SECTION 2E

TIRES AND WHEELS

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DESCRIPTION AND OPERATION

TIRE

Tread

A part (that contacts) road surfaces directly is fixed on the outside of carcass and breaker. It is a strong rubber coat made of high anti–abrasion rubber. Its running performance depends on is surface profile.

Breaker

A cord belt between tread and carcass prevents damages of inner code due to outer shock and vibration.

Carcass

This major part made by pilling code papers of strong synthetic fiber forms a structure of tire. Since it maintains tire pressure and endures applied load and shock to tire, it should have a high anti–fatigue characteristic.

Bead

A steel wire winding the ending part of carcass code, coated with rubber film and wrapped with nylon cord papers. It fixes tire to a rim.

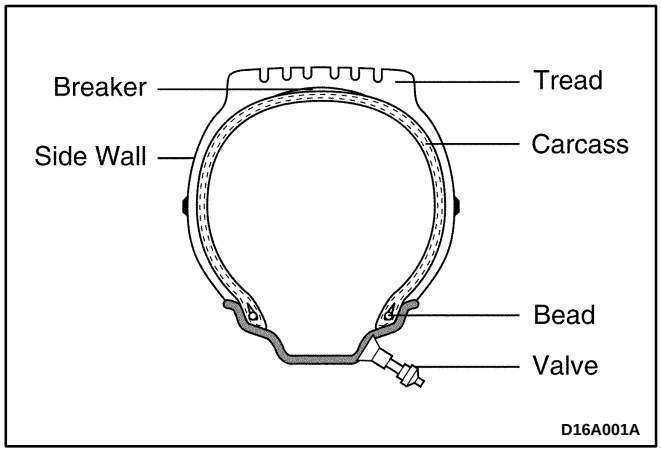
Tube

Tires used in mostly current vehicle are mostly tubeless tires.

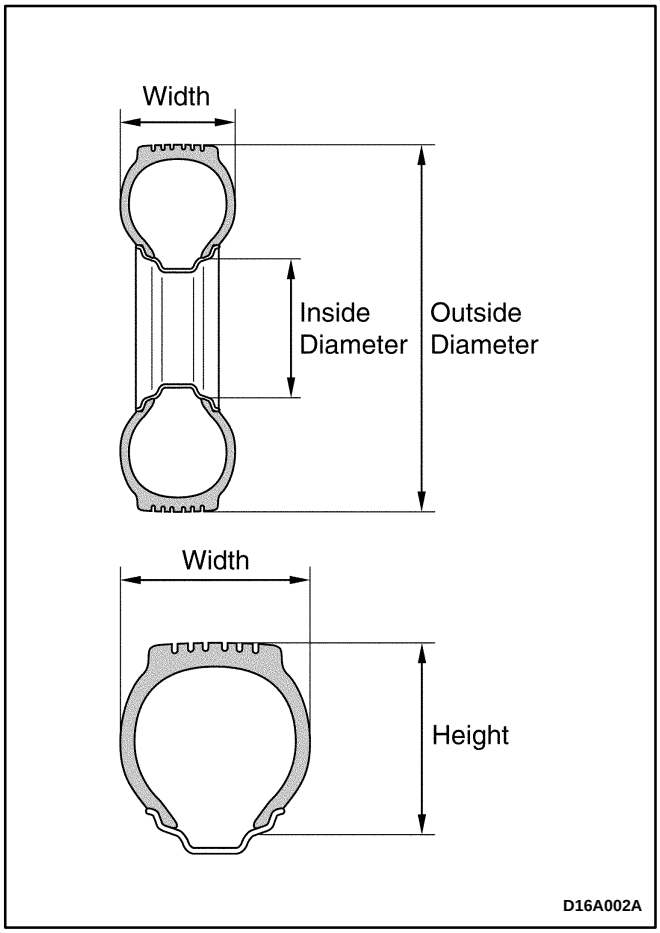
Side Wall

It is provided to improve the comfortable driving by protecting carcass and cushion movement.

Structure of Tubeless Tube



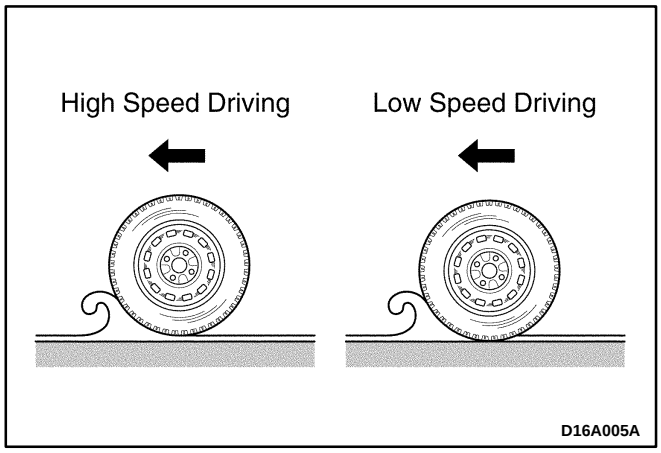
Nomenclature



175/60R13 77H	175	Width (mm)
	60	Flatness ratio 60% (Height/Width) × 100
	R	Radial
	13	Rim diameter (= Tire I.D, Inch)
	77	Max. load index
	H	Max. speed symbol

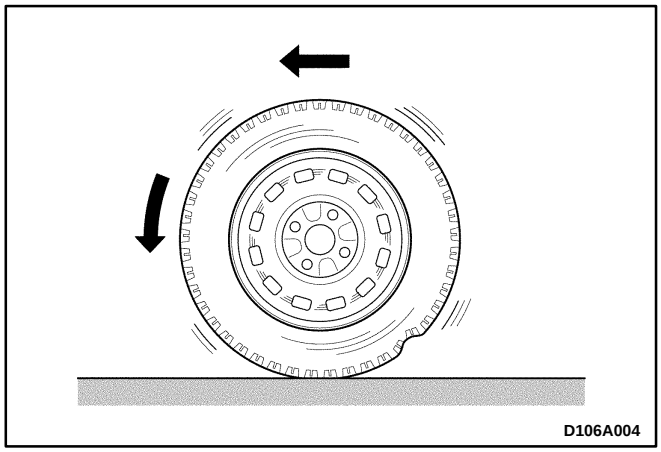
Hydroplaning

The condition of driving a vehicle fast on the road surface covered with water can cause tires to fail to rotate with a good contact on the surface, so results in remaining them afloat. This is so–called hydroplaning. It causes brake failure, lower tractive force, and losing the steering performance so it is very vulnerable condition.



Standing Wave

During running the rotating tire repeats deformation and restoring movement generated in tread. But when the wheel rotating speed reaches high, the next deformation applied to tire before restoring last deformation so the trembling wave appears in the tread portion. The lower the tire pressure the severe the trembling wave appears. And during the high speed.



REPLACEMENT TIRES

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 performance standards for traction, endurance, dimensions, noise, handling and rolling resistance. 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 emergencies, because vehicle handling may be seriously affected and may result in loss of control.

Caution: Do not change 145/70 R13 tires or 155/65 R13 tires for 175/60 R13 tires, because vehicle hancling may be seriously affected and may result in loss of control. If you change 145/70 R13 tires or 155/65 R13 tires for 175/60 R13 tires, you have to change the steering gear assembly.

Use only replacement tires with the same size, load range, and construction as the original. The 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 the chassis. This does not apply to the spare tire furnished with the vehicle.

It is recommended that new tires be installed in pairs on the same axle.

If it is necessary to replace only one tire, pair it with the tire having the most tread to equalize the braking action.

Although they may appear different in tread design, tires built by different manufacturers with identical TPC specifications may be used on the same vehicle.

ALL SEASON TIRES

Most 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 season radial tires previously used. Other performance areas, such as wet traction, rolling resistance, tread life, and air retention, have also been improved. This was done by improvements in both tread design and tread compounds. These tires are identified by an “M + S” molded in the tire sidewall following the size number. The suffix “MS” is also molded in the sidewall after the TPC specification number.

The optional handling tires used on some vehicles are not all season tires. These will not have the “MS” marking after the tire size or the TPC specification number.

TIRE LABEL

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

SPARE TIRE

This vehicle comes equipped with a full-sized spare tire and wheel.

WHEELS

Wheels 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 bolts won't stay tight or are heavily rusted. Wheels with excessive runout may cause vehicle vibration. 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 the chassis.

INFLATION OF TIRES

The pressure recommended for any vehicle line is carefully calculated to give a satisfactory ride, handling, tread life, and load-carrying capacity.

Tire pressure should be checked monthly or before any extended trip. Check the tires when they are cold, after the vehicle has sat for 3 hours or more or has been driven less than 1 mile. Set the tire pressure to the specifications on the tire label located on the rear face of the driver's door. Tire inflation pressure is also given under "Tire Size and Pressure Specifications" in this section.

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

Higher than recommended tire pressure can cause:

- Hard ride
- Tire bruising or damage
- Rapid tread wear at the center of the tire

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 breakage
- High tire temperatures

Unequal tire pressures on same axle can cause:

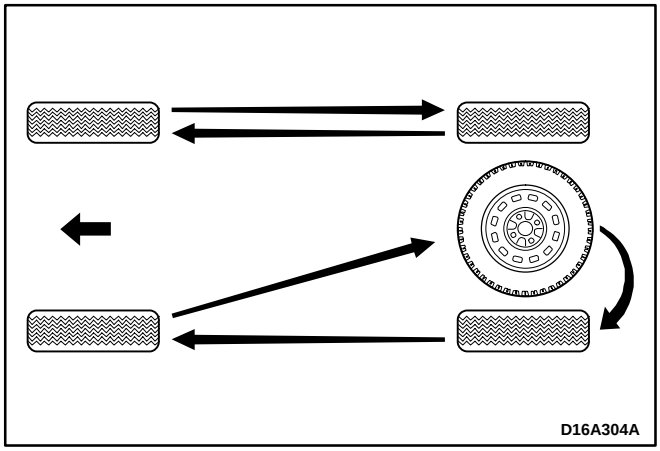
- Uneven braking
- Steering lead
- Reduced handling
- Swerve on acceleration
- Torque steer

ROTATION TIRES

Front and rear tires perform different jobs and can wear differently depending on the tires of road driven, driving habit, etc.

The front tires will wear faster than the rear ones.

To avoid uneven wear of tires and to prolong tire life, inspect and rotate the tires every 5,000 km (3,100 miles). After rotating the tires, adjust the tire inflation pressures and be sure to check wheel nuts tightness.



WHEEL BALANCE

Balance is the easiest procedure to perform and should be done first if the vibration occurs at high speeds, or if the tires or the wheels are replaced.

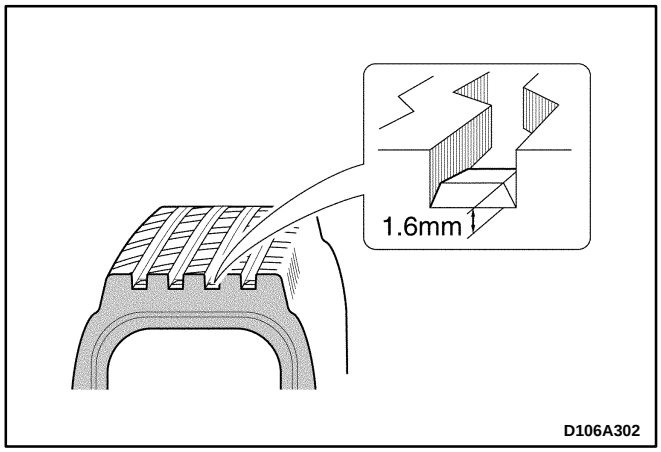
When proceeding the wheel balancing procedure regard the belows.

1. Do not use the wheel weight over two at the inboard and the outboard flanges.
2. The total weight of the wheel weights should not exceed the 100 grams (3.5 ounces).
3. Blanching the assemblies with factory aluminum wheels requires the use of special nylon–coated, clip–on wheel weights.

DIAGNOSTIC INFORMATION AND PROCEDURES

TIRE WEAR

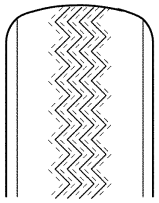
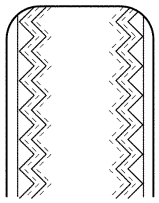
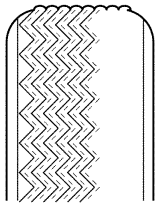
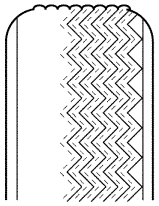
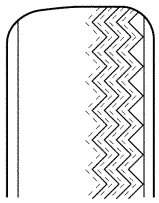
1. Measure the depth of the tire tread.
2. If the depth of the tread is below the specified value, replace the tire.



Limit of The Tread Wear	1.6mm (0.06 in.)

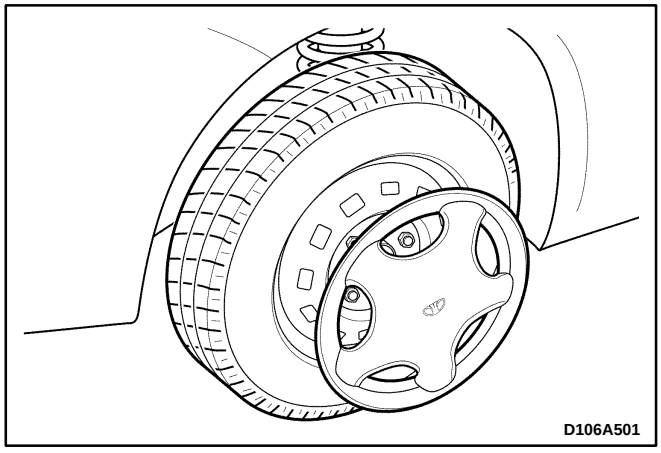
3. Indicators appear when the tire tread depth becomes shallow (less than 1.6mm (0.06 in.)).

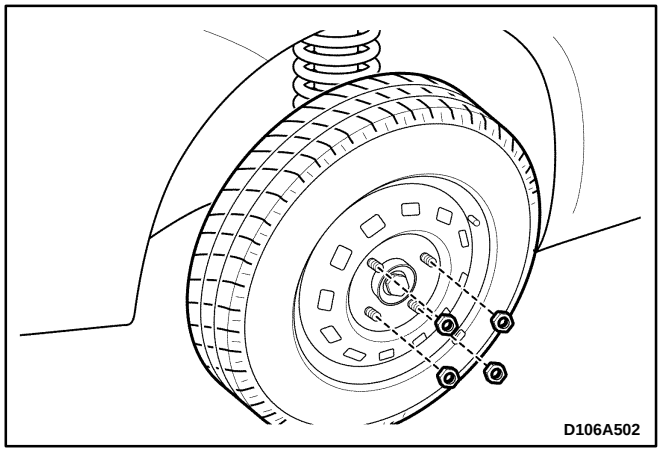
IRREGULAR OR EXCESSIVE TIRES WEAR

Condition	Probable Cause	Correction
 D16A305A	● Low tire inflation pressures. ● Improper the tire rotation.	● Adjust tire inflation pressures. ● Rotate the tires.
 D16A305B	● Excessive tire inflation pressures. ● Improper the tire rotation.	● Adjust tire inflation pressures. ● Rotate the tires.
 D16A305C	● Poor toe–in.	● Adjust the toe–in.
 D16A305D	● toe–out.	● Adjust the toe–in.
 D16A305E	● Poor camber or caster. ● Faulty suspensions. ● Poor wheel balancing. ● Improper the tire rotation.	● Check the steering knuckle, control arm, drive axle, and suspensions. Repair or replace them, as needed. ● Adjust the wheel balancing. ● Rotate the tires.

REPAIR INSTRUCTIONS

ON-VEHICLE SERVICE





WHEEL

Removal Procedure

1. Remove the wheel cover on the vehicle equipped with steel wheel.
2. Loosen the wheel nuts.
3. Raise and suitably support the vehicle.
4. Remove the wheel nuts.

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

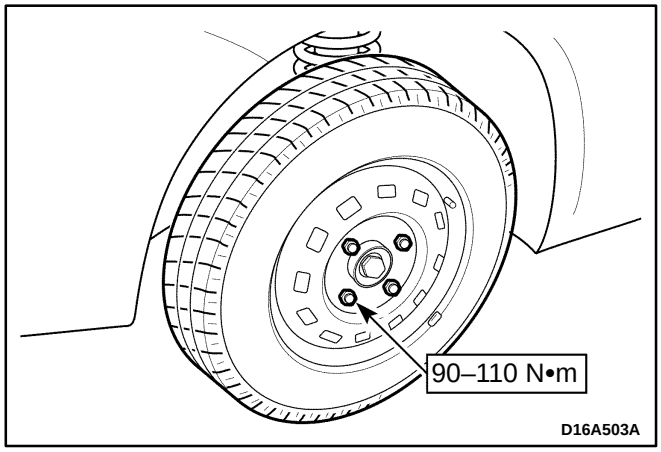
5. Remove the wheel.

Difficulty in removing the wheels from the vehicle can be due to foreign material or to a tight fit between the wheel centerhole and the hub or the rotor. These wheels can be removed by

1. Retightening the wheel nuts on the affected wheel and then loosening the wheel nuts by two turns.
2. Lowering the vehicle and rocking it from side to side as hard as possible, using one or more person's body weight to loosen the wheel.
3. Raising the vehicle and removing the wheel.

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 and an injury accident.

Penetrating oil is not effective in removing tight wheels. If it is used, however, apply it sparingly and only to the wheel's centerhole area.



Installation Procedure

Notice: Before installing the wheels, remove any build-up of corrosion on the wheel mounting surface and the brake drum or the rotor mounting surface by scraping and brushing them with a wire brush. Installing the wheels without good metal-to-metal contact at the mounting surfaces can cause the 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 the proper torque to avoid bending the wheel, the brake drum or the rotor.

1. Mount the wheel.
2. Install the wheel nuts in the diagonally. Do not tighten the wheel nuts.
3. Lower the vehicle.

Tighten

Tighten the wheel nuts to 90–110 N•m (66–81 lb-ft).

ON-VEHICLE BALANCING

On-vehicle balancing will help correct vibrations due to brake drum, rotor, and wheel cover imbalances.

Notice: Do not allow the front suspension to hang free. When the drive axle is run at an extreme angle, extra vibrations can occur, as well as damage to seals and joints.

1. During on-vehicle balancing, do not remove the balance weights from the off-vehicle dynamic balance.
2. If more than 1 ounce of additional weight is required, split the weight between the inner and the outer rim flanges.
3. Spin the driven tire and wheel assemblies using the engine.

OFF-VEHICLE BALANCING

Perform wheel balancing with an electronic off-vehicle balancer. The balancer is easy to use and gives both a static and a dynamic balance. Unlike on-vehicle balancing, the off-vehicle balancer does not correct for drum or rotor imbalance. This drawback is overcome by its accuracy. Secure the wheel on the balancer with a cone through the back side of the centerhole, not through the wheel nut holes.

CORRECTING NON-UNIFORM TIRES

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

Another method is to dismount the tire and rotate it 180 degrees on the rim. Do this only on the 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.

TIRE AND WHEEL MATCH-MOUNTING

The tires and wheels are match-mounted at the assembly plant. Match-mounting aligns the radially stiffest part of the tire, or high spot, to the smallest radius, or low spot, of the wheel.

The high spot of the tire is originally marked by a red paint mark or an adhesive label on the outboard sidewall.

The low spot of the wheel will be at the location of the valve stem.

Before dismounting a tire from its wheel, scribe a line on the tire at the valve stem to assure that it is remounted in the same position.

Replacement tires that are of original equipment quality will have their high and low spot marked in the same manner.

SPECIFICATIONS

TIRE SIZE AND PRESSURE SPECIFICATIONS

Inflation Pressure

Engine	Tires	Wheel	Front		Rear	
			kPa	psi	kPa	psi
0.8 SOHC	145/70 R13	4.5Jx13 (Steel)	207 (207)*	30 (30)*	207 (234)*	30 (34)*
	155/65 R13	4.5Jx13 (Alloy)	207 (207)*	30 (30)*	207 (234)*	30 (34)*

Important: ( )* : 4 – 5 occupants

INFLATION PRESSURE CONVERSION SPECIFICATIONS

kPa	psi	kPa	psi	kPa	psi
140	20	186	27	234	34
145	21	193	28	241	35
152	22	200	29	248	36
159	23	207	30	276	40
166	24	214	31	310	45
172	25	221	32	345	50
179	26	228	33	379	55

FASTENER TIGHTENING SPECIFICATIONS

Application	N•m	Lb-Ft	Lb-In
Wheel Nuts (Aluminum Wheel)	90 – 110	66 – 81	–
Wheel Nuts (Steel Wheel)	90 – 110	66 – 81	–