SECTION 3E

TIRES AND WHEELS

NOTICE: Always use the correct fastener in the proper location. When you replace a fastener, use ONLY the exact part number for that application. General Motors will call out those fasteners that require a replacement after removal. General Motors will also call out the fasteners that require thread lockers or thread sealant. UNLESS OTHERWISE SPECIFIED, do not use supplemental coatings (paints, greases, or other corrosion inhibitors) on threaded fasteners or fastener joint interfaces. Generally, such coatings adversely affect the fastener torque and joint clamping force, and may damage the fastener. When you install fasteners, use the correct sequence and tightening specifications. Following these instructions can help you avoid damage to parts and systems.

CONTENTS

GENERAL DESCRIPTION

This vehicle is equipped with P205/75R15M/S tires on four-wheel drive models, and P195/75R15M/S on two-wheel drive models. The tires are designed to operate satisfactorily with loads up to the full rated capacity when inflated to the recommended inflation pressures. Correct tire pressures and driving habits have an important influence on tire life. Heavy cornering, excessively rapid acceleration and unnecessary sharp braking increase tire wear, decreasing tire life.

REPLACEMENT TIRES

Figure 1

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

CAUTION: Do not mix different types of tires on the same vehicle such as radial, bias and bias-belted tires except in an emergency, because vehicle handling may be seriously affected and may result in loss of control.

Replacement tires should be of the same size, load range and construction as those originally on the vehicle. This can best be accomplished by using tires of the same TPC specification number. Use of any other tire size or construction type may seriously affect ride, handling, speedometer/odometer calibration, vehicle ground clearance and tire clearance to the body and chassis. This does not apply to the spare furnished with the vehicle.

It is recommended that new tires be installed in pairs on the same axle. In order to equalize braking traction, if it is necessary to replace only one tire, the replacement should be paired with the tire that has the most tread.

Although they may appear different in tread design, tires built by different manufacturers with identical TPC specification numbers can be intermixed on the same vehicle.

Tires should be replaced when:

1. They are worn to a point where 1.6 mm (0.063-inch) or less tread remains, or the cord or fabric is showing. 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 (0.063-inch) or less. When the indicators appear in two or more adjacent grooves at three spot around the tire, the tire should be replaced.
2. The tread or sidewall is cracked, cut or snagged deeply enough to expose the cord or fabric.

3. The tire has a bump, bulge or split. Slight sidewall indentations are normal and should not affect ride.
4. The tire has a puncture, cut or other damage that cannot be correctly repaired because of the size or location of the damage.

Passenger Tire Service Description

Most tires today have a service description branded on the side wall after the tire size. This service description consist of two parts: The load index and the speed symbol. The load index is a number usually between 75 and 115, which defines the tires load capacity at maximum inflation. Higher numbers mean greater load capacity. The speed symbol is a letter usually between P and Z which defines the speed capability of the tire. In the past, this letter may have been part of the tire size; this continues to be the case with some V and Z rated tires. The higher the letter, the greater the speed capability. The tire companies have charts which define equivalent loads and speeds for all load indexes and speed symbols that make up the tire service description.

Important

- When replacing tires, never install a tire that is a smaller size or lesser speed rating than that used as original equipment. These speeds only apply at the tire's full pressure. An under-inflated tire will not meet its speed rating capability.

The chart below shows the common speed rating on tires used by General Motors.

Speed Symbol	Maximum Speed (km/h)	Maximum Speed (mph)
S	160	112
T	190	118
U	200	124
H	210	130
V	240	149
Z	Over 240	Over 149

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 the non-all seasons previously used. Performance in other areas, such as wet traction, rolling resistance, tread life, and air retention is also slightly better. The above changes are the results of improvements in tread design and tread compounds. These tires are identified by the symbol "MS." This symbol follows the size and is molded with the size into the tire sidewall. The suffix "MS," which follows the TPC specification number, is also molded into the sidewall.

P-METRIC TIRES

Figures 2 and 3

All GM vehicles now use P-metric sized tires. P-metric tires are available in two load ranges: standard load (241 kPa/35 psi maximum), and extra load (283 kPa/41 psi maximum). Most passenger car tires are standard load. Most P-metric tire sizes do not have exact corresponding alphanumeric tire sizes. For this reason, replacement tires should be the same TPC specification number (same size, load range and 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 better recommend the closest match of alphanumeric to P-number sizes with their own tire lines.

Refer to the tire placard located in the left front door lock pillar (Figure 3).

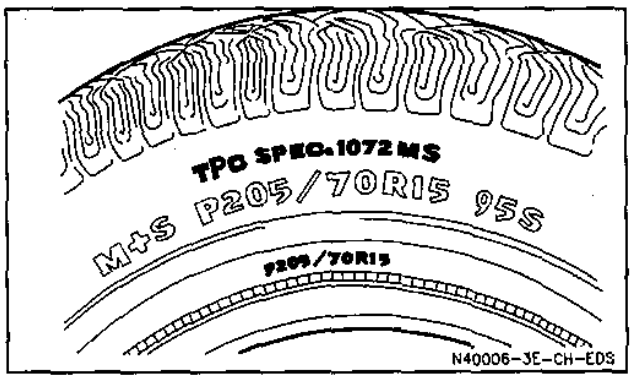


Figure 1—Tire Identification—Typical

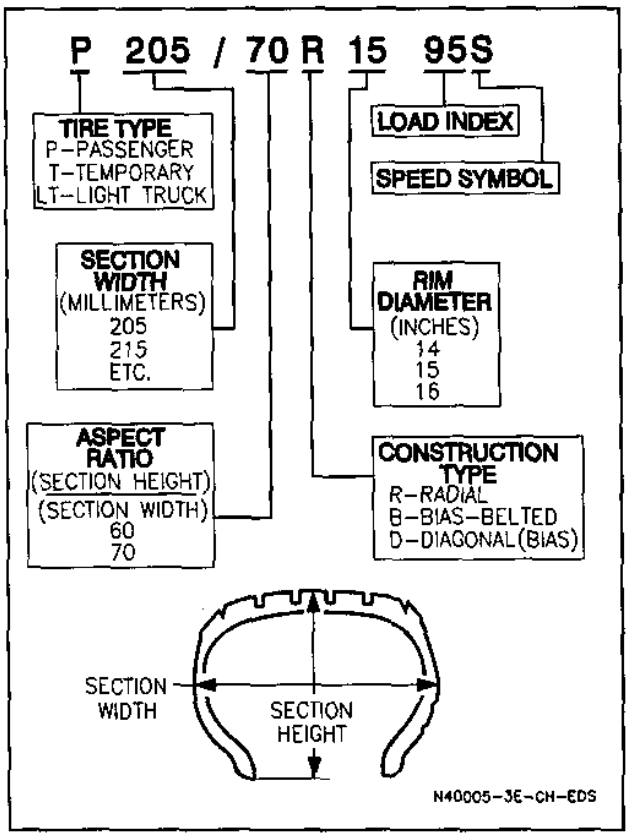


Figure 2—Metric Tire Size Explanation—Typical

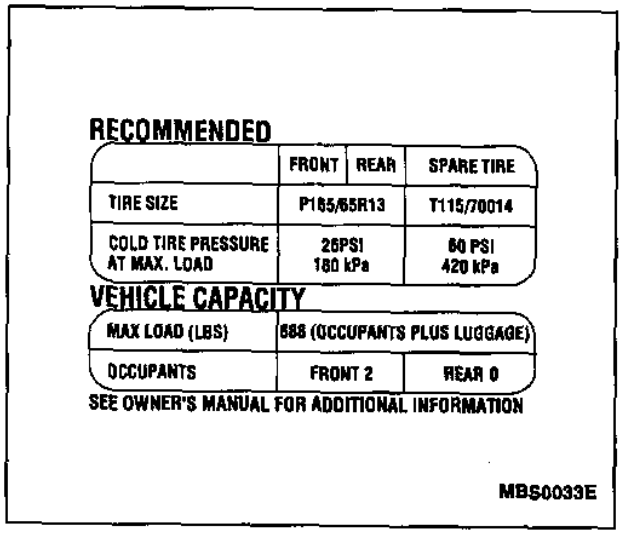


Figure 3—Tire Placard—Typical

TIRE PLACARD

Figure 3

The tire placard is located on the left door lock pillar and should be referred to for tire information. The placard lists the maximum load capacity, recommended tire size and cold tire pressure at maximum load (including spare).

WHEELS

Standard equipment wheels are 15 x 15 1/2 JJ steel wheels.

Replacement Wheels

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

Wheels must be replaced if they are bent, dented, have excessive lateral or radial runout, leak air through welds, have elongated bolt holes, if lug nuts will not stay tight, or if they are heavily rusted.

DIAGNOSIS

For tire and wheel diagnosis, refer to SECTION 3.

ON-VEHICLE SERVICE

WHEEL REPAIR

Wheel repairs that use welding, heating or peening are not approved. Wheels must be replaced if they are dented, have excessive lateral or radial runout, leak air through welds, have elongated bolt holes, if wheel nuts will not stay tight, or if wheel nuts are heavily rusted. An inner tube is not an acceptable repair for leaky wheels or tires.

METRIC WHEEL NUTS AND STUDS

Figure 4

This vehicle uses metric wheel nuts and wheel studs. The thread size of the metric wheel nuts and studs is "M12 x 1.25." This stands for:

M = Metric
12 = Diameter in millimeters
1.25 = Millimeters per thread

The nut will have the word "Metric" stamped on the face and the stud will have the letter "M" stamped into the threaded end. The word "Metric" is stamped on the head of the stud.

If a broken stud is found, refer to SECTION 3C for front wheel stud replacement or SECTION 3D for rear wheel stud replacement.

TIRE INFLATION

Figures 3 and 5

The pressure recommended for any model is carefully calculated to give a satisfactory ride, stability, steering, tread wear, tire life, load carrying capacity, and resistance to bruises.

The metric term for tire inflation pressure is the kilopascal (kPa). Tire pressure may be printed in both kPa and psi. One psi equals 6.9 kPa. Refer to the tire pressure conversion chart (Figure 5) for equivalent

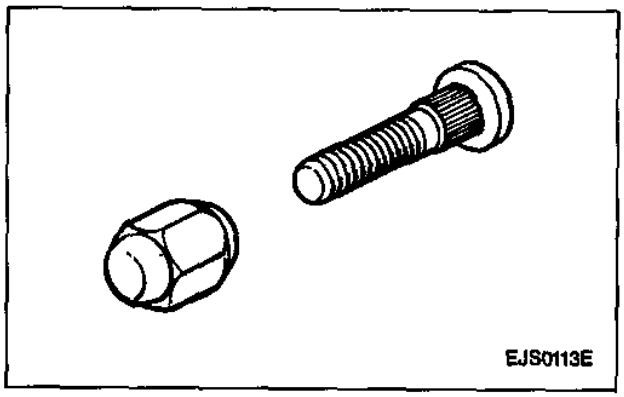


Figure 4—Metric Stud and Nut

TIRE PRESSURE CONVERSION CHART (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

Figure 5 - Tire Pressure Conversion Chart T5542

kPa-psi measurements. Refer to the tire placard located on the left door lock pillar for tire inflation specifications (Figure 3).

Tire pressure, with tires cold (after vehicle has set for three hours or more or driven less than one mile), should be checked monthly or before any extended trip. The front and rear tires require 160 kPa (23 psi) of air. It is normal for tire pressure to increase 28 kPa (4 psi) when the tires become hot during driving. **Do not** bleed or reduce tire pressure after driving. Bleeding reduces the cold inflation pressure.

Valve caps should be on the valves to keep dust and water out.

Tires inflated to higher than recommended pressure can cause:

- Hard ride.
- Tire bruising or carcass damage.
- Rapid tread wear at center of tire.
- Reduced handling.

Tires inflated to a lower than recommended pressure can cause:

- Tire squeal on turns.
- Hard steering.
- Rapid and uneven wear on the edges of the tread.
- Tire rim bruises and rupture.
- Tire cord damage.
- High tire temperatures.
- Reduced handling.
- Reduced fuel economy.

Unequal tire pressure on the same axle can cause:

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

WHEEL INSTALLATION

Figure 6

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

Install or Connect

1. Install wheel to vehicle; secure with wheel nuts.

Important

- Wheel nuts must be tightened in sequence and to proper torque to avoid bending the wheel, brake drum or rotor. Refer to Figure 6.

Tighten

- Wheel nuts to 95 N.m (70 lb. ft.)

2. Lower vehicle.

Inspect

- Wheel alignment and matching of tread wear. Adjust as necessary. Refer to SECTION 3A.

WHEEL REMOVAL

1. Loosen wheel nuts by approximately 180 degrees (one-half turn).
2. Raise and suitably support vehicle. Refer to SECTION 0A.
3. Remove wheel nuts and wheel from vehicle.

Difficult to Remove Wheels

Sometimes wheels can be difficult to remove from the vehicle due to foreign material or a tight fit between the wheel center hole and the hub or rotor. These wheels can be removed without damage as follows:

1. Tighten all wheel nuts on the affected wheel, then loosen each wheel nut two turns.
2. Lower vehicle.
3. Rock the vehicle from side to side as hard as possible using one or more person's body weight to loosen the wheel. Rock the vehicle from "D" (automatic transmission) or "1" (manual transmission) to "R" allowing the vehicle to move several feet in each direction. Apply quick, hard pumps on the brake pedal to loosen the wheel.
4. Raise and suitably support vehicle. Refer to SECTION 0A.

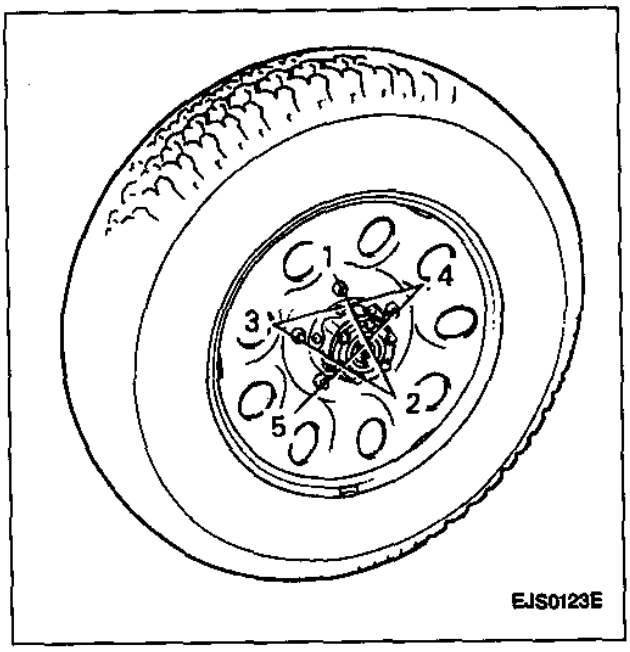


Figure 6—Wheel Nut Tightening Sequence

5. Remove the wheel nuts and the wheel. Penetrating oil has not been found to be effective in removing tight wheels; however, if it is used, it should be applied sparingly to the wheel's center hole area only.

CAUTION: Do not allow the penetrating oil to get on the vertical surfaces between the wheel and the drum or rotor because penetrating oil in this area could cause the wheel to work loose as the vehicle is driven, resulting in loss of control.

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.

TIRE ROTATION

Figure 7

To equalize wear, rotate tires using the pattern in Figure 7. Radial tires should be rotated every 10,000 km (6,000 miles). After rotation, be sure to check wheel nut torque and tire pressure.

TIRE MOUNTING AND DISMOUNTING

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 tires as they may damage the tire beads or wheel rim.

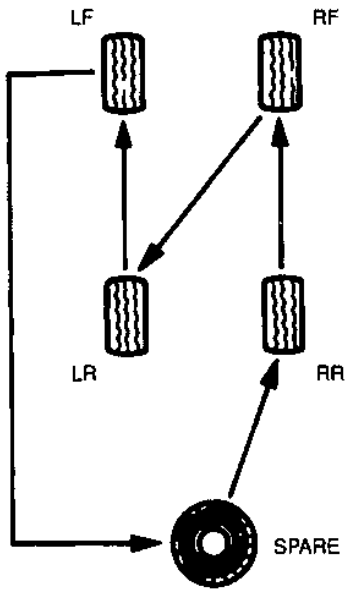
Wheel rim bead seats should be cleaned with a wire brush or coarse steel wool to remove lubricants, old rubber and light rust. Before mounting a tire, the bead area should be well lubricated with an approved tire lubricant.

After mounting, inflate the tire to 220 kPa (32 psi) so that beads are completely seated. Install valve core and inflate to proper pressure.

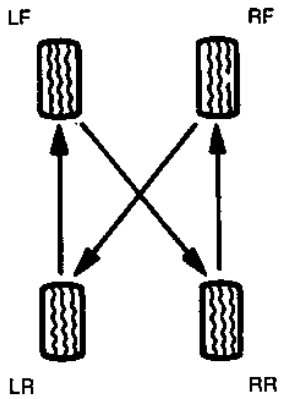
CAUTION: To avoid serious personal injury, do not stand over tire when inflating. Bead may break when it snaps over safety hump. Do not exceed 220 kPa (32 psi) pressure when inflating any tire if beads are not seated. If 220 kPa (32 psi) pressure will not seat beads, deflate, relubricate the beads and reinflate. Overinflation may cause the bead to break and cause serious personal injury.

TIRE REPAIR

There are many different materials on the market used to repair tires. Manufacturers have published detailed instructions on how and when to repair tires. These instructions can be obtained from the tire manufacturer if they are not included with the repair kit.



A



B

A WITH FULL-SIZE SPARE WHEEL

B IF SPARE WHEEL DOES NOT MATCH YOUR OTHER WHEELS

EJS0133E

Figure 7—Tire Rotation Pattern

MEASURING WHEEL RUNOUT

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

Radial runout and lateral runout should be measured on both the inboard rim flanges. With the dial indicator firmly in position, slowly rotate the wheel 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 should be replaced. Disregard any indicator readings due to welds, paint runs, scratches, etc. For procedures on measuring runout, refer to SECTION 3A.

SPARE TIRE

Figure 8

The spare is a full-size radial tire, identical in size to the other four tires, and located on the rear door. As with all the other tires on the vehicle, this wheel and/or tire must be replaced with equipment that has the same load capacity, diameter, rim width, offset and mounting configuration as the original wheel and/or tire.

CAUTION: Operating a vehicle with wheels or tires of improper size may result in loss of control, personal injury or property damage.

Remove or Disconnect

1. Unlock wheel lock and slide off lock piece.
2. Wheel nuts with lug wrench and remove spare tire from rear door.

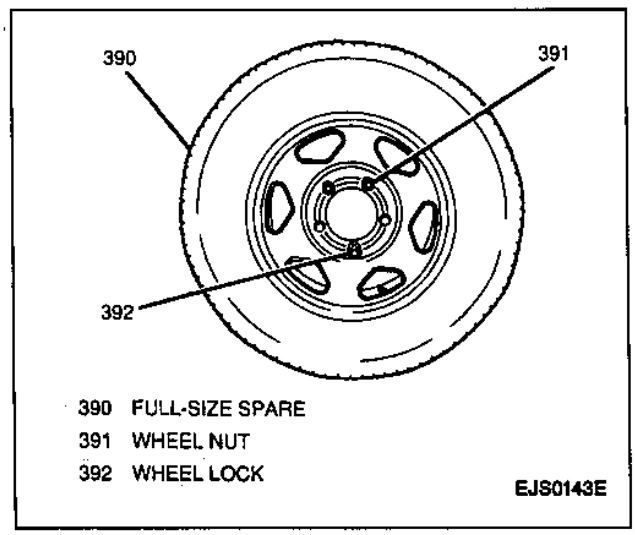


Figure 8—Full-Size Spare

Install or Connect

1. Spare tire to tailgate; secure with wheel nuts.
2. Lock piece to spare tire, relocking wheel to rear door.

BALANCING TIRE AND WHEEL

Figures 9 and 10

There are two types of wheel and tire balance: static and dynamic. Static balance is the equal distribution of weight around the wheel (Figure 9). Assemblies that are statically unbalanced, cause a bouncing action called tramp. This condition will eventually cause uneven tire wear.

Dynamic balance is the equal distribution of weight on each side of the wheel centerline so that when the tire spins there is no tendency for the assembly to move from side to side (Figure 10). Assemblies that are dynamically unbalanced may cause shimmy.

General Balance Precautions

CAUTION: Eye protection must be used to prevent personal injury. Stones should be removed from the tread to avoid operator injury during spin balancing and to obtain a good balance.

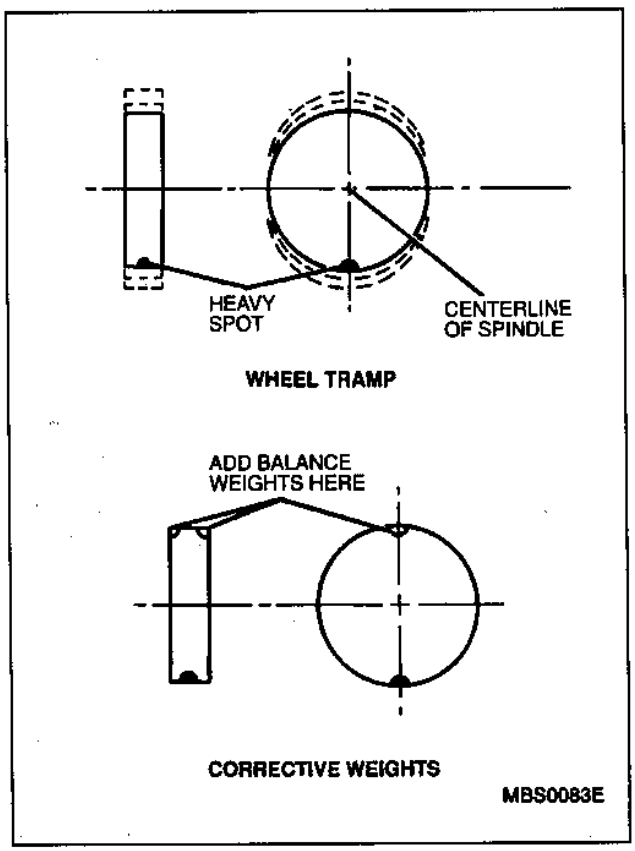


Figure 9—Static Unbalance Correction

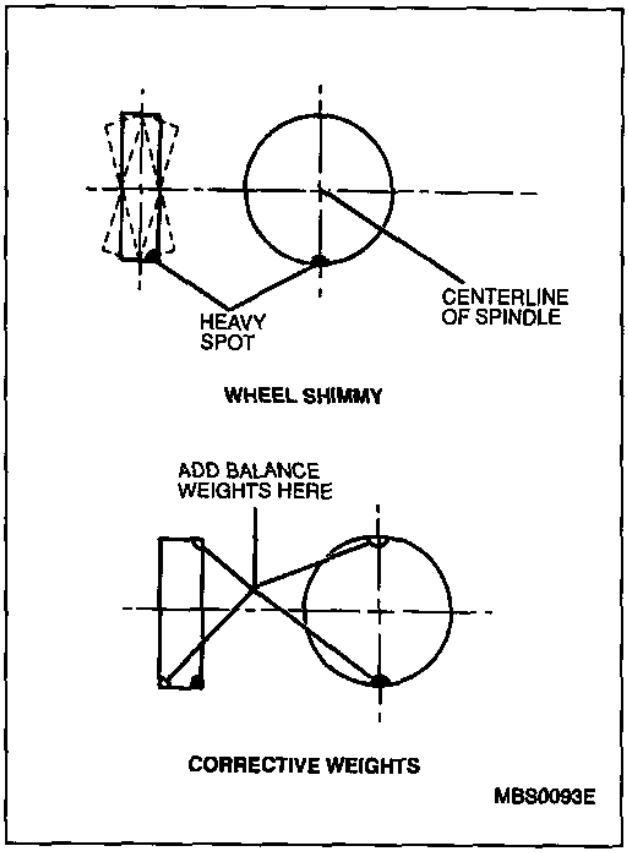


Figure 10—Dynamic Unbalance Correction

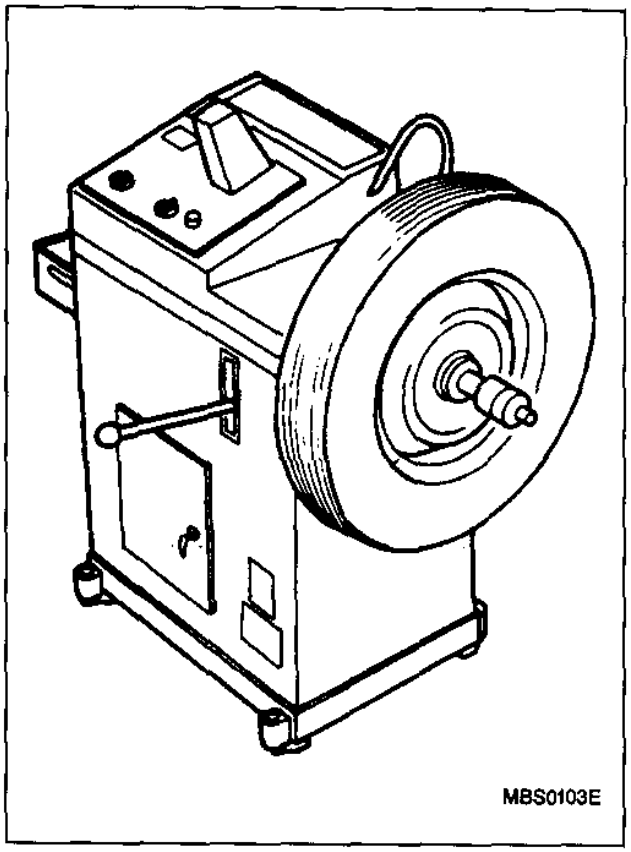


Figure 11—Off-Vehicle Balancing

Deposits of foreign material must be cleaned from the inside of the wheel. The tire should be inspected for any damage, then balanced according to the equipment manufacturer's recommendations.

Off-Vehicle Balancing

Figure 11

Most electronic off-vehicle balancers are more accurate than the on-vehicle spin balancers. They are easy to use and give a dynamic (two plane) balance. Although they do not correct for drum or rotor unbalance as does on-vehicle spin balancing, this is overcome by their accuracy.

When balancing tire and wheel assemblies off the vehicle, use a balancer that pilots the wheel by centerhole (not the lug holes), if possible.

Wheel Balance Weights

When static balancing, if more than 85 grams (3.0 oz.) are needed, the wheel weights should be split as equally as possible between the inboard and outboard flanges.

CORRECTING NON-UNIFORM TIRES

There are two ways to correct tires which cause a vibration even through 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 trueing 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 on tire and wheel assemblies which are known to be causing a vibration, because this method is just as likely to cause good assemblies to vibrate, as rotating the tire on the wheel will unbalance the wheel/tire assembly. Refer to SECTION 3.

SPECIFICATIONS

WHEEL NUT TORQUE

Wheel Nuts	95 N·m (70 lb. ft.)