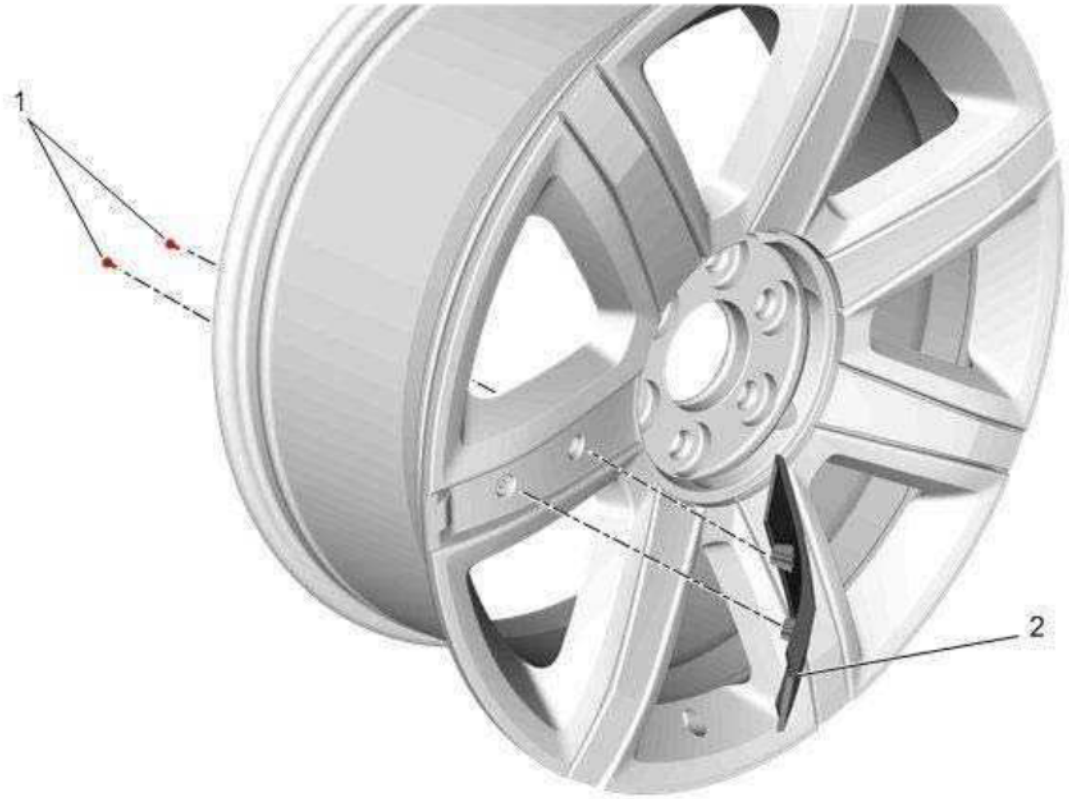

Fig. 22: Wheel Spoke Trim Insert (w/ Q7L)
Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedure	
1. Raise and support the vehicle. **Lifting and Jacking the Vehicle** . 2. Remove the tire and wheel. **Tire and Wheel Removal and Installation (6-Lug Wheel)Tire and Wheel Removal and Installation (8-Lug Wheel)**.	

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Callout	Component Name
1	Wheel Insert Screw (Qty 2) **CAUTION:** **Refer to** **Fastener Caution .** **Tighten** 1.85 N.m (16.37 lb in)
2	Wheel Insert

WHEEL SPOKE TRIM INSERT REPLACEMENT (W/ RBR, Q7M)

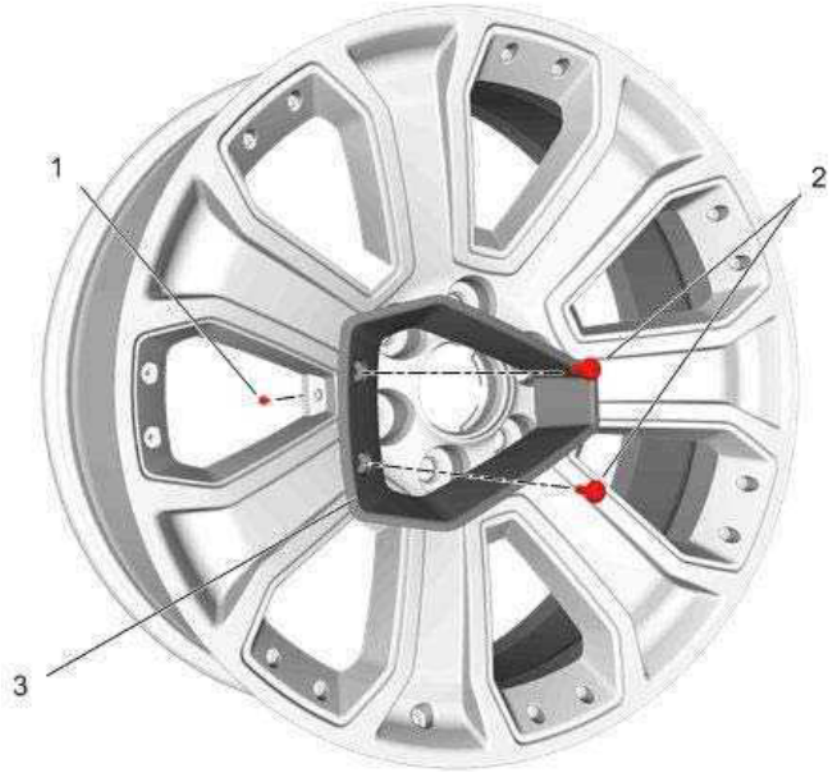

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Fig. 23: Wheel Spoke Trim Insert (w/ RBR, Q7M)
Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedure 1. Raise and support the vehicle. Lifting and Jacking the Vehicle . 2. Remove the tire and wheel. Tire and Wheel Removal and Installation (6-Lug Wheel)Tire and Wheel Removal and Installation (8-Lug Wheel).	
1	Wheel Insert Screw **CAUTION:** **Refer to Fastener Caution .** **Tighten** 1.85 N.m (16.37 lb in)
2	Wheel Insert Screw (Qty 2) **CAUTION:** **Refer to Fastener Caution .** **Tighten** 2.3 N.m (20.36 lb in)
3	Wheel Insert

TIRE REPAIR

WARNING:

- **Tire changing can be dangerous and should be done by trained professionals using proper tools and**

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procedures. Always read and understand any manufacturer's warnings contained in their customers literature or molded into the tire sidewall.

- **Serious eye and ear injury may result from not wearing adequate eye and ear protection while repairing tires.**
- **NEVER inflate beyond 275 kPa (40 pounds) pressure to seat beads.**
- **NEVER stand, lean or reach over the assembly during inflation.**

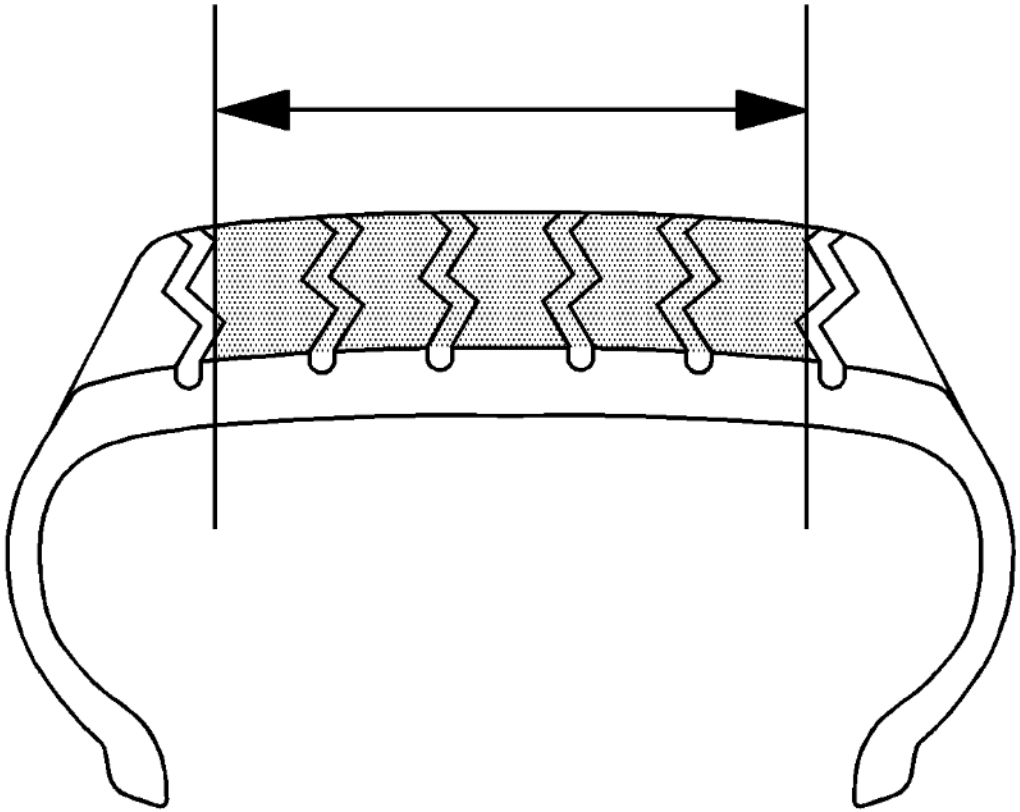

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Fig. 24: Identifying Repairable Area On A Radial Tire
Courtesy of GENERAL MOTORS COMPANY

Repairable area on a radial tire.

NOTE:

- **NEVER repair tires worn to the tread indicators 1.59 mm (2/32 in) remaining depth.**
- **NEVER repair tires with a tread puncture larger than 6.35 mm (1/4 in).**
- **NEVER substitute an inner tube for a permissible or non-permissible repair.**
- **NEVER perform an outside-in tire repair (plug only, on the wheel).**
- **Every tire must be removed from the wheel for proper inspection and repair.**
- **Regardless of the type of repair used, the repair must seal the inner liner and fill the injury.**
- **Consult with repair material supplier/manufacturer for repair unit application procedures and repair tools/repair material recommendations.**

Three basic steps for tire puncture repair:

1. Remove the tire from the wheel for inspection and repair.
2. Fill the injury (puncture) to keep moisture out.
3. Seal the inner liner with a repair unit to prevent air loss.

External Inspection

1. Prior to demounting, inspect the tire surface, the valve and the wheel for the source of the leak by using a water and soap solution. Mark the injured area and totally deflate the tire by removing the valve core.
2. Demount the tire from the wheel and place the tire on a well-lighted spreader.

Internal Inspection

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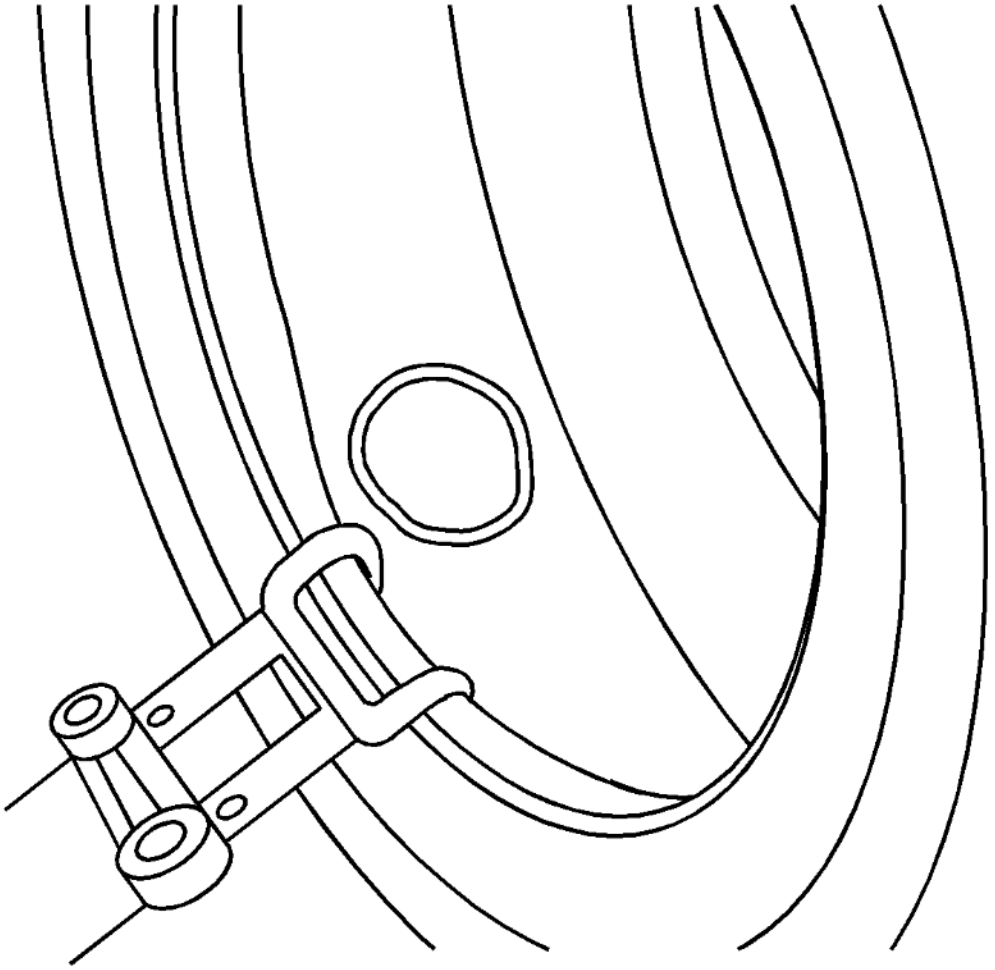

Fig. 25: Marking Tire Puncture Location
Courtesy of GENERAL MOTORS COMPANY

1. Spread the beads and mark the puncture with a tire crayon.
2. Inspect the inner tire for any signs of internal damage.
3. Remove the puncturing object, noting the direction of the penetration.
4. Probe the injury with a blunt awl in order to determine the extent and direction of the injury.

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5. Remove any loose foreign material from the injury.
6. Punctures exceeding 6.35 mm (1/4 in) should not be repaired.

Cleaning

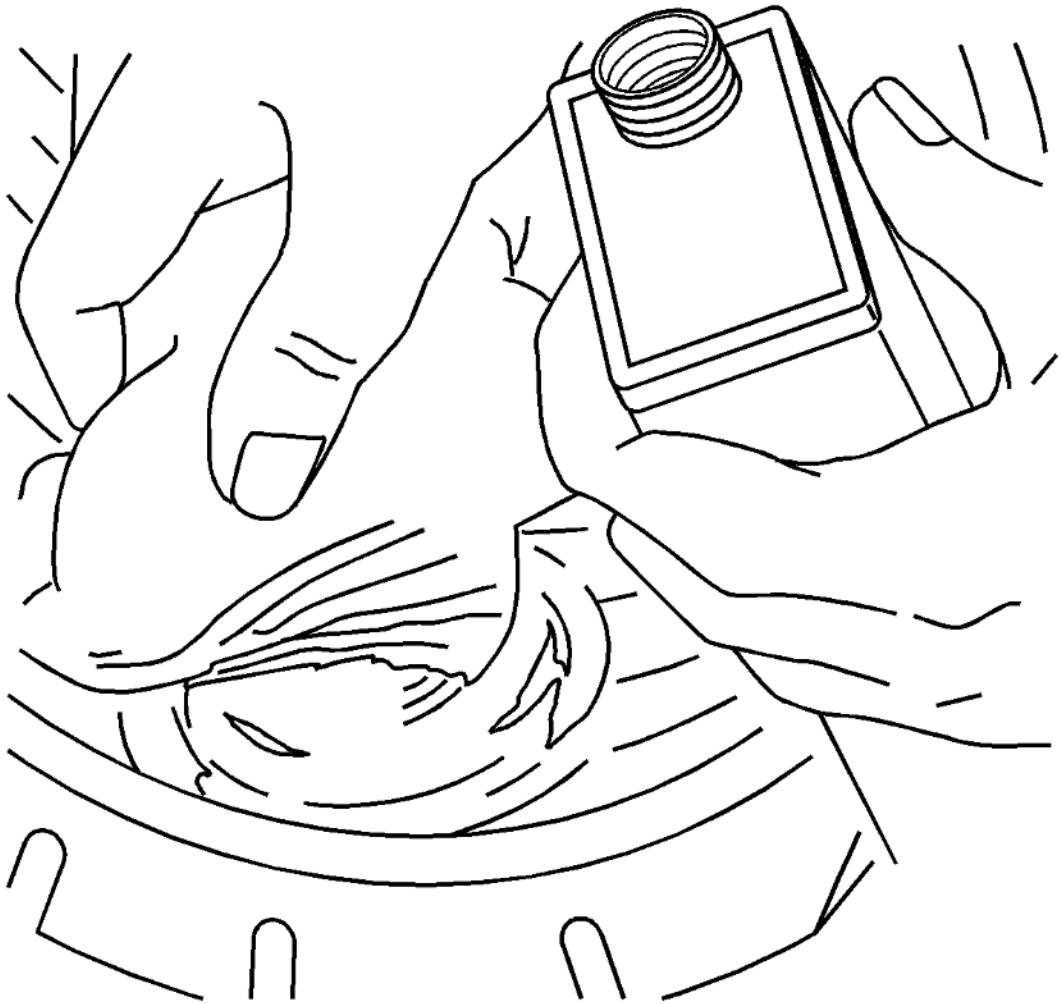

Fig. 26: Cleaning Repair Area
Courtesy of GENERAL MOTORS COMPANY

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1. Clean the area around the puncture thoroughly with a proper liner cleaner, clean cloth and a scraper. This step serves to remove dirt and mold lubricants to insure proper adhesion and non-contamination of the buffing tool.
2. Refer to information on the product or manufacturer's Material Safety Data Sheet and follow guidelines for handling and disposal.

Clean the Injury Channel

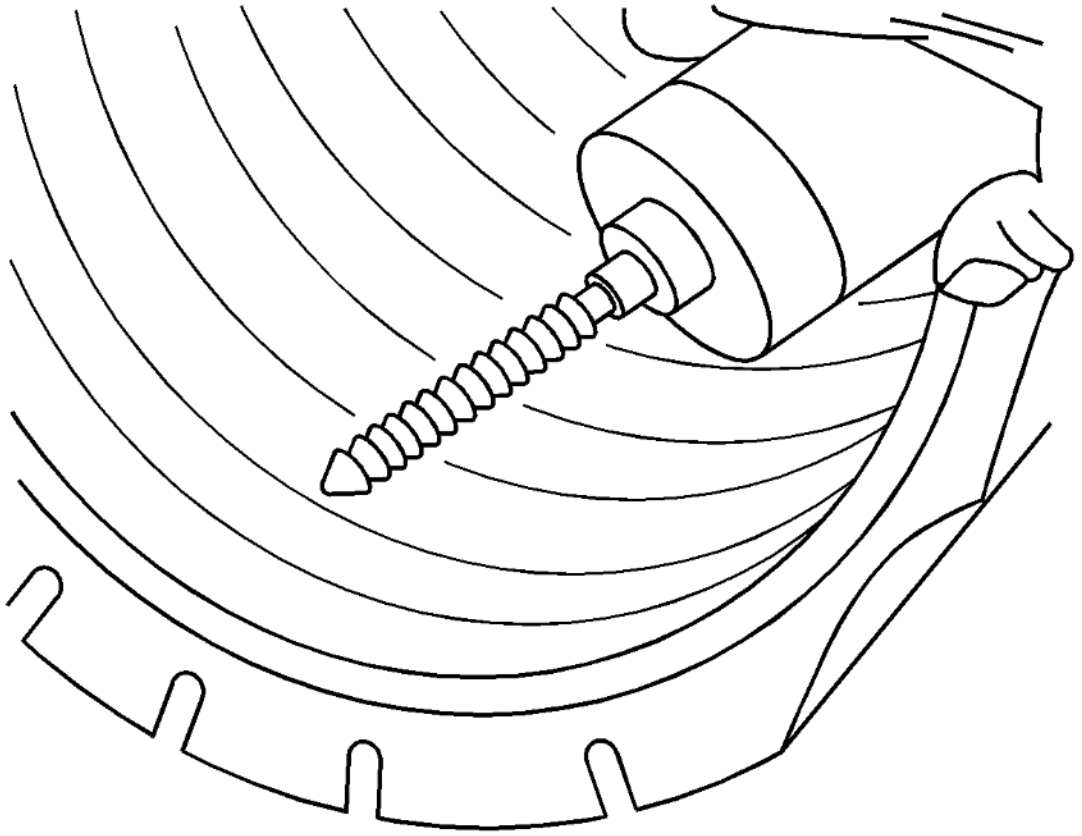

Fig. 27: Reaming Puncture Channel
Courtesy of GENERAL MOTORS COMPANY

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1. Use a proper hand reamer, carbide cutter or drill bit to ream the puncture channel from the inside of the tire in order to clean the injury.
2. Remove steel wires protruding above the liner surface to prevent damage to the repair unit.
3. Consult your repair material supplier for recommended reaming tool(s).

Fill the Injury

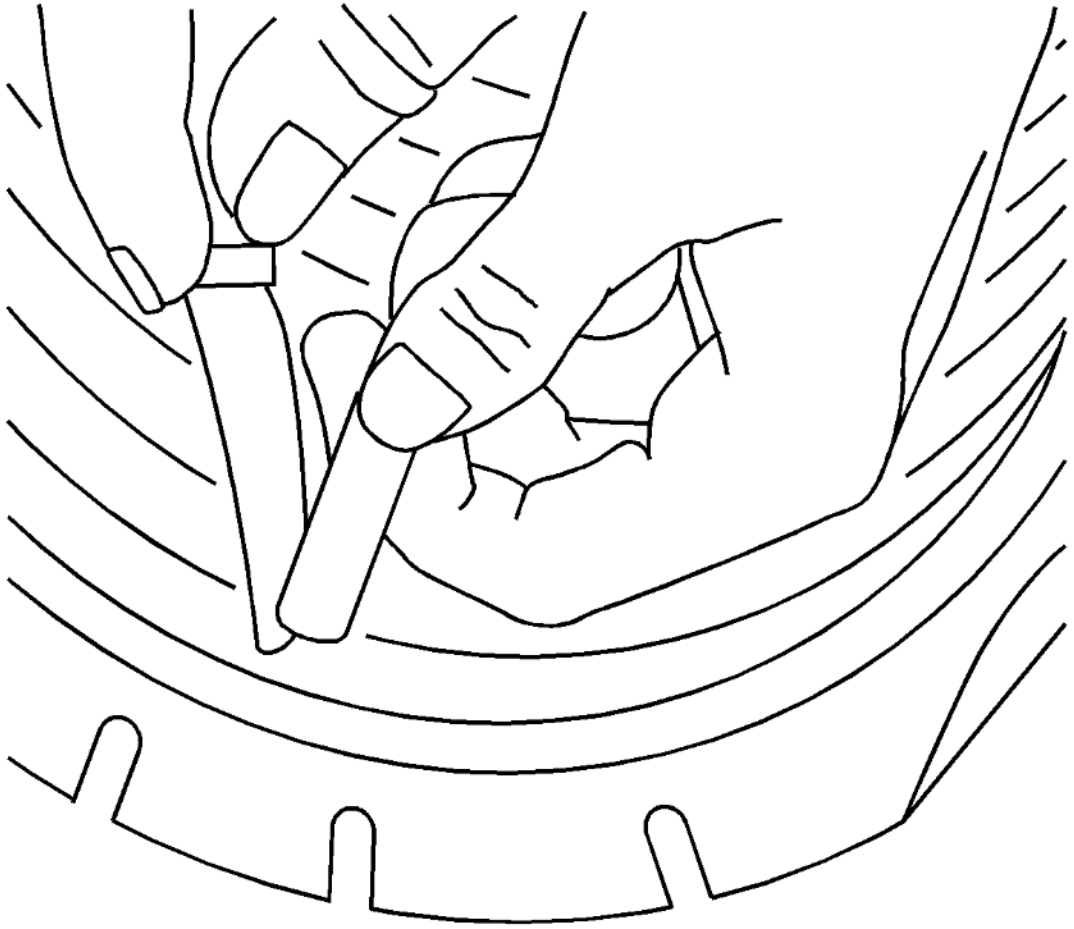

Fig. 28: Filling Injury Location
Courtesy of GENERAL MOTORS COMPANY

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1. It is necessary to fill the injury channel to provide back up for the repair unit and to prevent moisture from entering the tire fabric and steel wires.
2. For combination repair/plug units skip this step. Cement the injured channel and fill the injury from the inside of the tire with the repair plug per repair material manufacturer's recommendations. Without stretching the plug, cut the plug off just above the inside tire surface.
3. Consult your repair material supplier for proper repair material selection.

Repair Unit Selection

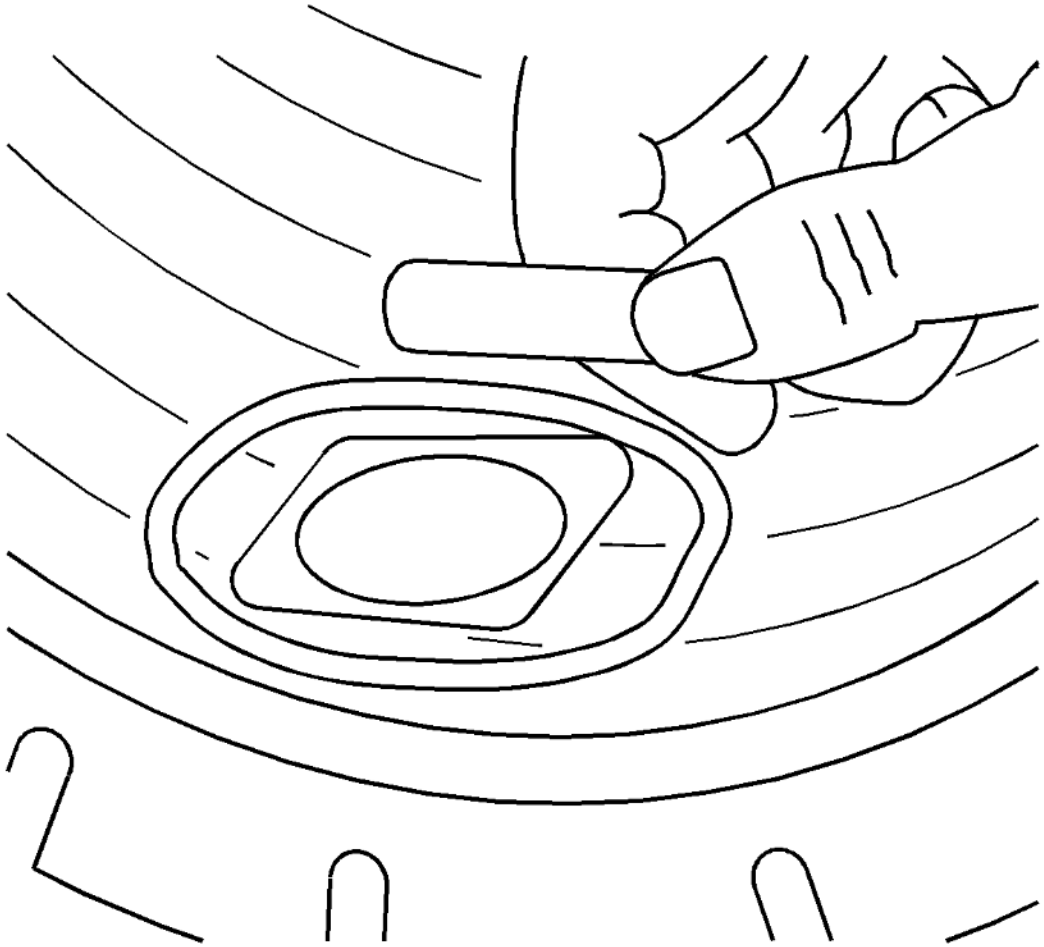

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Fig. 29: Outlining Tire Injury Area
Courtesy of GENERAL MOTORS COMPANY

NOTE: **Do not install the repair unit in this step.**

1. Center the repair unit over the injury as a reference and outline an area larger than the unit so that buffing will not remove the crayon marks.
2. Remove the repair unit.
3. DO NOT overlap previous or multiple repair units.
4. Consult your repair material supplier for proper repair unit selection.

Buffing

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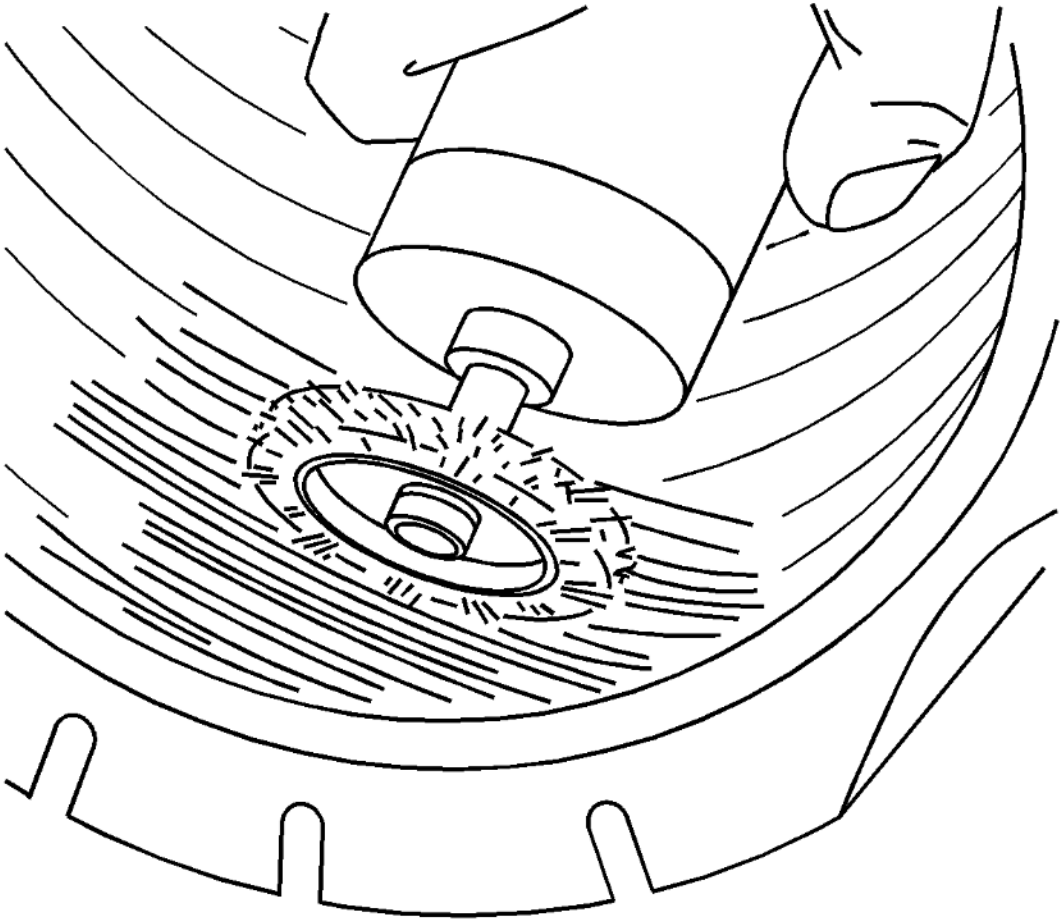

Fig. 30: Buffing Within Marked Area
Courtesy of GENERAL MOTORS COMPANY

1. To prevent contamination and preserve the outline, buff within the marked area thoroughly and evenly with a low speed buffing tool using a fine wire brush or gritted rasp.
2. Buff to a smooth velvet surface (RMA #1 or #2 buffed texture).
3. Use caution not to gouge the inner liner or expose casing fabric.

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4. Remove any buffing dust with a vacuum cleaner.
5. Consult your repair material supplier for a proper buffing tool.

Cementing

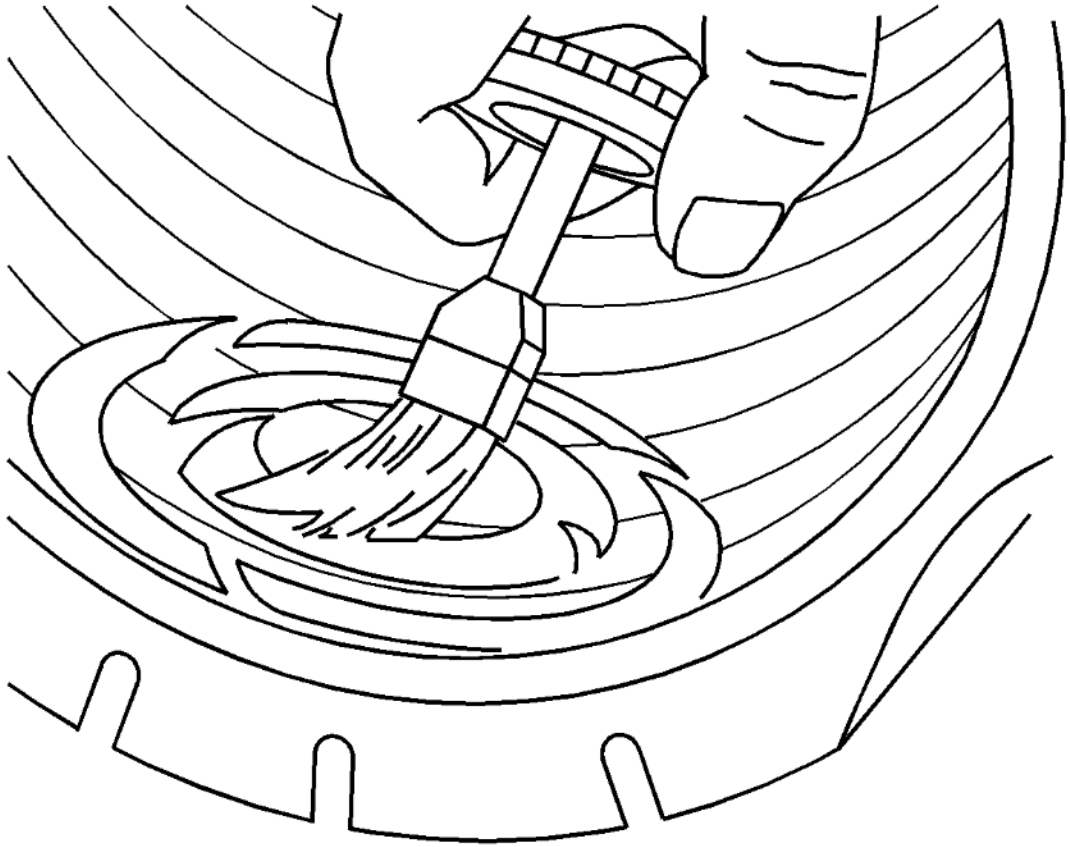

Fig. 31: Applying Chemical Cement
Courtesy of GENERAL MOTORS COMPANY

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Apply chemical cement according to the repair material manufacturer's procedures.

Repair Unit Application

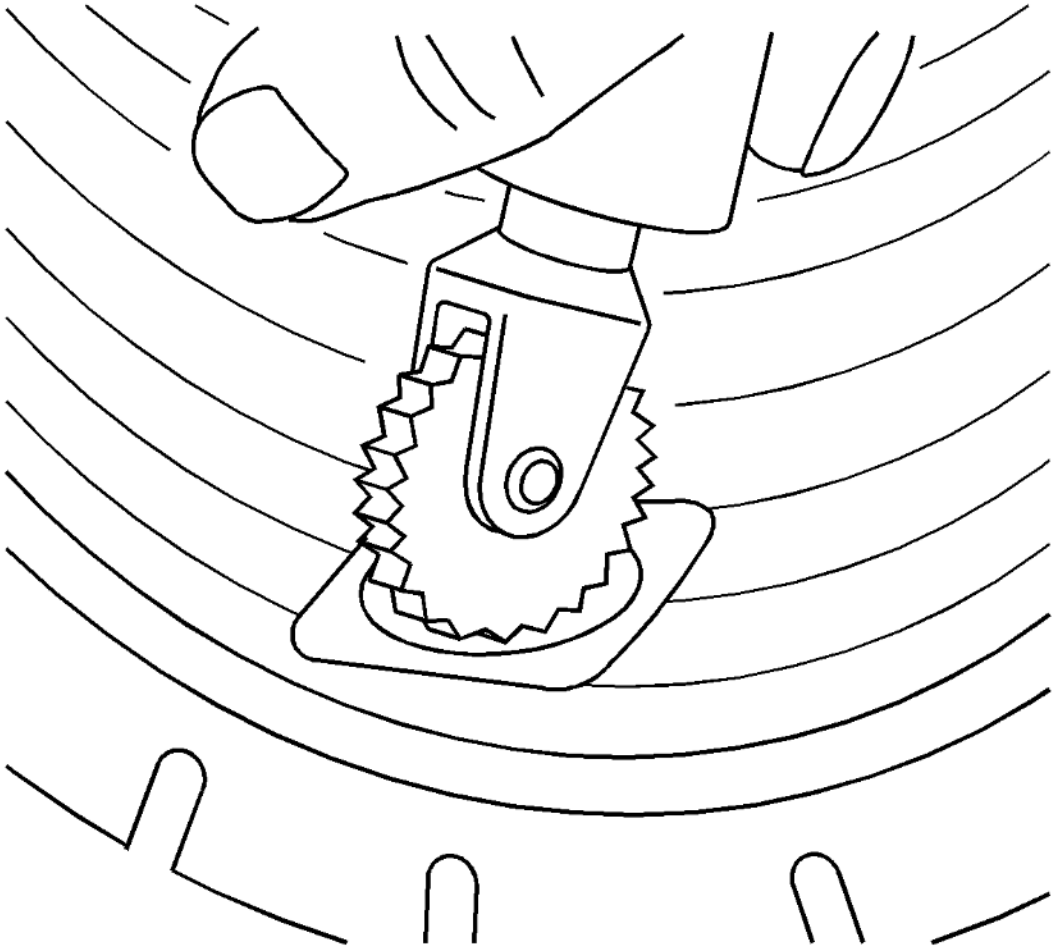

Fig. 32: Installing Repair Unit
Courtesy of GENERAL MOTORS COMPANY

The tire must be in the relaxed position when the repair unit is installed. Do not spread the beads excessively.

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Two-Piece Plug and Repair Units

1. If applicable, install the repair unit so that the alignment is correct.
2. Center the repair unit over the injury and stitch down thoroughly with the stitching tool, working from the center out.

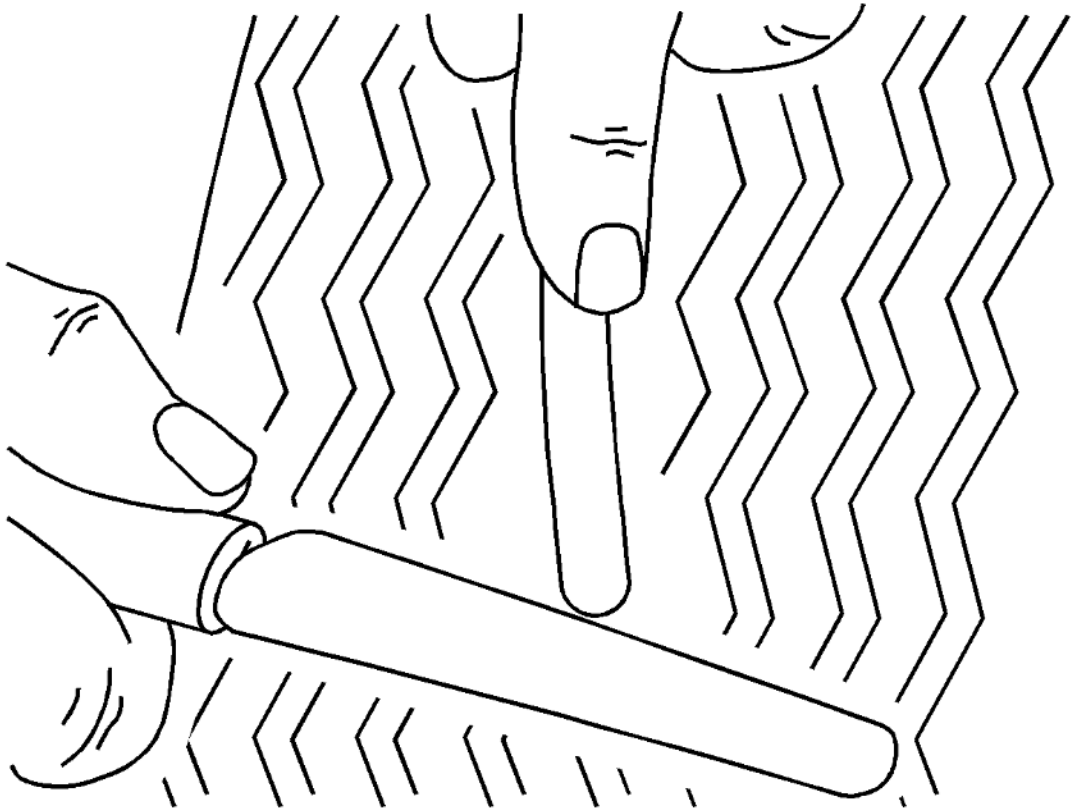

Fig. 33: Cutting Plug Material
Courtesy of GENERAL MOTORS COMPANY

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3. Being careful not to stretch the plug material, cut the plug flush with the outer tread.

Combination Repair/Plug Units

1. Pull the plug through the injury until the repair just reaches the liner. Stitch down thoroughly.
2. Follow the repair material manufacturer's recommendations for further installation instructions.

   Consult your repair material supplier for the proper stitching tool.

Safety Cage

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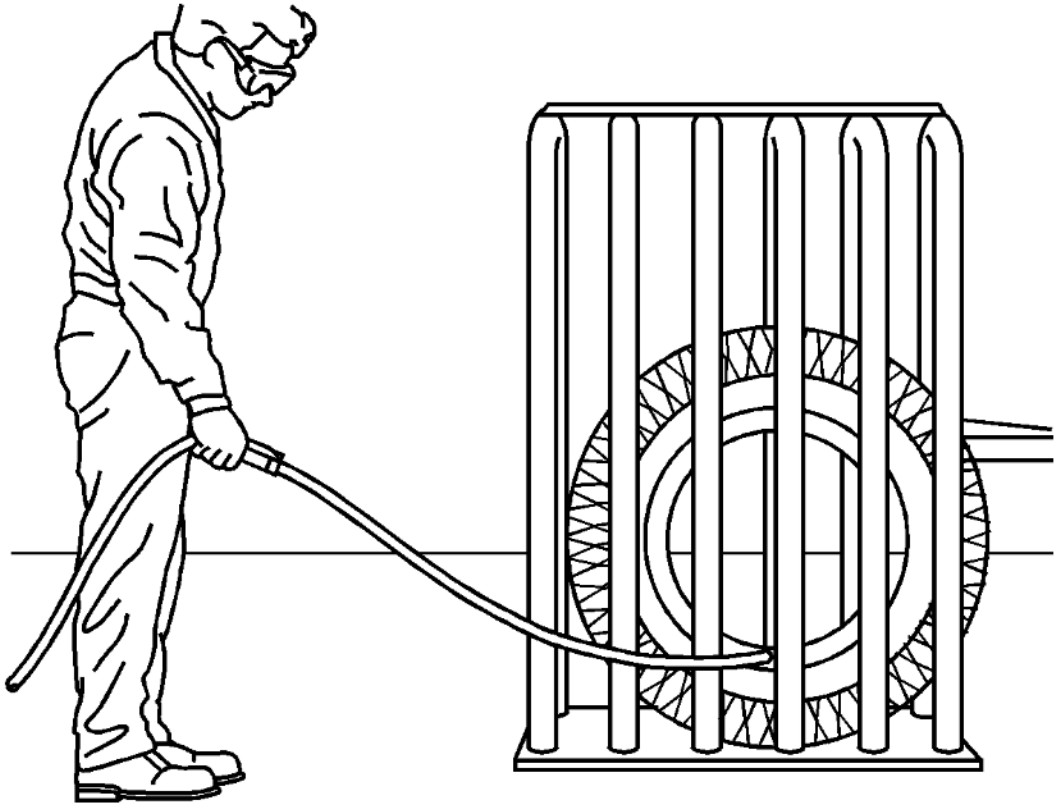

Fig. 34: Identifying Safety Cage
Courtesy of GENERAL MOTORS COMPANY

Some run flat tires may require more than 275 kPa (40 psi) to seat the bead. In such a case, a tire safety cage must be used. Consult the tire manufacturer for its individual repair policy.

Final Inspection

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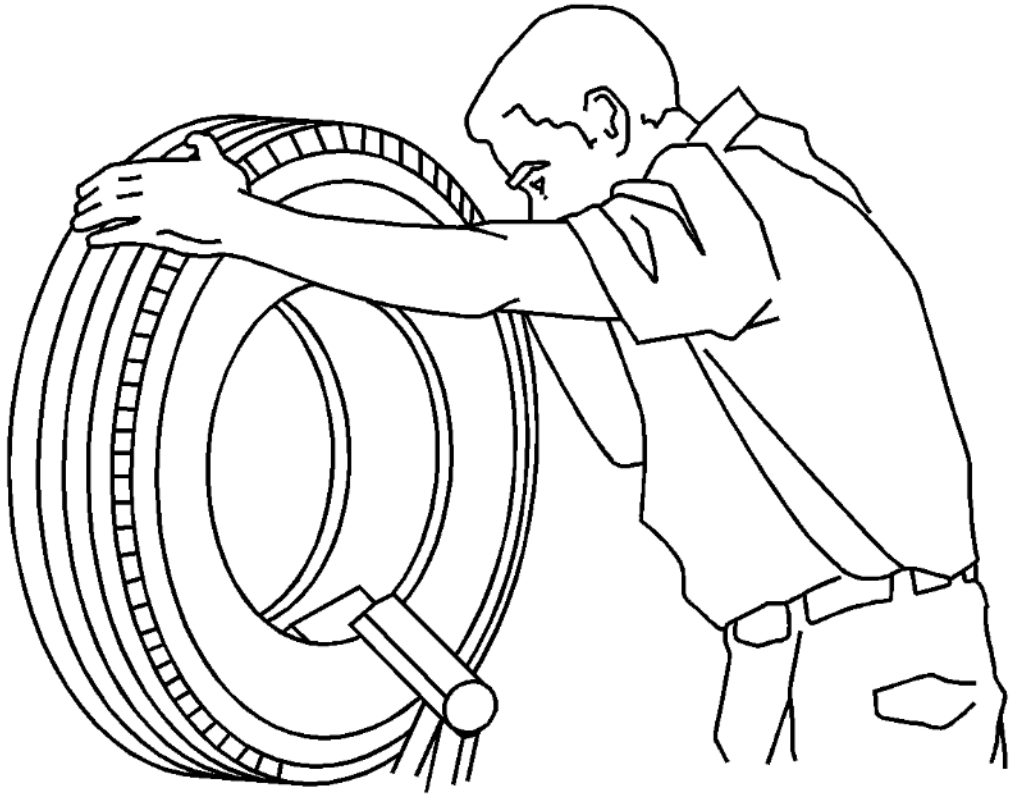

Fig. 35: Performing Final Inspection
Courtesy of GENERAL MOTORS COMPANY

1. After remounting and inflating the tire, check both beads, the repair and the valve with a water and soap solution in order to detect leaks.
2. If the tire continues to lose air, the tire must be demounted and reinspected.
3. Balance the tire and wheel assembly. Refer to **Tire and Wheel Assembly Balancing - Off Vehicle** .

For additional tire puncture repair information, contact:

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Rubber Manufacturers Association (RMA)

1400 K Street, N.W., Suite 900

Washington

DC

20005-2403

Telephone: 202-682-4800

E-mail: info@rma.org

Website: www.rma.org

TIRE DISMOUNTING AND MOUNTING

CAUTION: Use a tire changing machine in order to dismount tires. Do not use hand tools or tire irons alone in order to remove the tire from the wheel. Damage to the tire beads or the wheel rim could result.

CAUTION: Do not scratch or damage the clear coating on aluminum wheels with the tire changing equipment. Scratching the clear coating could cause the aluminum wheel to corrode and the clear coating to peel from the wheel.

CAUTION: Damage to either the tire bead or the wheel mounting holes can result from the use of improper wheel attachment or tire mounting procedures. It takes up to 70 seconds for all of the air to completely exhaust from a large tire. Failure to follow the proper procedures could cause the tire changer to put enough force on the tire to bend the wheel at the mounting surface. Such damage may result in vibration and/or shimmy, and under severe usage lead to wheel cracking.

1. Remove the valve core from the valve stem.
2. Deflate the tire completely.

NOTE: Rim-clamp European-type tire changers are recommended.

3. Use the tire changer in order to remove the tire from the wheel. Follow steps 4-7 to remove the tire from the wheel.

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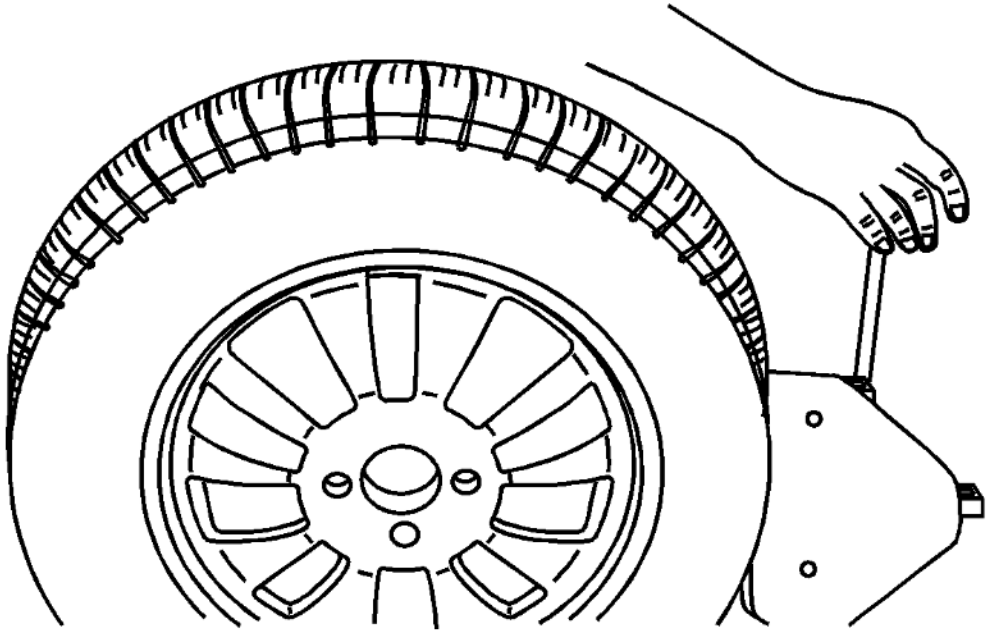

Fig. 36: Using Tire Changer to Remove Tire
Courtesy of GENERAL MOTORS COMPANY

4. When separating the tire bead from the wheel, position the bead breaking fixture 90, 180 and 270 degrees from the valve stem.

CAUTION: Failure to position valve stem in proper position while dismounting and mounting the tire may result in the TPM sensor to become damaged.

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5. Position the wheel and tire so the valve stem is at the 7 o'clock position relative to the head. Apply tire bead lubricant to the pry bar to prevent damage to the tire bead. The tire iron or pry bar can be inserted when prying the outer tire bead up and over the mounting/dismounting head.

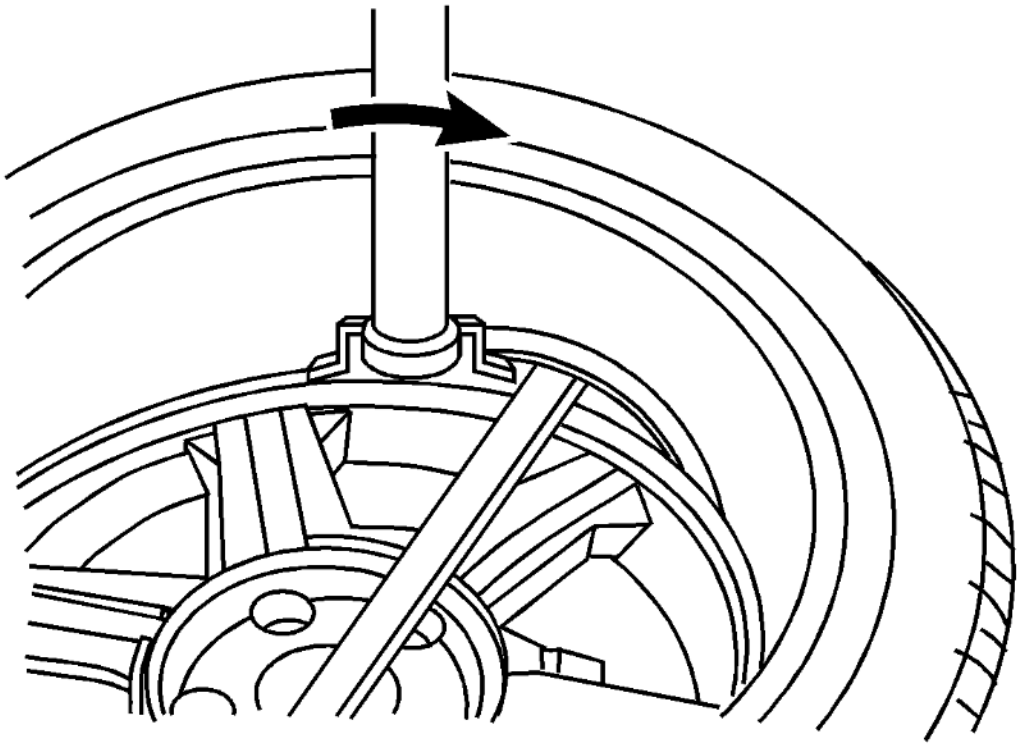

Fig. 37: Separating Tire Bead from Wheel
Courtesy of GENERAL MOTORS COMPANY

6. Position the wheel and tire so the valve stem is again at the 7 o'clock position relative to the head. The tire iron or pry bar can be inserted when prying the inner tire bead up and over the mounting/dismounting head.

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7. Remove all residual liquid sealant from the inside of the tire and wheel surfaces. If any tire sealant is noted upon tire dismounting on vehicles equipped with TPM, replace the tire pressure sensor. Refer to **Tire Pressure Indicator Sensor Replacement** .
8. Use medium coarseness steel wool in order to remove any rubber, light rust or corrosion from the wheel bead seats.

CAUTION: When mounting the tires, use an approved tire mounting lubricant. DO NOT use silicon or corrosive base compounds to lubricate the tire bead and the wheel rim. A silicon base compound can cause the tire to slip on the rim. A corrosive type compound can cause tire or rim deterioration.

9. Apply mounting lubricant to the tire bead and the wheel rim. Refer to **Adhesives, Fluids, Lubricants, and Sealers**.

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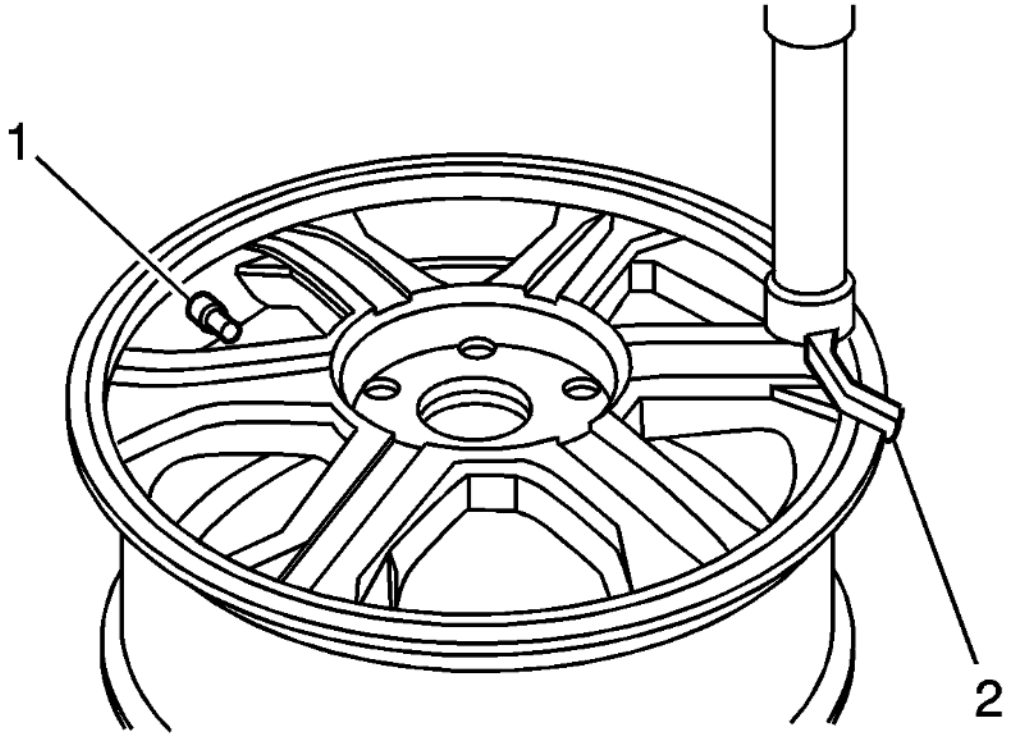

Fig. 38: Position Rim So Valve Stem Is At 7 O'clock Position Relative To Head
Courtesy of GENERAL MOTORS COMPANY

10. Position the rim so the valve stem (1) is at the 7 o'clock position relative to the head (2). This will protect the sensor when the bottom bead seats.

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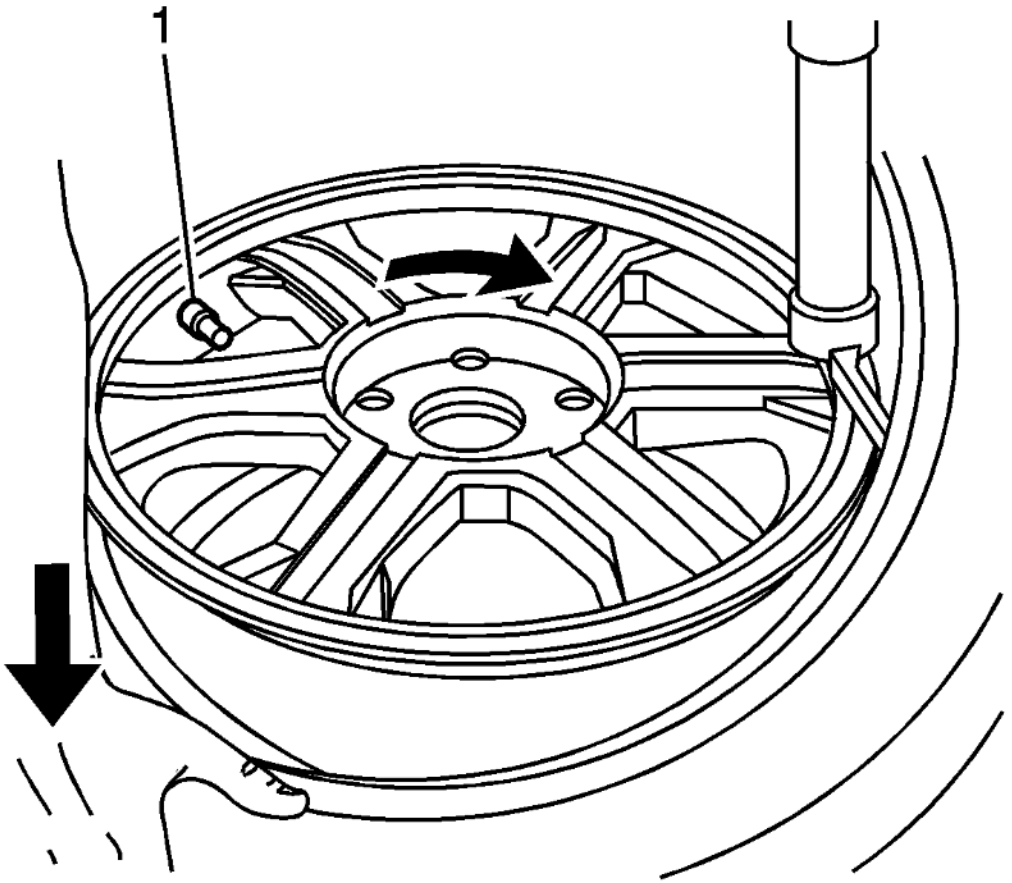

Fig. 39: Ensure Valve Stem Is At 7 O'clock Position
Courtesy of GENERAL MOTORS COMPANY

11. Using the tire machine, rotate the tire/wheel assembly clockwise when transferring the tire bead to the inside of the wheel rim. Ensure that the valve stem (1) is at the 7 o'clock position.

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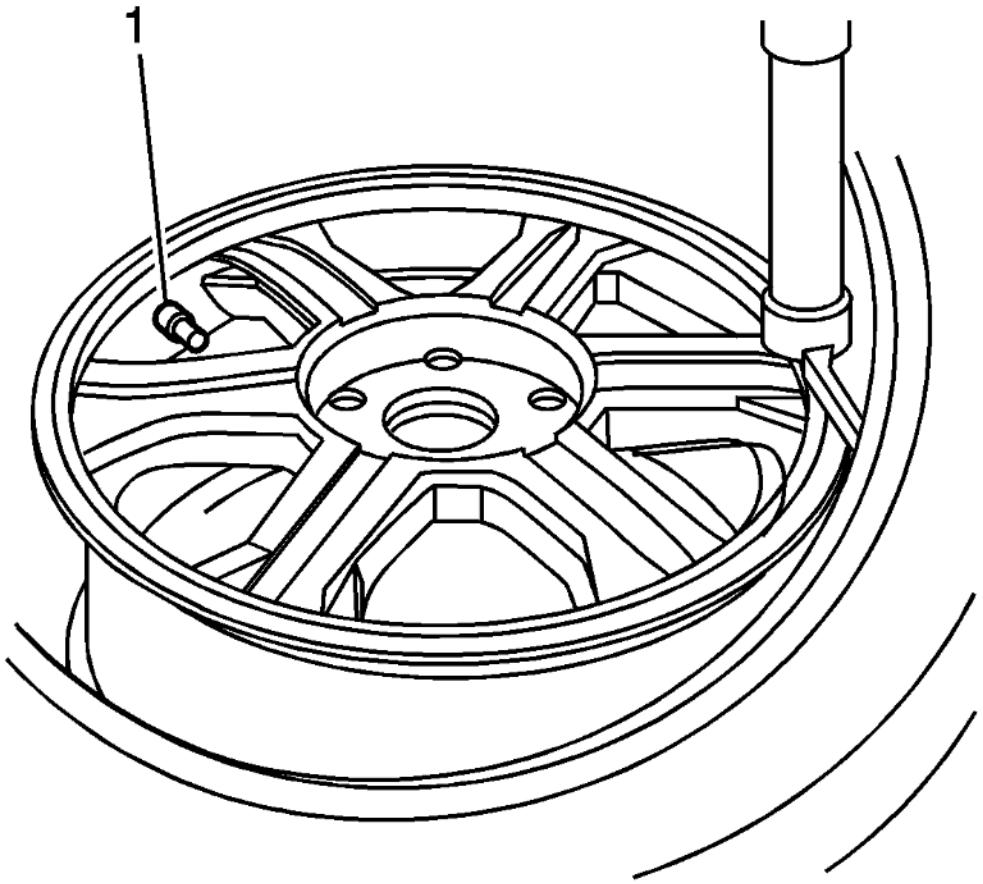

Fig. 40: Reposition Wheel And Tire So Valve Stem Is At 7 O'clock Position Relative To Head
Courtesy of GENERAL MOTORS COMPANY

12. After the bottom bead is on the wheel, reposition the wheel and tire so that the valve stem (1) is at the 7 o'clock position relative to the head. This will protect the sensor while mounting the tire bead to the outside of the wheel.

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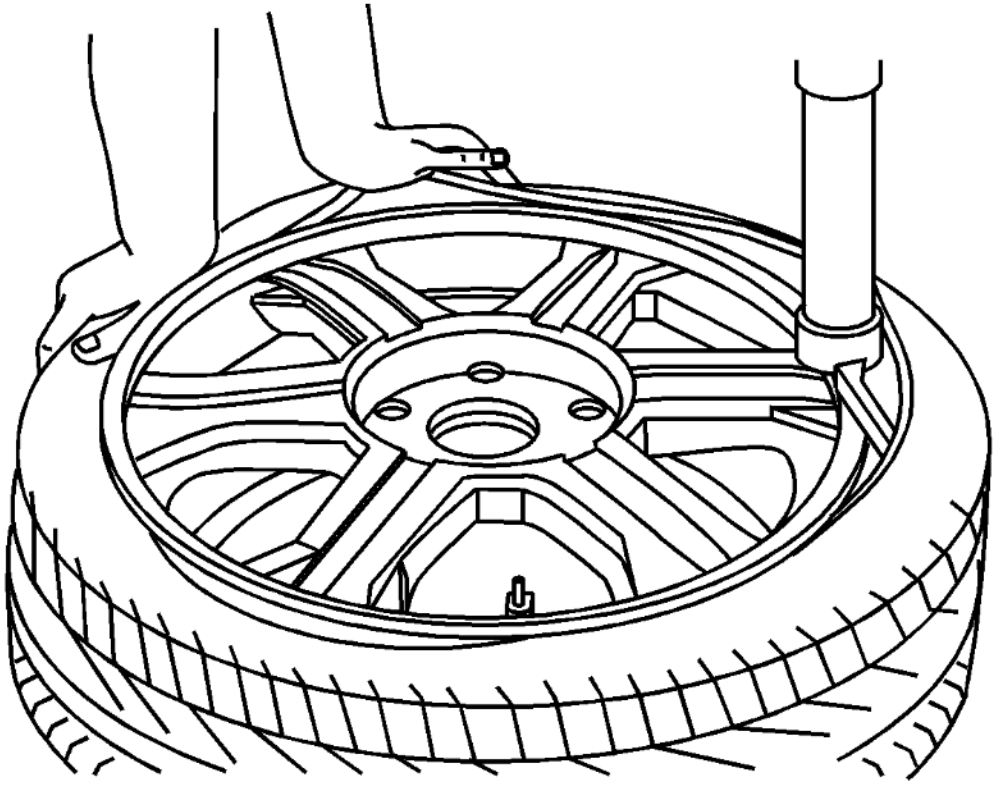

Fig. 41: Using Tire Changer
Courtesy of GENERAL MOTORS COMPANY

13. Use the tire changer in order to install the tire to the wheel.

WARNING: To avoid serious personal injury, do not stand over tire when inflating. The bead may break when the bead snaps over the safety hump. Do not exceed 275 kPa (40 psi) pressure when inflating any tire if beads are not seated. If 275 kPa (40 psi) pressure will not seat the beads, deflate, relubricate the beads and reinflate.

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Overinflation may cause the bead to break and cause serious personal injury.

14. Inflate the tire until it passes the bead humps. Be sure that the valve core is not installed at this time.
15. Install the valve core to the valve core stem.
16. Inflate the tire to the proper air pressure.
17. Ensure that the locating rings are visible on both sides of the tire in order to verify that the tire bead is fully seated on the wheel.

TIRE ROTATION

Tools Required

J 39544-KIT Torque Socket Set

Removal Procedure

In order to equalize wear, rotate the tires at the specified intervals. Refer to **Maintenance Schedule** . In addition to scheduled rotation, rotate the tire and wheel assemblies whenever you notice uneven tire wear.

Radial tires tend to wear faster in the shoulder area, particularly in front positions, due to design. Radial tires in non-drive locations may develop an irregular wear pattern that can generate tire noise. This especially makes regular tire rotation necessary.

1. Raise and support the vehicle. Refer to **Lifting and Jacking the Vehicle** .
2. Remove the center caps from the wheels, if equipped.
3. Remove the tire and wheel assemblies. Refer to **Tire and Wheel Removal and Installation (6-Lug Wheel)Tire and Wheel Removal and Installation (8-Lug Wheel)**.

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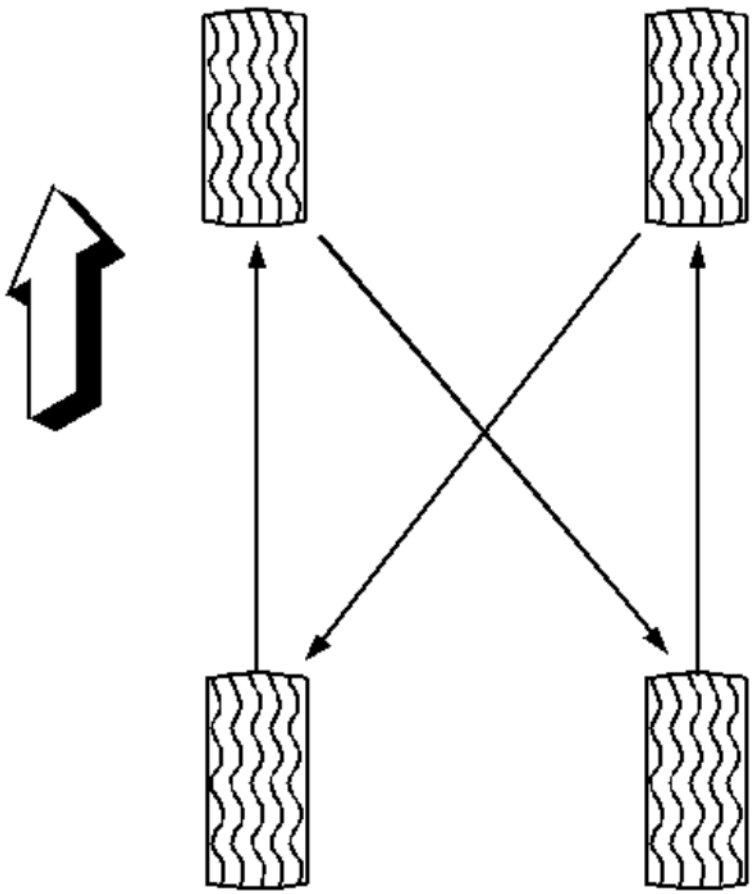

Fig. 42: Rotating Tires (4 Tires)
Courtesy of GENERAL MOTORS COMPANY

4. Rotate the 4 wheels and tires as shown.

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Installation Procedure

1. Install the tire and wheel assemblies. Refer to **Tire and Wheel Removal and Installation (6-Lug Wheel)Tire and Wheel Removal and Installation (8-Lug Wheel)**.
2. Install the center caps, if equipped.
3. Lower the vehicle.
4. Check the tire pressure. Refer to the tire placard and adjust the tire pressure as necessary.
5. Perform the tire pressure sensor learn procedure, if equipped. Refer to **Tire Pressure Indicator Sensor Learn** .

SPARE WHEEL HOIST LOCK CYLINDER REPLACEMENT

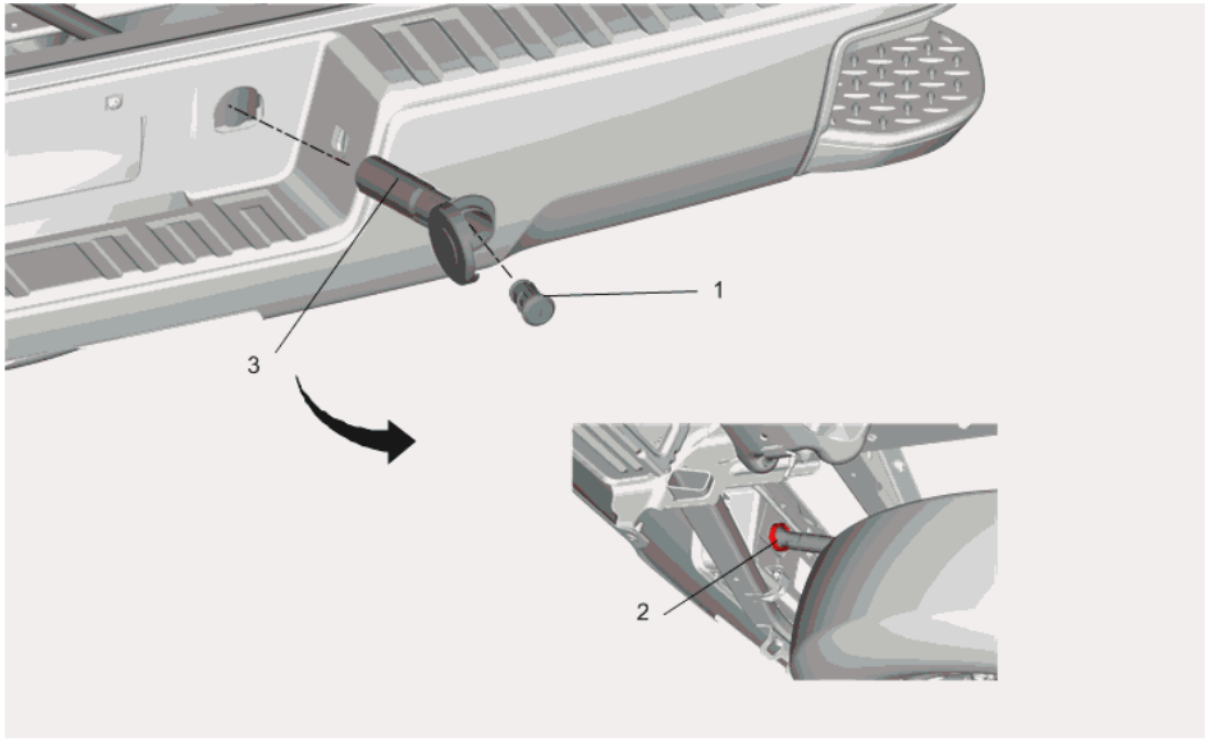

Fig. 43: Spare Wheel Hoist Lock Cylinder
Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
Preliminary Procedure	

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Callout	Component Name
1. Raise and support the vehicle. Refer to **Lifting and Jacking the Vehicle** .	
1	Spare Wheel Hoist Lock Cylinder **Procedure** If replacing the spare wheel hoist lock cylinder, coding will be necessary. Refer to **Spare Wheel Hoist Lock Cylinder Coding** .
2	Spare Wheel Hoist Lock Cylinder Case Retainer **Procedure** Using the appropriate tool remove the spare wheel hoist lock cylinder case retainer.
3	Spare Wheel Hoist Lock Cylinder Case

SPARE WHEEL HOIST REPLACEMENT

Tire Hoist Secondary Latch Mechanism

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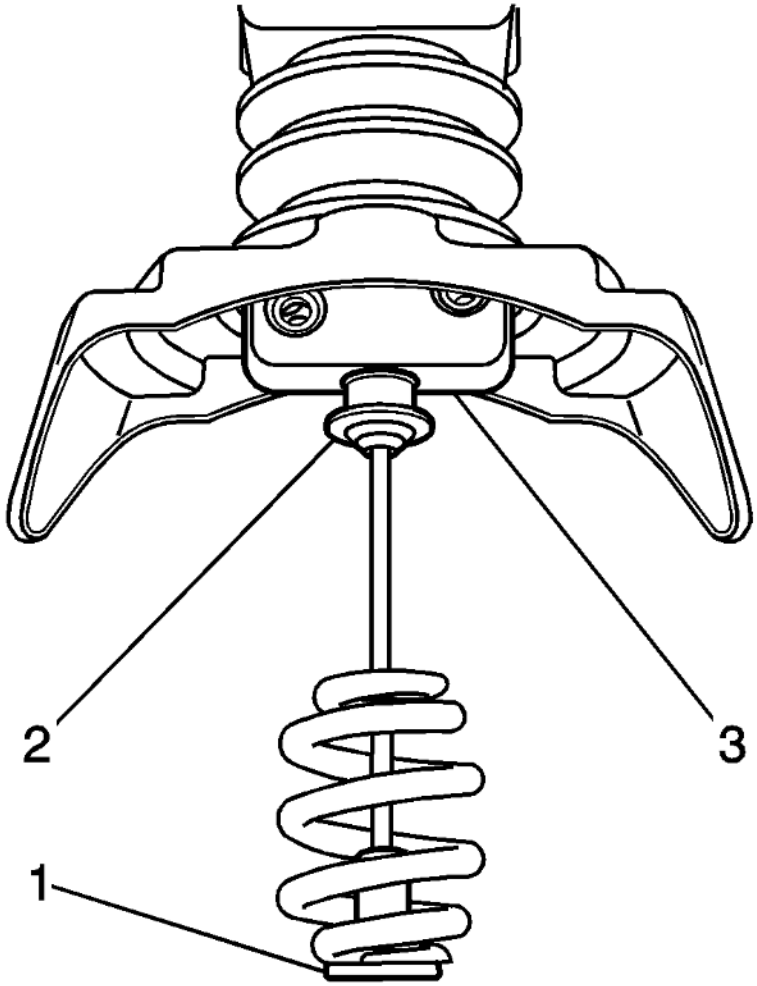

Fig. 44: Identifying Hoist Shaft
Courtesy of GENERAL MOTORS COMPANY

NOTE: **If the spare tire hoist has been fully raised without a spare tire in place, the secondary latch mechanism may have become engaged. If this has occurred the hoist will not lower and the following steps will need to be followed:**

1. Rotate the hoist shaft counterclockwise until approximately 15 cm (6 in) of cable (1) is exposed.

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2. While holding the latch pin (3), fully depress the latch button (2) and release the secondary latch from the hoist assembly. Some side-to-side and/or up-and-down movement may be necessary to disengage the latch mechanism.
3. Continue rotating the hoist shaft counterclockwise in order to lower the hoist the rest of the way.
4. If this does not release the secondary latch, the spare tire hoist will need to be replaced. See the following procedure.

Removal Procedure

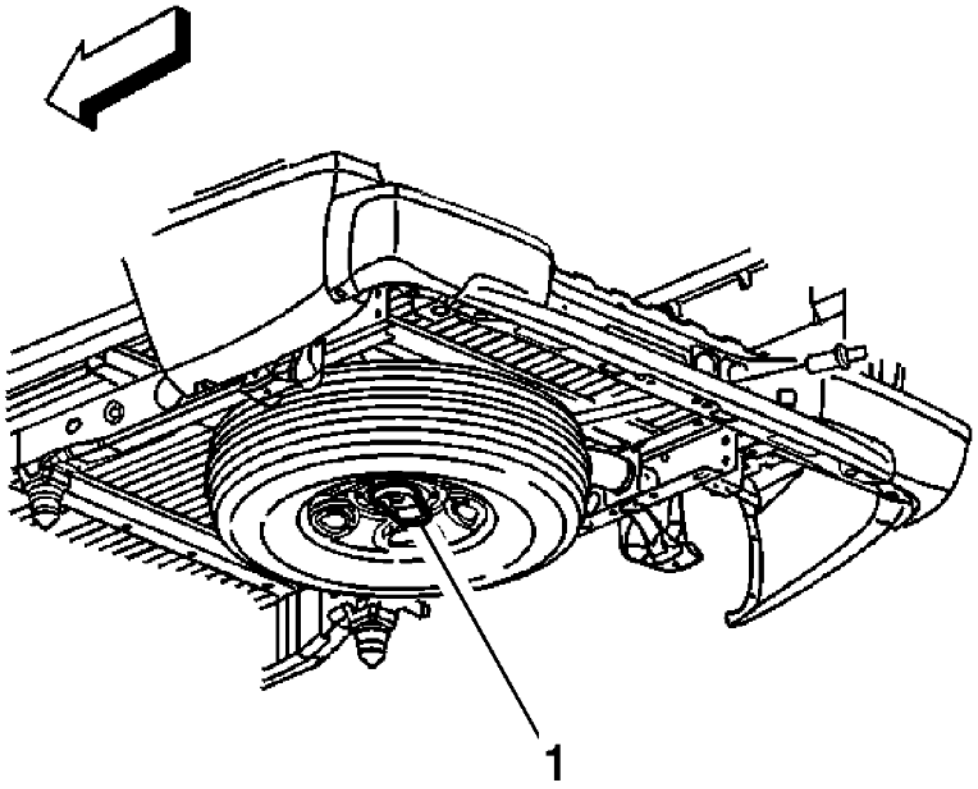

Fig. 45: Locating Spare Tire

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Courtesy of GENERAL MOTORS COMPANY

1. If the vehicle is equipped with a spare tire stowage lock cylinder (1), open the spare tire lock cover on the bumper and using the ignition key, remove the lock.

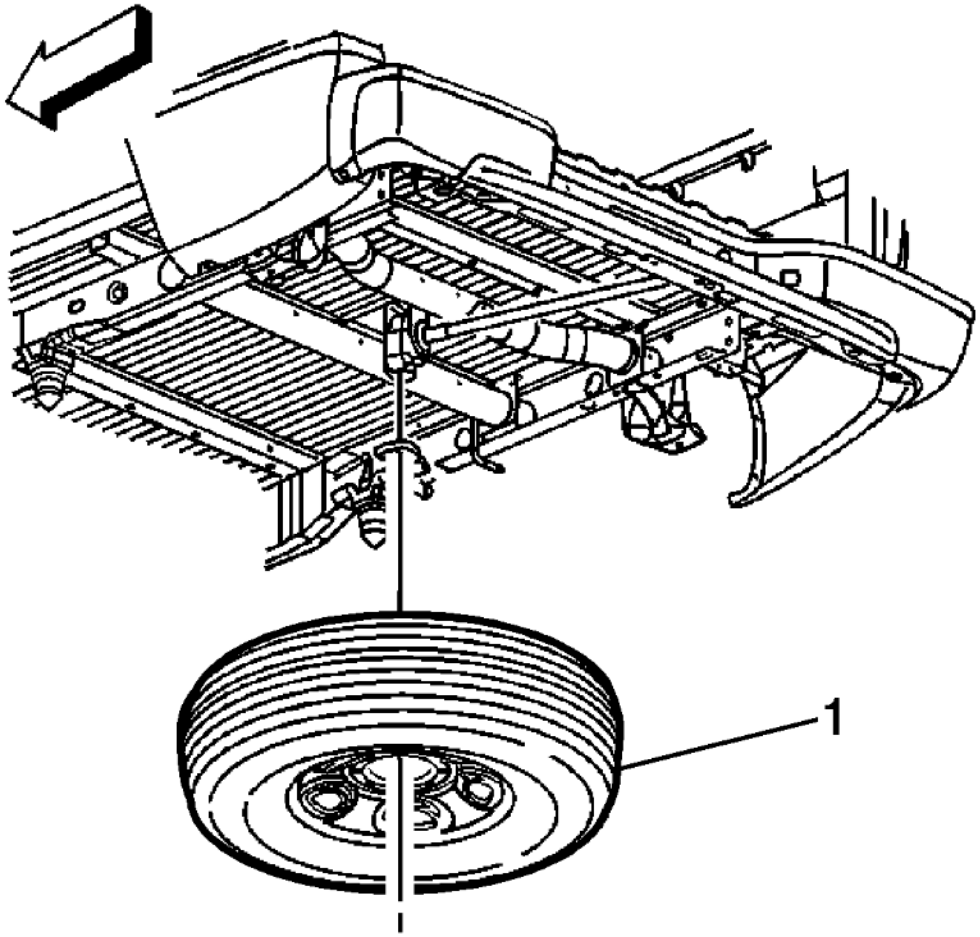

Fig. 46: View Of Spare Tire
Courtesy of GENERAL MOTORS COMPANY

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CAUTION: Use only hand tools to lower and raise the spare tire hoist assembly. Do not use air tools. The use of air tools at high speeds will damage the spare tire hoist assembly.

2. Rotate the hoist shaft counterclockwise in order to lower the spare tire (1) to the ground. Continue to rotate the shaft until the spare tire (1) can be pulled out from under the vehicle and removed. If the spare tire (1) does not lower to the ground, the secondary latch is engaged causing the spare tire (1) not to lower.
3. If the secondary latch is engaged and the cable end is visible, perform the following procedure:
    1. Tighten the cable by rotating the hoist shaft clockwise until you hear 2 clicks or feel it skip twice. You cannot overtighten the cable.
    2. Loosen the cable by rotating the hoist shaft counterclockwise 3 or 4 turns.
    3. If the spare tire (1) can be lowered, repeat steps 1 and 2 to see if the spare tire (1) can be removed.
    4. If the spare tire (1) cannot be lowered, rotate the hoist shaft counterclockwise until approximately 15 cm (6 in) of cable is exposed.
    5. Raise and support the vehicle. Refer to **Lifting and Jacking the Vehicle** .
    6. Place a transmission jack, or equivalent, under the spare tire (1).
    7. Position the center of the transmission jack under the secondary latch release button at the center of the spare tire. Arrange the arms of the transmission jack so they will support the tire after it has been released.
    8. Raise the jack until the spare tire (1) stops moving upward and is firmly held in place, releasing the secondary latch.
    9. Lower the spare tire (1). If the spare tire (1) is hanging by the cable, rotate the hoist shaft counterclockwise until the spare tire (1) is low enough to remove.
4. If the secondary latch is engaged and the cable end is NOT visible, perform the following procedure:
    1. Raise and support the vehicle. Refer to **Lifting and Jacking the Vehicle** .
    2. Place a transmission jack, or equivalent, under the spare tire (1).
    3. Position the center of the transmission jack under the secondary latch release button at the center of the spare tire (1). Arrange the arms of the transmission jack so they will support the tire after it has been released.
    4. Raise the jack until the spare tire (1) stops moving upward and is firmly held in place, releasing the secondary latch.
    5. Lower the tire and remove it from the jack.
5. Raise and support the vehicle if it is not already raised. Refer to **Lifting and Jacking the Vehicle** .
6. Depress the tabs, remove the guide shaft from the hoist collar, and slide the shaft toward the bumper.
7. Remove the collar from the hoist.

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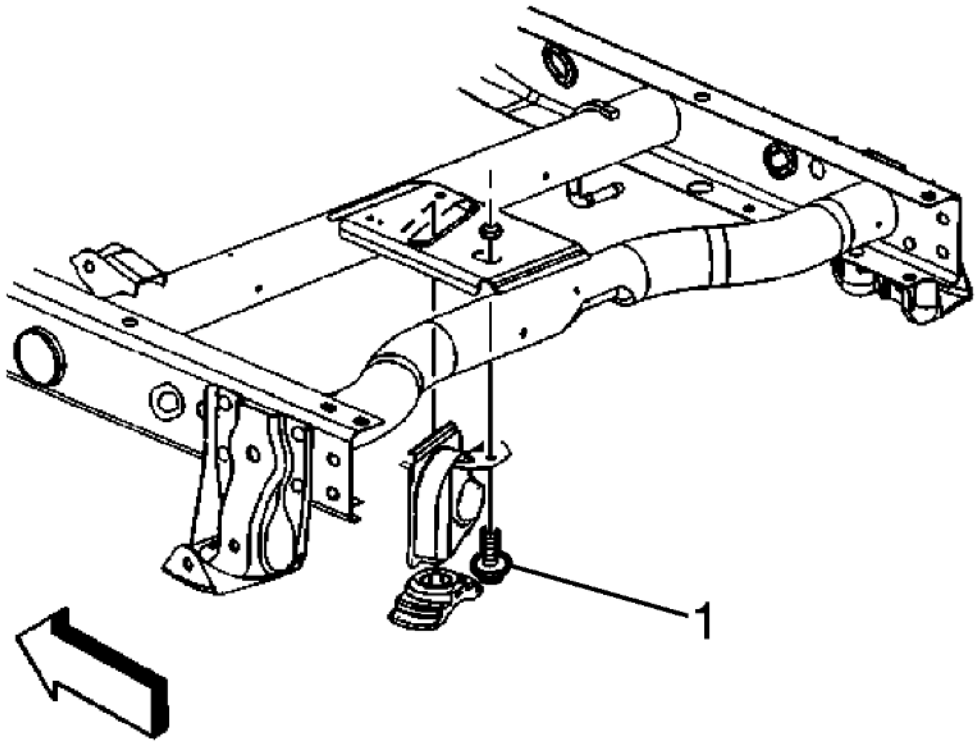

Fig. 47: Tire Hoist, Bracket And Bolt
Courtesy of GENERAL MOTORS COMPANY

8. Remove the bolt (1).
9. Remove the hoist from the bracket.

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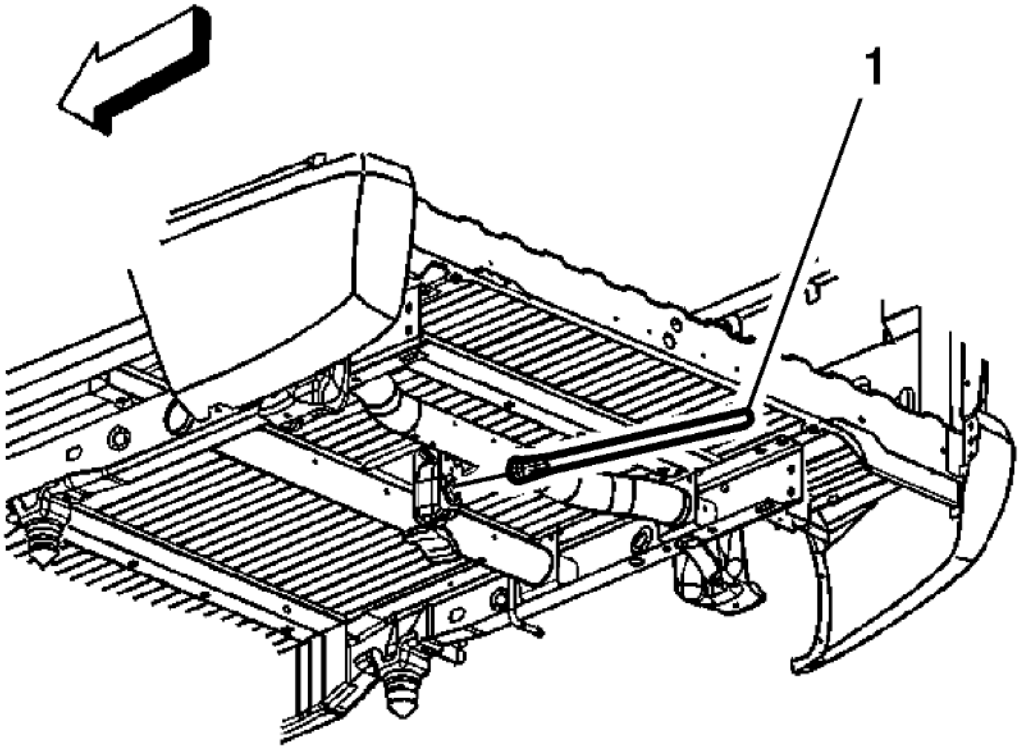

Fig. 48: Spare Tire Hoist Shaft Guide
Courtesy of GENERAL MOTORS COMPANY

10. Remove the spare tire hoist shaft guide (1) from the bumper.

Installation Procedure

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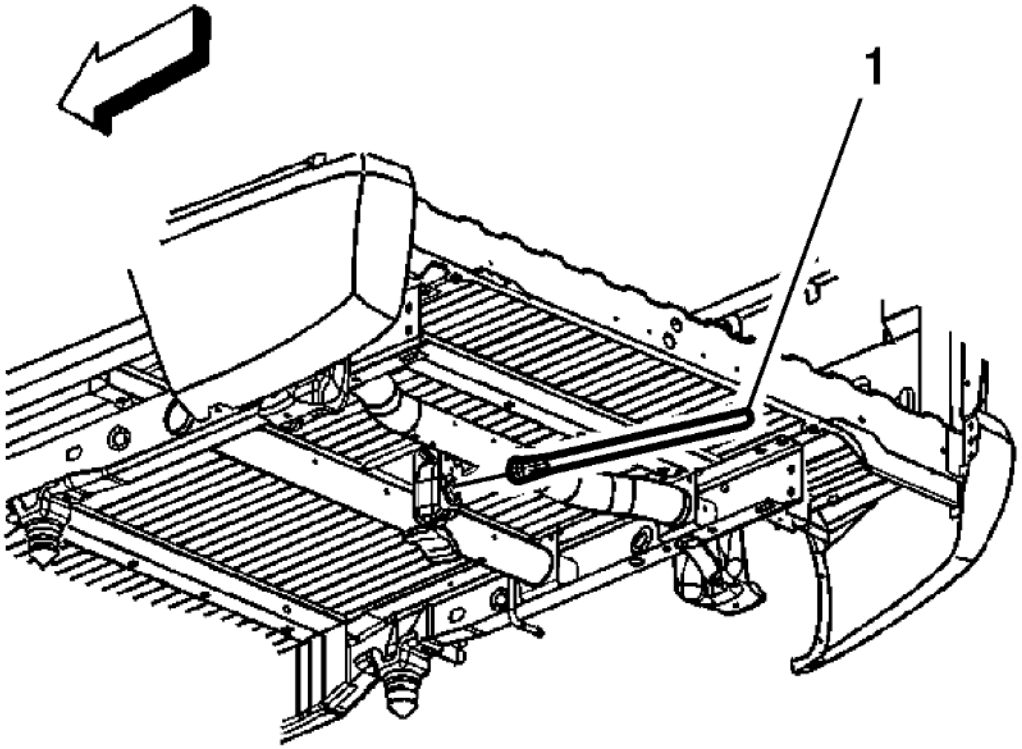

Fig. 49: Spare Tire Hoist Shaft Guide
Courtesy of GENERAL MOTORS COMPANY

1. Install the spare tire hoist shaft guide (1) to the bumper.

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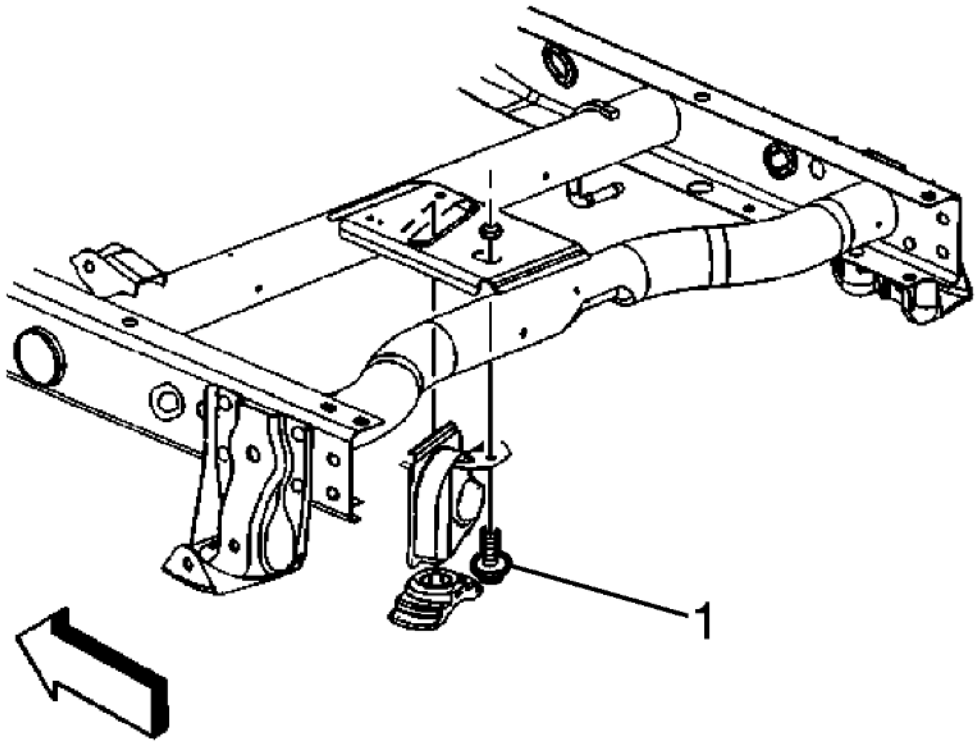

Fig. 50: Tire Hoist, Bracket And Bolt
Courtesy of GENERAL MOTORS COMPANY

CAUTION: Refer to Fastener Caution .

2. Install the hoist to the crossmember.
3. Install the bolt (1) and tighten to 50 N.m (37 lb ft).

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4. Install the collar to the hoist.
5. Install the shaft to the hoist.

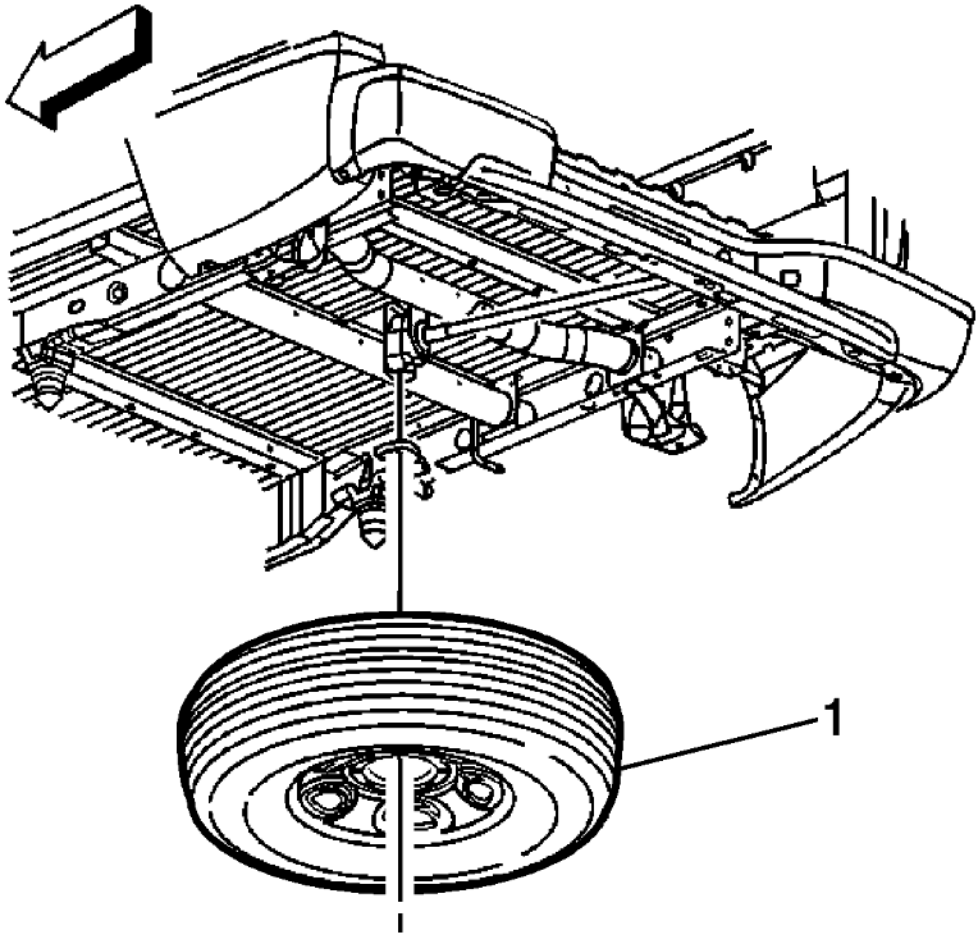

Fig. 51: View Of Spare Tire
Courtesy of GENERAL MOTORS COMPANY

6. Install the spare tire (1) to the hoist.

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CAUTION: Use only hand tools to lower and raise the spare tire hoist assembly. Do not use air tools. The use of air tools at high speeds will damage the spare tire hoist assembly.

7. Rotate the hoist shaft clockwise until the spare tire (1) is in position and the hoist clicks 2 times or it skips twice. You cannot overtighten the cable.
8. Remove the safety stands.
9. Lower the vehicle.

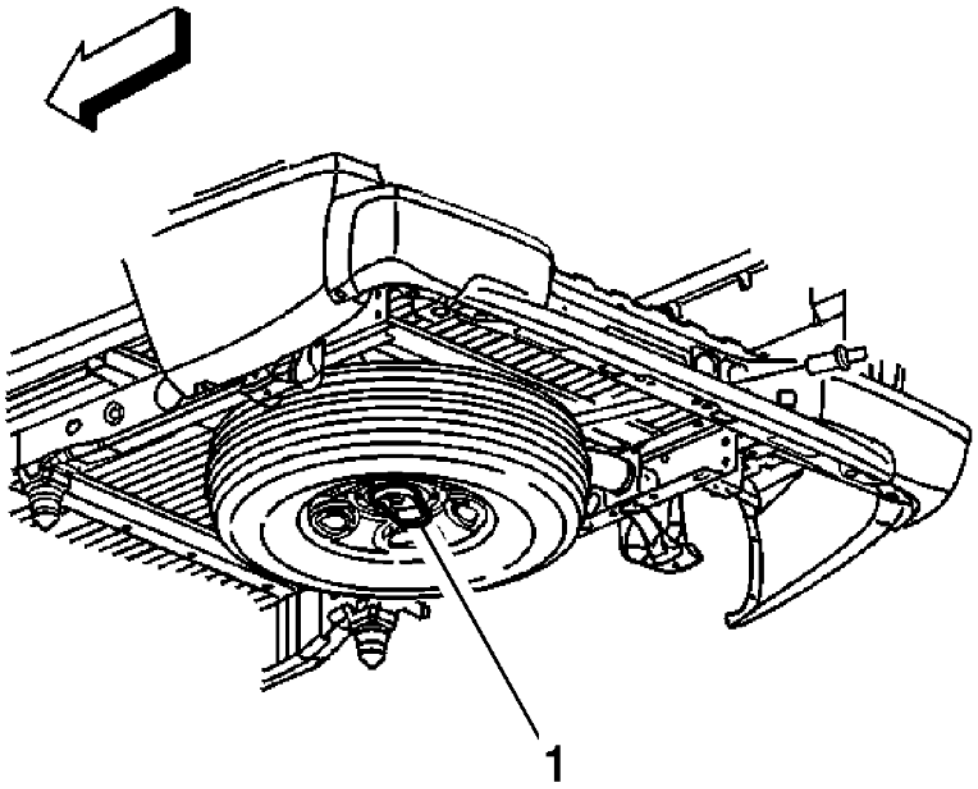

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Fig. 52: Locating Spare Tire
Courtesy of GENERAL MOTORS COMPANY

10. Install the spare tire stowage lock cylinder (1).

TIRE AND WHEEL BALANCING

WARNING: Failure to adhere to the following precautions before tire balancing can result in personal injury or damage to components:

- **Clean away any dirt or deposits from the inside of the wheels.**
- **Remove any stones from the tread.**
- **Wear eye protection.**
- **Use coated weights on aluminum wheels.**

Tire and Wheel Assembly Balancer Calibration

Tire and wheel balancers can drift out of calibration over time, or can become inaccurate as a result of heavy use. There will likely not be any visual evidence that a calibration problem exists. If a balancer is not calibrated within specifications, and a tire and wheel assembly is balanced on that machine, the assembly may actually be imbalanced.

Tire and wheel assembly balancer calibration should be checked approximately every 2 weeks, if the machine is used frequently, and/or whenever the balance readings are questionable.

Tire and Wheel Assembly Balancer Calibration Test

NOTE: If the balancer fails any of the steps in this calibration test, the balancer should be calibrated according to the manufacturer's instructions. If the balancer cannot be calibrated, contact the manufacturer for assistance.

Inspect the calibration of the tire and wheel assembly balancer according to the manufacturer's recommendations, or perform the following test.

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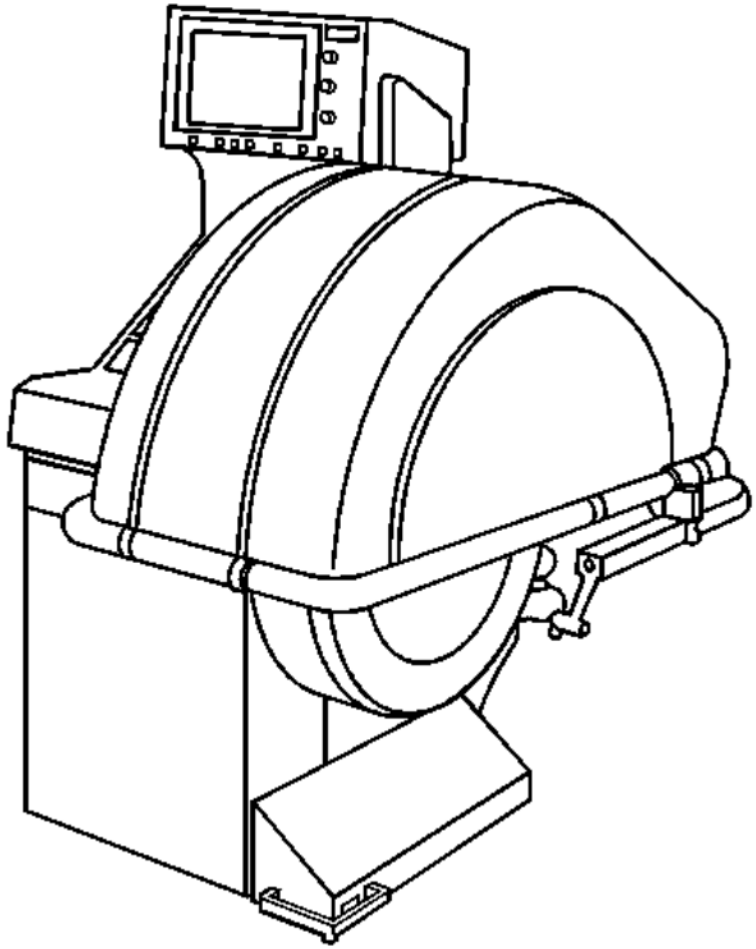

Fig. 53: View Of Tire & Wheel Assembly Balancer
Courtesy of GENERAL MOTORS COMPANY

1. Spin the balancer without a wheel or any of the adapters on the shaft.
2. Inspect the balancer readings.

Specification

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Zero within 7 g (1/4 oz)

3. If the balancer is within the specification range, balance a tire and wheel assembly - that is within radial and lateral runout tolerances - to ZERO, using the same balancer.
4. After the tire and wheel assembly has been balanced, add an 85 g (3 oz) test weight to the wheel at any location.
5. Spin the tire and wheel assembly again. Note the readings.
    - In the static and dynamic modes, the balancer should call for 85 g (3 oz) of weight, 180 degrees opposite the test weight.
    - In the dynamic mode, the weight should be called for on the flange of the wheel opposite the test weight.
6. With the assembly imbalanced to 85 g (3 oz), cycle the balancer 5 times.
7. Inspect the balancer readings:

    Specification

    Maximum variation: 7 g (1/4 oz)

8. Index the tire and wheel assembly on the balancer shaft, 90 degrees from the previous location.
9. Cycle the balancer with the assembly at the new location.
10. Inspect the balancer readings:

    Specification

    Maximum variation: 7 g (1/4 oz)

11. Repeat steps 8 through 10 until the tire and wheel assembly has been cycled and checked at each of the 4 locations on the balancer shaft.

Tire and Wheel Assembly Balancing Guidelines

NOTE: **Tire and wheel assemblies which exhibit excessive runout can produce vibrations even if the assemblies are balanced.**

It is strongly recommended that the tire and wheel assembly runout be measured and corrected if necessary BEFORE the assemblies are balanced.

If the runout of the tire and wheel assemblies has not yet been measured, refer to **Tire and Wheel Assembly Runout Measurement - Off Vehicle** before proceeding.

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There are 2 types of tire and wheel balance:

Static Balance

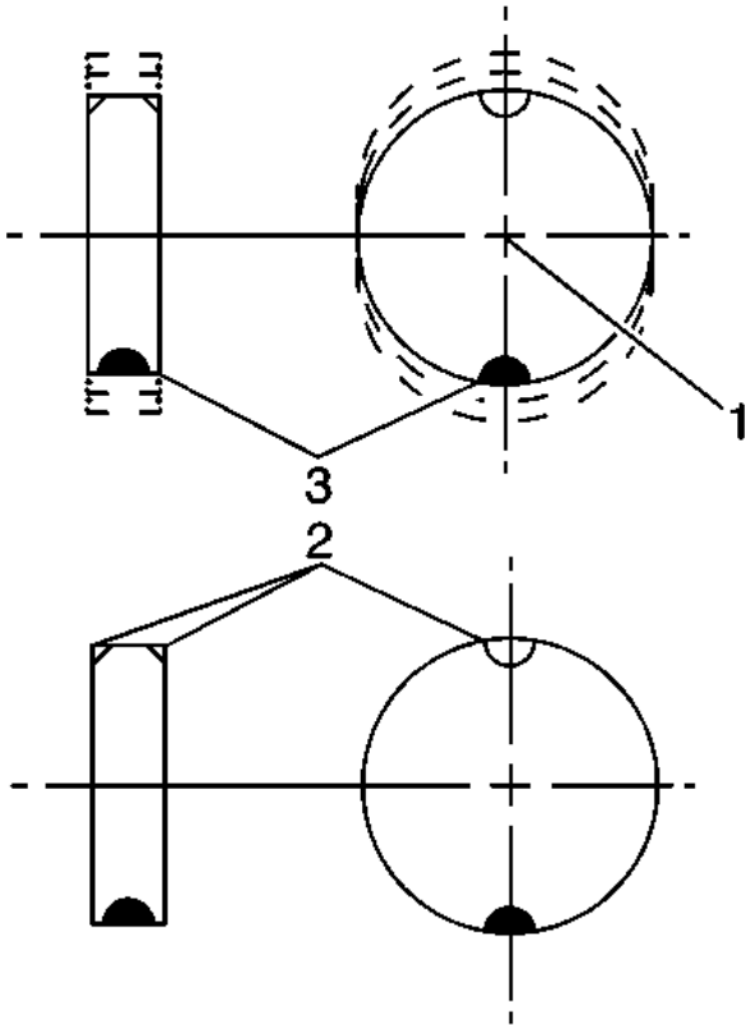

Fig. 54: View Of Static Balance
Courtesy of GENERAL MOTORS COMPANY

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Static balance is the equal distribution of weight around the wheel circumference. The wheel balance weights (2) are positioned on the wheel in order to offset the effects of a heavy spot (3). Wheels that have static imbalance can produce a bouncing action called tramp.

Dynamic Balance

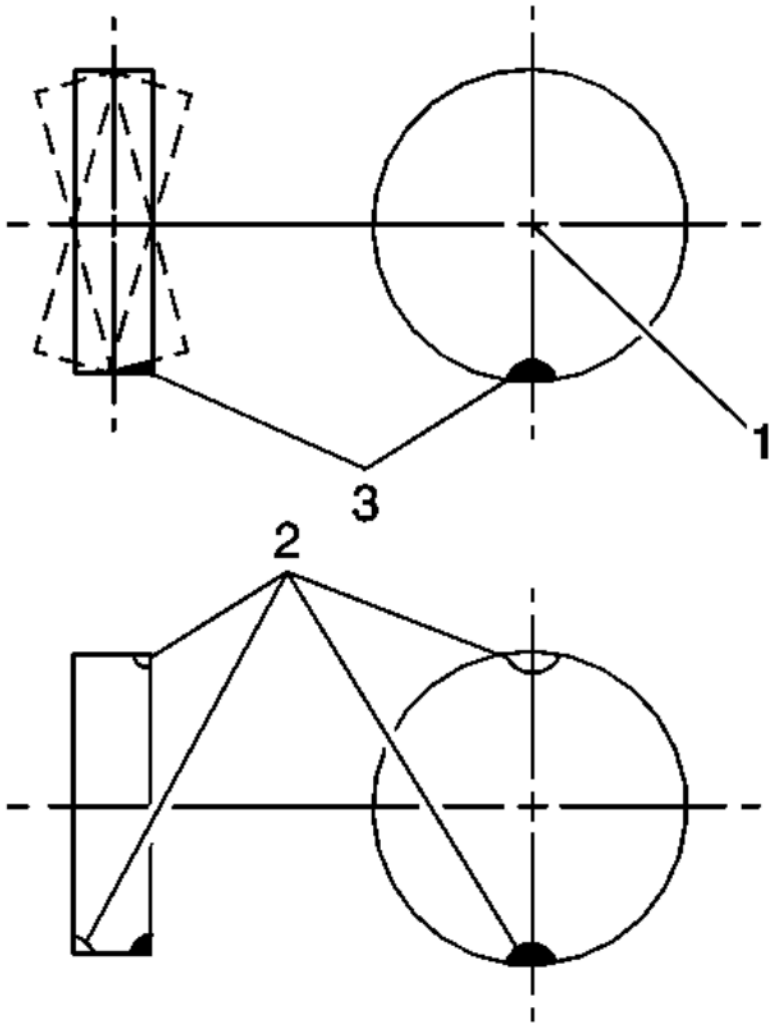

Fig. 55: View Of Dynamic Balance
Courtesy of GENERAL MOTORS COMPANY

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Dynamic balance is the equal distribution of weight on each side of the tire and wheel assembly centerline. The wheel balance weights (2) are positioned on the wheel in order to offset the effects of a heavy spot (3). Wheels that have dynamic imbalance have a tendency to move from side to side and can cause an action called shimmy.

Most off-vehicle balancers are capable of checking both types of balance simultaneously.

As a general rule, most vehicles are more sensitive to static imbalance than to dynamic imbalance; however, vehicles equipped with low profile, wide tread path, high performance tires and wheels are susceptible to small amounts of dynamic imbalance. As little as 14-21 g (1/2 - 3/4 oz) imbalance is capable of inducing a vibration in some vehicle models.

Balancing Procedure

NOTE: **When balancing tire and wheel assemblies, use a known good, recently calibrated, off-vehicle, two-plane dynamic balancer set to the finest balance mode available.**

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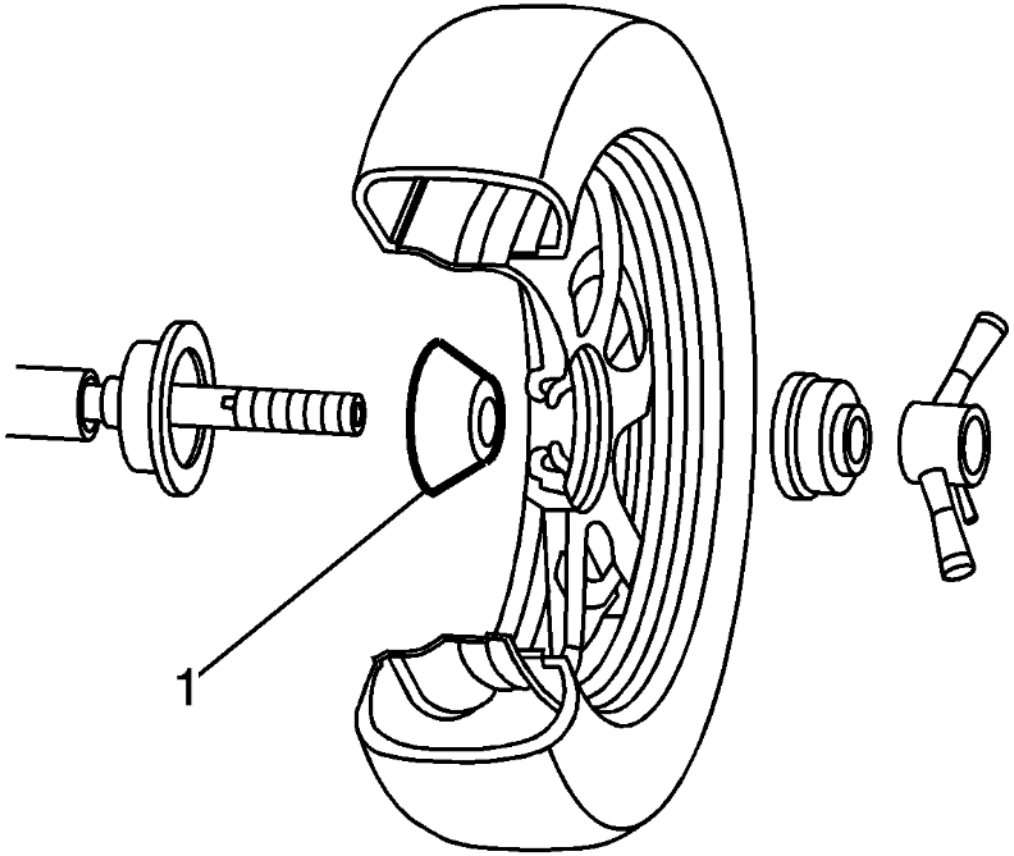

Fig. 56: Wheel Balancer Center Cone
Courtesy of GENERAL MOTORS COMPANY

NOTE: **Carefully follow the wheel balancer manufacturers's instructions for proper mounting of the center cone (1).**

1. Raise and support the vehicle. **Lifting and Jacking the Vehicle**
2. Mark the location of the wheels to the wheel studs and mark the specific vehicle position on each tire and wheel - LF, LR, RF, RR.

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3. Remove the tire and wheel assemblies one at a time and mount on a spin-type wheel balancer. **Tire and Wheel Removal and Installation (6-Lug Wheel)Tire and Wheel Removal and Installation (8-Lug Wheel)**
4. Carefully follow the wheel balancer manufacturer's instructions for proper mounting techniques to be used on different types of wheels.

   Regard aftermarket wheels, especially those incorporating universal lug patterns, as potential sources of runout and mounting concerns.

5. Be sure to use the correct type of wheel balance weights for the type of wheel rim being balanced. Be sure to use the correct type of coated wheel balance weights on aluminum wheels. Refer to Wheel Weight Usage.
6. Balance all four tire and wheel assemblies as close to zero as possible.
7. Using the matchmarks made prior to removal, install the tire and wheel assemblies to the vehicle. **Tire and Wheel Removal and Installation (6-Lug Wheel)Tire and Wheel Removal and Installation (8-Lug Wheel)**
8. Lower the vehicle.

Wheel Weight Usage

Tire and wheel assemblies can be balanced using either the static or dynamic method.

Clip-on Weights

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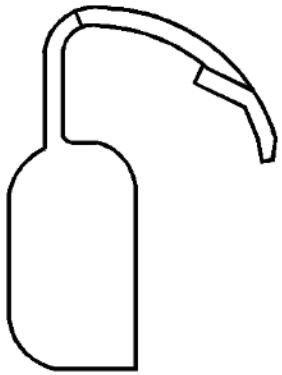

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Fig. 57: Identifying Clip-On Wheel Weight Types
Courtesy of GENERAL MOTORS COMPANY

NOTE: **When balancing factory aluminum wheels with clip-on wheel balance weights, be sure to use special polyester-coated weights. These coated weights reduce the potential for corrosion and damage to aluminum wheels.**

These coated weights reduce the potential for corrosion and damage to aluminum wheels.

- MC (1) and AW (2) series weights are approved for use on aluminum wheels.
- P (3) series weights are approved for use on steel wheels only.
- T (4) series coated weights are approved for use on both steel and aluminum wheels.

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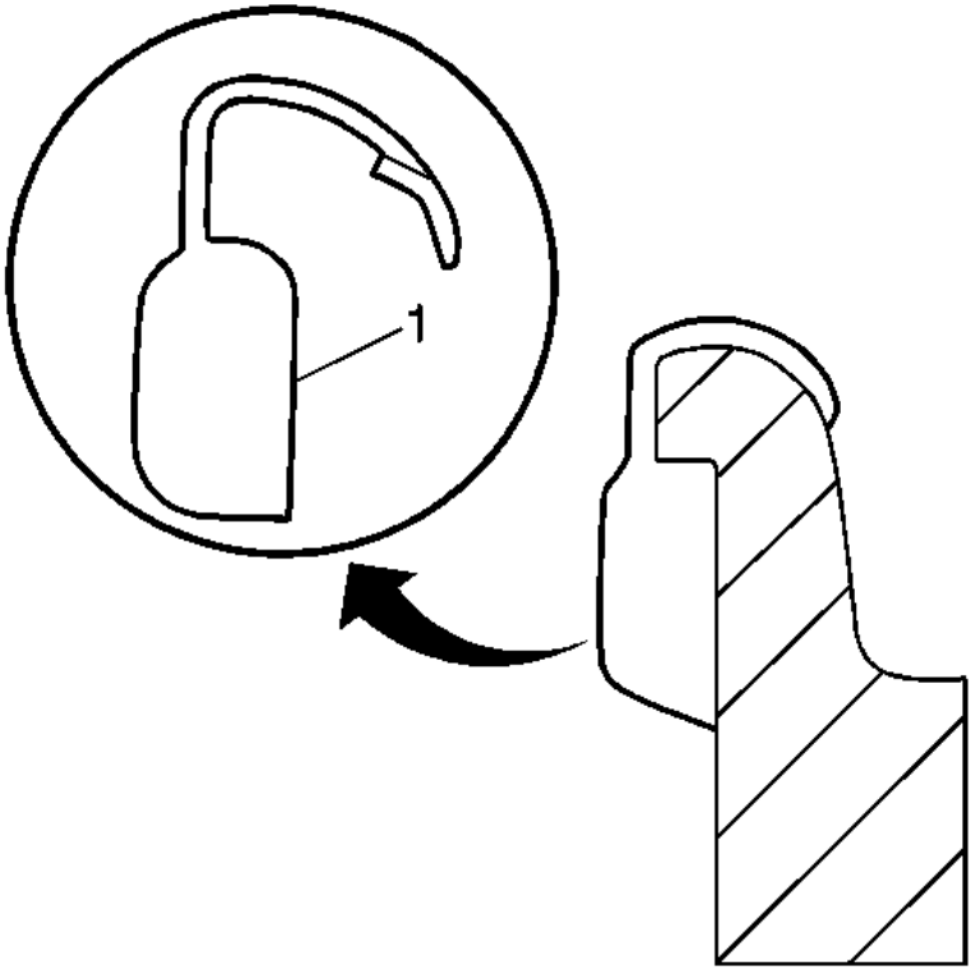

Fig. 58: Attaching Clip-On Wheel Weight
Courtesy of GENERAL MOTORS COMPANY

NOTE: **Use a nylon or plastic-tipped hammer when installing coated clip-on wheel balance weights to minimize the possibility of damage to the polyester coating.**

The contour and style of the wheel rim flange will determine which type of clip-on wheel weight (1) should be used. The weight should follow the

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contour of the rim flange. The weight clip should firmly grip the rim flange.

Wheel Weight Placement - Clip-on Weights

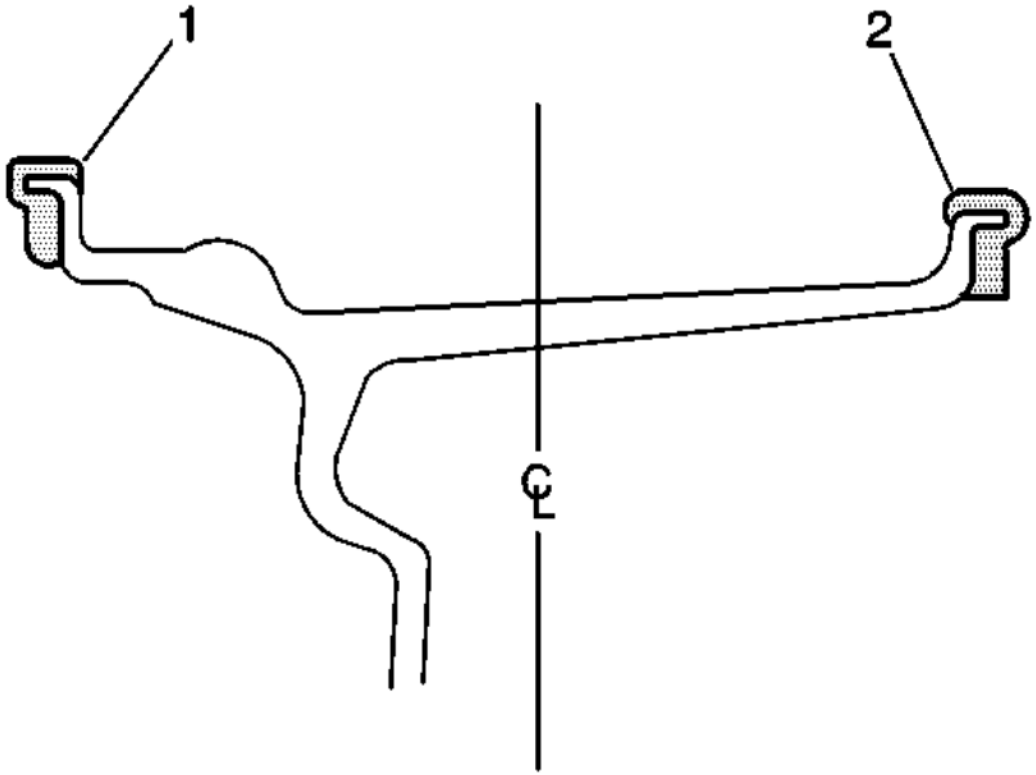

Fig. 59: Clip-On Weight Placement
Courtesy of GENERAL MOTORS COMPANY

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When static balancing, locate the wheel balance weights on the inboard flange (2) if only 28 g (1 oz) or less is called for. If more than 28 g (1 oz) is called for, split the weights as equally as possible between the inboard (2) and outboard (1) flanges.

When dynamic balancing, locate the wheel balance weights on the inboard (2) and outboard (1) rim flanges at the positions specified by the wheel balancer.

Adhesive Weights

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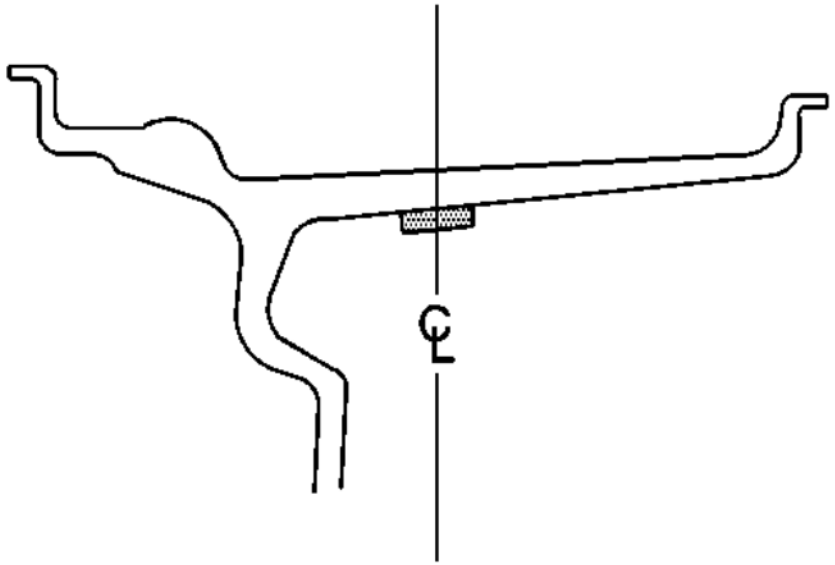

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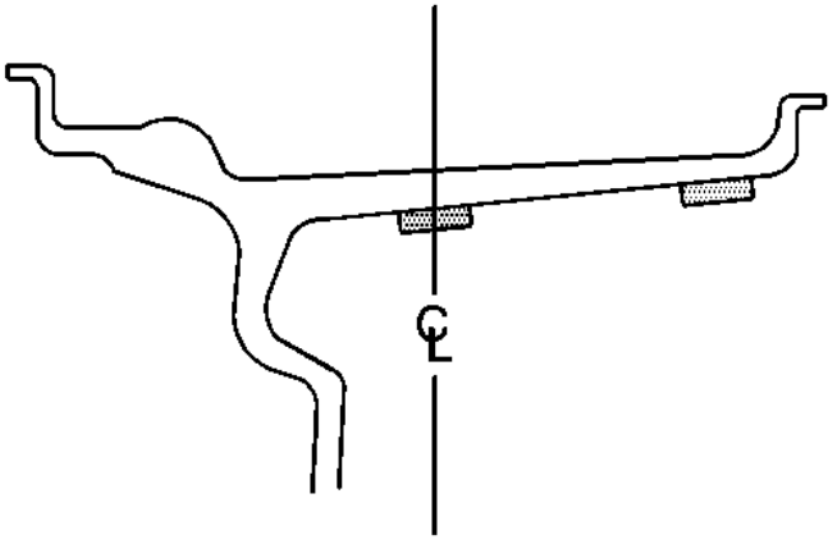

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Fig. 60: Identifying Adhesive Weight Wheel Placement
Courtesy of GENERAL MOTORS COMPANY

NOTE: **When installing adhesive balance weights on flangeless wheels, do NOT install the weight on the outboard surface of the rim.**

Adhesive wheel balance weights may be used on factory aluminum wheels. Perform the following procedure to install adhesive wheel balance weights.

1. Determine the correct areas for placement of the wheel weights on the wheel.
   - When static balancing, locate the wheel balance weights along the wheel centerline (1) on the inner wheel surface if only 28 g (1 oz) or less is called for. If more than 28 g (1 oz) is called for, split the weights as equally as possible between the wheel centerline and the inboard edge of the inner wheel surface (2).
   - When dynamic balancing, locate the wheel balance weights along the wheel centerline and the inboard edge of the inner wheel surface (2) at the positions specified by the wheel balancer.
2. Ensure that there is sufficient clearance between the wheel weights and brake system components.

NOTE: **Do not use abrasives to clean any surface of the wheel.**

3. Using a clean cloth or paper towel with a general purpose cleaner, thoroughly clean the designated balance weight attachment areas of any corrosion, overspray, dirt or any other foreign material.
4. To ensure there is no remaining residue, wipe the balance weight attachment areas again, using a clean cloth or paper towel with a mixture of half isopropyl alcohol and half water.
5. Dry the attachment areas with hot air until the wheel surface is warm to the touch.
6. Warm the adhesive backing on the wheel balance weights to room temperature.
7. Remove the protective covering from the adhesive backing on the back of the balance weights. DO NOT touch the adhesive surface.
8. Apply the wheel balance weights to the wheel, press into place with hand pressure.
9. Secure the wheel balance weights to the wheel with a 90 N (21 lb) force applied with a roller.

DESCRIPTION AND OPERATION

ALL SEASONS TIRES DESCRIPTION

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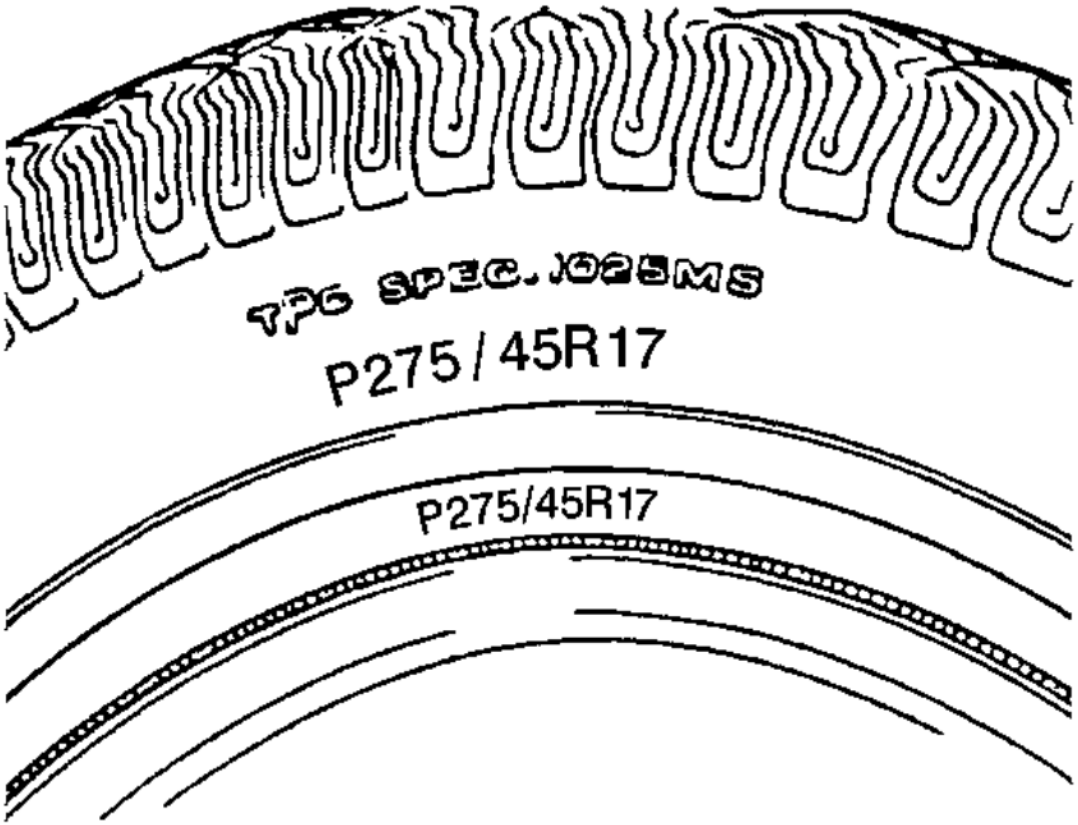

Fig. 61: Identifying All Seasons Tire Marking
Courtesy of GENERAL MOTORS COMPANY

Most GM vehicles are equipped with steel belted all-season radial tires as standard equipment. These tires qualify as snow tires, with a higher than average rating for snow traction than the non-all season radial tires previously used. Other performance areas, such as wet traction, rolling resistance, tread life, and air retention, are also improved. This is done by improvements in both tread design and tread compounds. These tires are identified by an M + S molded in the tire side wall after the tire size. The suffix MS is also molded in the tire side wall after the TPC specification number.

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The optional handling tires used on some vehicles now also have the MS marking after the tire size and the TPC specification number.

GENERAL DESCRIPTION

The factory installed tires are designed to operate satisfactorily with loads up to and including the full rated load capacity when these tires are inflated to the recommended pressures.

The following factors have an important influence on tire life:

- Correct tire pressures
- Correct wheel alignment
- Proper driving techniques
- Tire rotation

The following factors increase tire wear:

- Heavy cornering
- Excessively rapid acceleration
- Heavy braking

METRIC WHEEL NUTS AND BOLTS DESCRIPTION

Metric wheel/nuts and bolts are identified in the following way:

- The wheel/nut has the word Metric stamped on the face.
- The letter M is stamped on the end of the wheel bolt.

The thread sizes of metric wheel/nuts and the bolts are indicated by the following example: M12 x 1.5.

- M = Metric
- 12 = Diameter in millimeters
- 1.5 = Millimeters gap per thread

P-METRIC SIZED TIRES DESCRIPTION

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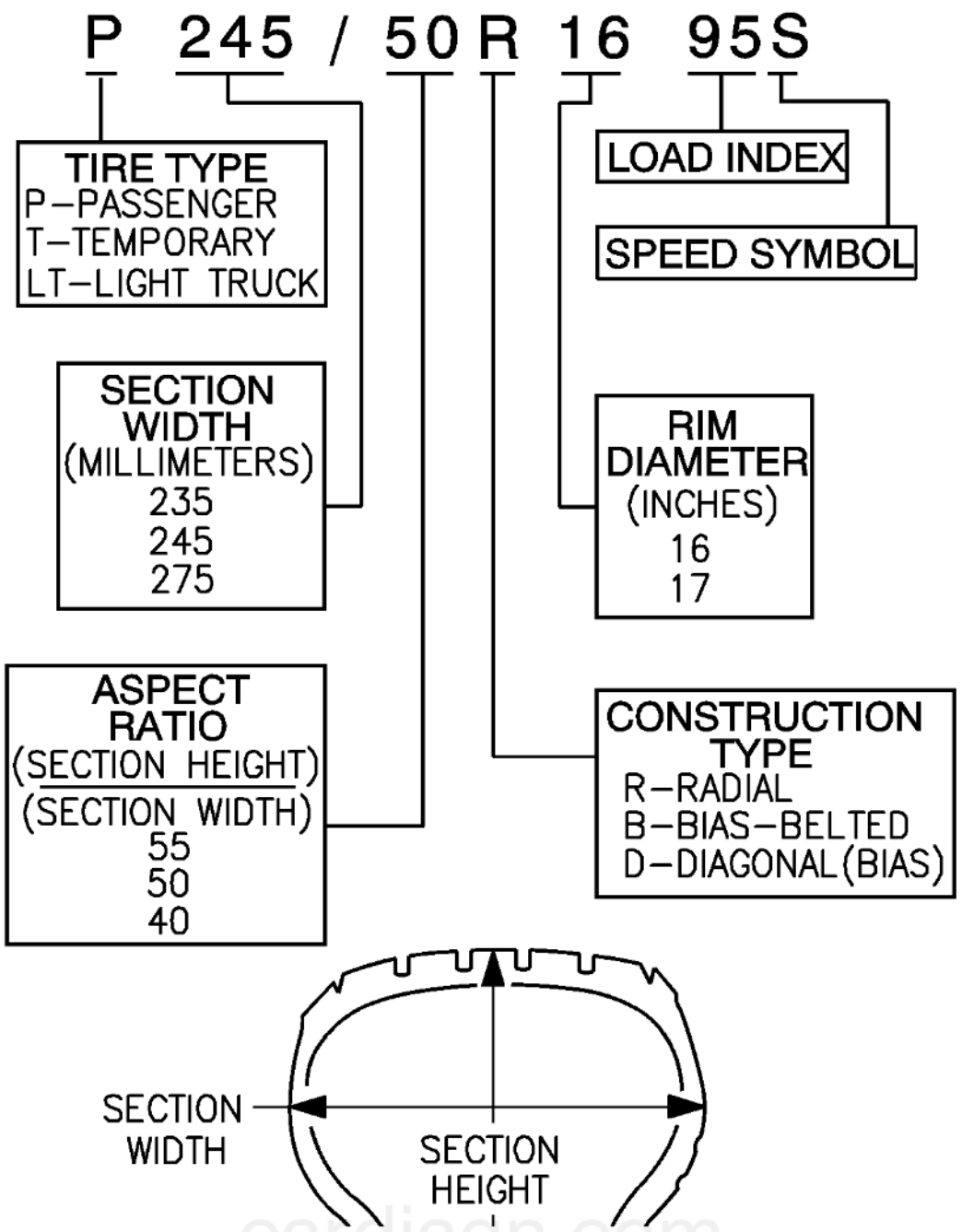

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Fig. 62: Identifying P-Metric Sized Tire Marking
Courtesy of GENERAL MOTORS COMPANY

Replacement tires should be of the same tire performance criteria (TPC) specification number. This will ensure the same size, the same load range, and the same construction as those originally installed on the vehicle.

REPLACEMENT WHEELS DESCRIPTION

Replace the wheel if any of the following conditions exist:

- The wheel exhibits excessive runout.
- The wheel is bent.
- The wheel is cracked.
- The wheel is severely rusted.
- The wheel is severely corroded.

NOTE: **Air leaks caused by porosity on aluminum wheels are repairable.**

WARNING: **If you are replacing the wheel(s), the wheel stud(s), the wheel nut(s) or the wheel bolt(s), install only new GM original equipment parts. Installation of used parts or non-GM original equipment parts may cause the wheel to loosen, loss of tire air pressure, poor vehicle handling and loss of vehicle control resulting in personal injury.**

- The wheel leaks air.

CAUTION: **The use of non-GM original equipment wheels may cause:**

- **Damage to the wheel bearing, the wheel fasteners and the wheel**
- **Tire damage caused by the modified clearance to the adjacent vehicle components**
- **Adverse vehicle steering stability caused by the modified scrub radius**
- **Damage to the vehicle caused by the modified ground clearance**
- **Speedometer and odometer inaccuracy**

Replace the wheel, the wheel studs and the wheel/nuts, or the wheel bolts if applicable, if any of the following conditions exist:

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- The wheel has elongated bolt holes.
- The wheel/nuts, or bolts if applicable, loosen repeatedly.

Steel wheel identification is stamped into the wheel near the valve stem.

Aluminum wheel identification is cast into the inboard side of the wheel.

TIRE INFLATION DESCRIPTION

When you inflate the tires to the recommended inflation pressures, the factory-installed wheels and tires are designed in order to handle loads to the tire's rated load capacity. Incorrect tire pressures, or under-inflated tires, can cause the following conditions:

- Vehicle handling concerns
- Poor fuel economy
- Shortened tire life
- Tire overloading

Inspect the tire pressure when the following conditions apply:

- The vehicle has been sitting at least 3 hours.
- The vehicle has not been driven for more than 1.6 km (1 mi).
- The tires are cool.

Inspect the tires monthly or before any extended trip. Adjust the tire pressure to the specifications on the tire label. Install the valve caps or the extensions on the valves. The caps or the extensions keep out dust and water.

The kilopascal (kPa) is the metric term for pressure. The tire pressure may be printed in both kilopascal (kPa) and psi. One psi equals 6.9 kPa.

Inflation Pressure Conversion (Kilopascals to PSI)

kPa	psi	kPa	psi
140	20	215	31
145	21	220	32
155	22	230	33
160	23	235	34
165	24	240	35

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kPa	psi	kPa	psi
170	25	250	36
180	26	275	40
185	27	310	45
190	28	345	50
200	29	380	55
205	30	415	60
Conversion: 6.9 kPa = 1 psi			

Tires with a higher than recommended pressure can cause the following conditions:

- A hard ride
- Tire bruising
- Rapid tread wear at the center of the tire

Tires with a lower than recommended pressure can cause the following conditions:

- A tire squeal on turns
- Hard steering
- Rapid wear and uneven wear on the edge of the tread
- Tire rim bruises and tire rim rupture
- Tire cord breakage
- High tire temperatures
- Reduced vehicle handling
- High fuel consumption
- Soft riding

Unequal pressure on the same axle can cause the following conditions:

- Uneven braking
- Steering lead
- Reduced vehicle handling

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Refer to the Tire Placard for specific tire and wheel applications and tire pressures.

TREAD WEAR INDICATORS DESCRIPTION

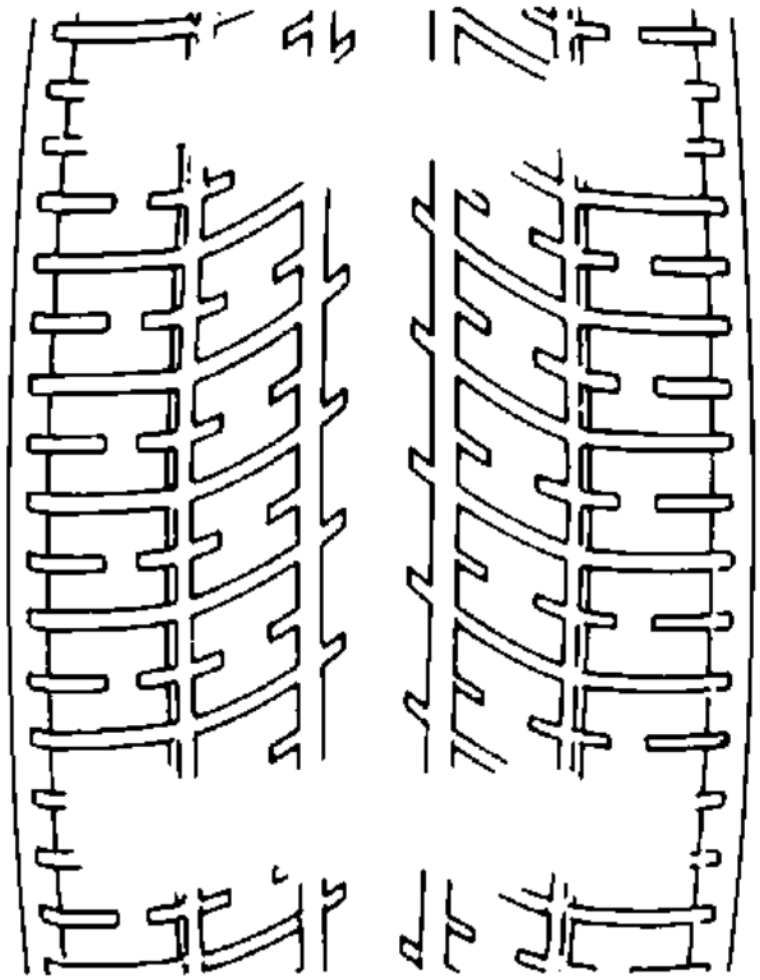

Fig. 63: View Of Tread Wear Indicators
Courtesy of GENERAL MOTORS COMPANY

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The original equipment tires have tread wear indicators that show when you should replace the tires.

The location of these indicators are at 60 degree intervals around the outer diameter of the tire. The indicators appear as a 6 mm (0.25 in) wide band when the tire tread depth becomes 1.6 mm (2/32 in).

SPECIAL TOOLS AND EQUIPMENT

SPECIAL TOOLS

Illustration	Tool Number/ Description

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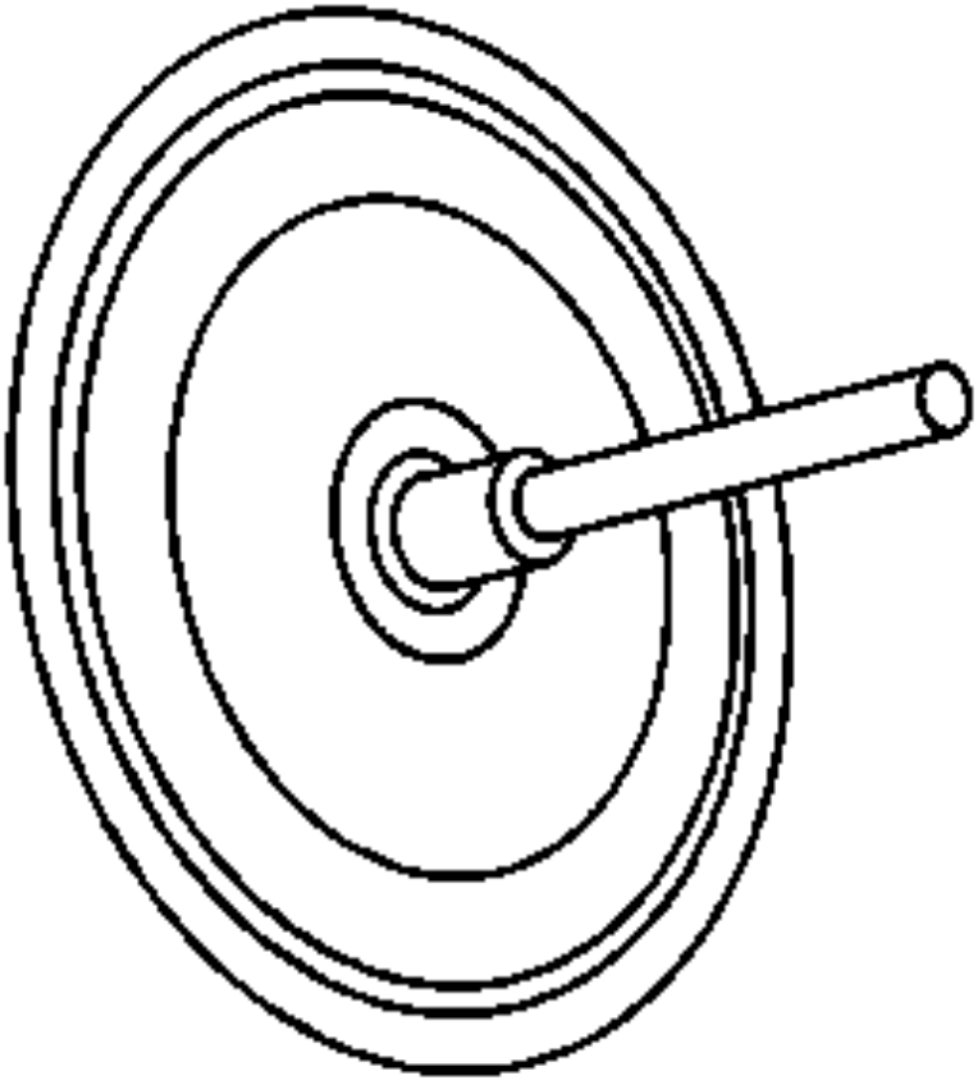
Illustration	Tool Number/ Description
	CH-41013 J-41013 Rotor Resurfacing Kit

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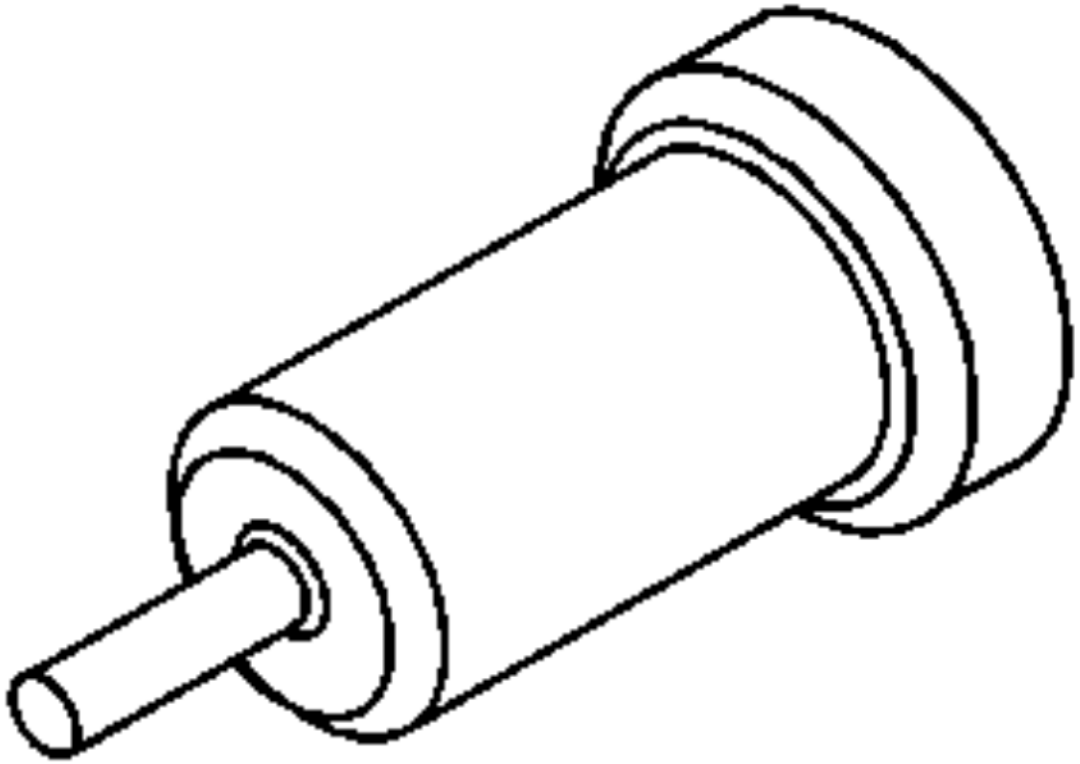
Illustration	Tool Number/ Description
	CH-42450-A J-42450-A Wheel Hub Resurfacing Kit

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