

2013 SUSPENSION

Tires and Wheels - Malibu

SPECIFICATIONS

FASTENER TIGHTENING SPECIFICATIONS

Fastener Tightening Specifications

Application	Specification	
	Metric	English
• Wheel Nut Torque	165 N.m	122 lb ft

ADHESIVES, FLUIDS, LUBRICANTS, AND SEALERS

Adhesives, Fluids, Lubricants, and Sealers

Application	Type of Material	GM Part Number	Canadian Part Number
Aluminum Wheel	Adhesive/Sealant	12378478	88900041
Wheel	Mounting Lubricant	12345884	88863415
Wheel to Hub	Lubricant	1051344	993037

DIAGNOSTIC INFORMATION AND PROCEDURES

TIRE DIAGNOSIS - IRREGULAR OR PREMATURE WEAR

Tire Wear

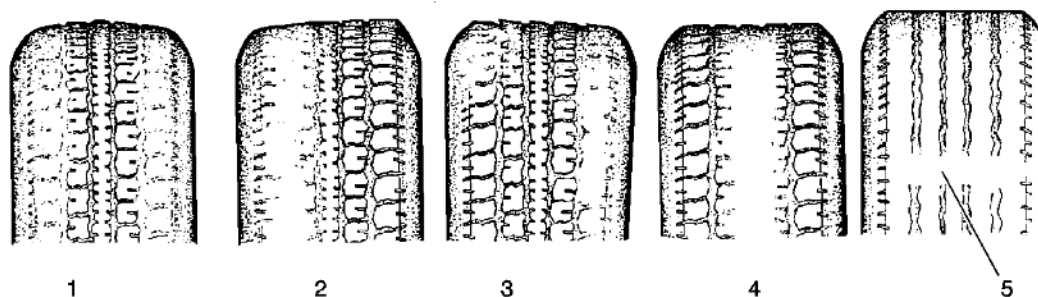


Fig. 1: Identifying Types Of Tire Wear
Courtesy of GENERAL MOTORS COMPANY

Callout	Component Name
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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

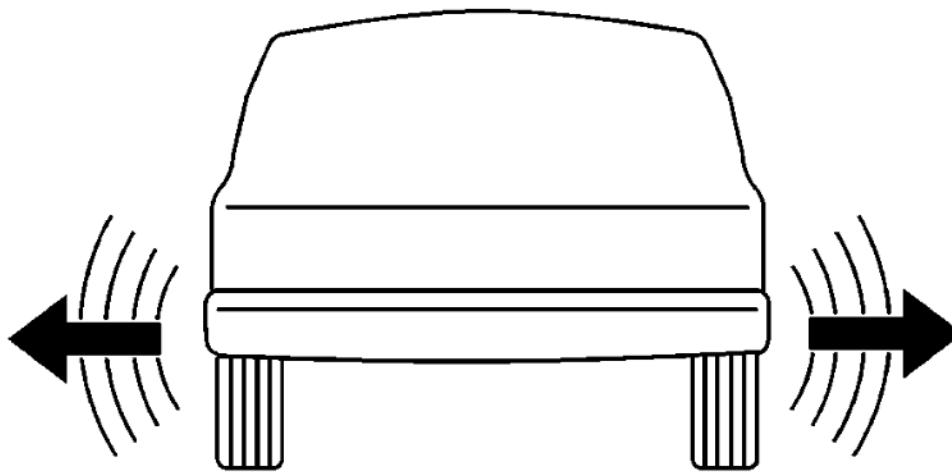


Fig. 2: Identifying Tire Wobble/Waddle
Courtesy of GENERAL MOTORS COMPANY

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
- 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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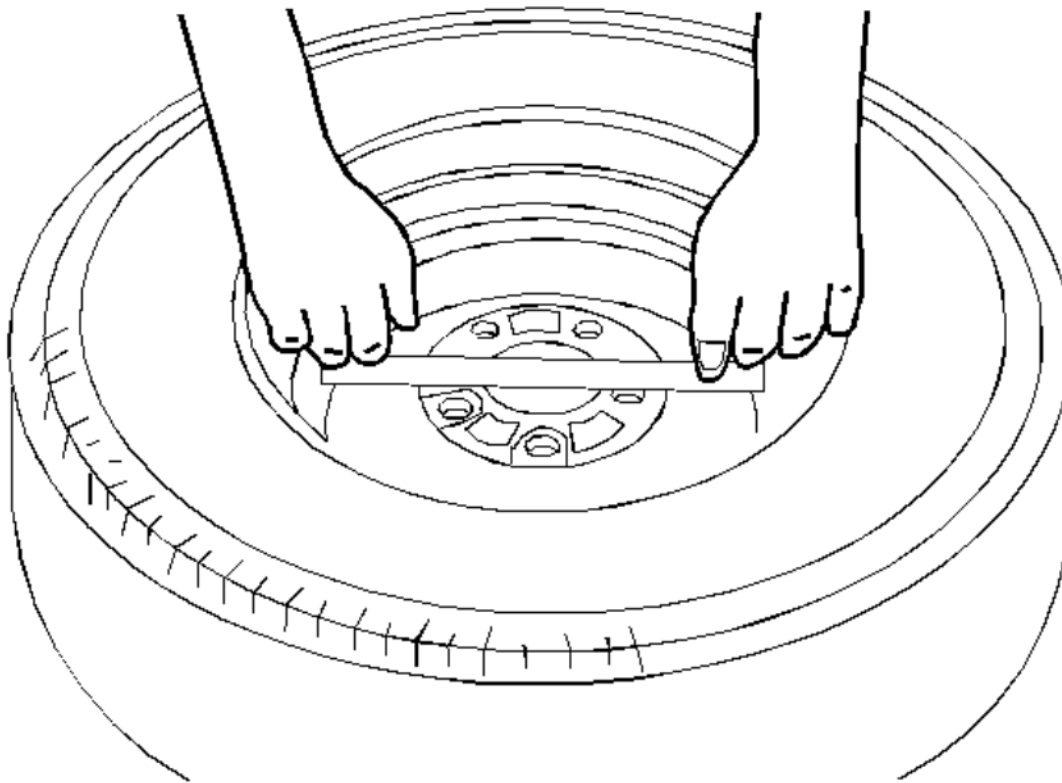


Fig. 3: Checking Wheel Mounting Surface
Courtesy of GENERAL MOTORS COMPANY

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 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.

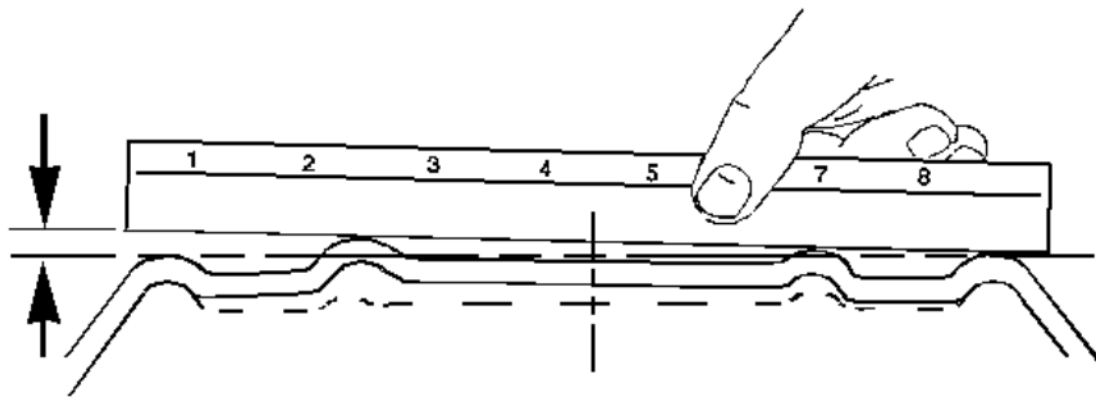


Fig. 4: Inspecting Wheel Inboard Mounting Surface
Courtesy of GENERAL MOTORS COMPANY

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

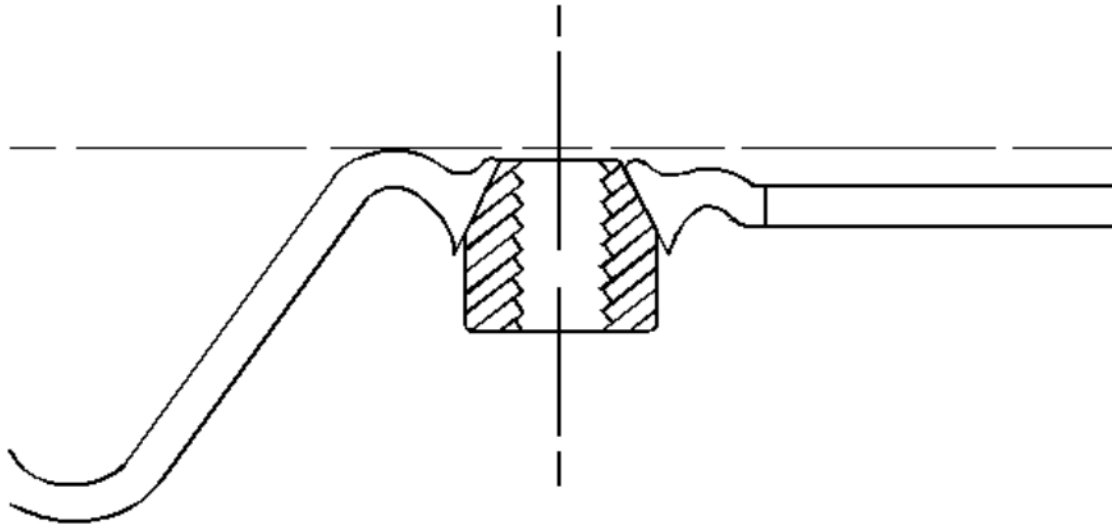


Fig. 5: Inspecting Mounting Wheel/Nut Holes For Damage Caused From Over-Torquing The Wheel/Nuts

Courtesy of GENERAL MOTORS COMPANY

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

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 Vehicle Leads/Pull diagnostic table?	Go to Step 2	Go to <u>Vehicle Leads/Pulls</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. Is the repair complete?	Go to Step 9	-
8	Replace the right rear tire. 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

ALUMINUM WHEEL POROSITY REPAIR

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.

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.**

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

NOTE: **Some outside companies are offering wheel refinishing services. Such refinished wheels will be permanently marked by the refinisher and are warranted by the refinisher. Any process that re-machines or otherwise re-manufactures the wheel should not be used.**

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. The wheel ID must be recorded and follow the wheel throughout the process in order to assure that the same wheel is returned. 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. Re-machining of the wheel is not allowed. Paint and/or clearcoat must not be present on the nut chamfers, the wheel mounting surfaces and the wheel pilot hole. 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.

NOTE: **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.**

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

TIRE AND WHEEL REMOVAL AND INSTALLATION

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.

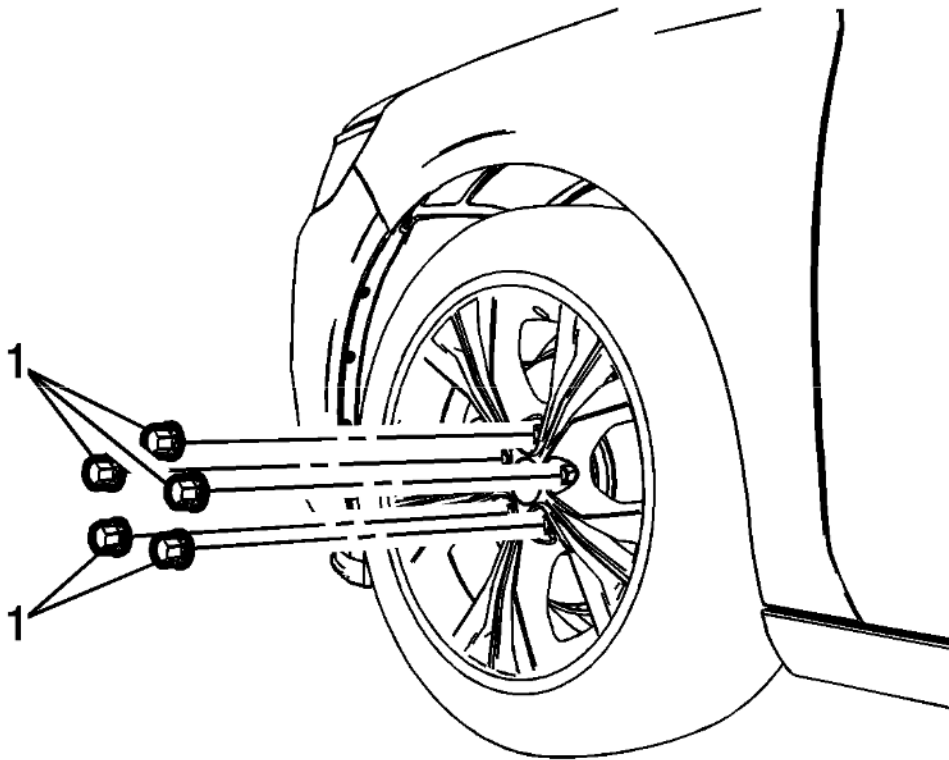


Fig. 6: Wheel Nut Caps

Courtesy of GENERAL MOTORS COMPANY

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

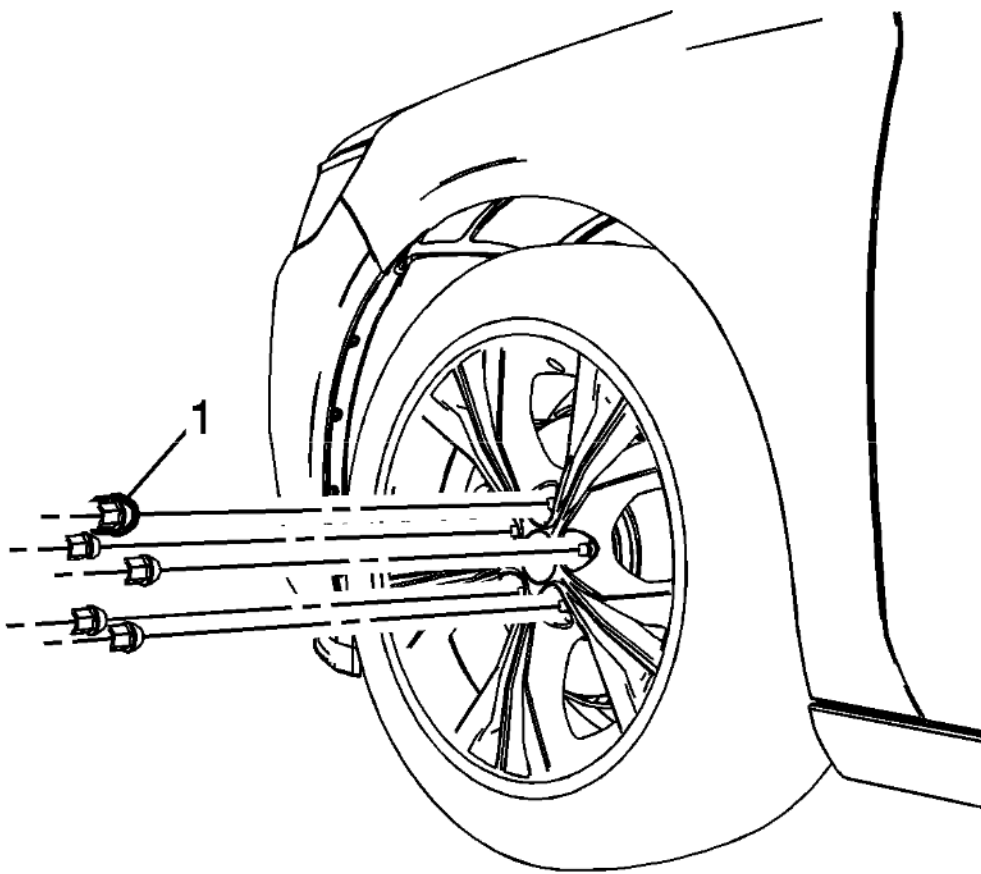


Fig. 7: Wheel Nuts

Courtesy of GENERAL MOTORS COMPANY

4. Remove the wheel nuts (1).

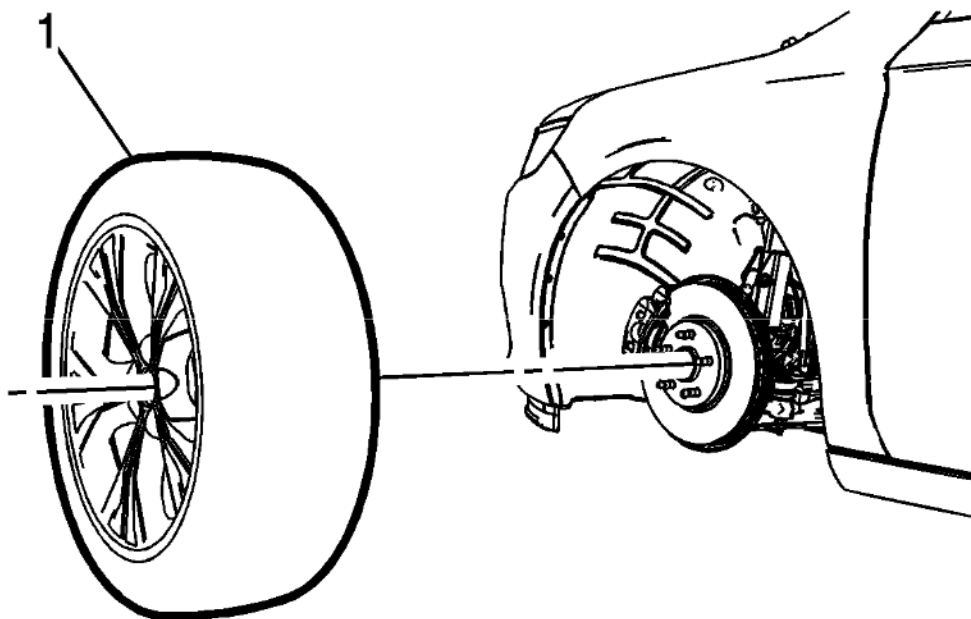


Fig. 8: Tire And Wheel Assembly
Courtesy of GENERAL MOTORS COMPANY

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.

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**, or **Wheel Stud Replacement**.
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 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**.

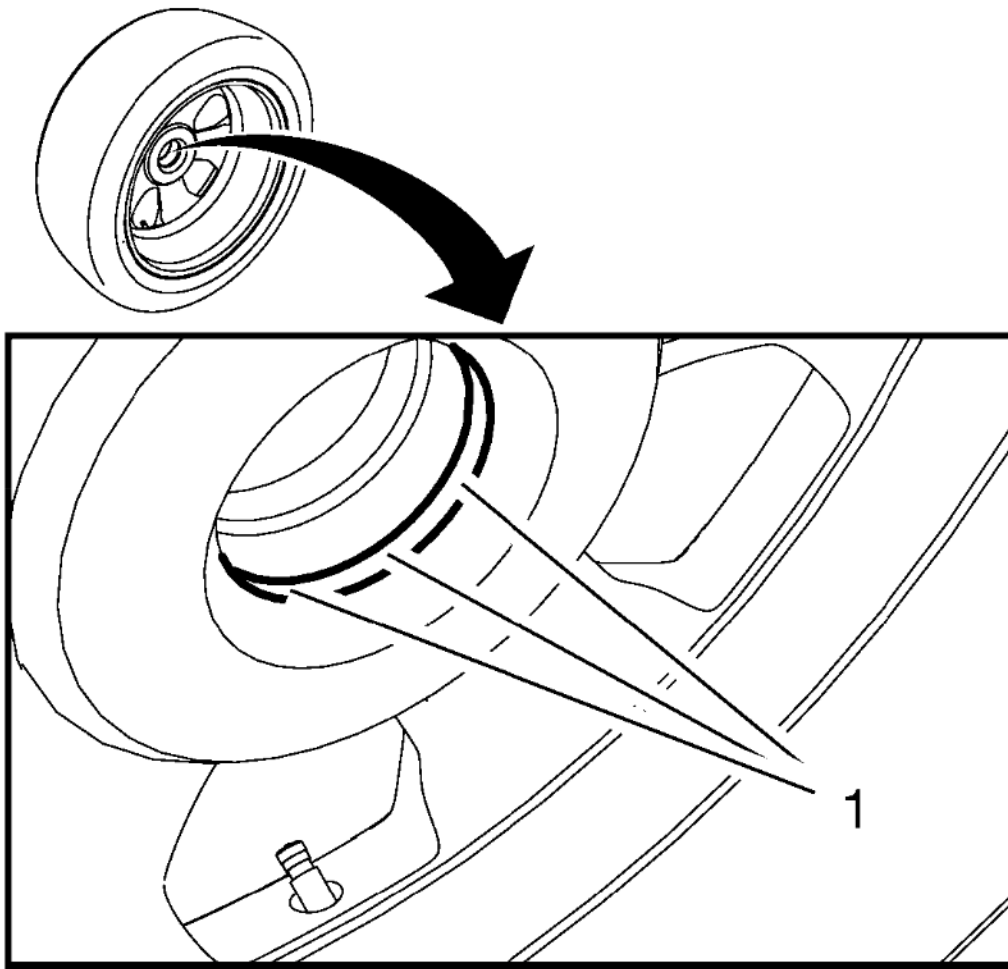


Fig. 9: Rim Inner Center Seat

Courtesy of GENERAL MOTORS COMPANY

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**.

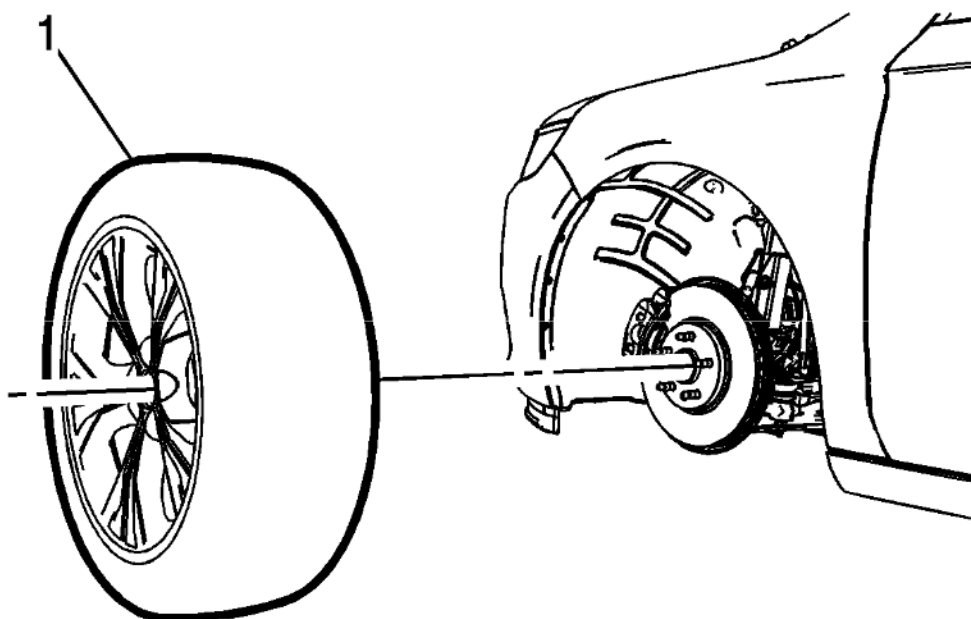


Fig. 10: Tire And Wheel Assembly
Courtesy of GENERAL MOTORS COMPANY

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

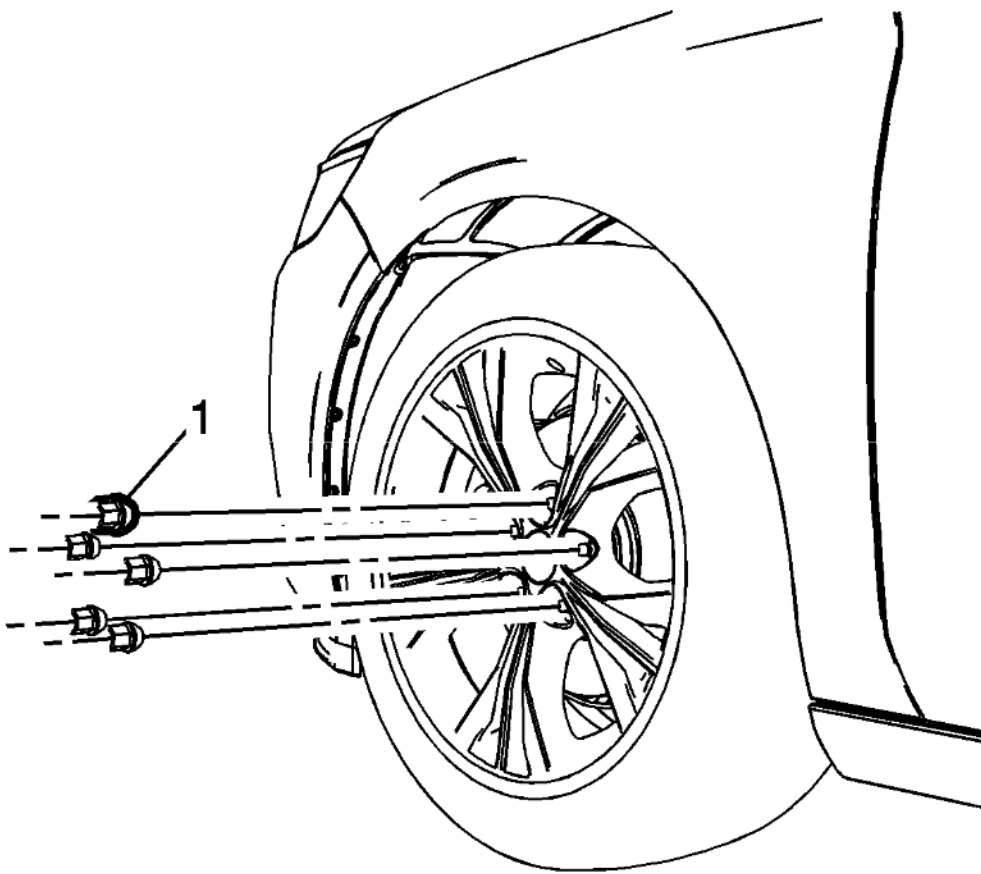


Fig. 11: Wheel Nuts

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.

10. Hand install the wheel nuts (1).

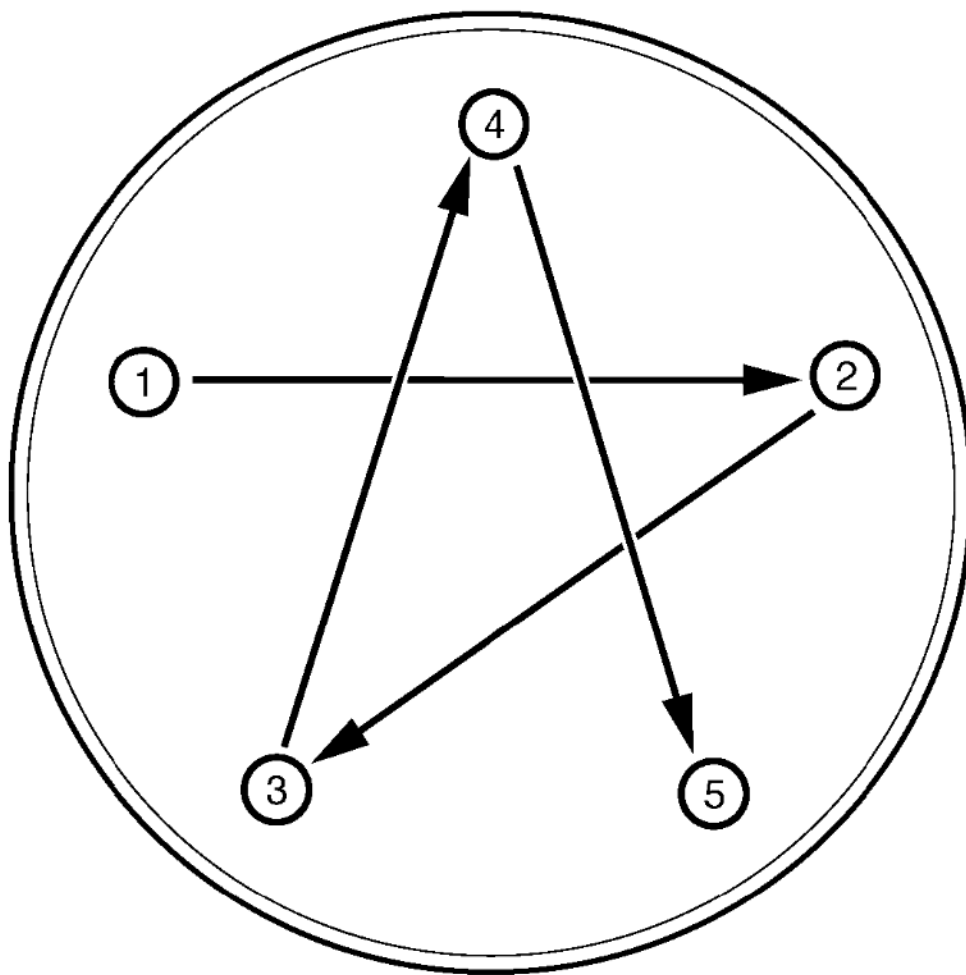


Fig. 12: Wheel Nut Tightening Sequence
Courtesy of GENERAL MOTORS COMPANY

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.

CAUTION: Refer to Fastener Caution .

11. Using a torque wrench and the appropriate socket, alternately and evenly tighten the wheel nuts to 150 (111 lb ft) in the sequence illustrated.

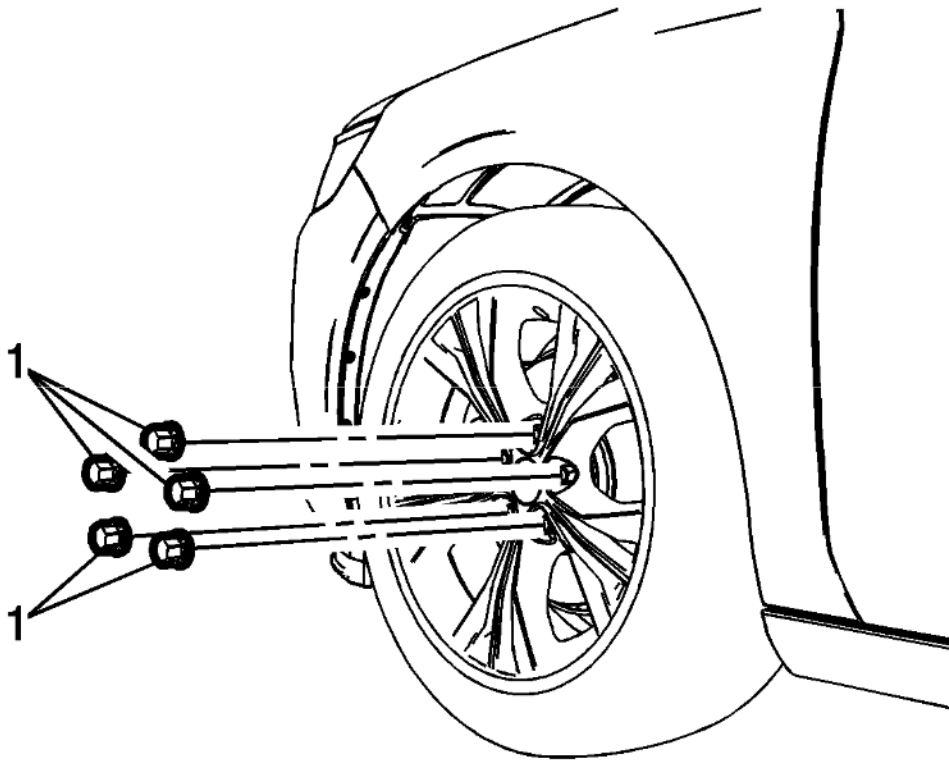


Fig. 13: Wheel Nut Caps

Courtesy of GENERAL MOTORS COMPANY

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

WHEEL TRIM COVER HUB CAP REPLACEMENT

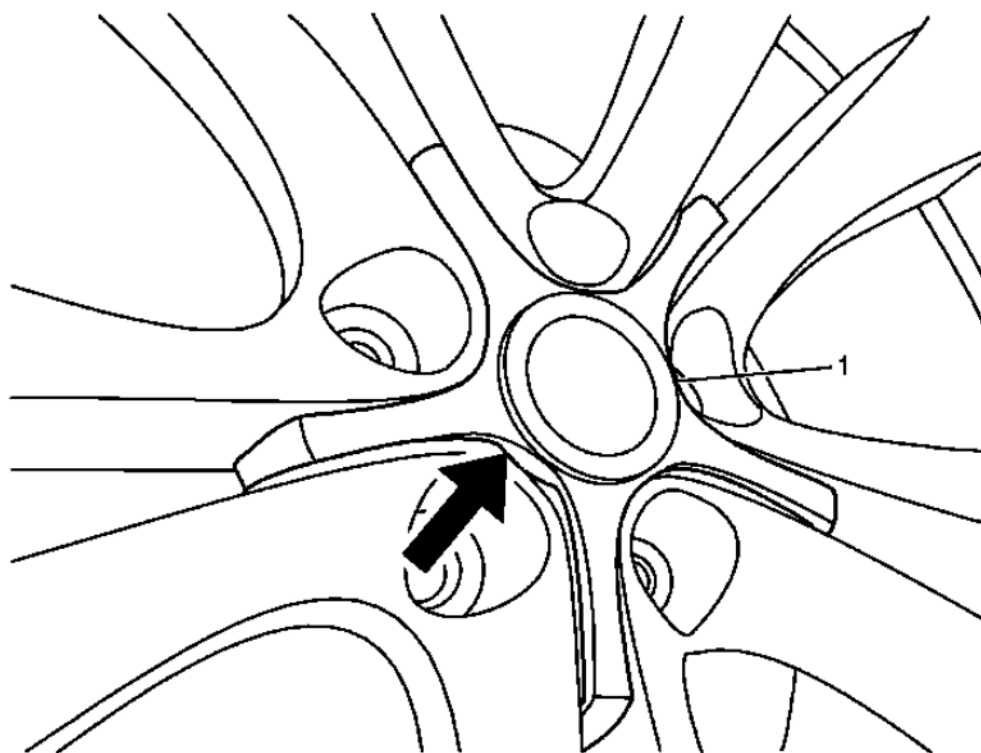


Fig. 14: Wheel Trim Cover Hub Cap
Courtesy of GENERAL MOTORS COMPANY

Wheel Trim Cover Hub Cap Replacement

Callout	Component Name
1	Wheel Trim Cover Hub Cap Procedure 1. Orientate the wheel cap depending on the positioning leg. 2. Press softly by hand, in the center of the wheel cap. 3. Clip the arms of the wheel cap to the wheel, one by one.

TIRE ROTATION

Rotate the tires and wheels at frequent intervals to equalize wear. Refer to **Maintenance Schedule** . 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**.

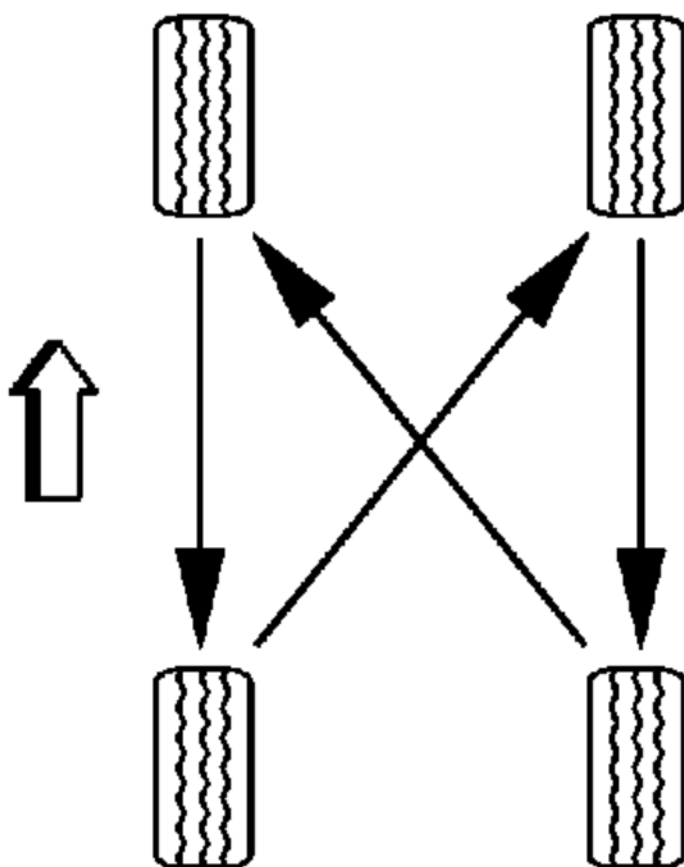


Fig. 15: Identifying Tire Rotation Pattern
Courtesy of GENERAL MOTORS COMPANY

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.

DESCRIPTION AND OPERATION

ALL SEASONS TIRES DESCRIPTION

Steel belted all-season radial 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

This vehicle has been engineered to operate up to the stated load capacity with wheel and tire assemblies of the type, size, construction, and configuration as originally installed. Maintenance of the tire inflation pressures is critical to the continued satisfactory performance, handling, and operating economy of the vehicle. Operation with incorrectly or improperly inflated tires can adversely affect vehicle performance and may contribute to the following:

- Reduced fuel economy
- Tire overloading
- Shortened tire life
- Excessive tire wear
- Uneven tire wear
- Vehicle handling concerns

Inspect the tire pressures when the vehicle has not been driven for at least 3 hours or not more than 1.6 km (1 mi) and when the tires are cool to the touch.

Tire inflation pressures should be inspected monthly and before an extended trip and adjusted to meet the specifications listed for the particular vehicle. Replace any missing or damaged tire valve stem extensions and/or caps to prevent the intrusion of water and contaminants.

One pound per square inch (psi) equals 6.9 kilopascals (kPa). The following table illustrates the conversion of kilopascals to pounds per square inch:

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			

For the correct inflation pressures refer to the vehicle Tire Placard.

Tires inflated to a higher than recommended pressure can contribute to the following conditions:

- A hard ride
- Tire bruising

- Rapid tread wear at the center of the tire

Tires inflated to a lower than recommended pressure can contribute to the following conditions:

- Tire squeal on turns
- Hard steering
- Rapid and/or uneven wear on the outer edges of the tread
- Tire rim bruises and tire rim rupture
- Tire cord breakage
- High tire temperatures
- Sluggish vehicle handling
- Higher fuel consumption

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

- Uneven braking action
- Steering lead
- Imprecise vehicle handling

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

Tire Designation

The dimensions of a P-metric sized tire are described in its designation as per the following table.

Example: 205/65 R 15 94V

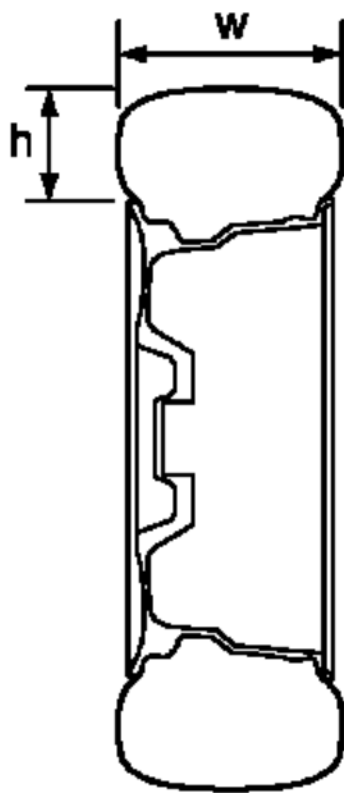


Fig. 16: View Of Tire Width & Height
 Courtesy of GENERAL MOTORS COMPANY

Designation	Explanation
205	Tire width in mm
65	Aspect ratio height (h)/width (w) %
R	Construction type, see table below
16	Rim diameter in inches
94	Load index, see table below
V	Speed rating, see table below

Construction Type

Designation	Explanation
R	Radial
B	Bias-belted
D	Diagonal (Bias)

Load Index

Code	Max Load kg	Max Load lb
91	615	1353

93	650	1430
94	670	1474
95	690	1518

Speed Rating

Code	Max Speed km/h	Max Speed mph
Q	160	99
S	180	112
T	190	118
H	210	130
V	240	149
W	270	168
Y	300	186

The marking of the tire in the example means:

- 205 - Tire width is 205 mm
- 65 - Aspect Ratio is 65% (height is 65% of width)
- 205 - Tire width is 205 mm
- 16 - The tire is for 16 inch rim
- 94 - Max load is 670 kg (1, 474 lb)
- V - Max speed is 240 km/h (149 mph)

There may sometimes be an added marking showing that the tire can handle more load:

- RF - Reinforced
- XL - Extra Load

Winter tires have an extra marking M+S.

Week of Manufacture

The week and year of manufacture is indicated on the tire.

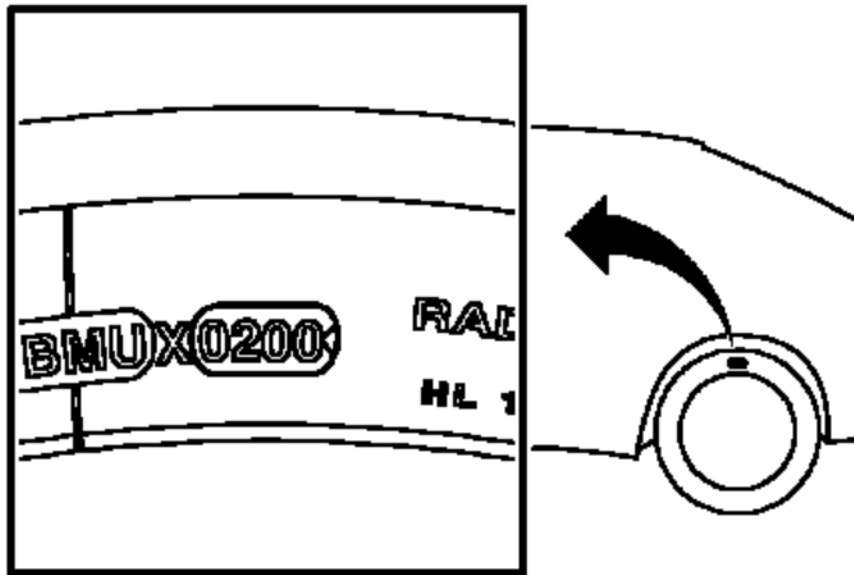


Fig. 17: Week Of Manufacture
Courtesy of GENERAL MOTORS COMPANY

The 2 first digits states the production week and the 2 last digits states the year. The symbol "<" points to the year. The code 0200< means that the tire is manufactured week 02 year 2000.

Replacing Tires

When replacing wheels/tires/rims using other dimensions always use the diagnostic tool to program the new values to avoid inaccuracy for e.g. speedometer, odometer and TPMS.

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.

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 corroded.
- 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.

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

When replacing wheels/tires/rims using other dimensions always use the diagnostic tool to program the new values to avoid inaccuracy for e.g. speedometer, odometer and TPMS.

TIRE INFLATION 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

TREAD WEAR INDICATORS DESCRIPTION

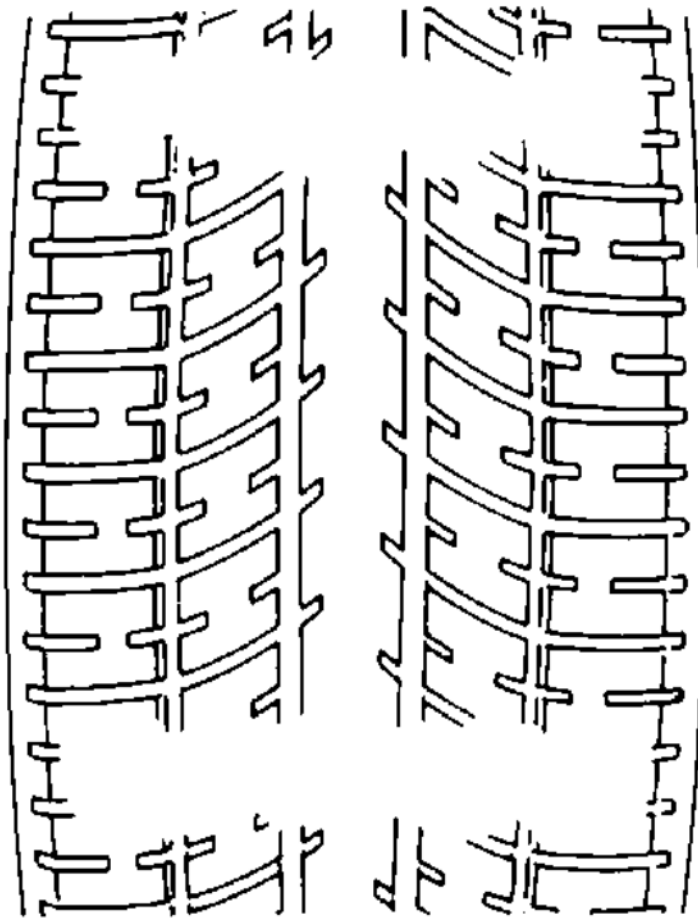


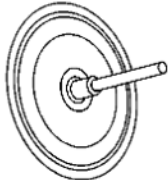
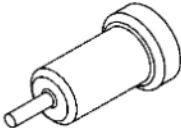
Fig. 18: View Of Tread Wear Indicators
 Courtesy of GENERAL MOTORS COMPANY

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 Not used in Europe
	CH 42450-A J 42450-A Wheel Hub Resurfacing Kit Not used in Europe