

2010 SUSPENSION

Tires and Wheels - Equinox & Terrain

SPECIFICATIONS

FASTENER TIGHTENING SPECIFICATIONS

Application	Specification	
	Metric	English
Wheel Nut	190 N.m	140 lb ft
Wheel Nut Cap	5 N.m	44 lb in

ADHESIVES, FLUIDS, LUBRICANTS, AND SEALERS

Application	Type of Material	GM Part Number
Wheels	Mounting Lubricant	12345884 (Canadian P/N 5728223)

DIAGNOSTIC INFORMATION AND PROCEDURES

TIRE DIAGNOSIS - IRREGULAR OR PREMATURE WEAR

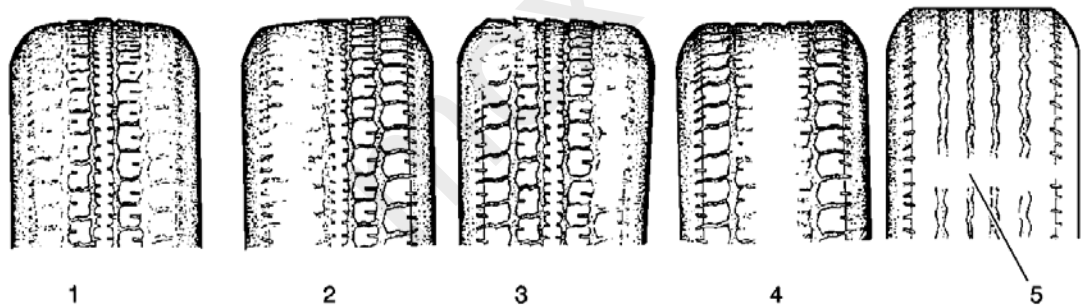


Fig. 1: Identifying Types Of Tire Wear
Courtesy of GENERAL MOTORS CORP.

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).
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

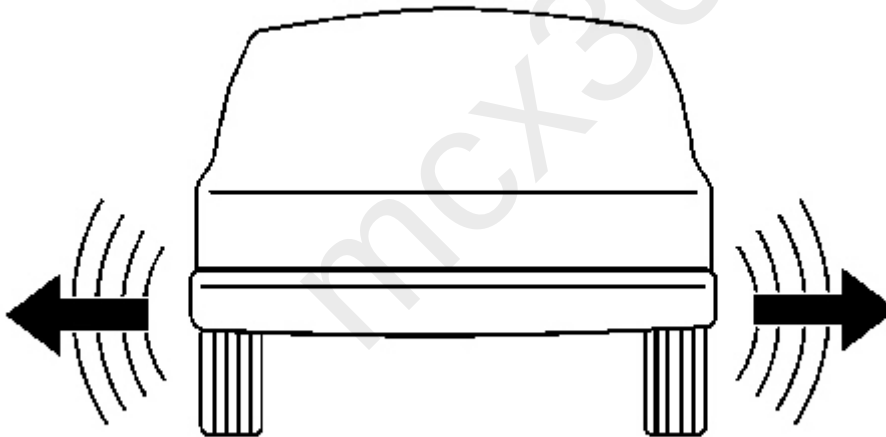


Fig. 2: Identifying Tire Wobble/Waddle
Courtesy of GENERAL MOTORS CORP.

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

- 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.

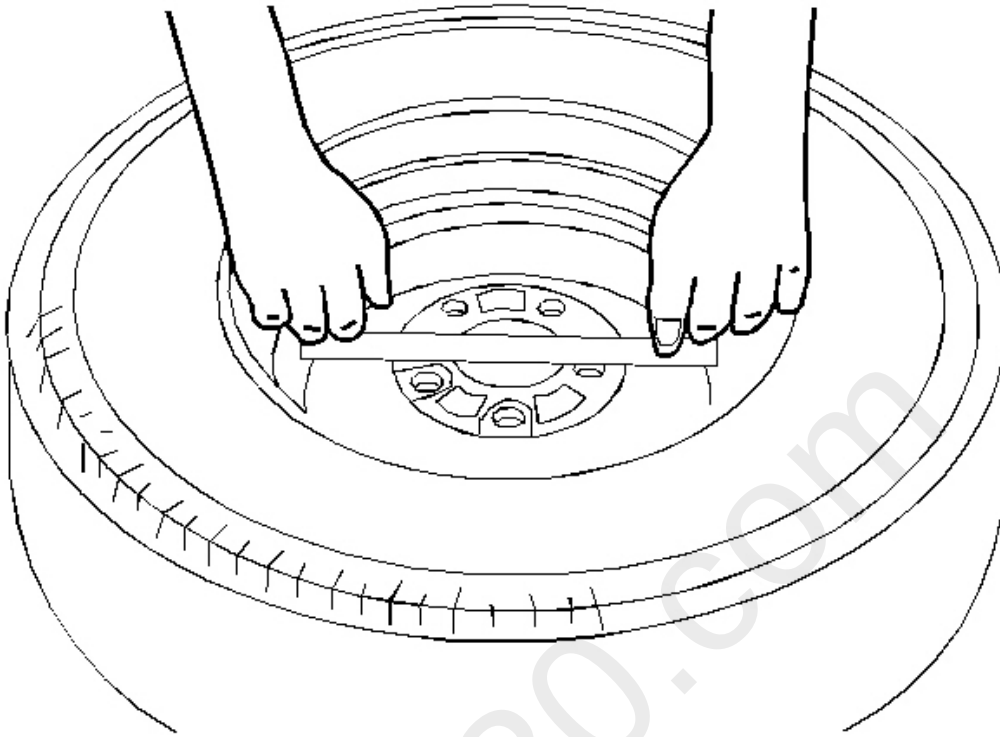


Fig. 3: Checking Wheel Mounting Surface
Courtesy of GENERAL MOTORS CORP.

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 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.

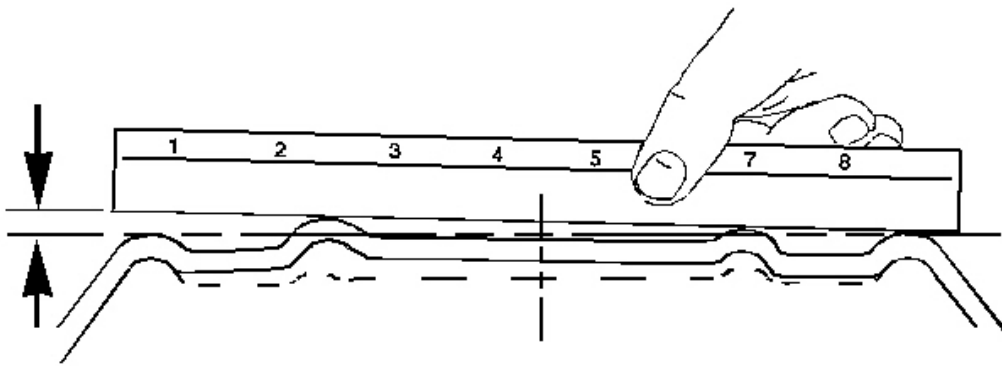


Fig. 4: Inspecting Wheel Inboard Mounting Surface
Courtesy of GENERAL MOTORS CORP.

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

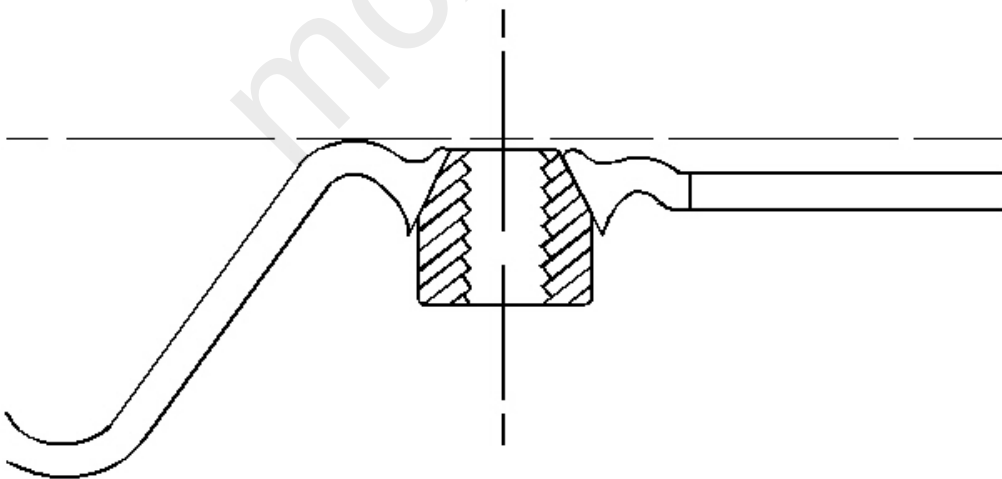


Fig. 5: Inspecting Mounting Wheel/Nut Holes
Courtesy of GENERAL MOTORS CORP.

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:

- 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

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 Diagnostic System Check - Vehicle?	Go to Step 2	Go to <u>Diagnostic System Check - Vehicle</u>
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 <u>Tire and Wheel Removal and Installation</u> . 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 <u>Wheel Alignment Measurement</u>
5	1. Cross-switch the left front tire/wheel assembly with the left rear tire/wheel assembly. Refer to <u>Tire and Wheel Removal and Installation</u> . 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 <u>Tire and Wheel Removal and Installation</u> . 2. Road test the vehicle on a smooth level surface. Does the vehicle still lead/pull?	Go to <u>Wheel Alignment Measurement</u>	Go to Step 8
7	Replace the left rear tire. Refer to <u>Tire Dismounting and Mounting</u> . Is the repair complete?	Go to Step 9	-
8	Replace the right rear tire. Refer to <u>Tire Dismounting and Mounting</u> . Is the repair complete?	Go to Step 9	-
9	Verify proper vehicle operation. Does the original condition still exist?	Go to Step 1	System OK

REPAIR INSTRUCTIONS

TIRE AND WHEEL REMOVAL AND INSTALLATION

Special Tools

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

Removal Procedure

1. Raise and support the vehicle. Refer to **Lifting and Jacking the Vehicle**.
2. Remove the wheel center cap, if equipped.
3. Remove the wheel center cap nuts, if equipped.
4. Remove the wheel nuts.
5. Remove the tire and wheel assembly.

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:
 1. Apply a small amount of penetrating oil to the wheel nuts, and the center hub. Allow a few moments for the penetrating oil to work.
 2. Loosen each wheel nut 2 complete turns.
 3. Lower the vehicle.
 4. Rock the vehicle from side to side.
 5. Repeat the procedure if necessary.
7. If the tire and wheel assembly still does not loosen, perform the following:
 1. Start the engine.
 2. Allow the vehicle to move forward, and quickly apply the brakes. Repeat this procedure in reverse.
 3. Repeat this procedure if necessary.
8. With the tire and wheel assembly loose, raise and support the vehicle.
9. Remove the tire and wheel assembly.

CAUTION: Before installing wheels, remove any build-up of corrosion on the wheel mounting surface by scraping and wire brushing. Installing wheels without good metal-to-metal contact at the mounting surfaces can cause wheel bolts or nuts to loosen, which can later allow a wheel bolt or nut to come off while the vehicle is moving. Wheel bolts or nuts must be tightened in sequence and to proper torque to avoid bending the wheel, brake drum or rotor.

NOTE:

- Wear approved safety glasses when performing the following service procedures.
- **DO NOT** use power grinders to clean any of the brake rotor or brake drum to wheel contact areas.

10. Using a wire brush or wire wheel, clean the rotor to the wheel or brake drum to wheel hub contact area.
11. Where possible, use the **J 41013** to clean the contact areas of the wheel to brake rotor or brake drum.

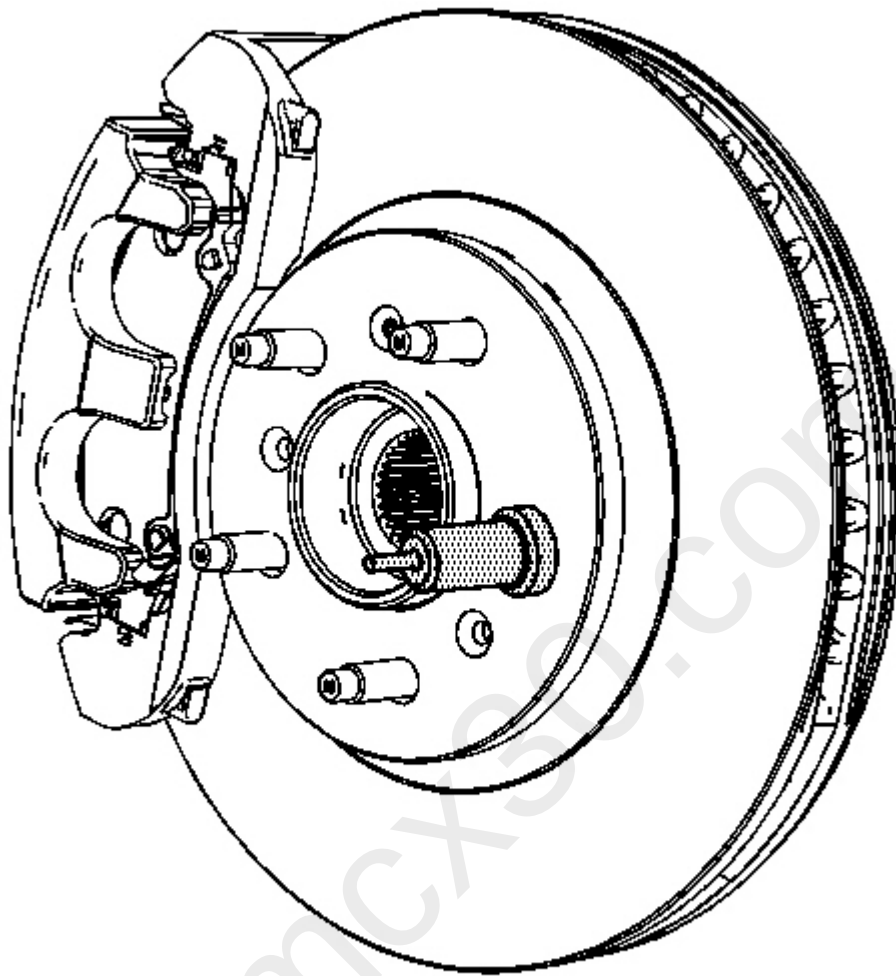


Fig. 6: Cleaning Wheel Studs
Courtesy of GENERAL MOTORS CORP.

12. Using the **J 42450-A** , clean the surface around the wheel studs.
13. Clean the threads of the wheel studs. If the threads are damaged, replace the wheel stud.
 - For the front wheel stud replacement, refer to **Wheel Stud Replacement** .
 - For the rear wheel stud replacement, refer to **Wheel Stud Replacement** .
14. After cleaning all the contact areas, use brake clean or denatured alcohol to remove all the penetrating oil, dirt and debris from the wheel nuts, brake rotor or brake drum.
15. Inspect and clean the contact area of the wheel. Refer to **Wheel Mounting Surface Check**.

Installation Procedure

1. Install the tire and wheel assembly.
2. Hand start the wheel nuts.

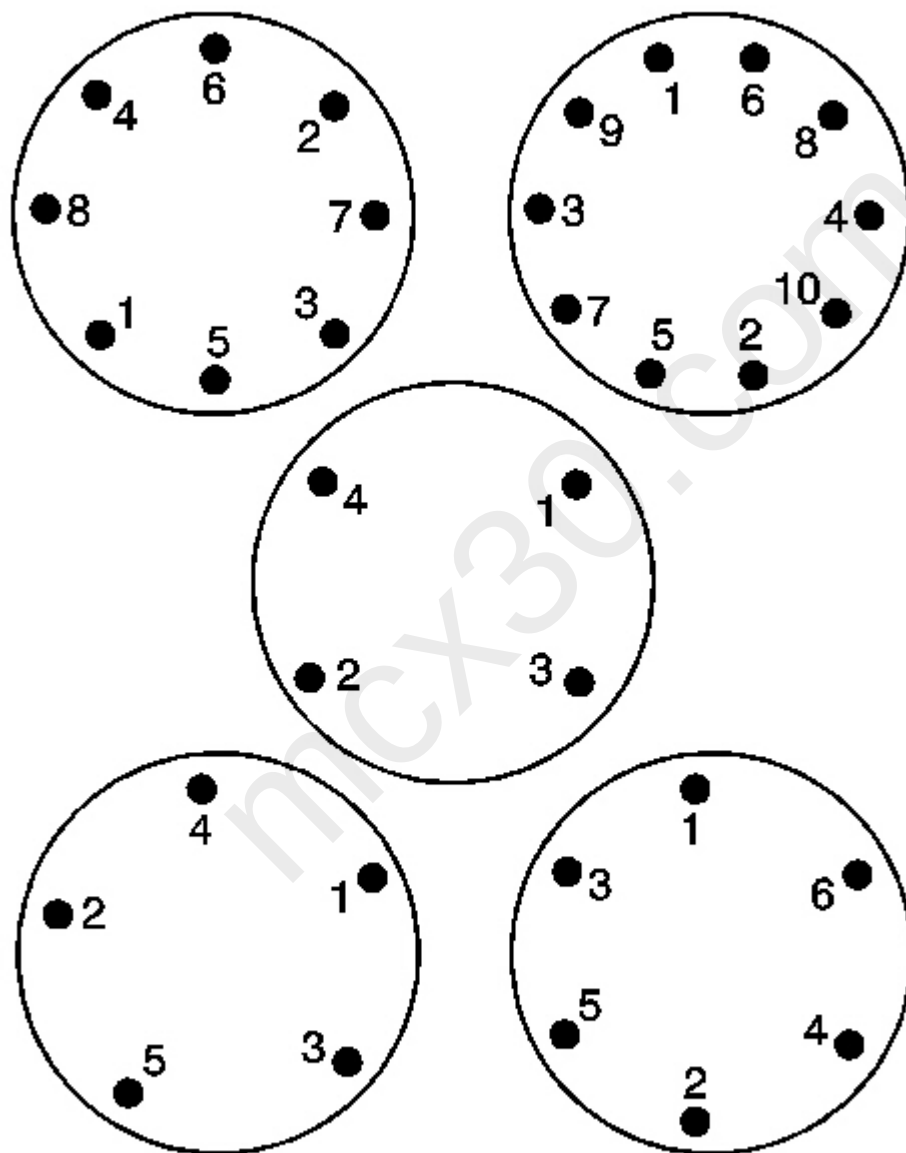


Fig. 7: Identifying Wheel Nut Tightening Sequence
Courtesy of GENERAL MOTORS CORP.

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.

3. Using the proper size socket and the torque wrench, tighten the wheel nuts in the proper sequence. Refer to **Fastener Tightening Specifications**
4. Install the wheel center cap, if required.
5. Install the wheel cap nuts, if required.
6. Remove the support and lower the vehicle.

TIRE REPAIR

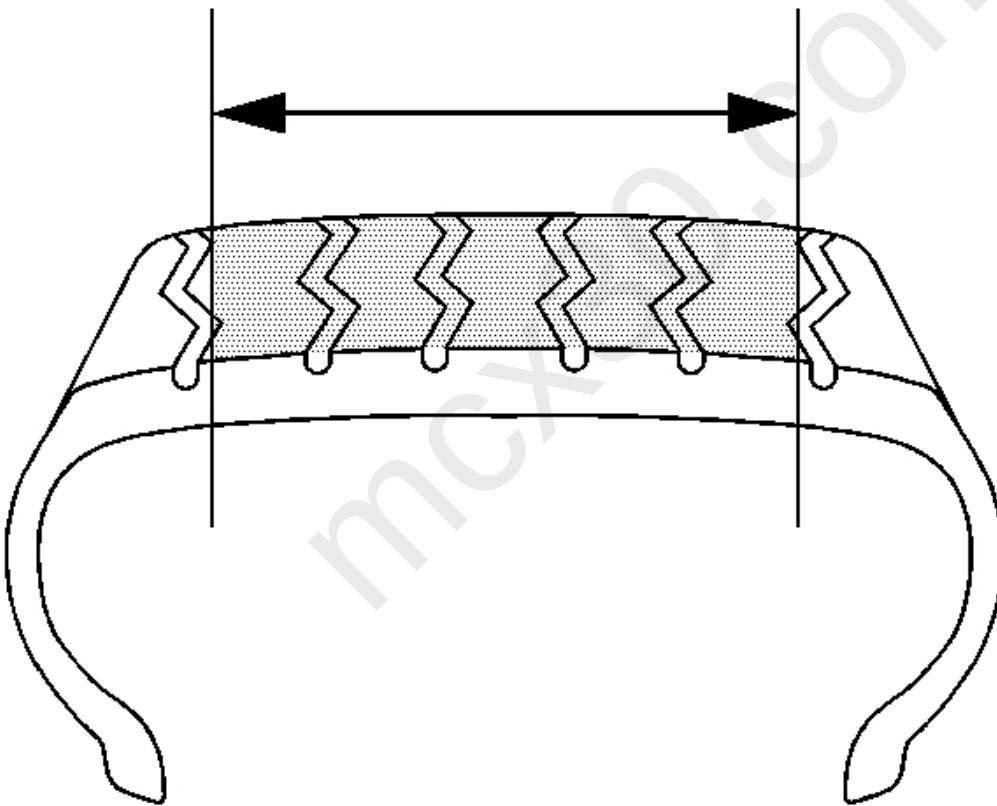


Fig. 8: Identifying Repairable Area On A Radial Tire
Courtesy of GENERAL MOTORS CORP.

WARNING: • Tire changing can be dangerous and should be done by trained

professionals using proper tools and 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.**

NOTE: **Repairable area on a radial tire.**

- **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

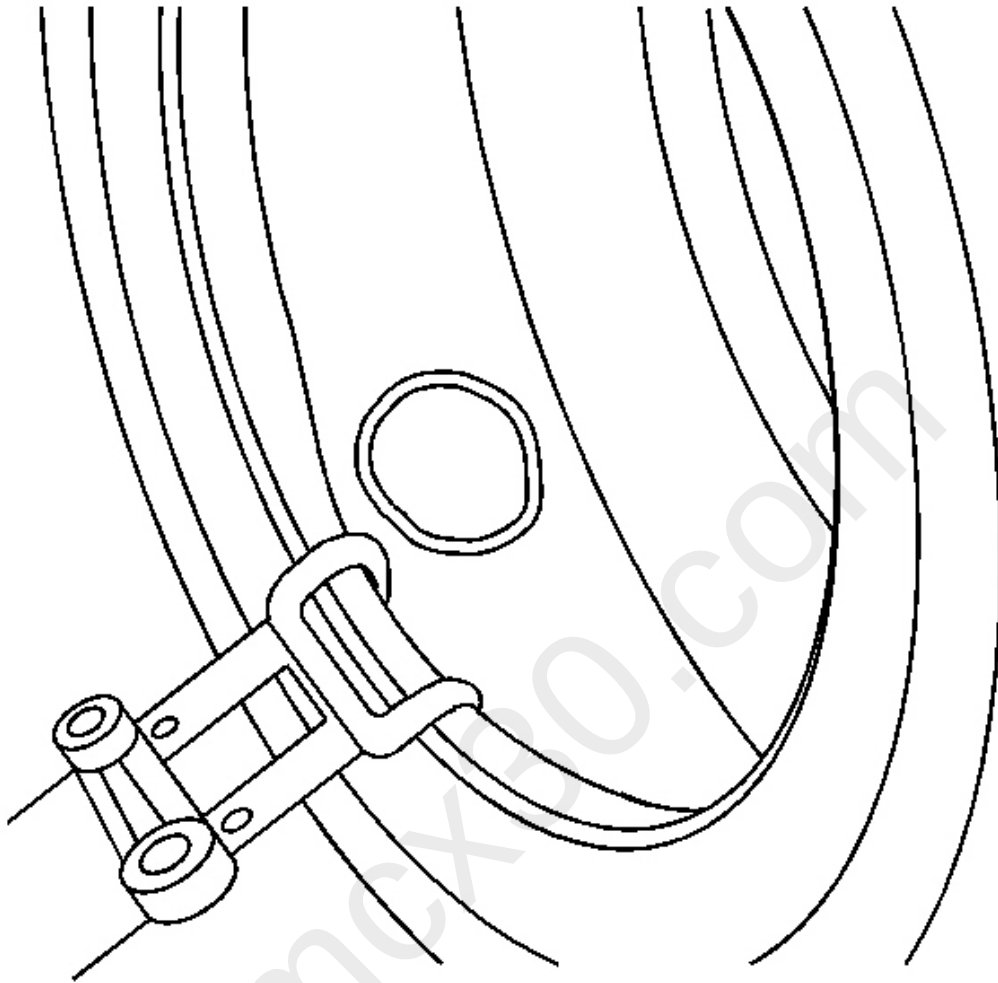


Fig. 9: Marking Tire Puncture Location
Courtesy of GENERAL MOTORS CORP.

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

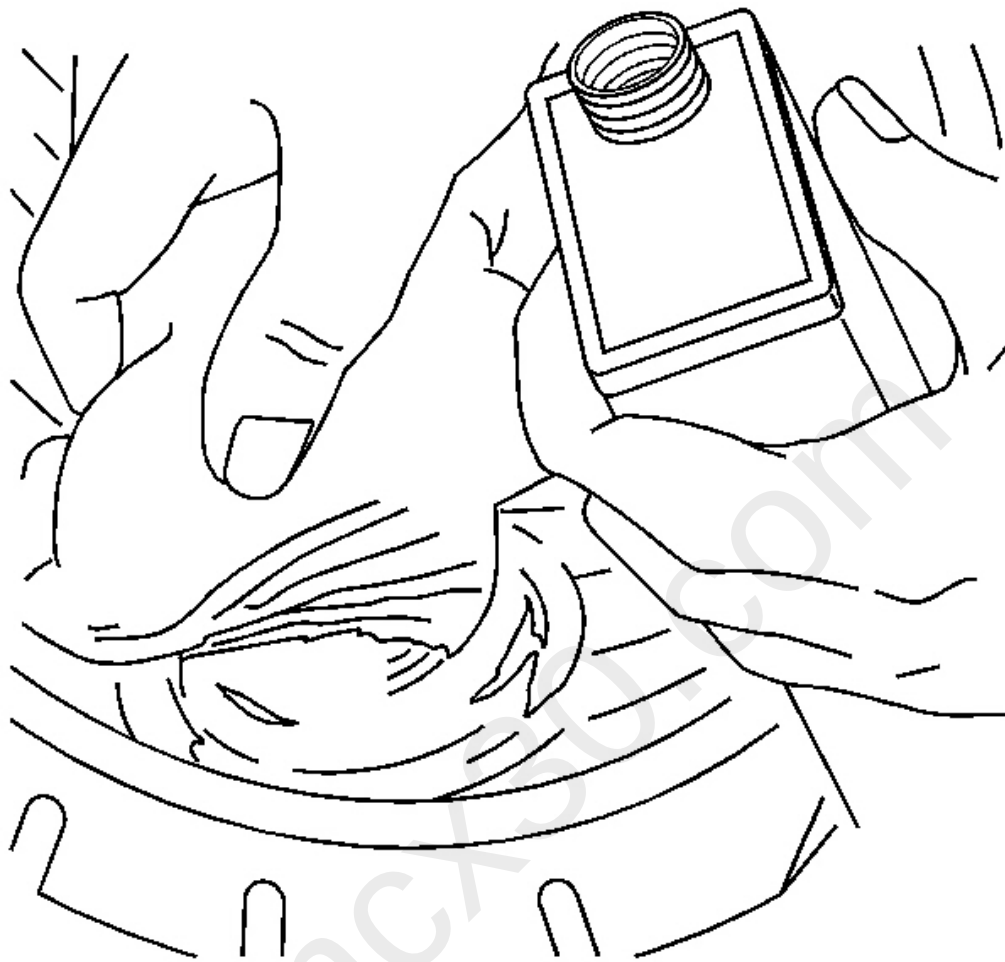


Fig. 10: Cleaning Repair Area
Courtesy of GENERAL MOTORS CORP.

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

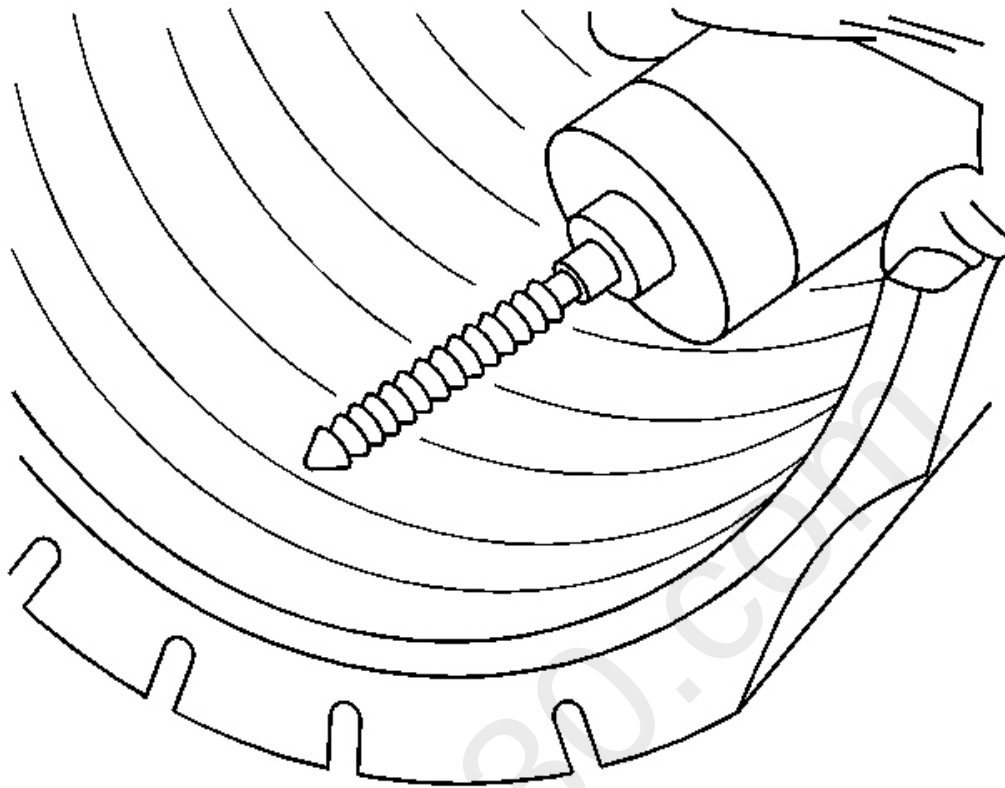


Fig. 11: Reaming Puncture Channel
Courtesy of GENERAL MOTORS CORP.

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

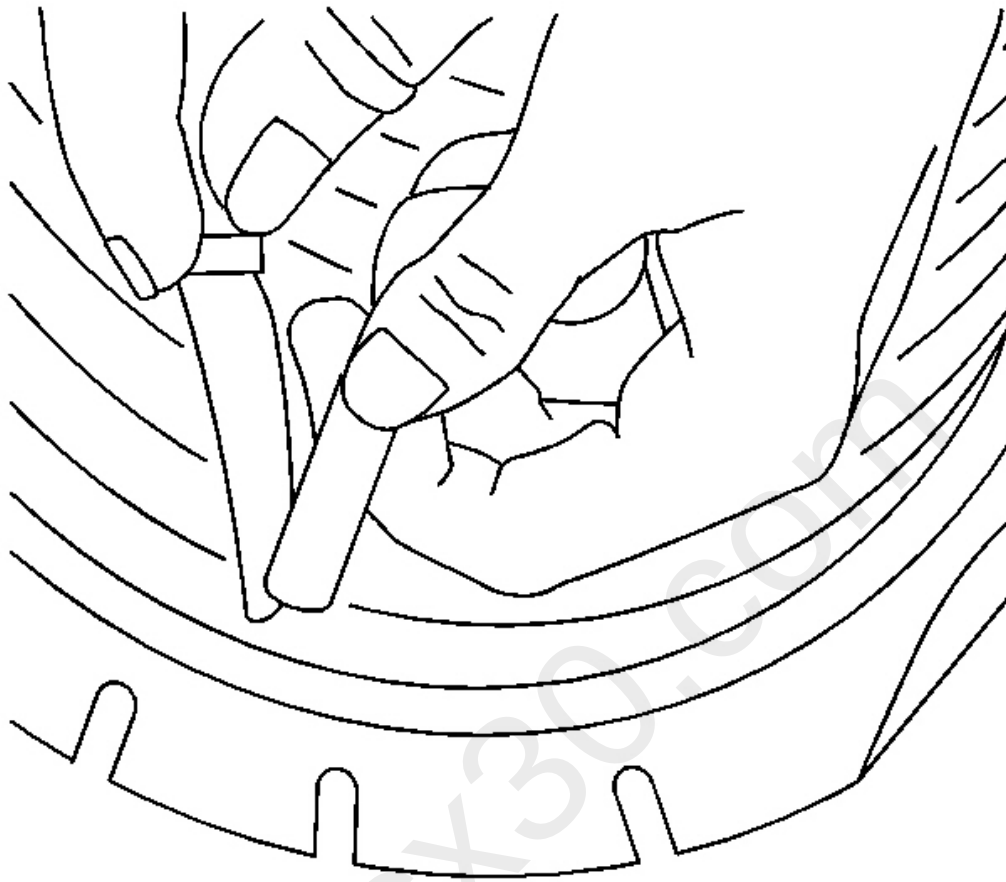


Fig. 12: Filling Injury Location
Courtesy of GENERAL MOTORS CORP.

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

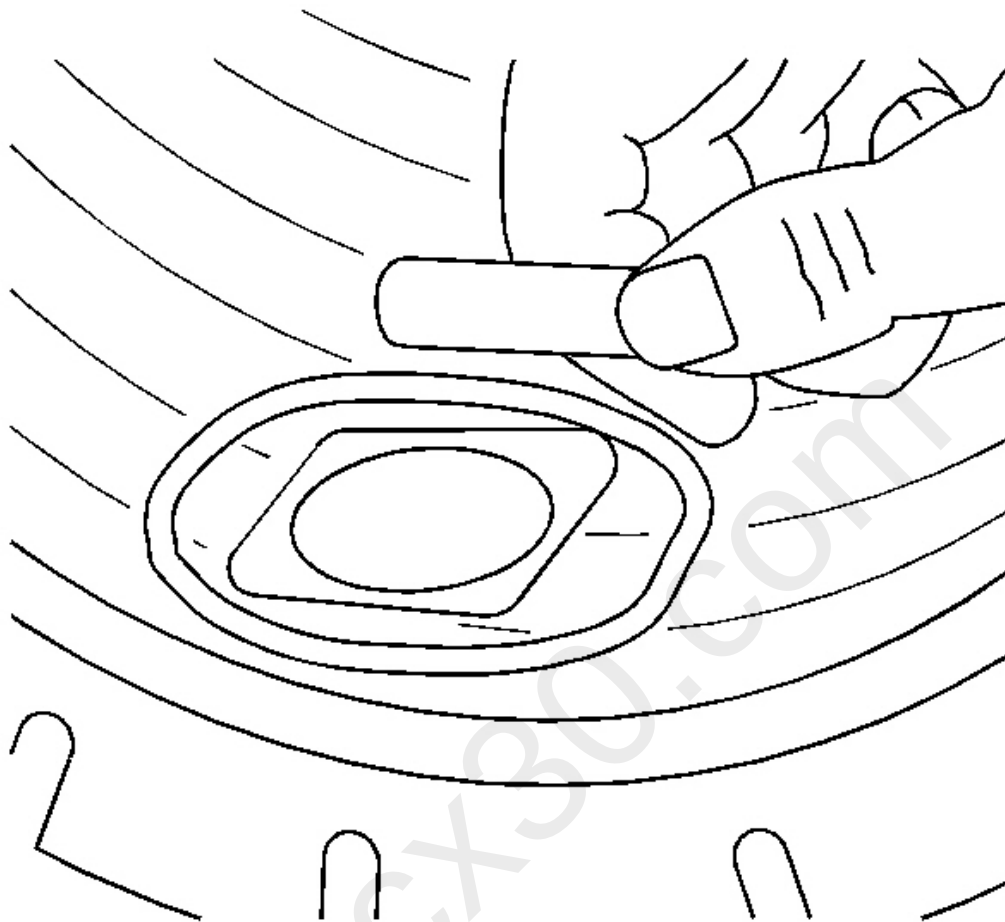


Fig. 13: Outlining Tire Injury Area
Courtesy of GENERAL MOTORS CORP.

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

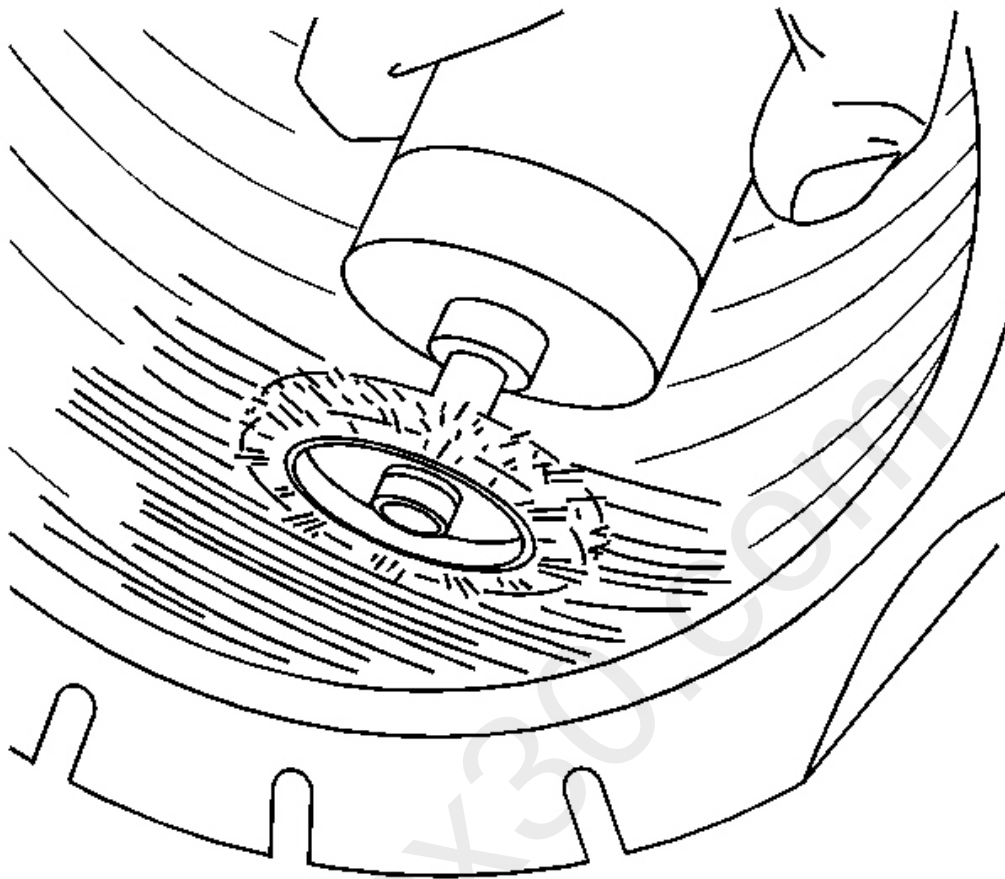


Fig. 14: Buffing Within Marked Area
Courtesy of GENERAL MOTORS CORP.

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

Cementing

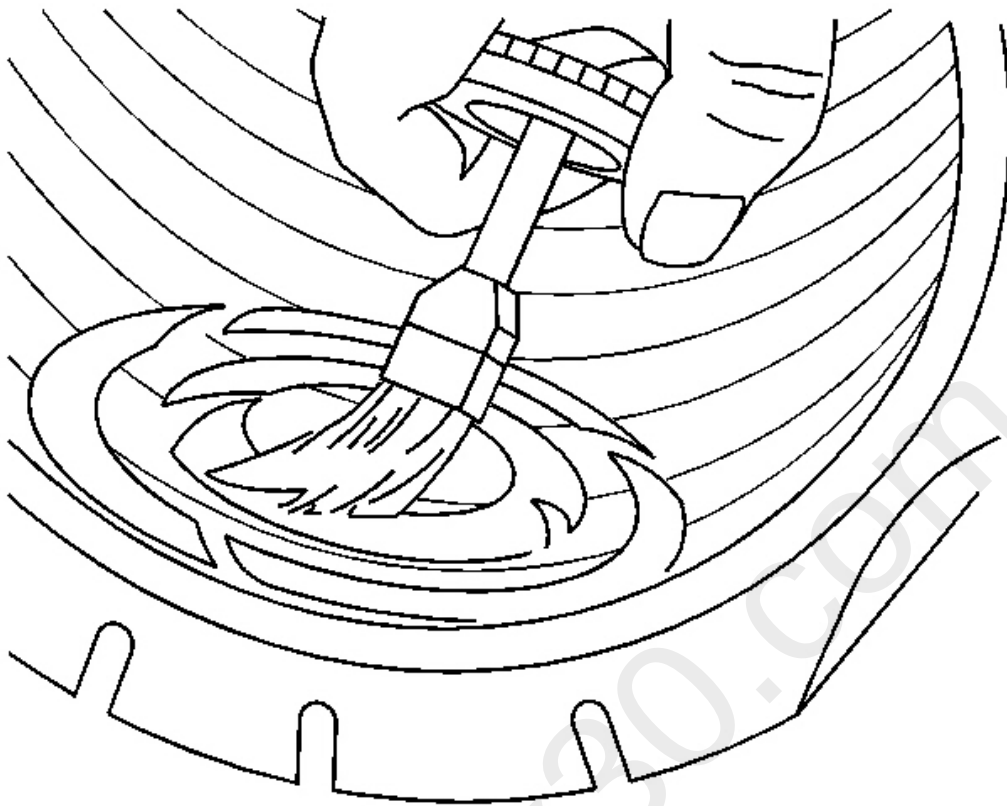


Fig. 15: Applying Chemical Cement
Courtesy of GENERAL MOTORS CORP.

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

Repair Unit Application

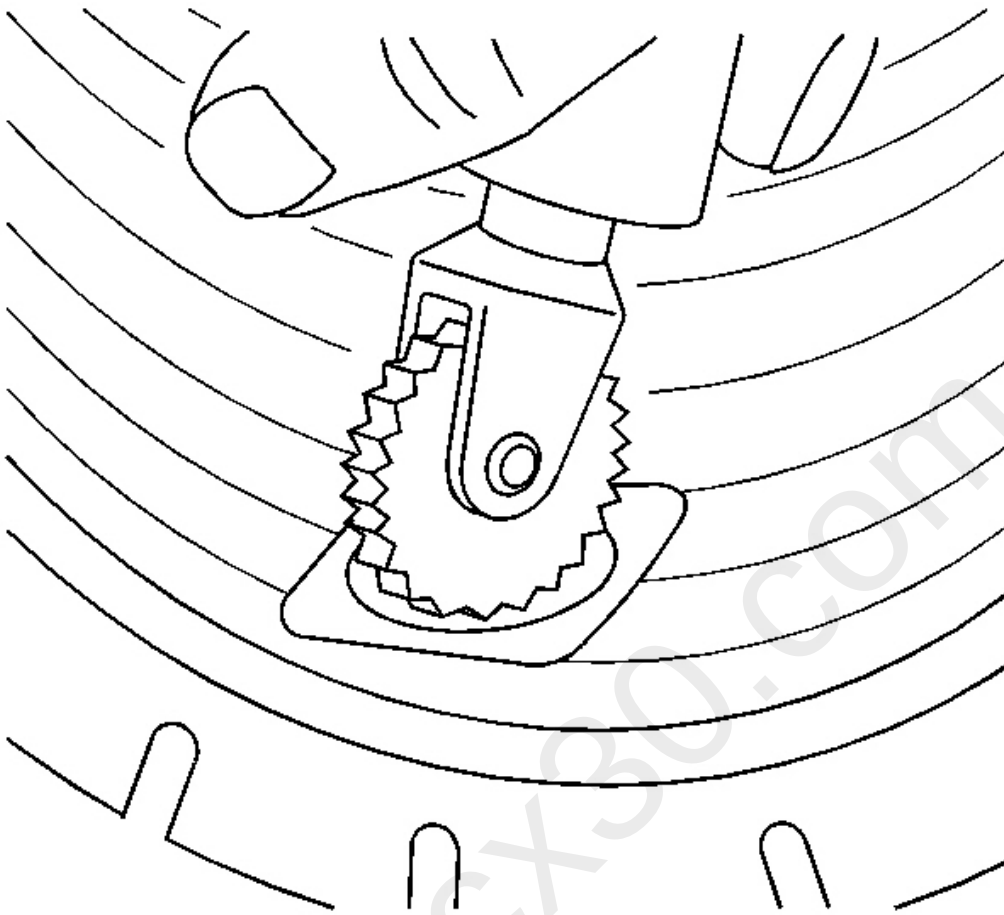


Fig. 16: Stitching Repair Unit
Courtesy of GENERAL MOTORS CORP.

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

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.

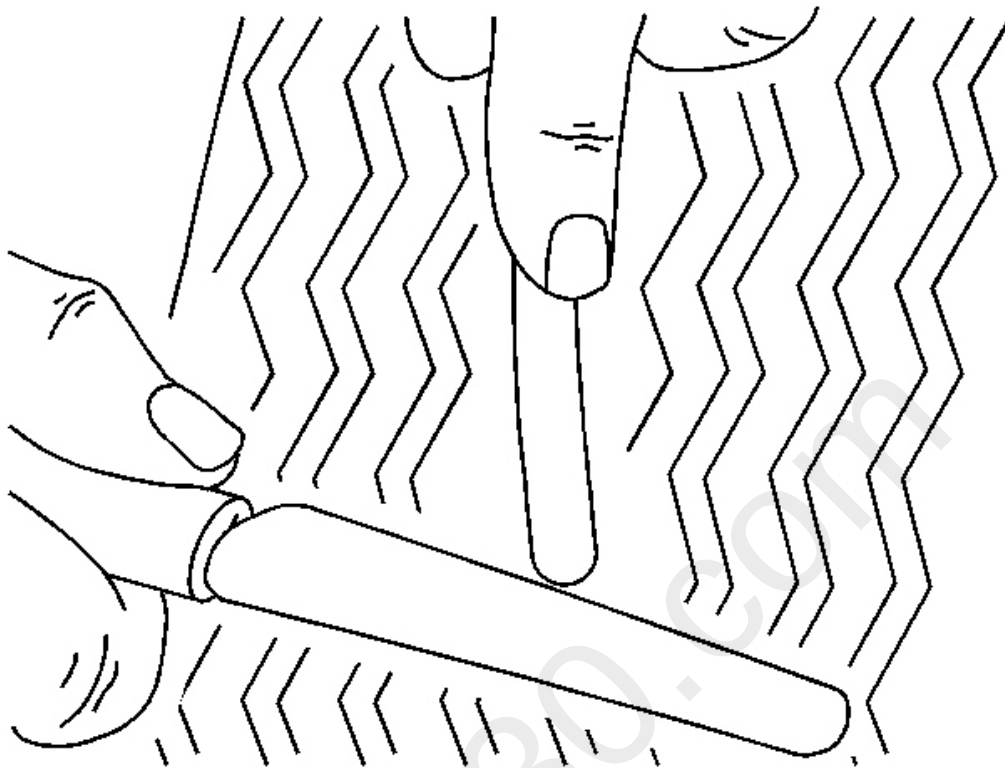


Fig. 17: Cutting Plug Material
Courtesy of GENERAL MOTORS CORP.

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

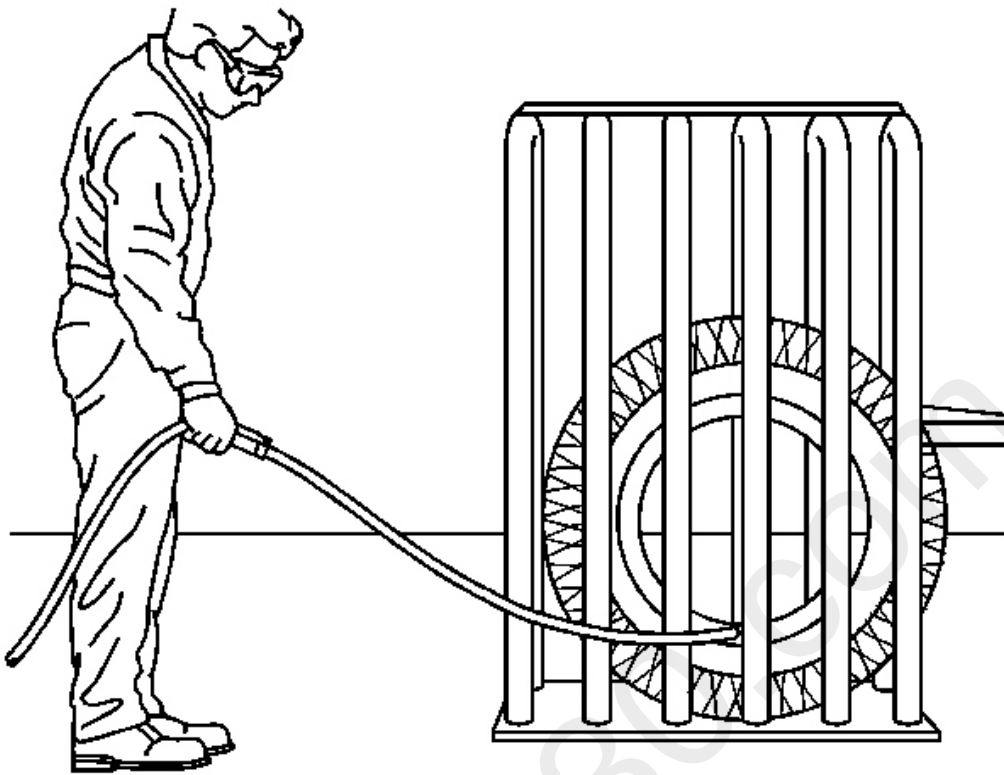


Fig. 18: Using Safety Cage
Courtesy of GENERAL MOTORS CORP.

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

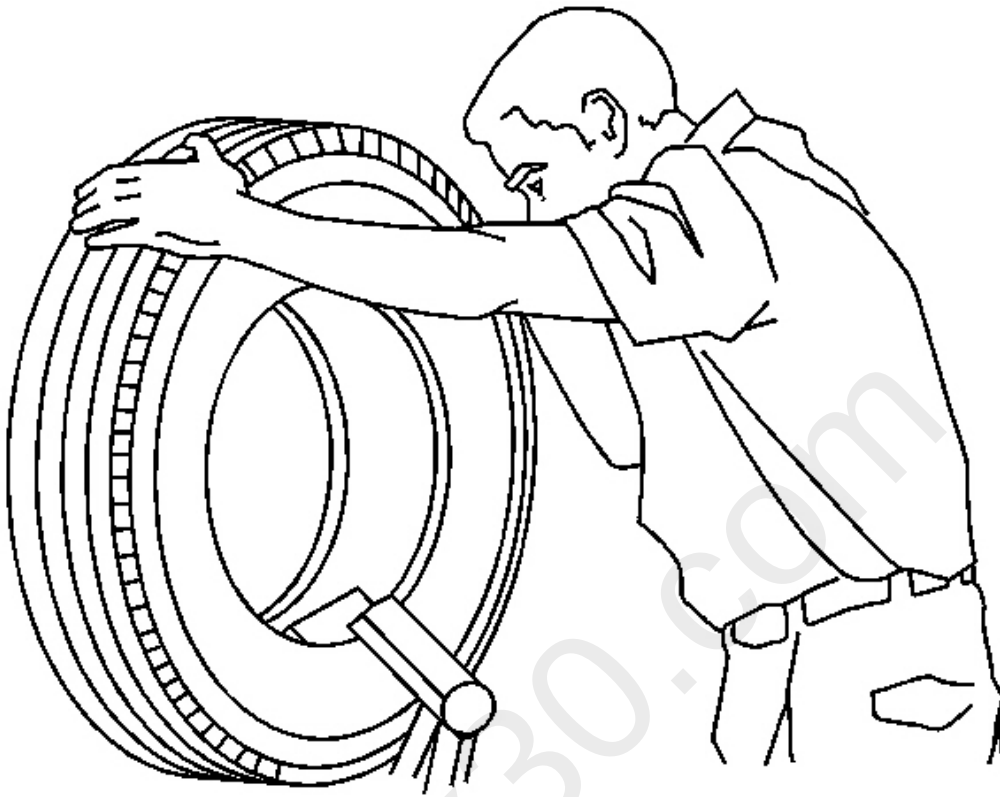


Fig. 19: Performing Final Inspection
Courtesy of GENERAL MOTORS CORP.

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:

Rubber Manufacturers Association (RMA)

1400 K Street, N.W., Suite 900

Washington

DC

20005-2403

Telephone: 202-682-4800

E-mail: informa.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.

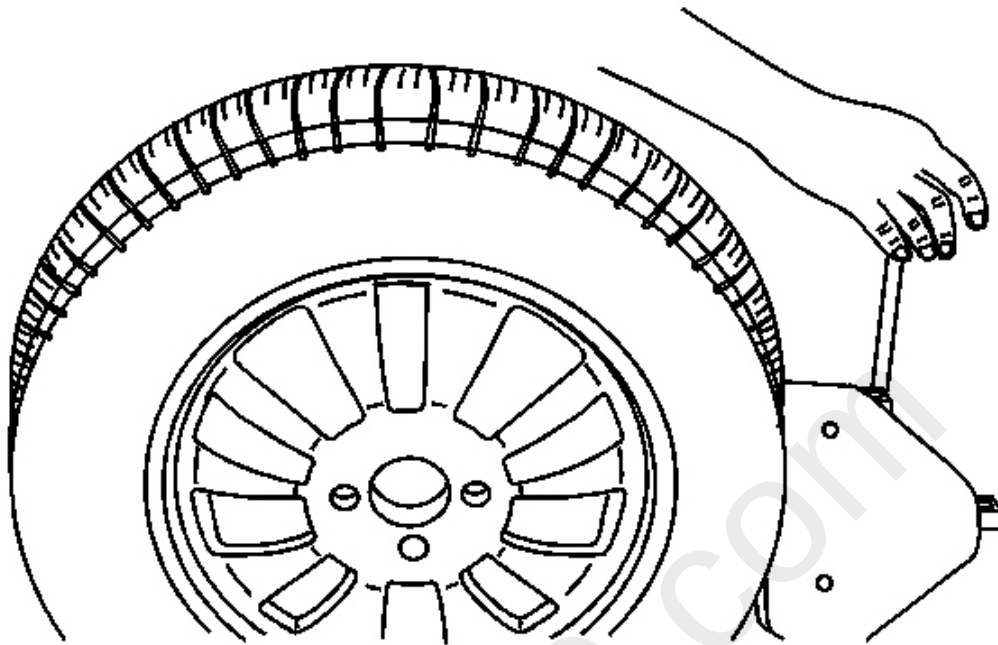


Fig. 20: Using Bead Breaking Fixture
Courtesy of GENERAL MOTORS CORP.

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.

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

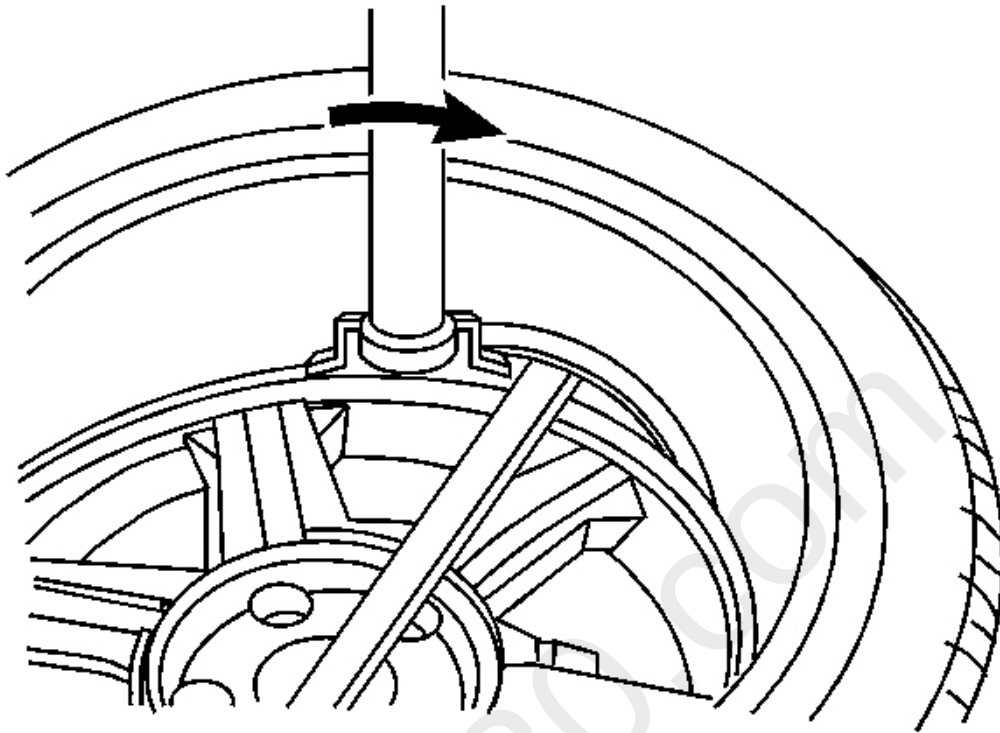


Fig. 21: Separating Tire Bead from Wheel
Courtesy of GENERAL MOTORS CORP.

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.
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 a wire brush or coarse 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.

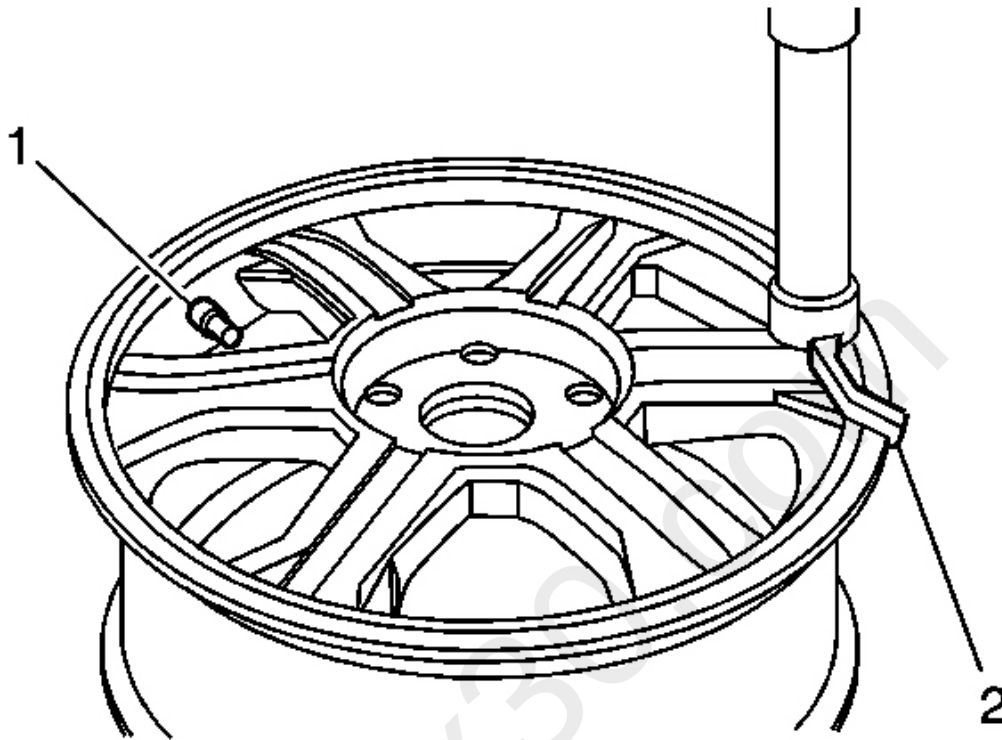


Fig. 22: Positioning Rim

Courtesy of GENERAL MOTORS CORP.

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.

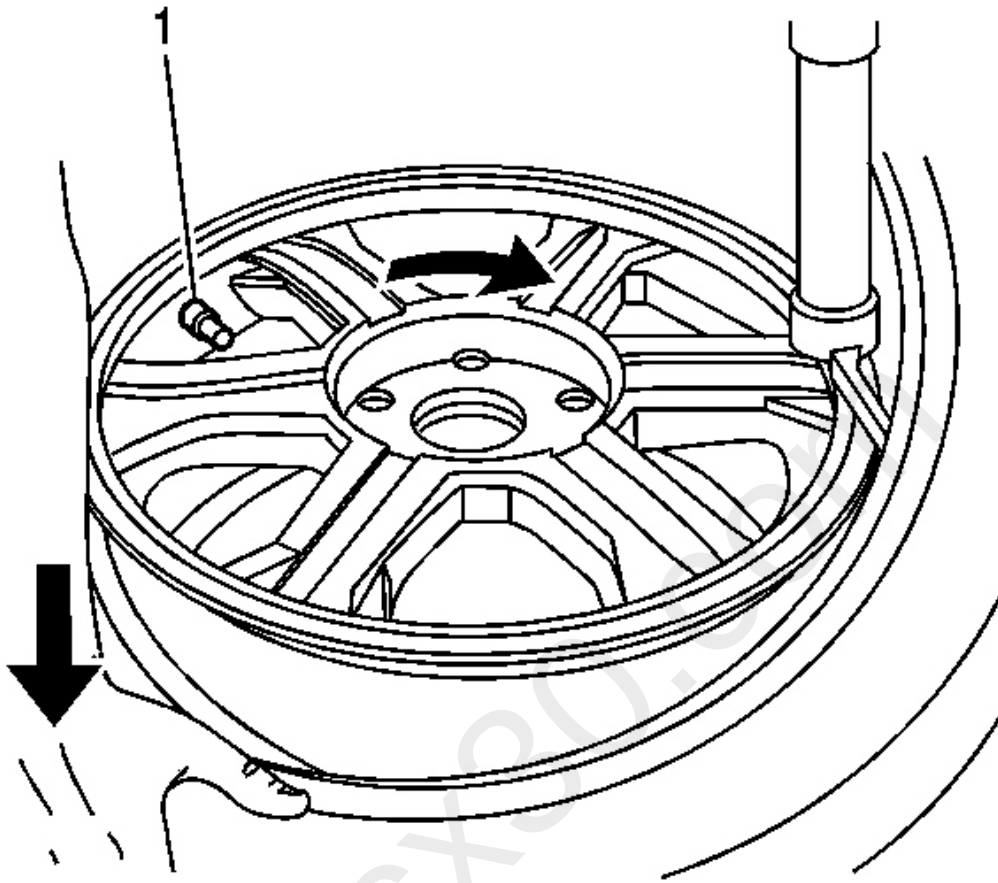


Fig. 23: Transferring Tire Bead To Inside Of Wheel Rim
Courtesy of GENERAL MOTORS CORP.

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.

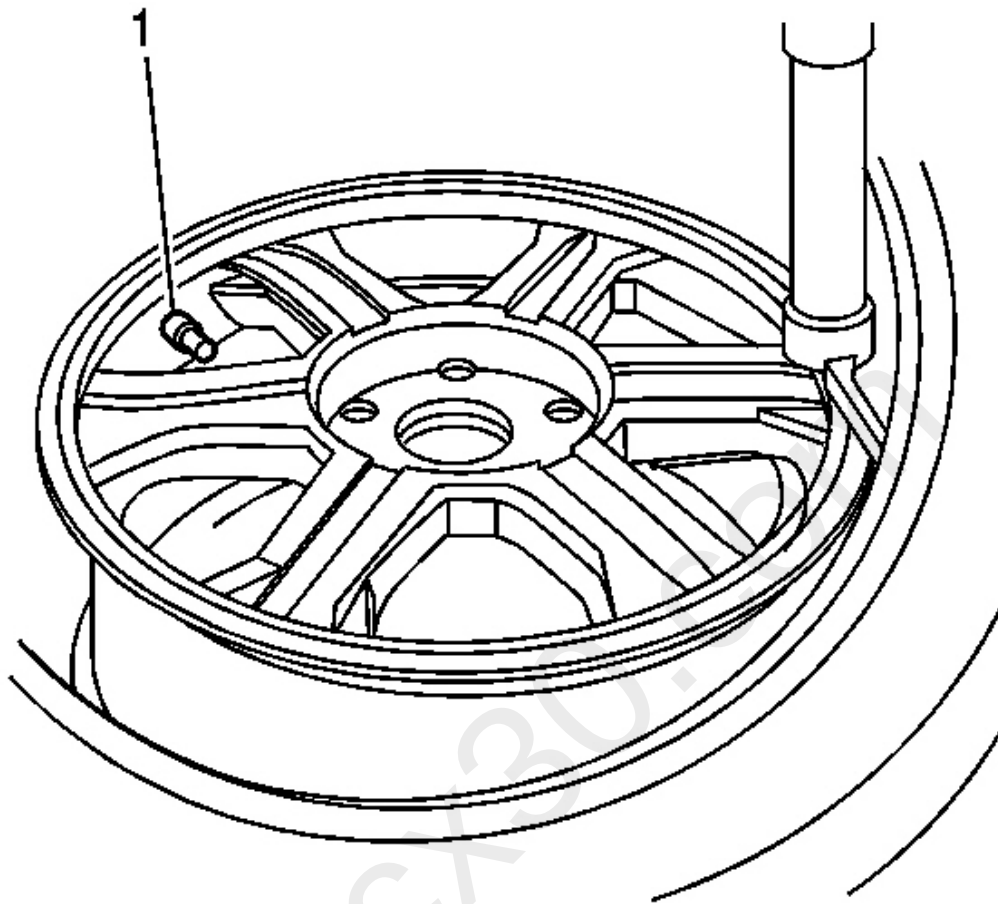


Fig. 24: Positioning Wheel & Tire
Courtesy of GENERAL MOTORS CORP.

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.

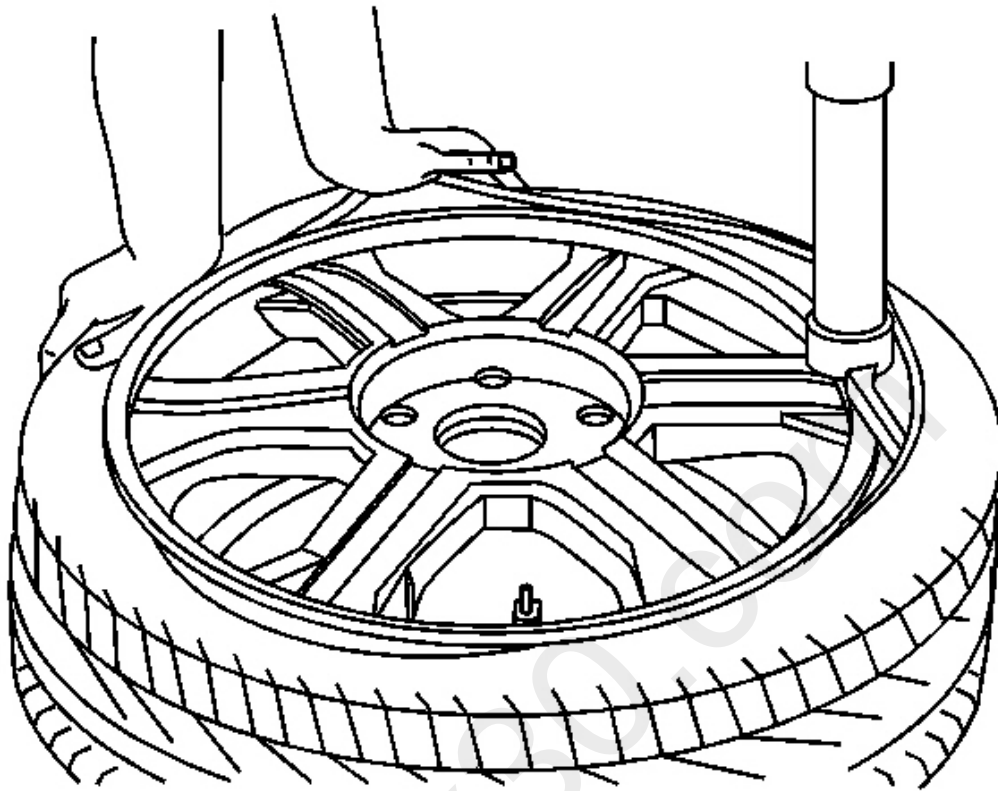


Fig. 25: Using Tire Changer
Courtesy of GENERAL MOTORS CORP.

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. 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

Rotate the tires and wheels at frequent intervals to equalize wear. Refer to **Maintenance Schedule (North American Emissions)** . In addition to scheduled rotation, rotate the tire and wheel whenever uneven tire wear is noticed.

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

Refer to **Tire and Wheel Removal and Installation**.

mcx30.com

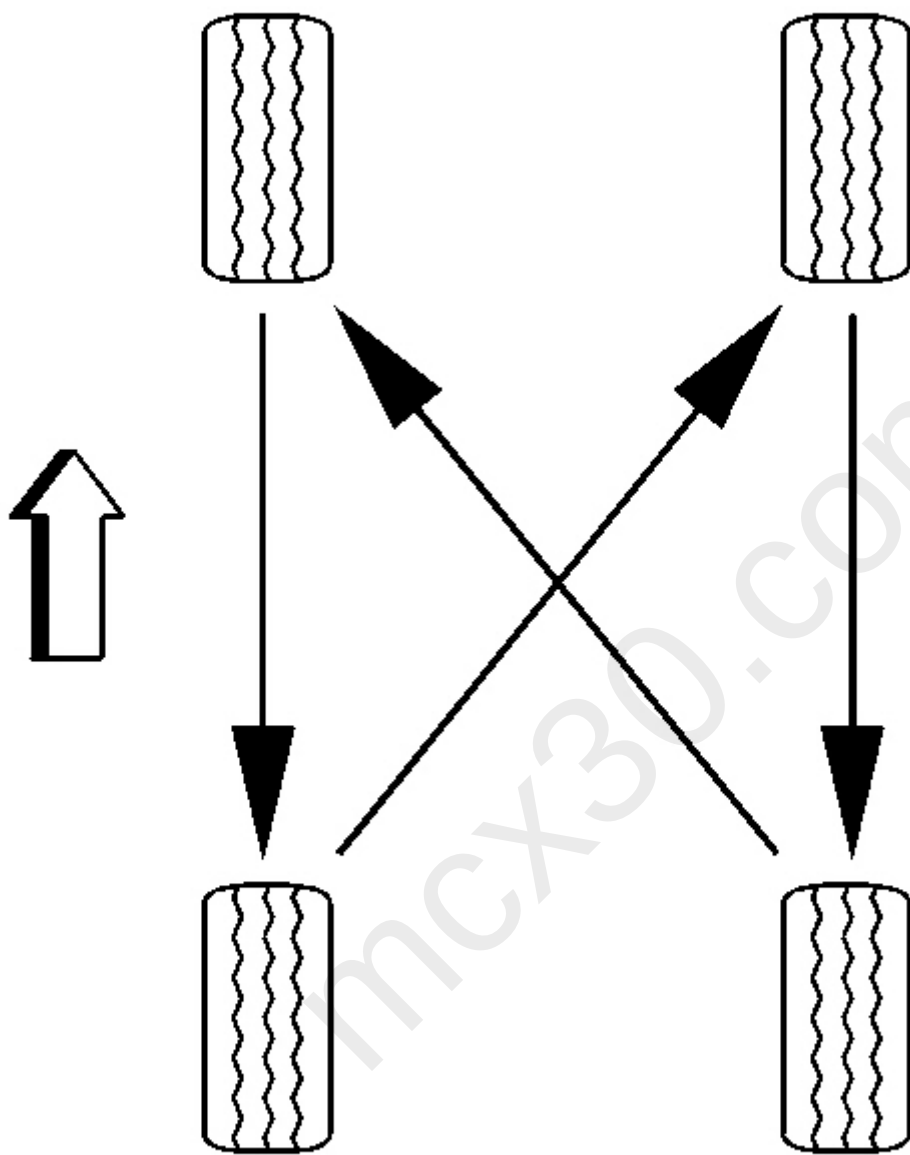


Fig. 26: Identifying Tire Rotation Pattern
Courtesy of GENERAL MOTORS CORP.

Always use a 4-wheel rotation. After rotation, check the wheel nuts for specified torque. Then, set the tire pressure.

After the tires have been rotated, the tire pressure sensors must be reset, if applicable. Refer to Refer to Tire

DESCRIPTION AND OPERATION

ALL SEASONS TIRES DESCRIPTION

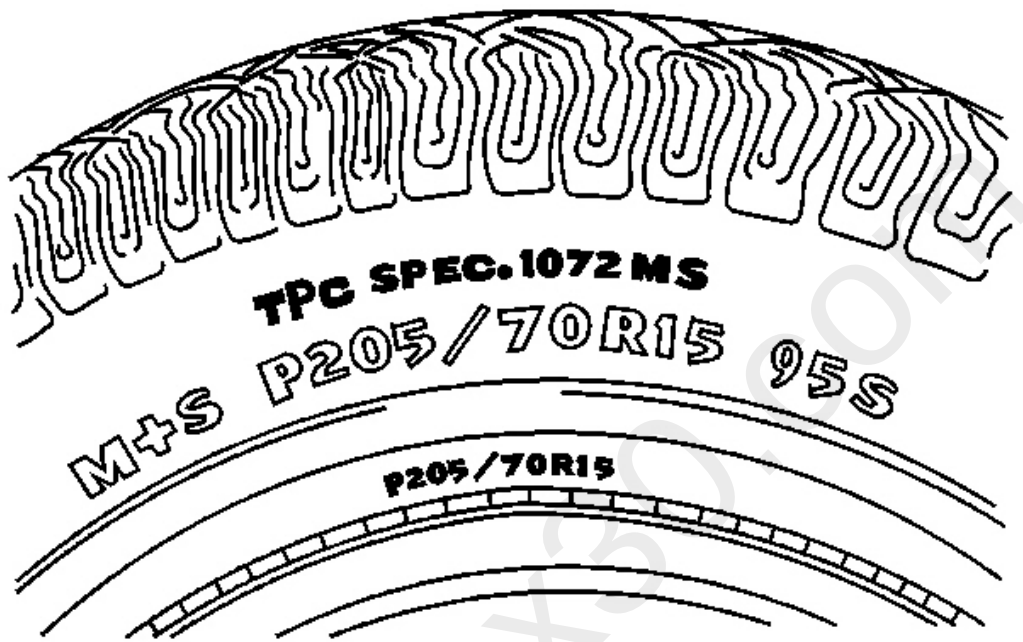


Fig. 27: Tire Performance Criteria (TPC) Rating Markings
Courtesy of GENERAL MOTORS CORP.

Most Saturn 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.

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

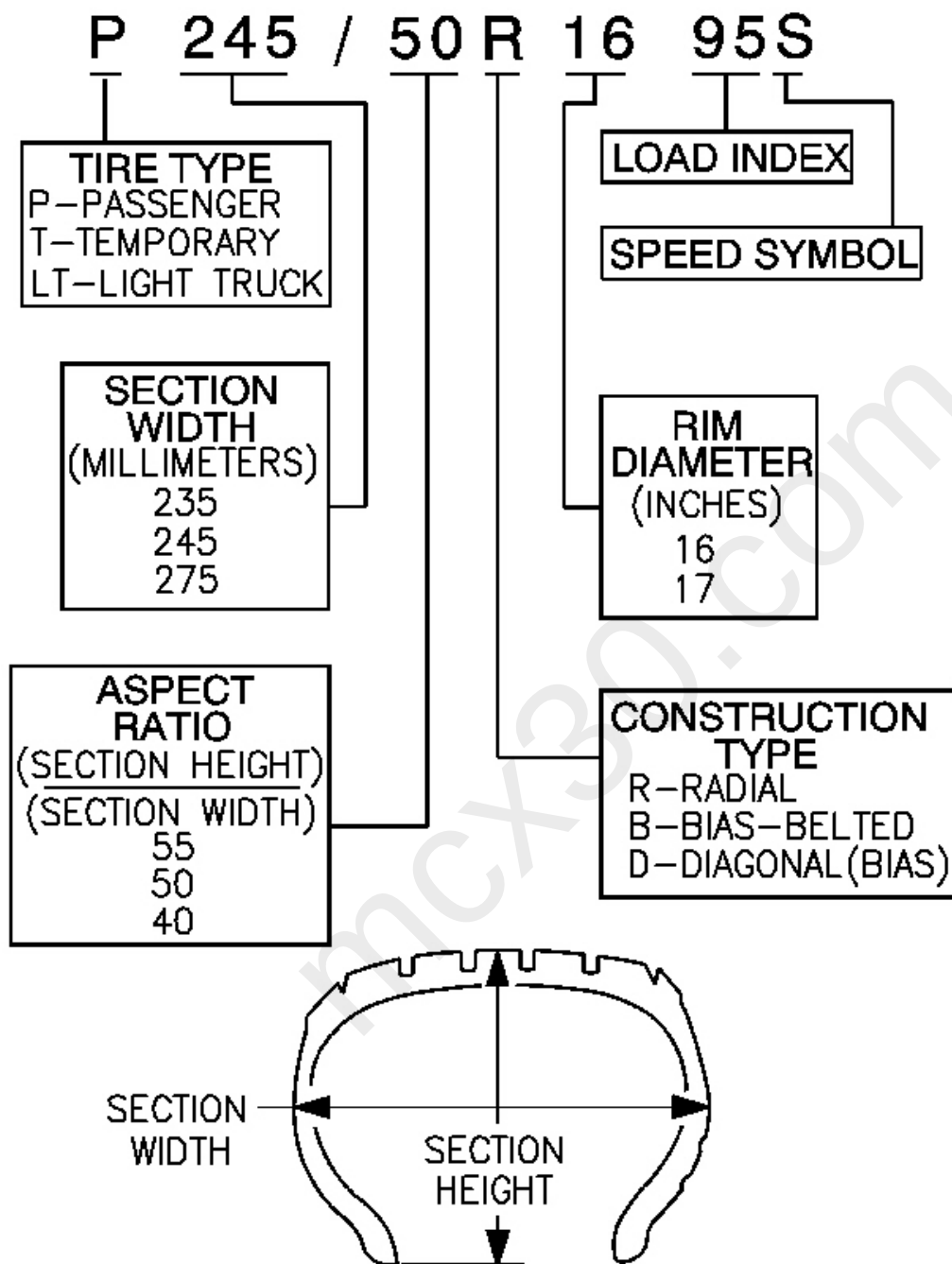


Fig. 28: Identifying P-Metric Sized Tire Marking
Courtesy of GENERAL MOTORS CORP.

Most P-metric tire sizes do not have exact corresponding alphanumeric tire sizes. Replacement tires should be of the same tire performance criteria TPC specification number including the same size, the same load range, and the same construction as those originally installed on the vehicle. Consult a tire dealer if you must replace the P-metric tire with other sizes. Tire companies can best recommend the closest match of alphanumeric to P-metric sizes within their own tire lines. The above illustration may not correspond with your vehicle, but is meant as an example.

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.

- The wheel leaks air.

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.

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:

- 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.

STEEL WHEEL REPAIR DESCRIPTION

CAUTION: Do not heat wheels in an attempt to soften them for straightening or repair damage from striking curbs, etc. Do not weld wheels. The alloy used in these wheels is heat-treated and uncontrolled heating from welding affects the properties of the material.

CAUTION: The use of tubes in tubeless tires is not a recommended repair due to the fact that speed ratings are greatly reduced.

If leaks are found in a steel wheel, replace the wheel with a wheel of original equipment quality.

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

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

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

TREAD WEAR INDICATORS DESCRIPTION

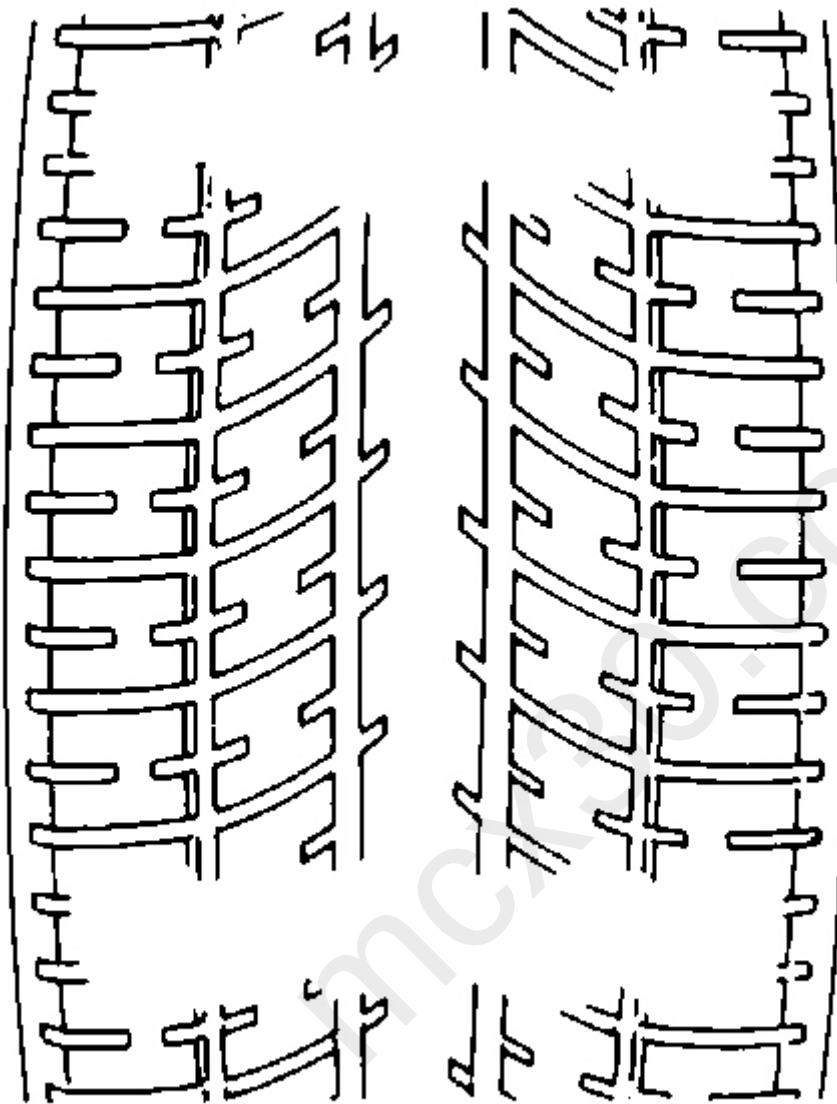


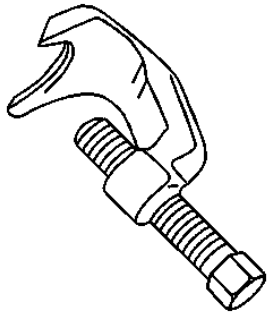
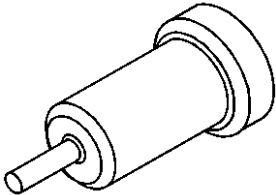
Fig. 29: View Of Tread Wear Indicators
Courtesy of GENERAL MOTORS CORP.

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
	CH 41013 J 41013 Rotor Resurfacing kit
	CH 42450-A J 42450-A Wheel Hub Resurfacing Kit