

SECTION 3E

TIRES AND WHEELS

NOTICE: When fasteners are removed, always reinstall them at the same location from which they were removed. If a fastener needs to be replaced, use the correct part number fastener for that application. If the correct part number fastener is not available, a fastener of equal size and strength (or stronger) may be used. Fasteners that are not reused, and those requiring thread locking compound will be called out. The correct torque value must be used when installing fasteners that require it. If the above conditions are not followed, parts or system damage could result.

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GENERAL DESCRIPTION

The factory-installed tire and wheel assemblies are designed to operate satisfactorily with loads up to and including the full load capacity when inflated to the recommended tire pressures.

Correct tire pressures and driving techniques have an important influence on tire life. Heavy cornering, excessively rapid acceleration, and unnecessarily sharp braking increase tire wear.

REPLACEMENT TIRES

Figure 1

A tire performance criteria (TPC) specification number is molded in the sidewall near the tire size of all original equipment tires. This specification number assures that the tire meets GM's performance standards for traction, endurance, dimension, noise, handling, rolling resistance, and others. Usually, a specific TPC number is assigned to each tire size.

Replacement tires should be the same size, load range and construction as the original tires. Replace the original tires with tires of the same TPC specification number. Use of any other tire size or type may seriously affect ride, handling, speedometer/odometer calibration,

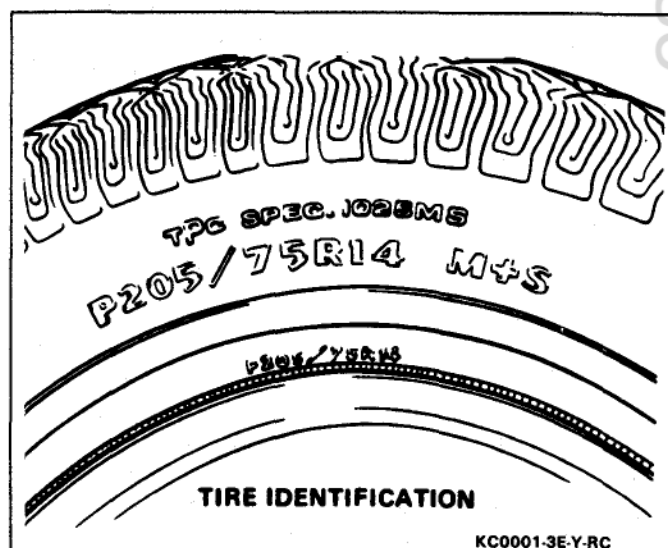


Figure 1 – Tire Identification

antilock brake system, vehicle ground clearance, and tire clearance to the body and chassis.

CAUTION: Do not mix different types of tires on the same vehicle, such as radial, bias, and bias-belted tires,

except in emergencies because vehicle handling may be seriously affected and may result in loss of control. This caution does not apply to the compact spare furnished with the vehicle.

Tires should be replaced when:

- They are worn to a point where 1.6 mm (1/16 inch) or less tread remains, or cord or fabric is showing. To help detect this condition, tires have built-in tread wear indicators that appear between tread grooves when tread is worn to 1.6 mm (1/16 inch) or less. Replace tire when indicators appear in two or more adjacent grooves at three spots around tire.
- Tread or sidewall is cracked, cut or snagged deeply enough to expose cord or fabric.
- Tire has a bump, bulge or split. Slight sidewall indentations are normal and should not affect ride.
- Tire has a puncture, cut or other damage that cannot be correctly repaired because of size or location of damage.

It is recommended that new tires be installed in pairs on the same axle. If only one tire is replaced, it should be paired with the tire having the most tread.

ALL SEASON TIRES

Figure 1

Most GM vehicles are now equipped with steel belted all season radial tires as standard equipment. These tires qualify as snow tires, with a 37 percent higher average rating for snow traction than non-all season radial tires used previously. Other performance areas, such as wet traction, rolling resistance, tread life and air retention, were also improved slightly. These improvements were made by changing both tread design and tread compounds. These tires are identified by an "M+S" molded in the tire sidewall following the size. The suffix "MS" is also molded in the sidewall after the TPC specification number.

P-METRIC TIRES

Figure 2

All GM vehicles now use passenger-metric (P-metric) sized tires. P-metric tires are available in two load ranges: standard load with 210 kPa (30 psi) maximum pressure and extra load with 240 kPa (35 psi) maximum pressure. Most passenger vehicle tires are standard load.

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. For this reason, replacement tires should be of the same TPC specification number (same size, load range, construction) as those originally on the vehicle. If P-metric tires must be replaced with other sizes, a tire dealer should be consulted. Tire companies 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.

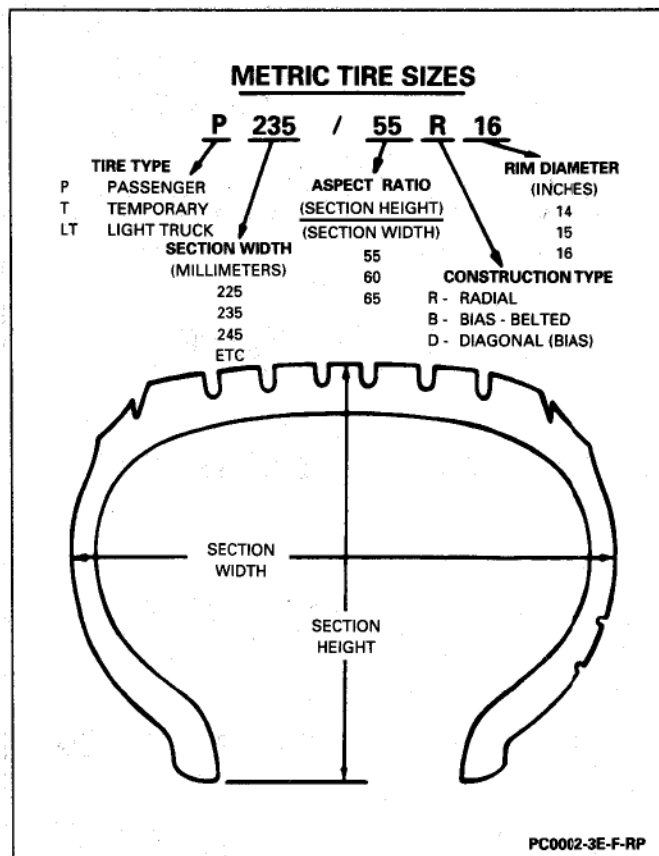


Figure 2 – Metric Tire Size Format

Refer to the tire placard or "Specifications" in this section for tire pressures.

TIRE CHAIN USAGE

Figure 3

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.

Due to limited tire-to-body clearance on certain vehicles, tire chain usage recommendations have been published in the Owner's Manual. When chains are to be used, most current GM vehicles require SAE Class "S" tire chains. These may also be designated as 1100 Series, Type PL tire chains. These chains are specially designed to limit the "fly off" effect that occurs when the tire and wheel assembly rotates.

Manufacturers of tire chains have a specific chain size for each tire and wheel assembly to ensure proper fit when installed. Therefore, specific chains should be obtained for the tire and wheel assemblies on which they are to be used. Rubber adjusters should not be used to take up slack or clearance in chains which are loose due to incorrect size. Always follow the chain manufacturer's installation instructions.

Use of chains may adversely affect vehicle handling. When tire chains are installed:

- Adjust speed to road conditions
- Avoid sharp turns

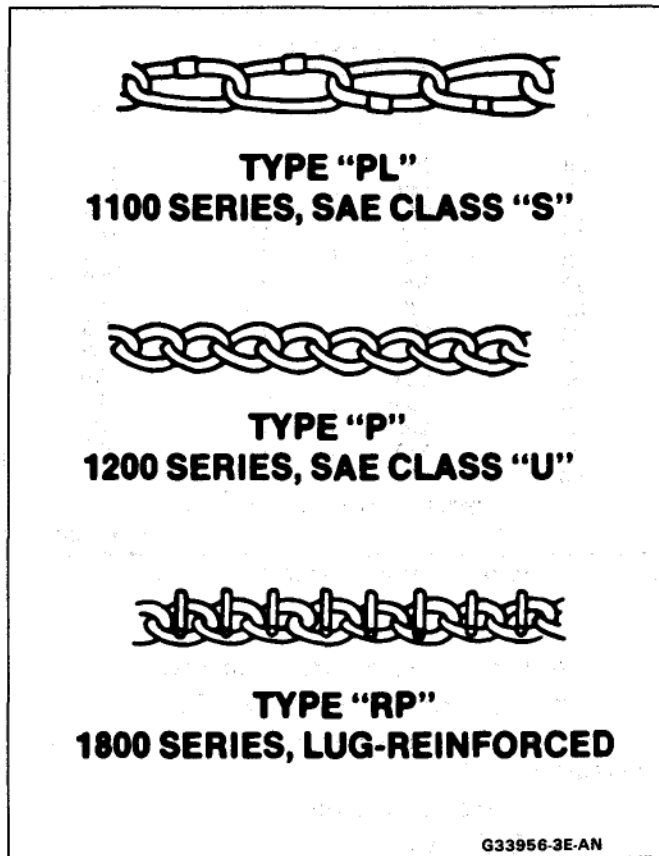


Figure 3 – Examples of Passenger Vehicle Tire Chains

In general, to help prevent chain damage to the vehicle:

- Install chains on rear tire and wheel assemblies as tightly as possible, then tighten them again after driving 0.4 to 0.8 km (1/4 to 1/2 mile). Use of chains on front tire and wheel assemblies is not recommended; chains may contact and possibly damage vehicle. If chains are to be used on front tire and wheel assemblies, be sure there is enough clearance.
- Do not exceed 70 km/h (45 mph), or chain manufacturer's speed limit, if lower.
- Drive in restrained manner and avoid large bumps, potholes, severe turns and other maneuvers which could cause tire and wheel assemblies to bounce up and down.
- Follow any other instructions of chain manufacturer which do not disagree with above.

Additional specific information is published in the Owner's Manual.

TIRE PLACARD

Figure 4

The tire placard is permanently located on the rear face of the driver's door, and should be referred to for tire information. The placard lists the maximum vehicle load, tire size (including spare), and cold inflation pressure (including spare).

DATE GVRA LB LB LB
KG KG KG

THIS VEHICLE CONFORMS TO ALL APPLICABLE
FEDERAL MOTOR VEHICLE SAFETY AND
BUMPER STANDARDS IN EFFECT ON THE DATE
OF MANUFACTURE SHOWN ABOVE

PRINTED IN USA

TIRE-LOADING INFORMATION
OCCUPANTS VEHICLE CAP. WT.
FRT. CTR. RR. TOTAL LBS. KG

MAX. LOADING @ GVWR SAME AS VEHICLE
CAPACITY WEIGHT
TIRE SIZE

BBW
SPEED
RTG

COLD TIRE
PRESSURE
PSI/KPA

FRT
RR
SPA

IF TIRES ARE HOT, ADD 4PSI/28KPA
SEE OWNER'S MANUAL FOR ADDITIONAL
INFORMATION

A DATE
B GROSS VEHICLE WEIGHT RATING
C GROSS AXLE WEIGHT RATING FRONT & REAR
D CERTIFICATION STATEMENT
E VEHICLE IDENTIFICATION NUMBER
F VEHICLE CLASS TYPE: "PASSENGER CAR"
G MAXIMUM OCCUPANTS
H MAXIMUM VEHICLE CAPACITY WEIGHT
I MAXIMUM LOADING AT GVWR
J TIRE SIZE
K SPARE TIRE SIZE
L SPEED RATING
M TIRE PRESSURE WITH MAXIMUM OCCUPANTS FRONT & REAR
N SPARE TIRE PRESSURE

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Figure 4 – Tire Placard

WHEEL ASSEMBLIES

Wheel assemblies must be replaced if they are bent, dented, have excessive lateral or radial runout, leak air through welds, have elongated bolt holes, or if the wheel nuts will not stay tight. Wheel assemblies with runout greater than specified may cause objectionable vibrations.

Replacement wheel assemblies must be equivalent to the original equipment wheel assemblies in load capacity, diameter, rim width, offset, and mounting configuration. A wheel assembly of incorrect size or type may affect wheel assembly and bearing life, brake cooling, speedometer/odometer calibration, antilock brake system, vehicle ground clearance and tire clearance to the body and chassis.

Steel wheel assemblies can be identified by a two- or three-letter code stamped into the front side of the rim near the valve stem assembly. Aluminum wheel assemblies have the code, part number, and manufacturer ID cast into the inboard side.

ON-VEHICLE SERVICE

WHEEL ASSEMBLY REPAIR

Wheel assembly repairs that use welding, heating or peening are not approved. An inner tube is not an acceptable repair for leaky tire and wheel assemblies. Porosity in aluminum wheel assemblies can be repaired. Refer to "Aluminum Wheel Assembly Porosity Repair" in this section.

METRIC WHEEL NUTS AND BOLTS

A metric wheel nut is identified by the word "Metric" stamped on its face. The wheel bolt has the letter "M" stamped into its end. The thread size of the metric wheel nuts and bolts are indicated by a code, such as M12 x 1.5.

WHEEL BOLT REPLACEMENT

CAUTION: If any wheel bolt is damaged by a loose-running wheel assembly, all the bolts for that wheel assembly should be replaced. A loose-running wheel assembly may break only one bolt, but the other bolts may be damaged internally. Replacing only the broken bolt and remounting the wheel assembly may cause further damage and personal injury.

Front Wheel Bolt

For the front wheel bolt replacement procedure, refer to SECTION 3C.

Rear Wheel Bolt

For the rear wheel bolt replacement procedure, refer to SECTION 4B.

TIRE INFLATION

Figure 5

The pressure recommended for all models is carefully calculated to give a comfortable ride, responsive steering, and maximum tread wear, tire life and resistance to bruises. Valve stem assembly caps or extensions should be installed on the valve stem assemblies to keep out dust and water.

Tire pressure, with tires cold (after vehicle has sat for three hours or more, or driven less than one mile), should be checked monthly or before any extended trip. Set tire pressure to the specifications on the tire placard located on the rear face of driver's door or in "Tire Pressures" in this section. Tire pressure will increase about 6.9 kPa (1 psi) for every 5.5°C (10°F) temperature increase.

For sustained high-speed driving, tires should be set at the pressures recommended. Sustained driving at high speeds, where permitted by law, is not advised unless vehicle has special high-speed tires.

Tire pressure which is higher than that recommended can cause:

- Hard ride.
- Reduced handling.

POUNDS PER SQUARE INCH (psi)
TO KILOPASCALS (kPa)

psi	kPa	psi	kPa
20	140	55	380
23	160	60	420
24	170	65	450
26	180	70	480
28	190	75	520
29	200	80	550
30	210	85	590
32	220	90	620
35	240	95	660
38	260	100	690
40	280	105	720
41	280	110	760
45	310	115	790
50	340	120	830

CONVERSION: psi x 6.895 = kPa

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Figure 5 – Inflation Pressure Conversion

- Tire bruising or carcass damage.
- Rapid tread wear at center of tire.

Tire pressure which is lower than that recommended can cause:

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

Unequal tire pressure on same axle can cause:

- Uneven braking.
- Steering lead.
- Reduced handling.
- Swerve on acceleration.

WHEEL ASSEMBLY REMOVAL AND INSTALLATION

Figures 6, 7 and 8

Penetrating oil has not been found to be effective in removing tight wheel assemblies. However, if it is used, it should be applied sparingly to the wheel assembly center-hole area only.

CAUTION: If penetrating oil gets on the vertical surfaces between the wheel assembly and the rotor assembly or brake drum, it could cause the wheel assembly to work loose as the vehicle is driven, resulting in a loss of control and an injury accident. Never use heat to loosen a tight wheel assembly. It can shorten the life of the wheel assembly, studs, or spindle and bearing assemblies. Wheel nuts must be tightened in sequence and to the proper torque to

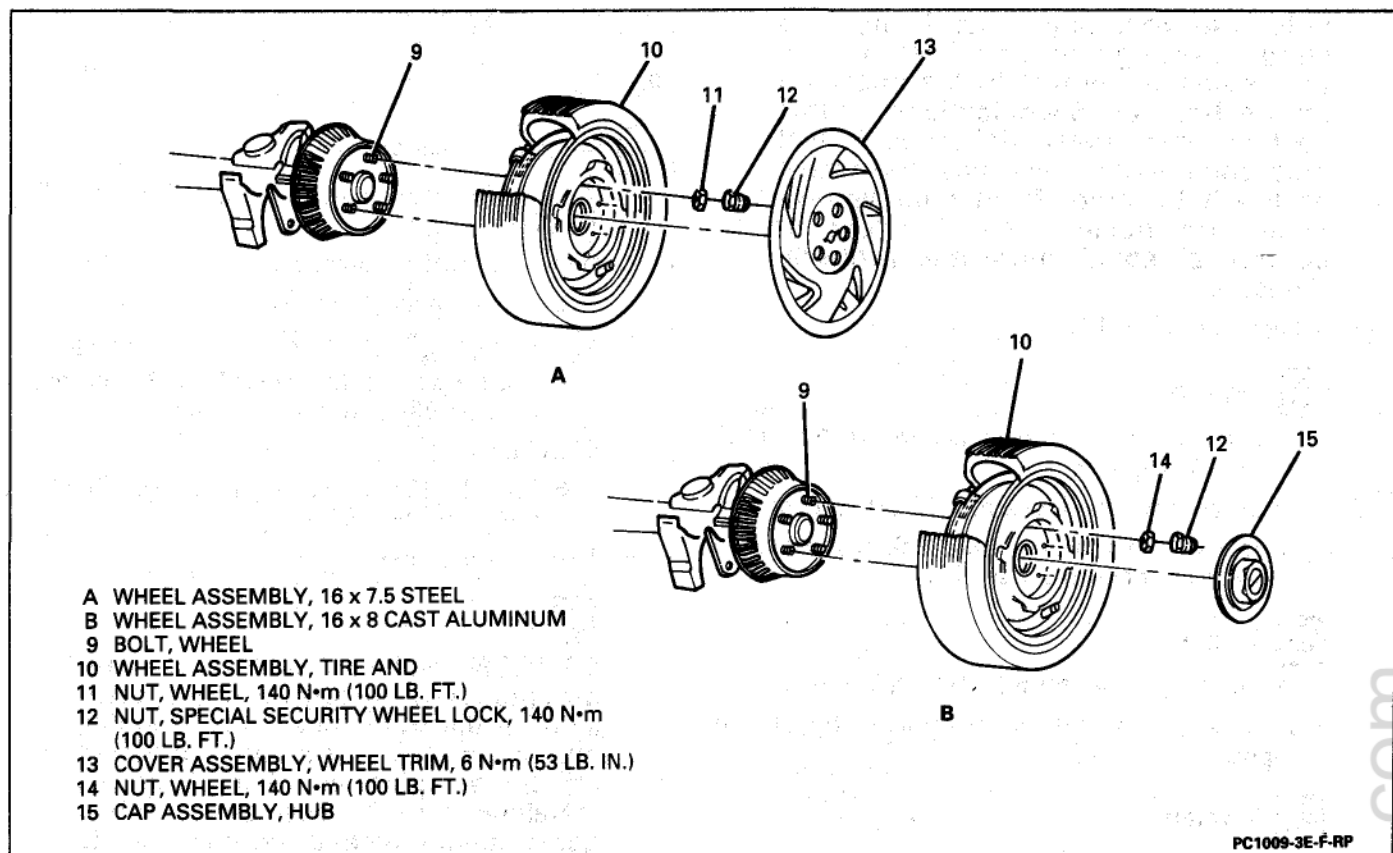


Figure 6 - Tire and Wheel Assembly - (Chevrolet)

avoid bending the wheel assembly or rotor assembly.

Sometimes wheel assemblies can be difficult to remove due to foreign material or a tight fit between the wheel assembly centerhole and the rotor assembly. Excessive force such as hammering the wheel assembly or tire can cause damage and is not recommended. Slight tapping on the tire sidewall using a large rubber mallet is acceptable.

The wheel assembly can be removed without damage as follows:

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

Chevrolet

Remove or Disconnect

1. Raise and suitably support vehicle. Refer to SECTION 0A.
2. Wheel nut caps, if equipped.
3. Hub cap (15) or wheel trim cover assembly (13).

4. Special security wheel lock nut (12), if equipped.
 - Use special security wheel lock key, located in the front floor console assembly.
5. Wheel nuts (11 or 14).
 - Mark location of the tire and wheel assemblies (10) to the hub assembly.
6. Tire and wheel assembly (10).

Clean

CAUTION: Before installing a wheel assembly, remove any buildup of corrosion on the wheel assembly mounting surface and brake drum or rotor assembly by scraping and wire brushing. Installing wheel assemblies without good metal-to-metal contact at the mounting surfaces can cause wheel nuts to loosen, which may later allow the wheel assembly to come off while the vehicle is in motion.

- Wheel nuts (11 or 14), bolts (9), wheel assembly (10) and brake drum or rotor assembly mounting surfaces.

Install or Connect

NOTICE: See "Notice" on page 3E-1 of this section.

1. Tire and wheel assembly (10).

CAUTION: Never use oil or grease on bolts or wheel nuts. Tighten the wheel

nuts with your fingers until they are snug. Then, tighten the wheel nuts (in the sequence shown) to the specified torque. Refer to "Specifications" in this section. Improperly tightened wheel nuts could eventually allow the wheel assembly to come off while the vehicle is moving, possibly causing loss of control, personal injury and property damage.

2. Wheel nuts (11 or 14).



Tighten

- Nuts (11 or 14) in sequence to 140 N•m (100 lb. ft.) (Figure 8).
3. Special security wheel lock nut (12), if equipped.
 - Use special security wheel lock key located in front floor console assembly.



Tighten

- Nut (12) to 140 N•m (100 lb. ft.).
4. Hub cap (15) or wheel trim cover assembly (13), if equipped.



Tighten

- Cover assembly (13) to 6 N•m (53 lb. in.).
5. Wheel nut caps, if equipped.

6. Lower vehicle.

Pontiac



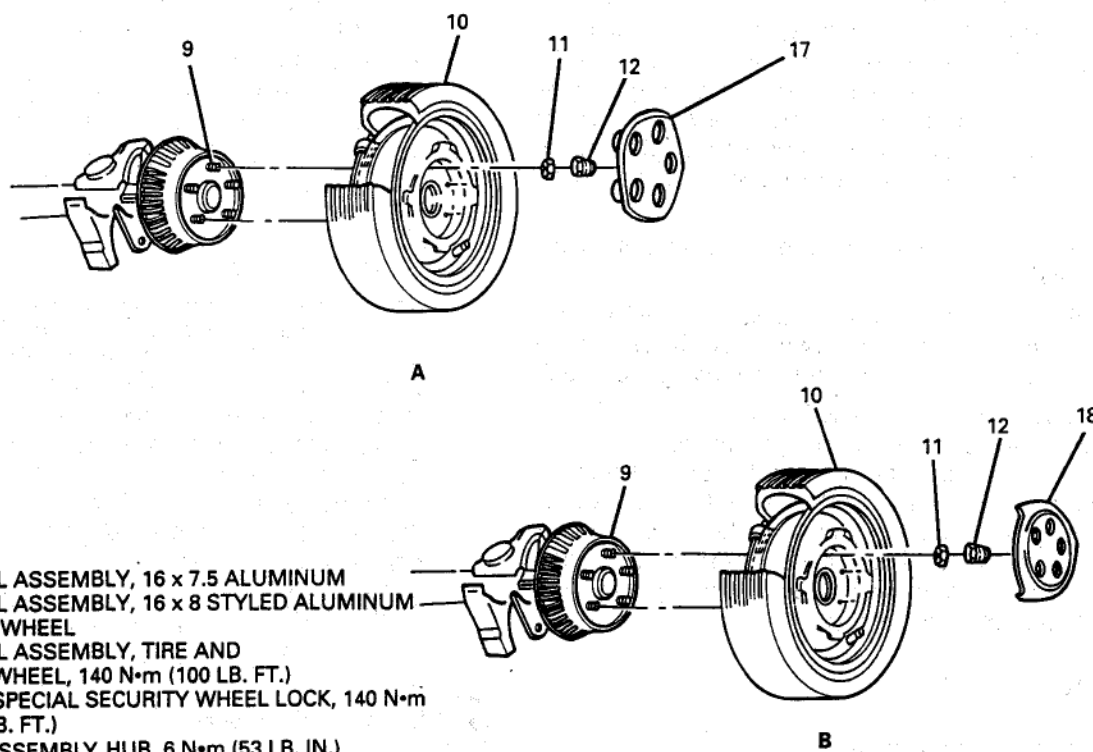
Remove or Disconnect

1. Raise and suitably support vehicle. Refer to SECTION 0A.
2. Wheel nut caps, if equipped.
3. Hub cap assembly (17 or 18).
4. Special security wheel lock nut (12), if equipped.
 - Use special security wheel lock key, located in the front floor console assembly.
5. Wheel nuts (11).
 - Mark location of the tire and wheel assemblies (10) to the hub assembly.
6. Tire and wheel assembly (10).



Clean

CAUTION: Before installing a wheel assembly, remove any buildup of corrosion on the wheel assembly mounting surface and brake drum or rotor assembly by scraping and wire brushing. Installing wheel assemblies without good metal-to-metal contact at the mounting surfaces can cause wheel nuts to loosen, which may later allow



- A WHEEL ASSEMBLY, 16 x 7.5 ALUMINUM
- B WHEEL ASSEMBLY, 16 x 8 STYLED ALUMINUM
- 9 BOLT, WHEEL
- 10 WHEEL ASSEMBLY, TIRE AND
- 11 NUT, WHEEL, 140 N•m (100 LB. FT.)
- 12 NUT, SPECIAL SECURITY WHEEL LOCK, 140 N•m (100 LB. FT.)
- 17 CAP ASSEMBLY, HUB, 6 N•m (53 LB. IN.)
- 18 CAP ASSEMBLY, HUB, 6 N•m (53 LB. IN.)

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Figure 7 - Tire and Wheel Assembly - (Pontiac)

the wheel assembly to come off while the vehicle is in motion.

- Wheel nuts (11), bolts (9), wheel assembly (10) and brake drum or rotor assembly mounting surfaces.

Install or Connect

NOTICE: See "Notice" on page 3E-1 of this section.

1. Tire and wheel assembly (10).

CAUTION: Never use oil or grease on bolts or wheel nuts. Tighten the wheel nuts with your fingers until they are snug. Then, tighten the wheel nuts (in the sequence shown) to the specified torque. Refer to "Specifications" in this section. Improperly tightened wheel nuts could eventually allow the wheel assembly to come off while the vehicle is moving, possibly causing loss of control, personal injury and property damage.

2. Wheel nuts (11).

Tighten

- Nuts (11) in sequence to 140 N•m (100 lb. ft.) (Figure 8).

3. Special security wheel lock nut (12), if equipped.

- Use special security wheel lock key located in front floor console assembly.

Tighten

- Nut (12) to 140 N•m (100 lb. ft.).

4. Hub cap assembly (17 or 18).

Tighten

- Cap assembly (17 or 18) to 6 N•m (53 lb. in.).

5. Wheel nut caps, if equipped.

6. Lower vehicle.

Tire and Wheel Assembly Rotation

Figure 9

To equalize wear, rotate tires at intervals specified in SECTION 0B. Whenever uneven tire wear is noticed, the cause should be investigated. Figure 9 shows the only methods of tire and wheel assembly rotation recommended.

Due to their design, radial tires tend to wear faster in the shoulder area, particularly in drive locations. Radial tires in non-drive locations may develop an 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 check wheel nut torque and set tire pressure. Never use oil or grease on wheel assembly bolts or nuts.

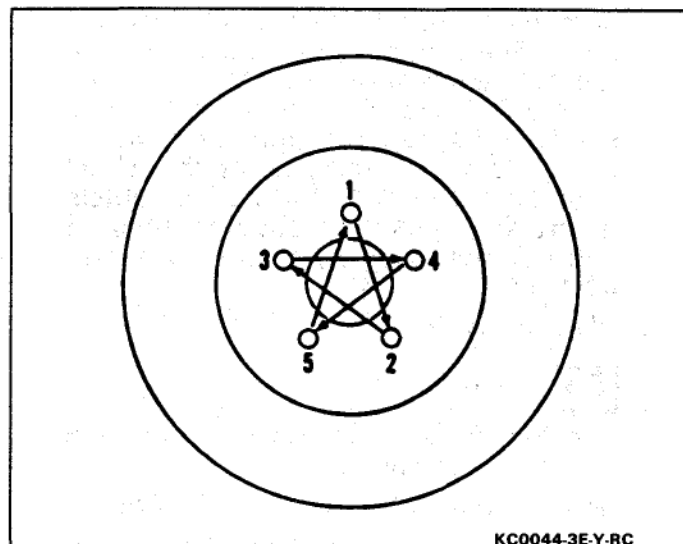


Figure 8 – Five-Hole Wheel Nut Tightening Sequence

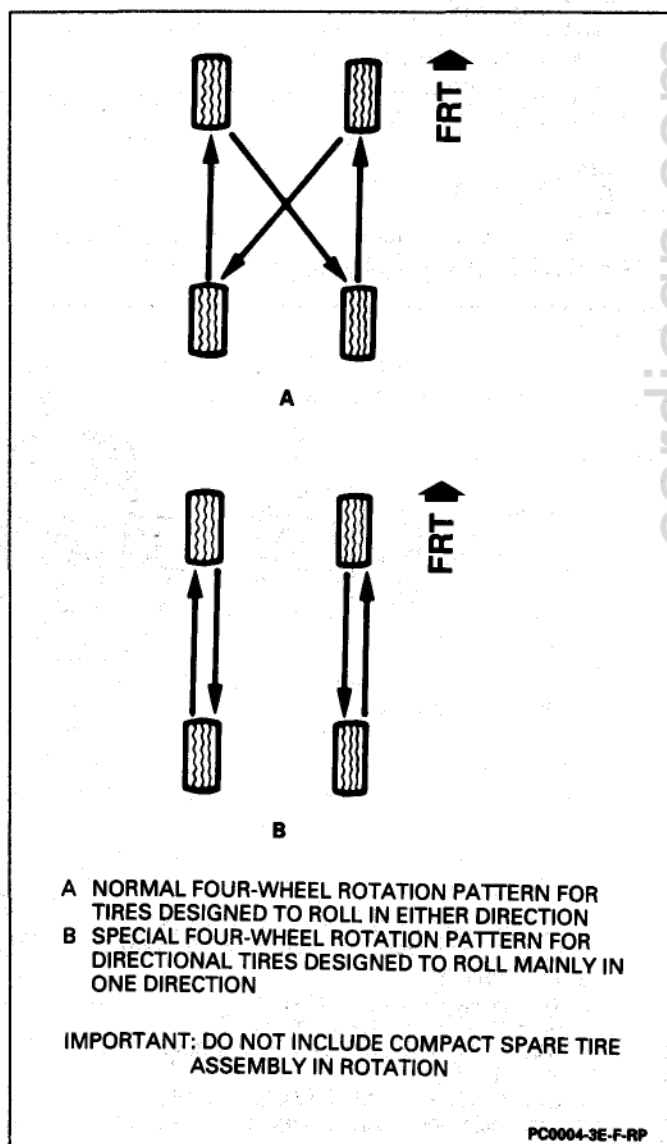


Figure 9 – Tire and Wheel Assembly Rotation

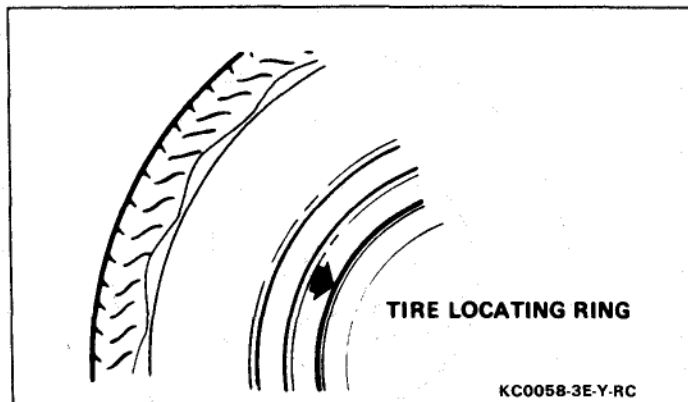


Figure 10 - Tire Locating Ring

On vehicles with P245/50ZR16 tires, special rotation provisions must be followed because the tires are directional. See Figure 9 for the recommended rotation.

Rotate the tires. If you have directional tires, be sure the color-coded arrows on the tires point in the direction the tires roll. Balance the tire and wheel assemblies using nylon-coated wheel balance weights. Adjust tire pressures and tighten wheel nuts to the specified torque. Refer to "Wheel Assembly Removal and Installation" in this section.

TIRE MOUNTING AND DISMOUNTING

Figure 10

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

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

NOTICE: Do not attempt to break the tire bead loose before the tire has completely deflated. It takes about 70 seconds for the air to completely exhaust from a large tire. If the valve stem assembly is removed before this amount of time, the bead breaker on the tire changing machine could put enough force on the tire to bend the wheel assembly at the mounting surface. This could result in vibration, shimmy and cracking of the wheel assembly. Completely deflate the tire before attempting to break the tire bead loose.

Rim bead seats should be cleaned with a wire brush or 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 percent lubricant and 50 percent water) or equivalent.

CAUTION: To avoid serious personal injury, do not stand over the tire when inflating. The bead may break when it

snaps over safety hump. Do not exceed 280 kPa (40 psi) pressure when inflating any tire if beads are not seated. If 280 kPa (40 psi) pressure will not seat beads, deflate, relubricate and inflate. Overinflation may cause the bead to break and cause serious personal injury.

- After mounting, inflate tire so that beads are completely seated, but never exceed 280 kPa (40 psi).



Important

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

Install the valve stem assembly and inflate to the pressure specified on the tire placard. Check the locating rings of the tire to be sure they show around the rim flanges on both sides of the wheel assembly.

Steel Wheel Assembly Mounting Surface Check

Figures 11 and 12

1. Place straight edge (about eight to nine inches long) with both hands on inboard mounting surface of wheel assembly.
2. Try to rock straight edge up and down.
 - The outer ring of mounting surface is normally raised above everything else inside it. If surface has been bent on a tire changer, it will be raised above outer ring and straight edge will rock on this position.
3. Repeat steps 1 and 2 at three or four different positions on inboard mounting surface.
4. If wheel assembly is bent, it must be replaced. Refer to "Wheel Assembly Removal and Installation" in this section.

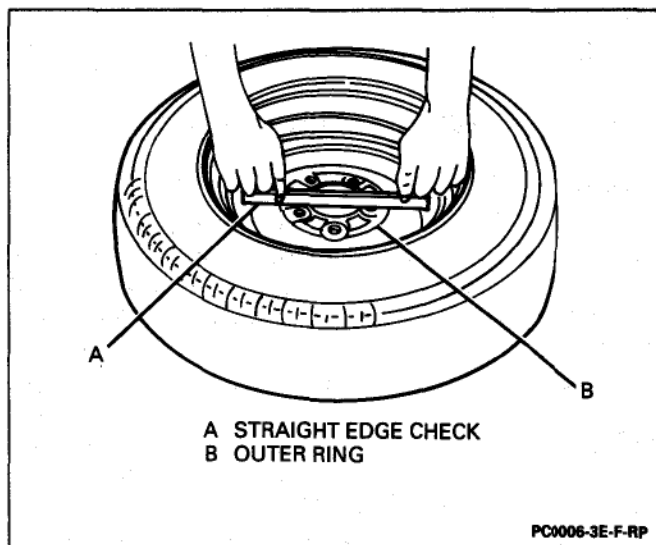


Figure 11 - Steel Wheel Assembly Mounting Surface Check

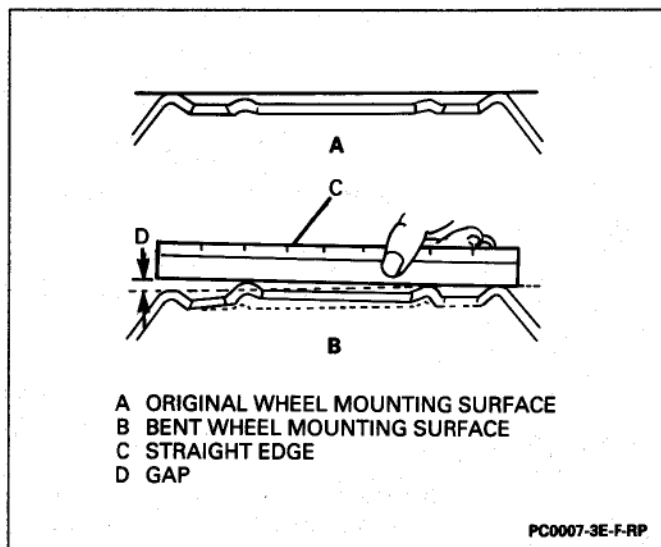


Figure 12 – Steel Wheel Assembly Mounting Surface

TIRE REPAIR

There are many different materials and techniques on the market to repair tires, but not all work on some types of tires. Tire manufacturers have published detailed instructions on how and when to repair tires. The instructions can be obtained from the tire manufacturer. Repair of compact spare tire is not recommended.

MEASURING WHEEL ASSEMBLY RUNOUT

Figure 13

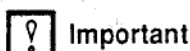
Wheel assembly runout should be measured with an accurate dial indicator. Measurements may be taken with the wheel assembly installed on the vehicle, or off the vehicle using an accurate mounting surface such as a wheel balancer. Measurements may be taken with or without the tire mounted on the wheel assembly.

Radial runout and lateral runout should be measured on both the inboard and outboard rim flanges. With the dial indicator firmly in position, slowly rotate the wheel assembly one revolution and record the total indicator reading. If any measurement exceeds specifications, and there is a vibration that wheel balancing will not correct, the wheel assembly should be replaced. Disregard any indicator readings caused by welds, paint runs, or scratches.

- Steel Wheel Assemblies
 - Radial runout 1.01 mm (0.040 inch)
 - Lateral runout 1.14 mm (0.045 inch)
- Aluminum Wheel Assemblies
 - Radial runout 0.76 mm (0.030 inch)
 - Lateral runout 0.76 mm (0.030 inch)

COMPACT SPARE TIRE ASSEMBLY

Figure 14



Important

- Use of compact spare may result in activating a wheel sensor fault code. This will result in "ANTI-LOCK" warning lamp turning on and deactivation

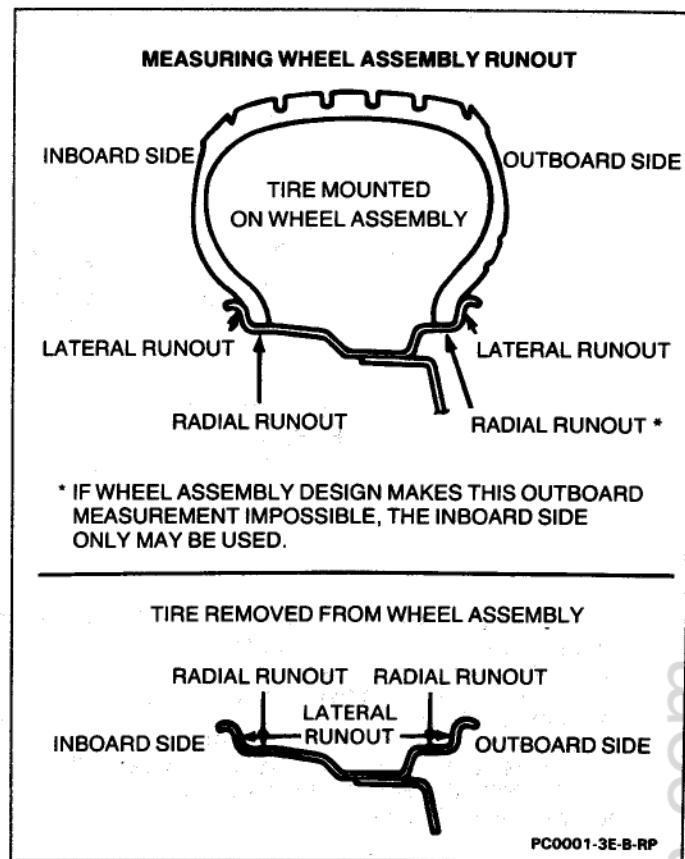


Figure 13 – Wheel Assembly Runout

of antilock brake system. After replacing compact spare, recycling ignition switch will reset system.

NOTICE: If the compact spare is used as a rear tire, do not drive faster than 80 km/h (50 mph). Damage to the rear axle assembly may occur if the compact spare is driven faster than 80 km/h (50 mph). This speed limitation does not apply when the compact spare is used as a front tire.

Some vehicles will be equipped with a high-pressure compact spare. The compact spare uses a narrow 4-inch wide rim, although the wheel assembly diameter is usually one inch larger than the road wheel assemblies.

NOTICE: The compact spare wheel assembly 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.

Inflation pressure of the compact spare must be periodically checked and maintained at 420 kPa (60 psi). It can be mounted and dismounted from its wheel assembly using present tire-changing equipment and procedures. As with other tires, the beads should completely seat at 280 kPa (40 psi).

CAUTION: To avoid serious personal injury, do not stand over tire when inflating. Bead may break when it snaps over safety hump. Do not exceed 280 kPa (40 psi) pressure when inflating any tire, including compact spares, if beads are not seated. If 280 kPa (40 psi) pressure will not seat beads,

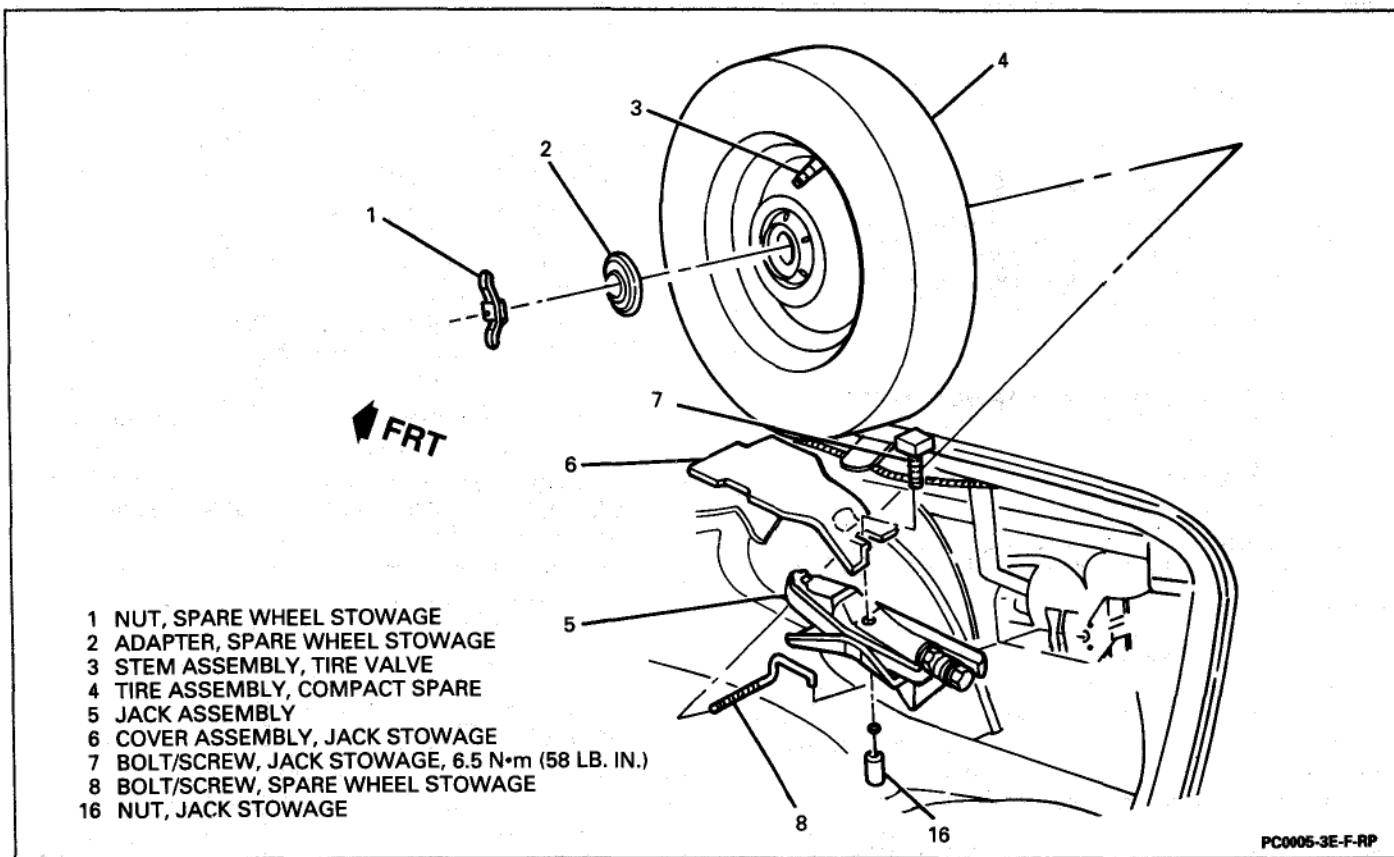


Figure 14 - Compact Spare Tire Assembly

deflate, relubricate and inflate. Over-inflation may cause bead to break and cause serious personal injury.

The compact spare is designed to weigh less than standard tires and is easier to handle when need arises. Check inflation pressure as soon as practical after installing compact spare and adjust to 420 kPa (60 psi). Replacement of the compact spare should be made only by an authorized tire dealer.

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.

BALANCING TIRE AND WHEEL ASSEMBLY

Figures 15 and 16

There are two methods used to balance tire and wheel assemblies: static and dynamic. Static balance is the equal distribution of weight around the wheel assembly. Wheel assemblies that are statically unbalanced cause a bouncing action called tramp.

Dynamic balance is the equal distribution of weight on each side of the centerline so that when the tire spins there is no tendency for the wheel assembly to move from side to side. Wheel assemblies that are dynamically unbalanced may cause shimmy.

General Balance Precautions

CAUTION: It is recommended that eye protection be used to prevent personal injury.

Deposits of foreign material must be cleaned from the inside of the wheel assembly. Stones should be removed from the tread in order to avoid operator injury during spin balancing and to obtain a good balance. The tire and wheel assembly should be inspected for any damage, then balanced according to the equipment manufacturer's recommendations.

Off-Vehicle Balancing

When balancing tire and wheel assemblies off the vehicle, use a balancer that pilots the wheel assembly by the centerhole (not the lug holes) if possible. Always follow the equipment manufacturer's instructions. Some electronic off-vehicle balancers are more accurate than the on-vehicle spin balancers, but do not correct for rotor assembly unbalance. If the vibration is not corrected by the off-vehicle balance, an on-vehicle balance may also be needed.

On-Vehicle Balancing

When needed, on-vehicle balancing will help correct vibrations due to brake drum, rotor assembly, and wheel cover imbalance.

When balancing on-vehicle, do not remove the balance weights from the off-vehicle dynamic balance. If more than one ounce of additional weight is required, it

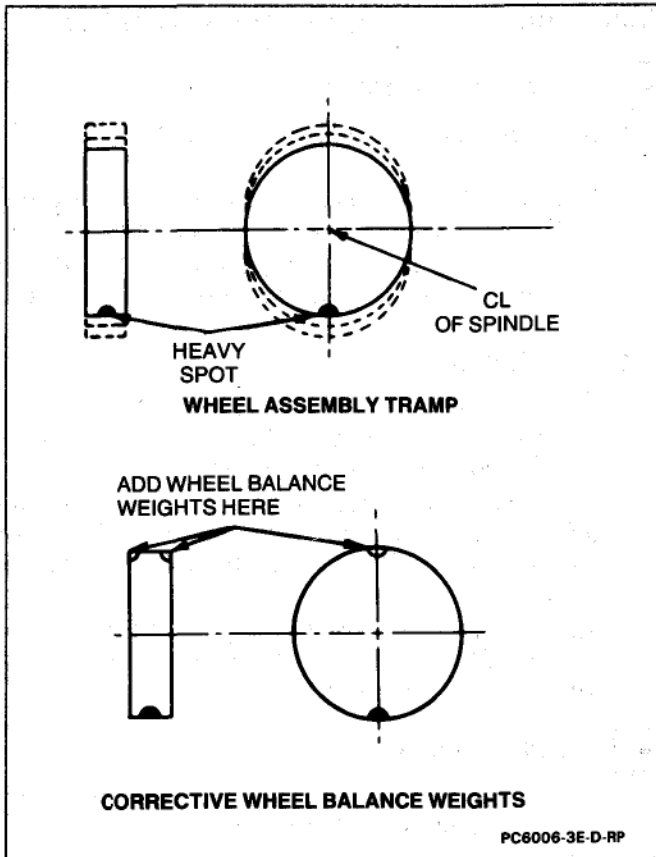


Figure 15 – Static Unbalance Correction

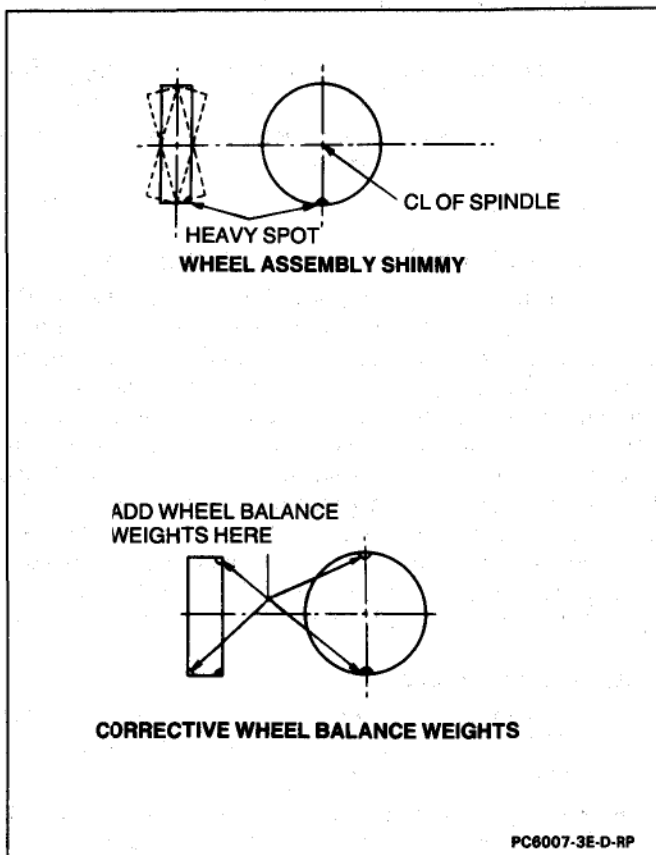


Figure 16 – Dynamic Unbalance Correction

should be split between the inboard and outboard rim flanges.

The driven tire and wheel assemblies should be spun using the engine. Limit speed as stated in the following caution.

CAUTION: On vehicles equipped with limited slip rear axles, do not attempt to balance a tire on a drive wheel assembly with the other drive wheel assembly on the ground. The vehicle may drive through this wheel assembly and cause the vehicle to move unexpectedly, resulting in personal injury and property damage.

CAUTION: Do not spin the drive wheel assemblies faster than 55 km/h (35 mph) as indicated by the speedometer. This limit is necessary because the speedometer indicates only one-half of the actual wheel speed when one drive wheel assembly is spinning and the other drive wheel assembly is stopped. Personal injury and damage may result from high-speed spinning.

To distinguish between standard rear axle and limited slip, raise rear of vehicle so both tires are clear of ground. With the transmission in "PARK" (in gear with a manual transmission) attempt to turn one wheel assembly by hand. If the wheel assembly can be turned easily, it is a standard rear axle; if the wheel assembly cannot be turned easily, it is a limited slip rear axle. Also, check for limited slip (G80) on the Service Parts Identification label.

Wheel Balance Weights

Figure 17

When static balancing, if more than 28 grams (1.0 ounce) are needed, the wheel balance weights should be split as equally as possible between the inboard and outboard flanges.

Assemblies with factory aluminum wheel assemblies must be balanced using special nylon-coated clip-on wheel balance weights. These weights are designed to fit over the thicker inboard and outboard rim flanges of the aluminum wheel assembly and should be installed with a nylon-coated hammer.

Adhesive wheel balance weights are also available for aluminum wheel assemblies. Use the following procedure to install adhesive wheel balance weights.

Adhesive Wheel Balance Weight Installation

1. Clean wheel assembly by sanding to bare aluminum where wheel balance weight is to be located.
2. Wipe wheel balance weight attachment area with mixture of half isopropyl alcohol and half water. Use clean cloth or paper towel for this operation.
3. Dry attachment area with hot air. Surface of wheel assembly should be warm to touch.
4. Warm adhesive backing on wheel balance weights to room temperature.
5. Remove tape from back of weights. Do not touch adhesive surface.

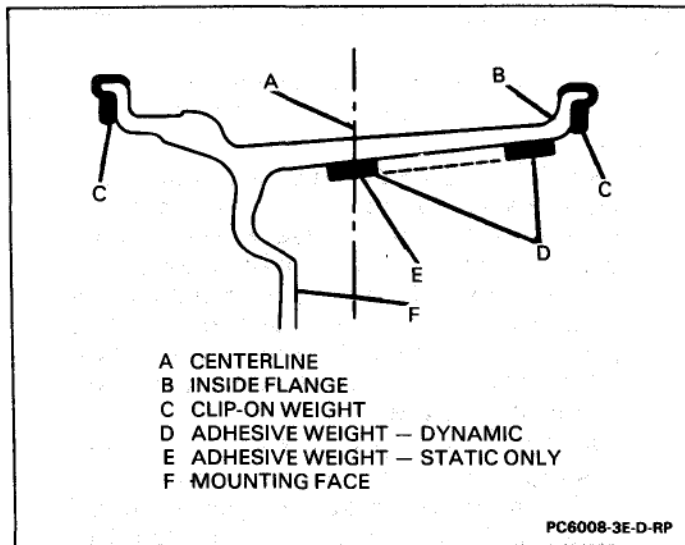


Figure 17 – Aluminum Wheel Balance Weight Placement

6. Apply wheel balance weight and press on with hand pressure.
7. Secure wheel balance weight with a 70 to 110 N (16 to 25 pound) force applied with a roller.

CORRECTING NON-UNIFORM TIRES

There are two ways to correct tires which cause a vibration even though they are properly balanced. One method uses an automatic machine which loads the tire and buffs small amounts of rubber from the stiff spots on the outer two tread rows. Correction by this method is usually permanent and, if done properly, does not significantly affect the appearance or tire tread life. Tire truing for free runout with a blade-type machine is not recommended as this reduces the tread life substantially and often does not permanently correct the problem.

Another method is to dismount the tire and rotate it 180 degrees on the rim. It is important that this be done only on tire and wheel assemblies which are known to be causing a vibration as it is just as likely to cause good tire and wheel assemblies to vibrate.

Refer to SECTION 3 for more details.

ALUMINUM WHEEL ASSEMBLIES

Aluminum Wheel Assembly Hub Cap

Remove or Disconnect

- Hub cap.
 - Use flat-bladed tool to pry off hub cap by inserting tool into slot between rim and hub cap.

Install or Connect

- Hub cap.
 - Use rubber mallet to fully seat hub cap into rim.

Aluminum Wheel Assembly Porosity Repair

Remove or Disconnect

1. Raise and suitably support vehicle. Refer to SECTION 0A.
2. Tire and wheel assembly. Refer to “Wheel Assembly Removal and Installation” in this section.
3. Locate leaking areas by inflating tire to 280 kPa (40 psi) and dipping tire and wheel assembly into water bath.
4. Mark leak areas.
5. Mark tire at valve stem assembly.
6. Tire from wheel assembly. Refer to “Tire Mounting and Dismounting” in this section.
7. Scuff inside rim surface at leak area with number 80 grit sandpaper and clean area with general purpose cleaner such as 3M part number 08984 or equivalent.
8. Apply 3 mm (1/8-inch) thick layer of adhesive/sealant, GM P/N 1052366 or equivalent, to leak test area and allow six hours of drying time.

Install or Connect

1. Tire to wheel assembly. Refer to “Tire Mounting and Dismounting” in this section.
2. Align matchmark on tire with valve stem assembly.
3. Pressurize to 280 kPa (40 psi) and check for leaks.
4. Adjust tire pressure to meet specifications on tire placard.
5. Balance tire and wheel assemblies. Refer to “Balancing Tire and Wheel Assembly” in this section.
6. Tire and wheel assembly. Refer to “Wheel Assembly Removal and Installation” in this section.
7. Lower vehicle.

Aluminum Wheel Assembly Refinishing

A protective clearcoat or colorcoat is applied to the surface of original equipment cast-aluminum wheel assemblies. A surface break-down condition can begin to develop if frequent, repeated automatic car wash cleaning scratches or wears off the factory-applied protective clearcoat. Once the protective clearcoat is damaged, exposure to caustic cleaners and/or road salt further causes surface break-down. The service procedures detail how to strip, clean and recoat aluminum wheel assemblies that are affected by the above condition. Select and follow only those procedures for the conditions that apply to the wheel assemblies you are refinishing.

Required Materials

- Amchem Alumi Prep number 33, stock number DX533, or equivalent – cleaning and conditioning chemical for aluminum.
- Amchem Alodine number 1001, stock number DX501, or equivalent – coating chemical for aluminum.
- Ditzler Declear Acrylic Urethane Clear, stock number DAU-75, or equivalent.

- Ditzler Delthane Ultra-Urethane Additive, stock number DXR-80, or equivalent.

Initial Preparation

Remove or Disconnect

1. Raise and suitably support vehicle. Refer to SECTION 0A.
 - Matchmark tire for reinstallation of outboard wheel balance weights after recoating of wheel assembly.
2. Tire and wheel assembly from vehicle. Refer to "Wheel Assembly Removal and Installation" in this section.
3. Outboard wheel balance weights.

Clean

- Wheel assembly inside and out with water base all-purpose cleaner. Remove grease or oil with solvent cleaner.

Accent Color Preparation

- Sand over painted areas that do not require recoloring with number 400-grit wet or dry sandpaper to promote adhesion of clearcoat.

Surface Damage

CAUTION: Do not use vehicle power to rotate the wheel assembly while sanding or personal injury may result.

1. Mount wheel assembly on brake lathe and spin slowly.

NOTICE: Do not use abrasive coarser than 80-grit or wheel assembly may be damaged.
2. Sand wheel assembly with backing block or pad by holding abrasive flat to surface of wheel assembly and moving slowly back and forth from center to outer edge to remove imperfections.
 - A. First, sand with number 80-grit sandpaper.
 - B. Follow with number 150-grit sandpaper.
 - C. Finish with number 240-grit sandpaper.

Slight Clearcoat Damage on Unpainted Wheel Assemblies

CAUTION: Use of rubber gloves and eye protection is necessary to prevent personal injury.

1. Apply chemical stripper.
 - A. Allow stripper to penetrate coating.
 - B. Use a small 1/4-inch detail brush dipped in stripper to apply material around perimeter and spoke-like areas.
2. Remove stripper, following manufacturer's recommendations.

CAUTION: Do not use vehicle power to rotate the wheel assembly while sanding or personal injury may result.

3. Sand wheel assembly with number 240-grit sandpaper while rotating wheel assembly on slowly spinning brake lathe or by mounting it on vehicle and spinning by hand.
 - This restores machined appearance and promotes adhesion of finish coats.

Recoating Procedure

CAUTION: Use of rubber gloves and eye protection is necessary to prevent personal injury.

1. Clean surface of contaminants by washing with soap and water.
2. Spray wheel assembly with Amchem number 33 or equivalent.
 - A. Let wheel assembly soak for 1 to 3 minutes.
 - B. Rinse with water and blow dry.
3. Spray wheel assembly with Amchem number 1001 or equivalent.
 - A. Let wheel assembly soak for 1 to 3 minutes.
 - B. Rinse with water and blow dry.
4. Mask off tire.

CAUTION: When applying any two part component paint system, wear proper respiratory protection such as Easi-Air Respirator, part number 06986, or equivalent. Follow the specific precautions provided by the paint manufacturer. Failure to follow these precautions may cause lung irritation and allergic respiratory reaction.

5. Finish wheel assembly with Ditzler Declear Acrylic Urethane Clear and Ditzler Ultra Urethane-Additive, or equivalents. Refer to labels for specific directions.
 - A. First coat – light mist coat, let flash.
 - B. Second coat – light, let flash.
 - C. Third coat – heavy duty, wet coat.
6. Let wheel assembly dry for 24 hours or flash for 30 minutes. Force dry at 60°C (140°F) for 30 minutes and allow to cool for 30 minutes before mounting.

Install or Connect

1. Balance tire and wheel assembly. Refer to "Balancing Tire and Wheel Assembly" in this section.
 - Replace original wheel balance weights with nylon-coated wheel balance weights to avoid discoloration of wheel assembly.
2. Tire and wheel assembly. Refer to "Wheel Assembly Removal and Installation" in this section.
3. Lower vehicle.

SPECIFICATIONS

FASTENER TIGHTENING SPECIFICATIONS

Hub Cap Assembly – 16 x 7.5 Aluminum Wheel Assembly (Pontiac)	6 N•m (53 lb. in.)
Hub Cap Assembly – 16 x 8 Aluminum Wheel Assembly (Pontiac)	6 N•m (53 lb. in.)
Jack Stowage Bolt/Screw	6.5 N•m (58 lb. in.)
Special Security Wheel Lock Nut	140 N•m (100 lb. ft.)
Wheel Nut – M12 x 1.5	140 N•m (100 lb. ft.)
Wheel Trim Cover Assembly (Chevrolet)	6 N•m (53 lb. in.)

RUNOUT SPECIFICATIONS

Maximum Radial Runout	
Steel Wheel Assemblies	1.01 mm (0.040")
Aluminum Wheel Assemblies	0.76 mm (0.030")
Maximum Lateral Runout	
Steel Wheel Assemblies	1.14 mm (0.045")
Aluminum Wheel Assemblies	0.76 mm (0.030")

TIRE PRESSURES

Compact Spare	420 kPa (60 psi)
Front	210 kPa (30 psi)
Rear	210 kPa (30 psi)

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