

Tires and Wheels

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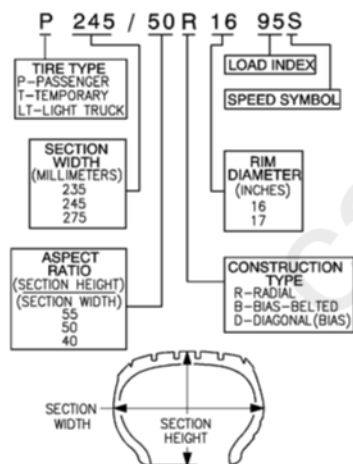
Description and Operation

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P-Metric Sized Tires Description

The tire sidewall has a coded marking system, which provides information about the tire.



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Tire Marking Example:		
P 245 50 R 16 95 S		
P	Passenger Vehicle Designation	
245	Section Width in mm (245â€”mm)	
50	Aspect Ratio (Section Height to Section Width) (50=; 50)	
R	Tire Construction (R=; Radial)	
16	Rim Diameter in inches (16=; 16")	
95	Max Load Index	91=; 615â€”kg
		92=; 630â€”kg
		93=; 650â€”kg
		94=; 670â€”kg
		95=; 690â€”kg
		96=; 710â€”kg
		97=; 730â€”kg
		99=; 775â€”kg
		104=; 900â€”kg
		106=; 950â€”kg
S	Speed Rating	R = 170â€”km/h
		S = 180â€”km/h
		H = 210â€”km/h
		V = 240â€”km/h
		W = 270â€”km/h

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.

Related Part Information

Part Name	Catalog Name	Part Code
Tire	TIRE,(W/ WHL)	0050A
Tire	TIRE,(LH PROC)	0101A
Tire	TIRE,(RH PROC)	0102A

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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, if any of the following conditions exist:

- The wheel has elongated wheel stud holes.
- The wheel nuts loosen repeatedly.

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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.

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Tire Inflation 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.

Operating the vehicle with 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 3½ 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

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Tires and Wheels Description and Operation

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

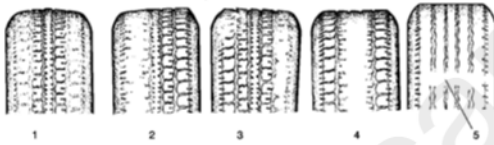
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Diagnostic Information and Procedures

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Tire Diagnosis - Irregular or Premature Wear



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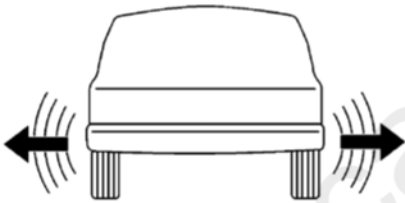
- (1) Under-Inflation, Hard Cornering, Lack of Regular Rotation
- (2) Incorrect Wheel Alignment, Hard Cornering, Lack of Regular Rotation
- (3) Incorrect Wheel Alignment, Shock Absorber Failure
- (4) Over-Inflation, Heavy Acceleration, Lack of Regular Rotation
- (5) Normal Wear to the Wear Indicator

Inspection Procedure

1. Inspect front tire for wear and damage.
2. Inspect rear tire for wear and damage.
3. Rotate the tires if any of the following conditions exist:
4.
 - The amount of time or distance 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).
5. Measure the wheel alignment if any of the following conditions exist:
6.
 - 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).
7. Inspect the struts or the shock absorbers if the tire tread exhibits a cupped appearance (3).

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Tire Diagnosis - Waddle Complaint



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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

Tire waddle is most noticeable at a low speed of about 80–113 km/h (50–70 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. Caution:

Refer to [Lifting and Jacking the Vehicle](#).

2. Raise and support the vehicle with safety stands.

3. Warning:

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

4. Perform the following preliminary inspection:

5.

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.

6. Use a tire substitution in order to identify the faulty tire. Perform the following steps for a tire substitution check:

7.

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.

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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 Stepâ€™%02	Go to Vehicle Leads/Pulls
2	Road test the vehicle to verify the complaint. Select a smooth level surface to perform the test. Does the condition exist?	Go to Stepâ€™%03	System OK
3	1. Cross-switch the front tire/wheel assemblies. Refer to Tire and Wheel Removal and Installation . 2. Road test the vehicle on a smooth level surface. Does the vehicle still lead/pull?	Go to Stepâ€™%04	System OK
4	Does the vehicle lead/pull in the opposite direction?	Go to Stepâ€™%05	Go to Wheel Alignment Measurement
5	1. Cross-switch the left front tire/wheel assembly with the left rear tire/wheel assembly. Refer to Tire and Wheel Removal and Installation . 2. Road test the vehicle on a smooth level surface. Does the vehicle still lead/pull?	Go to Stepâ€™%06	Go to Stepâ€™%07
6	1. Cross-switch the right front tire/wheel assembly with the right rear tire/wheel assembly. Refer to Tire and Wheel Removal and Installation . 2. Road test the vehicle on a smooth level surface. Does the vehicle still lead/pull?	Go to Wheel Alignment Measurement	Go to Stepâ€™%08
7	Replace the left rear tire. Refer to Tire Dismounting and Mounting . Is the repair complete?	Go to Stepâ€™%09	â€™”
8	Replace the right rear tire. Refer to Tire Dismounting and Mounting . Is the repair complete?	Go to Stepâ€™%09	â€™”
9	Verify proper vehicle operation. Does the original condition still exist?	Go to Stepâ€™%01	System OK

Repair Instructions

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Aluminum Wheel Porosity Repair

1. Remove the tire and wheel. [Tire and Wheel Removal and Installation](#)
2. Inflate the tire to the manufactures specified pressure as stated on the tire.
3. Submerge the tire/wheel into a water bath in order to locate the leak.
4. Inscribe a mark on the wheel in order to indicate the leak areas.
5. Inscribe a mark on the tire at the valve stem in order to indicate the orientation of the tire to the wheel.
6. Note:
Do not damage the exterior surface of the wheel.
7. Remove the tire from the wheel. [Tire Dismounting and Mounting](#)
8. Use number 80 grit sandpaper to scuff the inside of the rim surface at the leak area.
9. Use general purpose cleaner to clean the leak area.
10. Apply 3mm (0.12in) thick layer of adhesive/sealant to the leak area.
11. Allow for the adhesive/sealant to dry.
12. Align the inscribed mark on the tire with the valve stem on the wheel.
13. Install the tire to the wheel. [Tire Dismounting and Mounting](#)
14. Pressurize the tire to 276kPa (40psi).
15. Submerge the tire/wheel into a water bath in order to ensure the leak is sealed.
16. Inflate the tire to the specified pressure as stated on the tire placard.
17. Balance the tire and wheel. [Tire and Wheel Assembly Balancing - Off Vehicle](#)
18. Install the tire and wheel. [Tire and Wheel Removal and Installation](#)

Related Part Information

Part Name	Catalog Name	Part Code
Aluminum Wheel WHEEL KIT,AL		3440A
Aluminum Wheel WHEEL,AL		3440B
Aluminum Wheel WHEEL,AL (CHROME FIN)		X0010
Aluminum Wheel WHEEL,AL (POLISHED)		X0014
Aluminum Wheel WHEEL,AL		SS107

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Aluminum Wheel Refinishing

Finish Damage Evaluation Procedure

1. Note:
 - If the wheels are chrome-plated, do not re-plate or refinish the wheels.
 - If the wheels are polished aluminum, do not refinish the wheels in the dealer environment. Utilize a refinisher that meets manufacturer guidelines.
2. Inspect the wheels for damage from uncoated wheel balance weights or from automatic car wash facilities.
3. Inspect the wheels for the following conditions:
4.
 - Corrosion
 - Scrapes
 - Gouges
5. Verify the damage is not deeper than what sanding can remove.
6. Inspect the wheels for cracks. If a wheel has cracks, discard the wheel.
7. Inspect the wheels for bent rim flanges. If a rim flange is bent, discard the wheel.

Refinishing Procedure

Warning:

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. [Tire and Wheel Removal and Installation](#)
2. Remove the balance weights from the wheel.
3. Remove the tire from the wheel. [Tire Dismounting and Mounting](#)
4. Note:
 - Do not re-machine the wheel.
 - Do not use chemicals in order to strip the paint from the wheel.
5. Use a suitable cleaner in order to remove the following contaminants from the wheel:
6.
 - Lubricants
 - Wax
 - Dirt
7. Use plastic media blasting in order to remove the paint from the wheel.
8. If the wheel had a machined aluminum finish, spin the wheel and use sand paper in order to restore the circular machined appearance.
9. Note:

The wheel mounting surface and the wheel nut contact surface must remain free of paint.

10. Mask the wheel mounting surface and the wheel nut contact surface.
11. Follow the paint manufacturer instructions for painting the wheel.
12. Install a new valve stem.
13. Note:
Use new coated balance weights in order to balance the wheel.
14. Install the tire to the wheel. [Tire Dismounting and Mounting](#)
15. Use a suitable cleaner in order to remove the following contaminants from the wheel mounting surface:
16.
 - Corrosion
 - Overspray
 - Dirt
17. Install the tire and wheel assembly to the vehicle. [Tire and Wheel Removal and Installation](#)

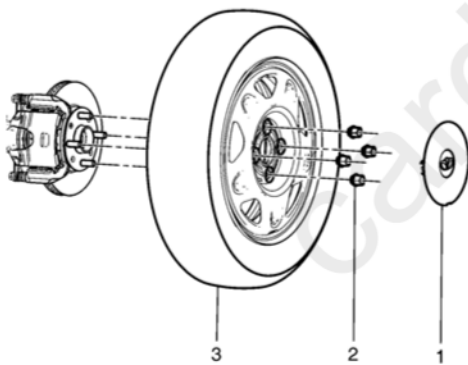
Related Part Information

Part Name	Catalog Name	Part Code
Aluminum Wheel	WHEEL KIT,AL	3440A
Aluminum Wheel	WHEEL,AL	3440B
Aluminum Wheel	WHEEL,AL (CHROME FIN)	X0010
Aluminum Wheel	WHEEL,AL (POLISHED)	X0014
Aluminum Wheel	WHEEL,AL	SS107

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Tire and Wheel Removal and Installation

Removal Procedure



1. [Click here for full size](#)
2. Caution:

Refer to [Lifting and Jacking the Vehicle](#).
3. Raise and support the vehicle.
4. Remove the wheel cap(1), if equipped.
5. Mark the wheel in relation to the wheel hub flange.
6. Remove the wheel nuts(2).
7. 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.
8. 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.
9. Remove the tire and wheel assembly(3) from the vehicle. If the tire and wheel assembly is difficult to remove, perform the following steps:
10.
 1. Install and tighten all wheel nuts on the affected wheel.
 2. Loosen each wheel nut two turns.
 3. Lower the vehicle to the ground.
 4. Rock the vehicle from side to side.
 5. Caution:

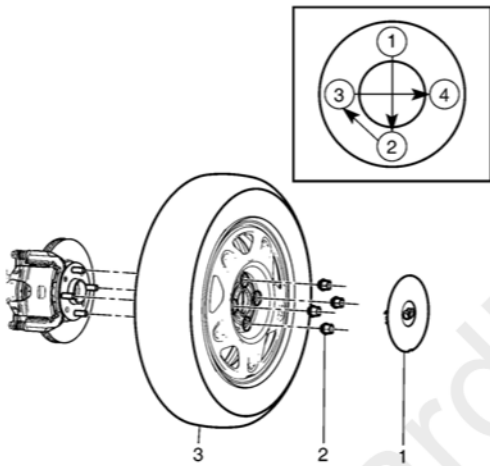
Refer to [Lifting and Jacking the Vehicle](#).
 6. Raise and support the vehicle.
 7. Remove the wheel nuts.
 8. Remove the tire and wheel assembly.

Installation Procedure

1. Warning:

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

Wheel nuts, studs, and mounting surfaces must be clean and dry.
3. Remove any corrosion or foreign material from the wheel and the hub mounting surfaces.
4. Clean the threads on the wheel studs and wheel nuts.



5. [Click here for full size](#)

6. Install the tire and wheel assembly(3). Align the locating mark of the wheel to the hub.

7. Caution:

Refer to [Fastener Caution](#).

8. Note:

Tighten the nuts evenly and alternatively in the sequence shown, in order to avoid excessive runout.

9. Install the wheel nuts(2) and tighten in sequence shown to 140N-m (103lb-ft).

10. Install the wheel cap(1), if equipped.

11. Lower the vehicle to the ground.

Related Part Information

Part Name	Catalog Name	Part Code
Tire and Wheel	TIRE & WHEEL,(LH PROC)	0105A
Tire and Wheel	TIRE & WHEEL,	0106A

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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. Deflate the tire completely.
2. Use the tire changer in order to remove the tire from the wheel.
3. Use a wire brush or coarse steel wool in order to remove any rubber, light rust or corrosion from the wheel bead seats.
4. 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.

5. Apply an approved lubricant to the tire bead and the wheel trim.
6. Use the tire changer in order to install the tire to the wheel.
7. 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 275â€‰kPa (40â€‰psi) pressure when inflating any tire if beads are not seated. If 275â€‰kPa (40â€‰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.

8. Inflate the tire to the proper air pressure.
9. 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.

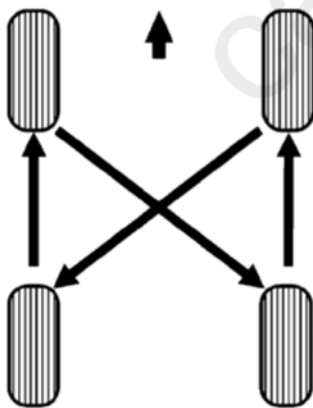
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Tire Rotation

Rotate the tire and wheel assemblies at frequent intervals to equalize wear. Refer to the Maintenance Schedule in the Owner's Manual. In addition to scheduled rotation, rotate the tire and wheel assembly 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.

1. Remove the tire and wheel assemblies. Refer to [Tire and Wheel Removal and Installation](#).



2. [Click here for full size](#)
3. Rotate the tire and wheel assemblies as shown in the above diagram.
4. Install the tire and wheel assemblies. Refer to [Tire and Wheel Removal and Installation](#).
5. Check the tire inflation pressure and adjust to the tire inflation specifications as necessary.

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Specifications

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Tire and Wheel Specifications

Tire Inflation Pressure Specifications

Market	Wheel	Tire Designation	Recommended Cold Inflation at Max. Load			
			Front		Rear	
			kPa	psi	kPa	psi
Korea	4.5J x 13	155/80R13	220 for Gasoline + MT/AT	32 for Gasoline + MT/AT	220 for Gasoline + MT/AT	32 for Gasoline + MT/AT
	4.5J x 14	155/70R14				
	5.0J x 15	165/60R15	230 for LPG + MT/AT	33 for LPG + MT/AT	230 for LPG + MT/AT	33 for LPG + MT/AT
Europe	4.5J x 13	155/80R13	220	32	220	32
	4.5J x 14	165/65R14	220	32	220	32
	5.0J x 15	165/60R15	220	32	220	32
General	4.5J x 13	155/80R13	220	32	220	32
	4.5J x 14	155/70R14	220	32	220	32
	4.5J x 14	165/65R14	220	32	220	32
US/Canada	6.0J x 15	185/55R15	275	40	275	40

Related Part Information

Part Name	Catalog Name	Part Code
Tire and Wheel	TIRE & WHEEL,(LH PROC)	0105A
Tire and Wheel	TIRE & WHEEL,	0106A

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Fastener Specifications

Reusable Threaded Fastener Tightening Specifications

Application	Specification
	Metric (English)
Note:	
All fasteners listed in this table can be reused after removal.	
Wheel Nuts	140â€%N-mâ€%(103â€%lbâ€%ft)

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