

Tires and Wheels

Specifications

Tire and Wheel Specifications

Application	Specification	
	Metric	English
Maximum Radial Runout		
Aluminum Wheels	0.76	0.030
Steel Wheels	1.01	0.040
Maximum Lateral Runout		
Aluminum Wheels	0.76	0.030
Steel Wheels	1.14	0.045
Tire Pressures		
Compact Spare	420	60
Front/Rear	210	30

Fastener Tightening Specifications

Application	Specification	
	Metric	English
Jack Storage Bolt/Screw	6.5 N·m	58 lb in
Wheel Nut - M12 x 1.5	140 N·m	100 lb ft
Wheel Nut Cap - 16 x 8 Aluminum Wheel	6 N·m	53 lb in
Wheel Trim Cover (Chevrolet)	6 N·m	53 lb in

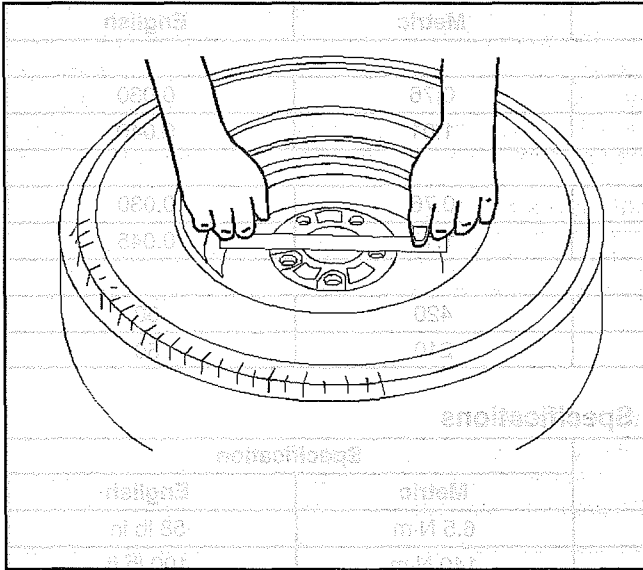
GM SPO Group Numbers

Application	GM SPO Group Number
Aluminum Wheel Hubcap	5.000
Aluminum Wheels	5.000
Compact Spare Tire	5.000

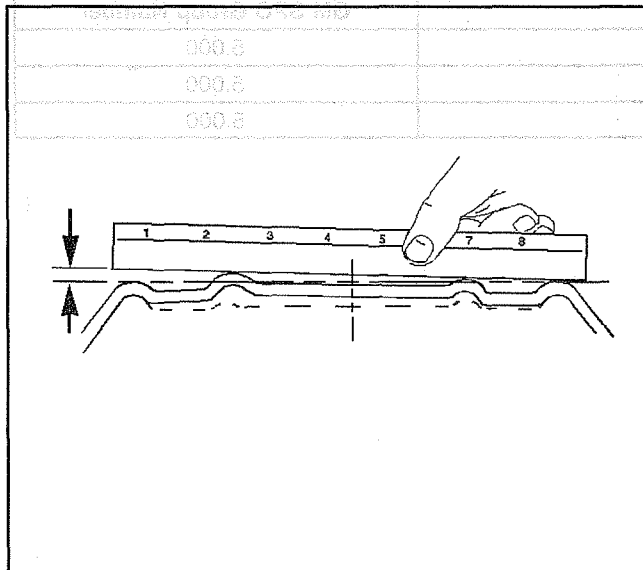
Diagnostic Information and Procedures

Wheel Mounting Surface Check

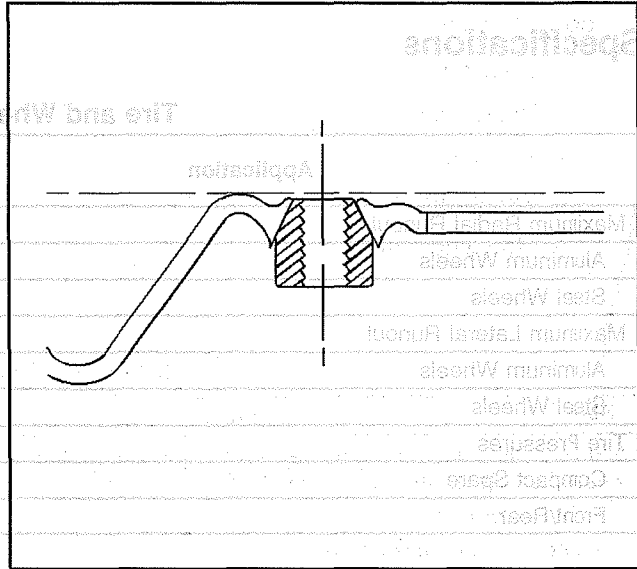
It is necessary to replace any wheels which are bent, dented, or which have excessive lateral or radial runout. Also, wheels with runout greater than specified may cause objectionable vibrations.



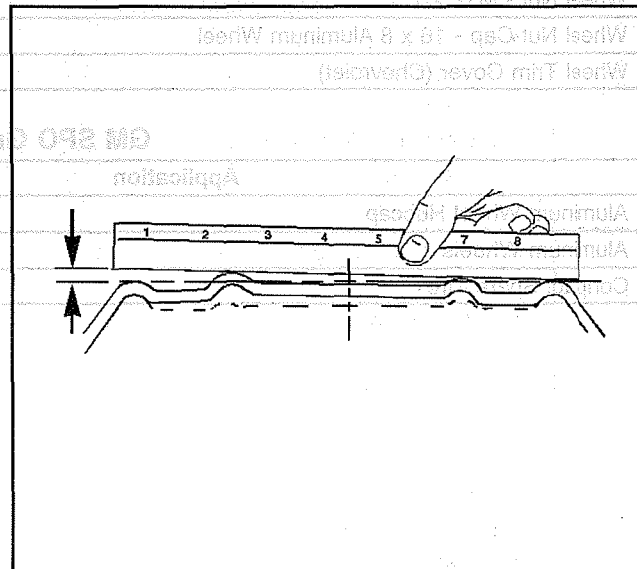
1. Use a straight edge 203 to 229 mm (8 to 9 in) long. Place the straight edge on the wheel inboard mounting surface. Try to rock the straight edge up and down within the mounting surface.



2. Repeat this procedure on at least three or four different positions on the inboard mounting surface.
 - The outer ring of the mounting surface normally is raised above everything inside the mounting surface.
 - The mounting surface will be raised above the outer ring if the wheel mounting surface has been bent on a tire changer.



3. 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.



Notice: 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

Important:

- Replacement wheels must be equivalent to the original equipment wheels in the following ways:

- Load capacity
- Wheel diameter
- Rim width
- Wheel offset
- Mounting configuration

- A wheel of incorrect size or type may effect the following conditions:

- Wheel and hub-bearing life
- Brake cooling
- Speedometer/odometer calibration
- Vehicle ground clearance
- Tire clearance to the body and the chassis

4. Replace the wheel if the wheel is bent. 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	Value(s)	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. Lead is usually caused by the following conditions: • Off center belt • Uneven brake assemblies • Improper tire and wheel alignment In the front tires (rear tires will not cause lead) Tire construction can be a cause of lead in a vehicle. An example of this is placement of the belt. Off center belts on radial tires can cause the tire to develop a side force while rolling straight down the road, and the tire will tend to roll like a cone. Important: Use the lead/pull correction table in order to verify that improper tire and wheel alignment is not mistaken for tire lead.				
1	Inspect and repair/replace tire/wheel assemblies for: • Correct tire pressure. • Excessive/uneven tire wear. • Correct tire size. • Excessive radial/lateral wheel runout. • Out of balance. Is action complete?		Go to Step 2	
2	Inspect and repair front and rear suspensions for: • Damage. • Excessive wear. • Loose Components. • Excessive wheel bearing play. Is action complete?	—	Go to Step 3	
3	Inspect and repair power steering gear and pump for: • Damage. • Excessive wear. • Variable Effort steering for DTCs. Is action complete?		Go to Step 4	
4	1. Cross-switch front tire/wheel assemblies. 2. Road test vehicle. Does vehicle still lead/pull?	—	Go to Step 5	System OK
5	Does the vehicle lead/pull in the opposite direction?	—	Go to Step 6	Go to Measuring Wheel Alignment
6	1. Cross-switch left front tire/wheel assembly with left rear tire/wheel assembly. 2. Road test the vehicle. Does vehicle still lead/pull?	—	Go to Step 7	Go to Step 8
7	1. Cross-switch right front tire/wheel assembly with right rear tire/wheel assembly. 2. Road test the vehicle. Does vehicle still lead/pull?	—	Go to Measuring Wheel Alignment	Go to Step 9

Radial Tire Lead/Pull Correction (cont'd)

Step	Action	Value(s)	Yes	No
8	Replace left rear tire. Is repair complete?	—	System OK	—
9	Replace right rear tire. Is repair complete?	—	System OK	—

Repair Instructions

Aluminum Wheel Hub Cap Replacement

Removal Procedure

Use the following procedure in order to remove the hub cap:

1. Insert a flat-bladed tool into the slot between the rim and the hub cap.
2. With the tool in position, pry off the hub cap.
3. Remove the hub cap.

Installation Procedure

Install the hub cap.

Use a rubber mallet in order to fully seat the hub cap into the rim.

Aluminum Wheel Porosity Repair

Removal Procedure

1. Raise and suitably support the vehicle. Refer to Vehicle Lifting and Jacking in General Information.
2. Remove the tire and the wheel. Refer to *Tire and Wheel Removal and Installation*.
3. Locate the leaking areas by inflating the tire to 280 kPa (40 psi) and dipping the tire and the wheel into a water bath.
4. Mark the leak areas
5. Mark the tire at the valve stem.
6. Remove the tire from the wheel. Refer to *Tire Mounting and Dismounting*.
7. Scuff the inside rim surface at the leak area with a number 80 grit sandpaper.
8. Clean the area with a general purpose cleaner such as 3M part number 08984 or the equivalent.
9. Apply 3 mm (1/8 in) thick layer of adhesive/sealant, GM P/N 1052366 or the equivalent, to the leak test area. Allow six hours of drying time.

Installation Procedure

1. Install the tire to the wheel. Refer to *Tire Mounting and Dismounting*.
2. Align the matchmark on the tire with the valve stem.
3. Pressurize the tire to 280 kPa (40 psi) and inspect for leaks.
4. Adjust the tire pressure in order to meet the specifications on the tire placard.
5. Balance the tires and wheels. Refer to *Balancing Tires and Wheels* in Vibration Diagnosis and Correction.
6. Install the tire and the wheel. Refer to *Tire and Wheel Removal and Installation*.
7. Lower the vehicle.

Aluminum Wheel Refinishing

Wheel Refinishing

A protective clearcoat and/or base color is applied to the surface of the original equipment cast aluminum wheels. Surface degradation can begin to develop if uncoated balance weights are used, or if frequent, repeated automatic car wash cleaning wears off the factory applied protective clearcoat and/or base color. This can happen at some automatic car wash facilities that use aggressive silicone carbide tipped tire brushes to clean the whitewalls and the tires. Exposure to caustic cleaners and/or to road salt causes further surface degradation once the protective clearcoat is damaged.

The refinishing of aluminum wheels requires that the wheel surface be plastic media blasted to remove old clearcoat or paint. The remachining or the use of chemical strippers is not recommended due to the concerns for repair durability. The service procedure details how to strip, how to clean, and how to recoat the aluminum wheels that are affected by the above condition.

Wheel Refinishing Service Procedure

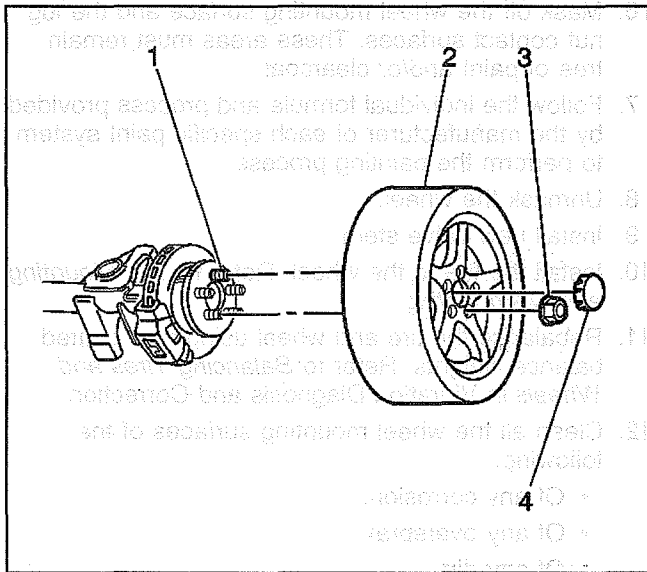
Caution: To avoid serious personal injury when applying any two part component paint system, follow the specific precautions provided by the paint manufacturer. Failure to follow these precautions may cause lung irritation and allergic respiratory reaction.

1. Remove the tire and wheel assembly from the vehicle. Refer to *Tire and Wheel Removal and Installation*.
2. Remove the balance weights and valve stem from the wheel.
3. Remove the tire from the wheel. Refer to *Tire Mounting and Dismounting*.
4. Use a suitable remover to wipe the following from the wheel:
 - Wipe the excess grease from the wheel.
 - Wipe the excess wax from the wheel.
 - Wipe the excess dirt from the wheel.

Important:

- Do not re-match the aluminum wheels.
 - Do not use chemical strippers.
5. Remove the old clearcoat and the old paint from the wheel by plastic media blasting the wheel. Light sanding of the wheel, while manually spinning the wheel, may also be done to restore the circular machined appearance.

6. Mask off the wheel mounting surface and the lug nut contact surfaces. These areas must remain free of paint and/or clearcoat.
7. Follow the individual formula and process provided by the manufacturer of each specific paint system to perform the painting process.
8. Unmask the wheel.
9. Install new valve stem.
10. Install the tire to the wheel. Refer to *Tire Mounting and Dismounting*.
11. Rebalance the tire and wheel using new coated balance weights. Refer to *Balancing Tires and Wheels* in Vibration Diagnosis and Correction.
12. Clean all the wheel mounting surfaces of the following:
 - Of any corrosion.
 - Of any overspray.
 - Of any dirt.
13. Install the tire and wheel assembly to the vehicle. Refer to *Tire and Wheel Removal and Installation*.



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Tire and Wheel Removal and Installation

Caution: 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 a loss of control and an injury accident.

Notice: Improperly tightened wheel nuts can lead to brake pulsation and rotor damage. To avoid expensive brake repairs, evenly tighten the wheel nuts in the proper torque specification.

Notice: NEVER use heat to loosen a tight wheel. It can shorten the life of the wheel, wheel nuts and wheel bearings. Excessive force, such as hammering the wheel or tire, can also cause damage and is not recommended. Slight tapping of the tire side wall, such as with one's hand or a rubber mallet, is normally acceptable.

Important: Penetrating oil has not been found to be effective in removing tight wheels. However, if used, you should apply the oil sparingly on the wheel centerhole area only.

Sometimes the wheels can be difficult to remove due to foreign material or a tight fit between the wheel centerhole and the rotor.

You can remove the wheel without damage through the following steps:

1. Retighten all the wheel nuts on the affected wheel. Then loosen each nut two turns. Rock the vehicle from side to side. If this is not effective, go to step 2.
2. Rock the vehicle from Drive and Reverse allowing the vehicle to move several feet in each direction. Apply quick, hard pressure on the brake pedal in order to loosen the wheel. If the wheel still does not loosen, then rock the vehicle again from side to side as hard as possible using one or more person's body weight. If the wheel is still tight, repeat the procedure.

Removal Procedure

1. Raise the vehicle. Support the vehicle. Refer to *Lifting and Jacking the Vehicle* in General Information.
2. Remove the wheel nut cap, if equipped.
3. Remove the hub cap or the wheel trim cover (4).
4. Remove the special security lock nut, if equipped. Use a special security wheel lock key located in the front floor console.
5. Remove the wheel nuts (3).
6. Mark the location of the tires and the wheels to the hub.
7. Remove the tire and the wheel (2).

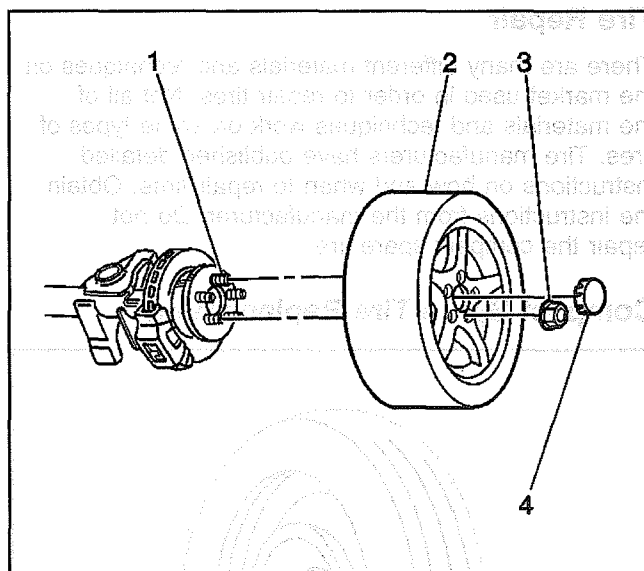
Caution: Refer to *Buildup of Corrosion Removal Caution in Cautions and Notices*.

8. Clean the following components:
 - The wheel nuts (3)
 - The wheel hub bolts (1)
 - The wheel (2)
 - The brake drum or rotor mounting surfaces

Installation Procedure

Caution: Never use oil or grease on studs or nuts. Tighten the wheel nuts with your fingers until they are snug. Then, tighten the nuts (in the sequence shown) to the fastener tightening specification shown in Specifications in this Section. Improperly tightened wheel nuts could eventually allow the wheel to come off while the vehicle is moving, possibly causing loss of control, personal injury, and property damage.

1. Install the tire and wheel (2).
2. Install the wheel nuts (3) and the security wheel lock nut, if equipped.



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Notice: Refer to *Fastener Notice* in Cautions and Notices.

3. Tighten the wheel nuts to specifications.

Tighten

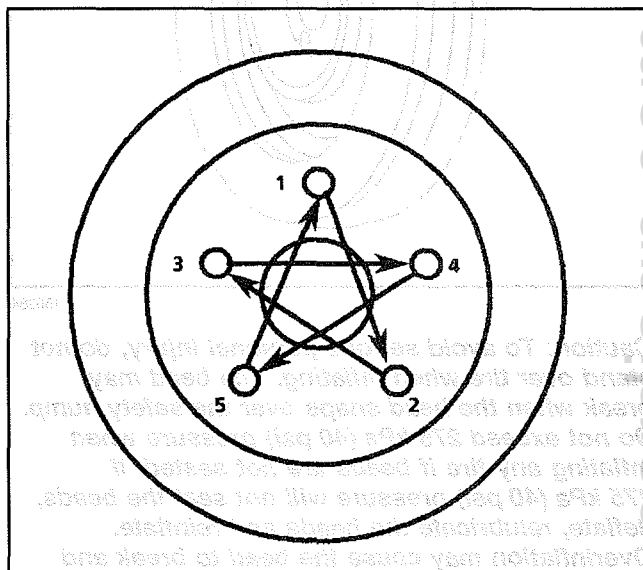
Tighten the wheel nuts in increments of 27 N·m (20 lb ft) in sequence up to 140 N·m (100 lb ft).

4. Tighten the special security wheel lock nut, if equipped. Use a special security wheel lock key located in the front floor console.
5. Install the hub cap or the wheel trim cover, if equipped.

Tighten

Tighten the wheel trim cover to 6 N·m (53 lb in).

6. Install the wheel nut cap, if equipped.
7. Lower the vehicle.



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Caution: The compact spare wheel should not be used with standard tires. Snow tires, wheel covers or trim rings, if such use is attempted, damage to these items or other parts of the vehicle may occur. The compact spare should be used only on vehicles that offer it as original equipment.

Notice: Do not take the vehicle through an automatic car wash with the compact spare installed. The vehicle may get caught, which could result in property damage.

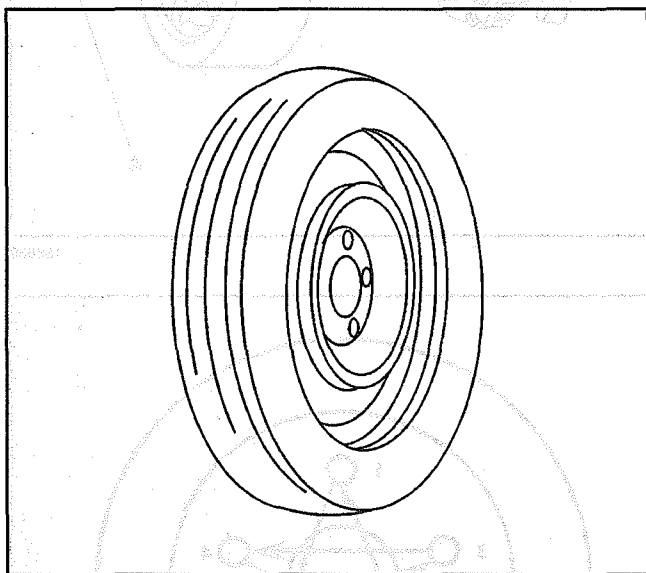
Important: Use of the compact spare may result in activating a wheel sensor anti-lock code.

Measure the compact spare inflation pressure periodically and maintain the inflation pressure at 420 kPa (60 psi). You can mount or dismount the tire from the wheel using a standard tire-changing equipment procedures.

Tire Repair

There are many different materials and techniques on the market used in order to repair tires. Not all of the materials and techniques work on some types of tires. Tire manufacturers have published detailed instructions on how and when to repair tires. Obtain the instructions from the manufacturer. Do not repair the compact spare tire.

Compact Spare Tire Replacement



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Caution: 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.

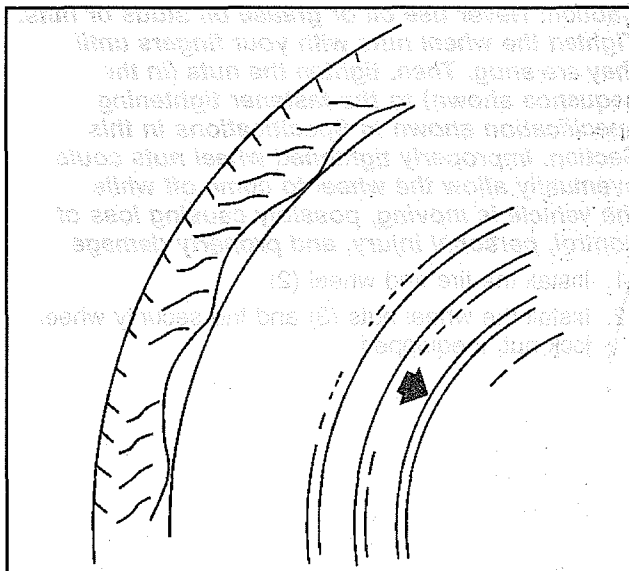
Notice: The compact spare wheel should not be used with standard tires, snow tires, wheel covers or trim rings. If such use is attempted, damage to these items or other parts of the vehicle may occur. The compact spare should be used only on vehicles that offer it as original equipment.

Notice: Do not take the vehicle through an automatic car wash with the compact spare installed. The vehicle may get caught, which could result in property damage.

Important: Use of the compact spare may result in activating a wheel sensor fault code.

Measure the compact spare inflation pressure periodically and maintain the inflation pressure at 420 kPa (60 psi). You can mount or dismount the tire from the wheel using present tire-changing equipment procedures.

Tire Mounting and Dismounting



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Use a tire changing machine in order to mount or dismount tires. Follow the equipment manufacturer's instructions. Do not use hand tools or tire irons to change the tire as they may damage the tire beads, wheel rim or flanges.

Notice: 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.

Important: Do not lubricate the tire beads or wheel rim with the lubricant containing silicone. Silicone will allow the tire to rotate on the wheel rim, throwing the tire and wheel out of balance.

Clean the rim bead seats with a wire brush or a coarse steel wool to remove old rubber and light rust or corrosion. Before mounting or dismounting a tire, the bead area should be well-lubricated with GM P/N 9985555 (50% lubricant and 50% water) or equivalent.

Caution: 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 220 kPa (32 psi) pressure when inflating any tire if beads are not seated. If 220 kPa (32 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.

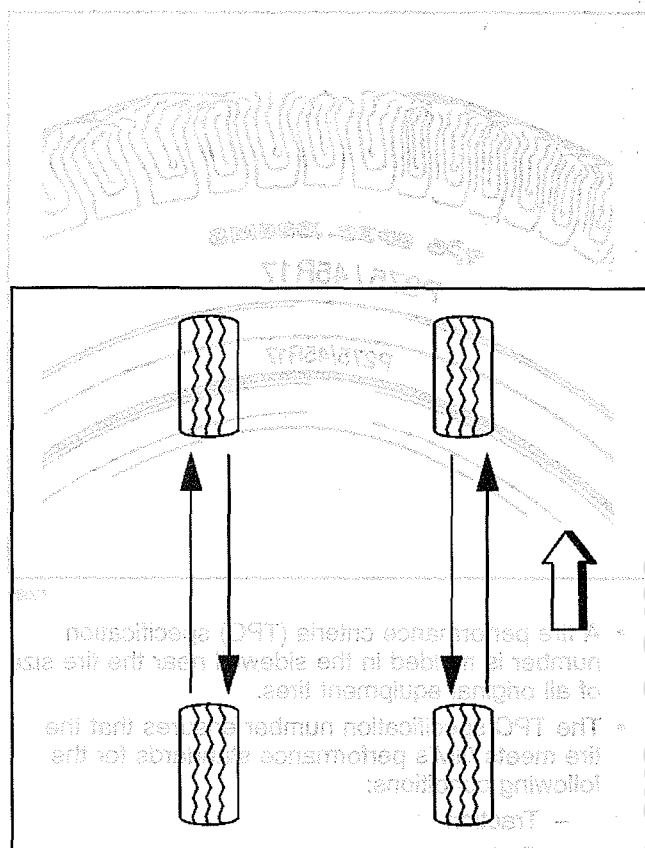
After mounting the tire, inflate the tire so that the beads are completely seated. Never exceed 280 kPa (40 psi).

Important: When mounting blackwall tires, be sure that the TPC specification number faces the outboard side of the vehicle.

Install the valve stem and inflate the tire to the pressure specified on the tire placard. Inspect the locating rings of the tire in order to determine that the rings show around the rim flanges on both sides of the wheel.

Tire Rotation

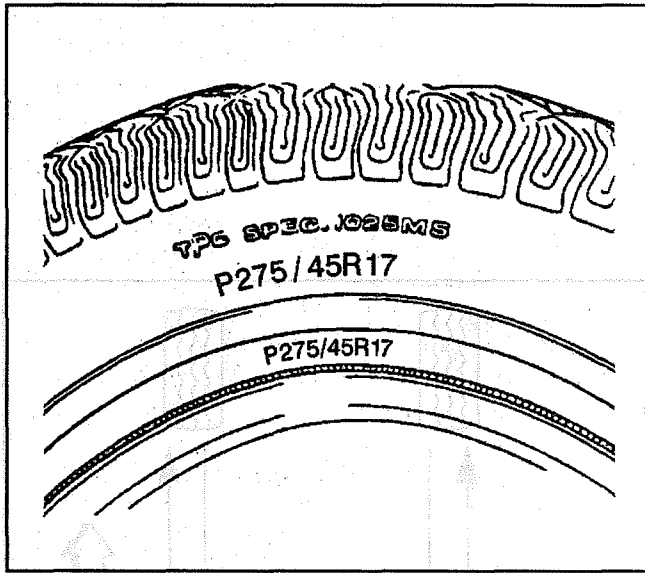
- In order to equalize tire wear, rotate the tires at intervals specified in Maintenance and Lubrication in General Information. If you notice uneven tire wear, investigate the cause.
- Due to design, radial tires tend to wear faster in the shoulder area, particularly in drive locations. Radial tires in non-drive locations may develop and irregular wear pattern that can generate tire noise. This wear makes regular rotation especially important.
- Always use a four-wheel rotation. After rotation, be sure to measure wheel nut torque and set the tire pressure. Never use oil or grease on the wheel bolts or nuts.
- On vehicles with P245/50ZR16 or P275/40ZR17 tires, follow special rotation provisions because the tires are directional.
- Rotate the tires. If you have directional tires, be sure the color-coded arrows on the tires roll forward.
- Balance the tires and wheels using a polyester-coated clip-on wheel balancing weights. Refer to *Balancing Tires and Wheels in Vibration Diagnosis and Correction*.
- Adjust the tire pressures and tighten the wheel nuts to the specified torque. Refer to *Tire and Wheel Removal and Installation*.



231490

Description and Operation

Tires Description



- A tire performance criteria (TPC) specification number is molded in the sidewall near the tire size of all original equipment tires.
- The TPC specification number ensures that the tire meets GM's performance standards for the following conditions:
 - Traction
 - Endurance
 - Dimension
 - Noise
 - Handling
 - Rolling resistance
- A specific TPC number is usually assigned to each tire size.
- The following characteristics on replacement tires should be the same as on the original tires:
 - Load range
 - Speed Rating
 - Construction
- Replace the original tires with tires of the same TPC specification number.
- Use of any other tire size or type may affect the following conditions:
 - Ride
 - Handling
 - Speedometer/odometer calibration
 - Antilock brake system
 - Vehicle ground clearance
 - Tire clearance to body and chassis
- Install new tires in pairs on the same axle.
- If it is necessary to replace only one tire, the tire should be paired with the tire having the most tread in order to equalize the braking traction.

Replace the tires under the following conditions:

- Tires are worn to a point where 1.6 mm (1/16 in) or less tread remains, or the cord fabric shows.
To help detect this condition, tires have built-in tread wear indicators that appear between the tread grooves when the tread is worn to 1.6 mm (1/16 in) or less.
Replace the tire when the indicators appear in two or more adjacent grooves at three spots around the tire.
- The tread or sidewall is damaged in one of the following ways:
The tread or sidewall is cracked or either cut or snagged deeply enough to expose the cord or the fabric.
 - The tread or sidewall is cracked.
 - The tread or sidewall is cut deeply enough in order to expose the cord or the fabric.
 - The tread or sidewall is snagged deeply enough in order to expose the cord or the fabric.
- One of the following conditions exists in the tire:
 - A bump
 - A bulge
 - A split
 Slight sidewall indentations are normal and should not affect the ride.
- One of the following conditions exists in the tire:
 - A puncture
 - A cut
 - Other damage that cannot be correctly repaired because of the size or location of the damage.

Tire Inflation Description

When you inflate the tires to the recommended inflation pressures, the factory-installed wheels and tires are designed 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:

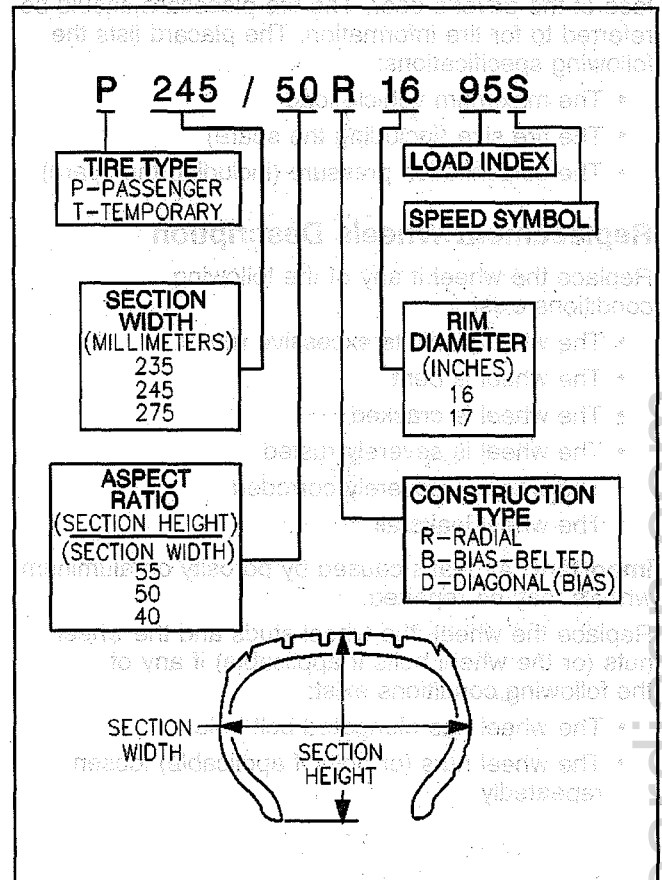
- Uneven braking
- Steering lead
- Reduced vehicle handling

See the Tire Placard for specific tire and wheel applications and tire pressures.

Tire Chain Usage Description

Notice: Tire chains should not be used with P245/50ZR16 or P235/55R16 tires. The chains could damage the vehicle. Tire chains are only recommended for emergency use or when required by law.

P-Metric Sized Tires Description



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All GM vehicles now use passenger-metric (P-metric) sized tires. P-metric tires are available in the following two load ranges:

- Standard load with 210 kPa (30 psi) maximum pressure
- Extra load with 240 pKa (35 psi) maximum pressure

Most P-metric tire sizes do not have exact corresponding alpha-numeric tire sizes. For example, a P205/75R15 is not exactly equal in size and load carrying capacity to an FR78-15. Replacement tires should be of the same TPC specification number as those originally on the vehicle. If the TPC specification number is the same then the following conditions are the same:

- The size
- The load range
- The construction

If you must replace the P-metric tires with other sizes, consult a tire dealer. A tire company can best recommend the closest match of alpha-numeric to P-metric sizes within their own tire lines.

The metric term for tire pressure is the kilopascal (kPa). Tire pressure may be printed in both kPa and pounds per square inch (psi). One psi equals 6.9 kPa. Refer to the tire placard or Specifications for tire pressures.

Tire Placard Description

The tire placard is permanently located on the rear face of the driver's door. The tire placard should be referred to for tire information. The placard lists the following specifications:

- The maximum vehicle load
- The tire size (including the spare)
- The cold inflation pressure (including the spare)

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
- The wheel leaks air

Important: Air leaks caused by porosity on aluminum wheels may be repaired.

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.

Caution: 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.

Notice: 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

Aluminum Wheels Description

Clean aluminum wheels with mild soap and water. Wax aluminum wheels regularly. Do not use abrasive or caustic cleaners. These could damage the protective coating of the wheel.