Firestone

TIRE MAINTENANCE, SAFETY and WARRANTY MANUAL

REPLACEMENT MARKET PASSENGER and LIGHT TRUCK TIRES

Including

RFT™

Tires with Run-Flat Technology

Congratulations! You have just purchased quality tires from a FIRESTONE BRANDS dealer.

To ensure optimum tire performance and reduce the risk of a tire failure, Bridgestone Americas Tire Operations, LLC strongly recommends you read and follow all maintenance and safety information contained in this manual. In addi-tion, we recommend periodic inspection and maintenance, if necessary, by a qualified tire service professional.

CONTENTS

Inflate

Check your tire pressure monthly.

Rotate.

Rotate your tires as recommended by the vehicle manufacturer or every 5,000 miles.

Evaluate.

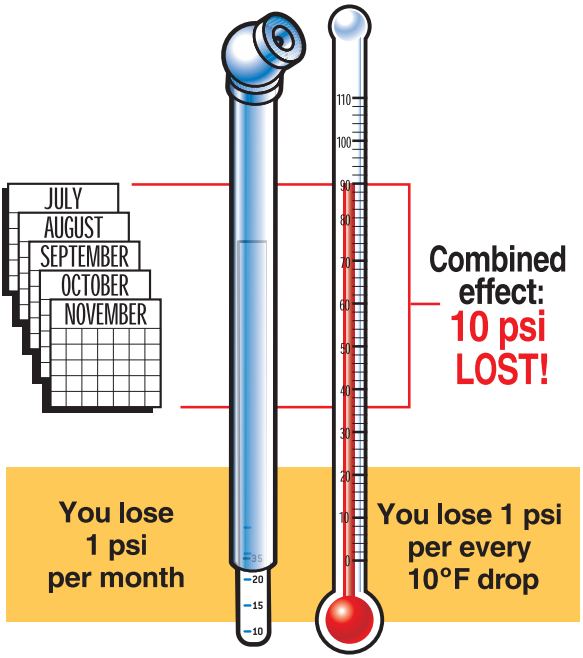
Routinely look for signs of tread wear or damage.

TIRE CARE BASICS

Quick Reference Guide to Maintenance for All Tires, Including the Spare.

TIRE INFLATION PRESSURE

Tires can lose 1 psi (pound per square inch) per month under normal conditions. Additionally, tires can lose 1 psi for every 10° F temperature drop.

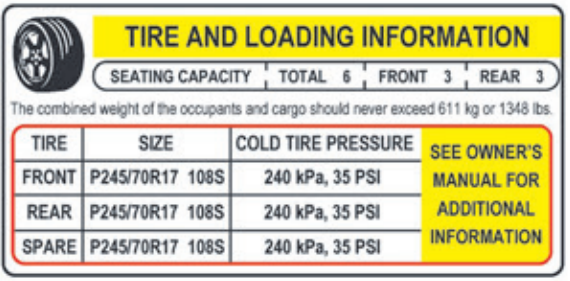


Just a look won't do it. One of these tires is actually 10 psi under-inflated. Your eyes can deceive you, so rely on a good tire gauge for an accurate reading.

30psi

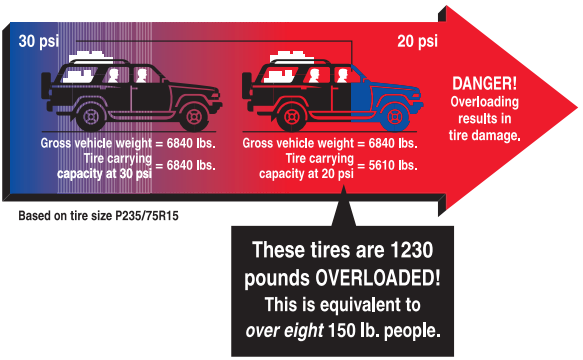
20psi

Look for the manufacturer's recommended tire pressure listed on the sticker usually located on the driver's-side door edge or door jamb area. Example:



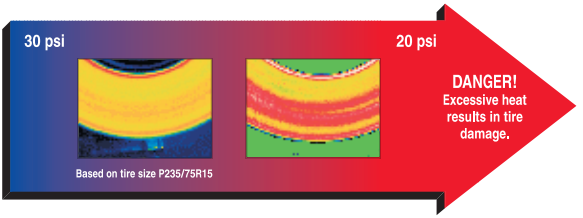
This chart shows you how underinflation can create an overload on tires.

Check your tire pressure every month to make sure it's up to specification, especially before long trips or carrying extra weight.



Lower pressure increases heat.

Infrared photography of tires tested at high speed. Damaging heat increases as inflation pressure drops.



TIRE PRESSURE—MONTHLY CHECK

For accuracy, check your inflation pressure with a tire gauge when tires are cold. Driving heats up tires and makes the reading incorrect.

a) Remove tire valve cap.

b) Place the end of the tire gauge over valve.

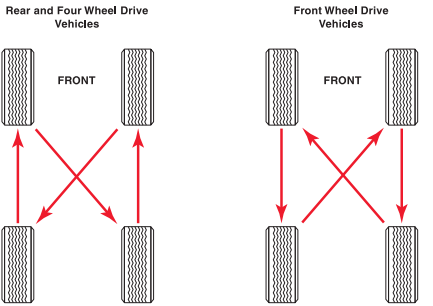
c) Press the tire gauge straight and firmly until the scale extends.

d) If needed, increase pressure and recheck with the tire gauge.

e) Replace valve cap.

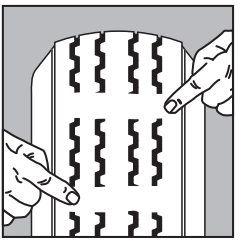
TIRE ROTATION

For maximum mileage, rotate your tires according to the vehicle manufacturer's recommendations (consult your vehicle owner's manual), or if not provided, rotate every 5,000 miles using a rotation pattern such as below (see "Radial Tire Rotation" in this manual).

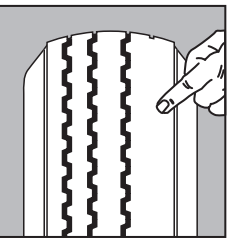


TIRE WEAR—VISUAL CHECK

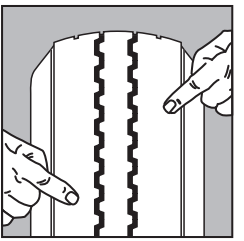
Check for obvious signs of wear.



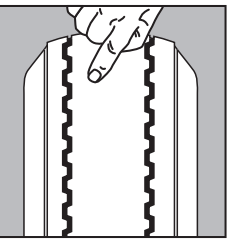
Exposed tread bars (replace)



Irregular shoulder wear (have inspected)

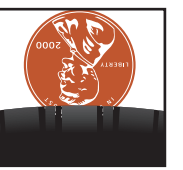


Shoulder wear (have inspected)



Center Wear (have inspected)

Place a penny in the tire tread grooves as shown. If you can see the top of Lincoln's head, the tire is worn out and needs to be replaced.



TIRE MAINTENANCE and SAFETY INFORMATION

Any tire, no matter how well constructed, may fail in use as a result of punctures, impact damage, improper inflation, overloading, or other conditions resulting from use or misuse. Tire failure may create a risk of property damage, serious personal injury or death.

SAFETY WARNING

Serious personal injury or death may result from a tire failure. Many tire failures are preceded by vibration, bumps, bulges or irregular wear. If a vibration occurs while driving your vehicle or you notice a bump, bulge or irregular wear, have your tires and vehicle evaluated by a qualified tire service professional.

To reduce the risk of tire failure, Bridgestone Americas Tire Operations, LLC strongly recommends you read and follow all safety information contained in this manual. In addition, we recommend periodic inspection and maintenance, if necessary, by a qualified tire service professional.

TIRE FAILURE WHILE DRIVING

SAFETY WARNING

It is not often that a properly maintained tire will "blow out" while you are driving. More commonly, if inflation pressure is lost, it will be gradual. If you do experience a blowout or sudden tire failure, the following information should be helpful:

- When the failure occurs, you may hear a loud noise, feel a vibration, and/or the vehicle may pull toward the side of the failed tire.
- DO NOT abruptly brake or turn.
- Slowly remove your foot from the accelerator, hold the steering wheel firmly, and steer to maintain your lane position.
- Once the vehicle has slowed, apply the brakes gently.
- Gradually pull over to the shoulder and come to a stop, as far off the road as possible.

TIRE INFLATION PRESSURE

Tires need proper inflation pressure to operate effectively and perform as intended. Tires carry the vehicle, passenger, and cargo loads and transmit the braking, acceleration, and turning forces. The vehicle manufacturer recommends the inflation pressures for the tires mounted on your vehicle.

SAFETY WARNING

Driving on tires with improper inflation pressure is dangerous.

- Under-inflation causes excessive tire heat build-up and internal structural damage.
- Over-inflation makes it more likely for tires to be cut, punctured, or broken by sudden impact.

These situations can cause a tire failure - (even if the tire is properly inflated later) - which could lead to serious personal injury or death. Consult the vehicle tire information placard and/or owner's manual for the recommended inflation pressures.

In addition to tire damage, improper inflation pressure may also:

- Adversely affect vehicle ride and handling.
- Reduce tire tread wear.
- Affect fuel economy.

Therefore, follow these important recommendations for tire and vehicle safety, mileage, and economy:

- **Always keep the vehicle manufacturer's recommended inflation pressure in all your tires, including the spare.**
- **Check their pressure monthly and before long trips or carrying extra weight.**

Your vehicle's tire information placard and/or owner's manual will tell you the recommended cold inflation pressure for all your tires, including the spare. Examples of placards are shown in Figures 1 and 2. Your placard may look differently and have different tire and loading information than that shown in either of the figures. **You must check the driver's-side door edge or door jamb area for the actual placard that applies to your vehicle.** For questions about locating or understanding the tire information placard, consult your vehicle owner's manual or ask a qualified tire service professional.

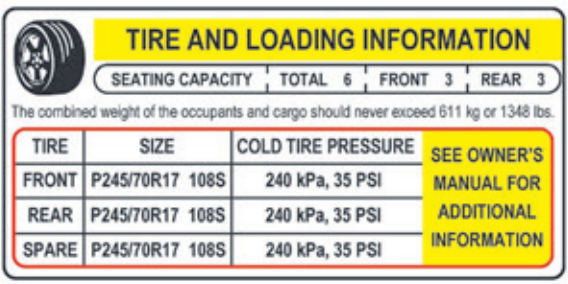


Figure 1: EXAMPLE—Tire and Loading Information Placard

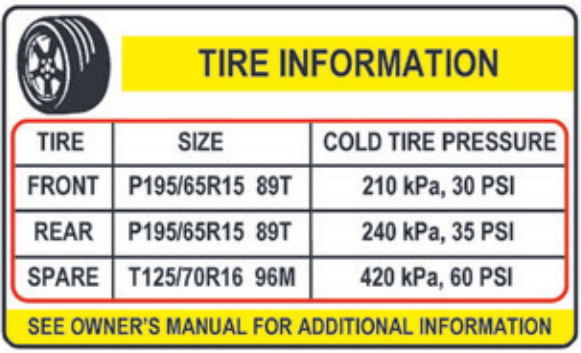


Figure 2: EXAMPLE—Tire Information Placard

Maximum Pressure Indicated on the Tire Sidewall: This is the maximum permissible inflation pressure for the tire only. The vehicle manufacturer's recommended tire pressures may be lower than, or the same as, the maximum pressure indicated on the tire sidewall. The vehicle manufacturer's specification of tire pressure is limited to your particular vehicle and takes into account your vehicle's load, ride, and handling characteristics, among other criteria. Since there may be several possible vehicle applications for a given tire size, a vehicle manufacturer may choose a different inflation pressure specification for that same size tire on a different vehicle. Therefore, always refer to the inflation pressure specifications on the vehicle tire information placard and/or in your vehicle owner's manual.

Different Tire Pressures for the Front and Rear Tires: For some vehicles, the recommended front and rear inflation pressures may be different (such as in the example shown in Figure 2). Make sure you take this into account during inflation pressure checks and when rotating tires.

Pressure Loss: Tires can lose 1 psi (7 kPa) per month under normal conditions and can lose 1 psi (7 kPa) for every 10°F (5.6°C) temperature drop. A puncture, leaking valve, or other damage could also cause inflation pressure loss. If a tire loses more than 2 psi (14 kPa) per month, have it checked by a qualified tire service professional.

TIPS FOR SAFE TIRE INFLATION

SAFETY WARNING

Inflating an unsecured tire is dangerous. If it bursts, it could be hurled into the air with explosive force resulting in serious personal injury or death. Never inflate a tire unless it is secured to the vehicle or a tire mounting machine.

- Check your tire pressures, including your spare tire, monthly and before long trips or carrying extra weight. Be sure to use an accurate pressure gauge.

- Check inflation pressure when the tires are “cold.” Tires are considered “cold” when the vehicle has been parked for three hours or more, or if the vehicle has been driven less than a mile (1.6 km) at moderate speed.
- Never release pressure from a hot tire in order to reach the recommended cold tire pressure. Normal driving causes tires to run hotter and inflation pressure to increase. If you reduce inflation pressure when your tires are hot, you may dangerously under-inflate your tires.
- If it is necessary to adjust inflation pressure when your tires are “hot,” set their pressure to 4 psi (28 kPa) above the recommended cold inflation pressure. Recheck the inflation pressure when the tires are cold.
- If your tires lose more than 2 psi (14 kPa) per month, the tire, the valve, or wheel may be damaged. Consult a qualified tire service professional for an inspection.
- Use valve caps to keep the valves clear of debris and to help guard against inflation pressure loss.

TIPS FOR SAFE LOADING

SAFETY WARNING

Driving your vehicle in an overloaded condition is dangerous. Overloading causes excessive tire heat build-up and internal structural damage. This can cause a tire failure - (even after the load is reduced) - which could lead to serious personal injury or death. Consult the vehicle tire information placard, certification label, and owner’s manual for the recommended vehicle load limits and loading recommendations.

- Always keep the vehicle manufacturer’s recommended inflation pressure in all your tires, including the spare. Check their pressure monthly and before long trips or carrying extra weight.
- Never exceed the maximum load rating stamped on the sidewall of your tire.
- Never exceed the gross vehicle weight rating (GVWR) or front/rear gross axle weight ratings (GAWR) of your vehicle.
- Consult your vehicle owner’s manual for load recommendations and special instructions (such as for trailer/towing and snow plow installations).

TIRE DAMAGE, INSPECTION AND SERVICE LIFE

Evaluation and maintenance of your tires is important to their performance and the service they provide to you. Over time and/or through use, the condition of a tire can change from exposure to everyday road conditions, the environment, damaging events such as punctures, and other external factors.

SAFETY WARNING

Driving on damaged tires is dangerous. A damaged tire can suddenly fail causing serious personal injury or death. Have your tires regularly inspected by a qualified tire service professional.

You should visually inspect your tires on a regular basis throughout their life, and you should have your tires periodically evaluated by a qualified tire service professional when your vehicle is serviced such as routine maintenance intervals, oil changes, and tire rotations. In particular, note the following tips for spotting tire damage:

- After striking anything unusual in the roadway, have a qualified tire service professional demount the tire and inspect it for damage. A damaged tire may not show any visible signs of harm. Yet, the tire may suddenly fail without warning, a day, a week, or even months later.
- Inspect your tires for cuts, cracks, splits or bruises in the tread and sidewall areas. Bumps or bulges may indicate a separation within the tire body. If you see damage or unusual condition, have your tire inspected by a qualified tire service professional. It may be necessary to have it removed from the wheel for a complete inspection.
- Inspect your tires for adequate tread depth. When the tire is worn to the built-in indicators at 2/32 inch (1.6 mm) or less tread groove depth, or the tire cord or fabric is exposed, the tire is dangerously worn and must be replaced immediately.
- Inspect your tires for uneven wear. Wear on one side of the tread or flat spots in the tread may indicate a problem with the tire or vehicle. Consult a qualified tire service professional.
- Inspect your wheels also. If you have a bent or cracked wheel, it must be replaced.
- Don't forget to check the spare tire.

Tire Service Life

Make sure your tires, including the spare, continue to be regularly inspected after 5 years of service to determine if they can continue in service. Regardless of the tire's condition or tread depth, it is recommended that tires more than 10 years old be taken out of service and replaced with new tires. **REMEMBER TO CHECK YOUR FULL-SIZE OR TEMPORARY SPARE, ALSO.** A spare tire over 10 years old may look like a new tire, but it should be replaced. See "Tire Manufacture Date," the next section in this manual.

The 10 year period after the date of production is not an indicator of actual service life for any individual tire. Some tires will need to be replaced before 10 years due to conditions such as punctures, impact damage, improper inflation, overloading, tread wear or other conditions involving use or misuse of the tire. If a tire is worn out or otherwise unserviceable from damage or conditions of use, it should

be replaced regardless of when it was produced or placed in service.

The vehicle manufacturer may consider vehicle performance characteristics when making tire replacement recommendations. Consult your vehicle owner's manual for any information regarding tire service life and replacement and follow the recommendations applicable to your vehicle.

TIRE MANUFACTURE DATE

The tire manufacture date is determined by examining the DOT tire identification number, also known as the DOT serial number or code, which can be found on at least one sidewall near the wheel. It may be necessary to look on both sides of the tire to find the entire serial code. For more information on DOT serial codes, see "Tire Sidewall Labeling" in this manual.

Tires Produced Since 2000: The last four (4) digits of the serial code identify the week and year of production. In the example below, the tire was produced in the 18th week of 2000. Another example, a tire with a serial code ending in "2406" would have been produced in the 24th week of 2006.

Tires Produced Prior to 2000: The last three (3) digits of the serial code identify the week and year of production. For example, a tire with a code ending in "329" would likely have been produced in the 32nd week of 1999, but possibly produced in 1989. If in doubt, consult a qualified tire service professional.

TIRE REPAIRS

SAFETY WARNING

Driving on an improperly repaired tire is dangerous. An improper repair can be unreliable or permit further damage to the tire. The tire may suddenly fail, causing serious personal injury or death. A complete inspection and repair of your tire in accordance with Rubber Manufacturers Association (RMA) procedures should be conducted by a qualified tire service professional.

While the comprehensive procedures and recommendations for tire repair are beyond the scope of this manual, a proper tire repair includes the following:

- **The tire is demounted from the wheel for a complete inspection, inside and out.** Some damage to the tire may only be evident on the interior of the tire.

☑ **The puncture injury is 1/4 inch (6 mm) or less and must be within the tread area as shown in the graphic.** This helps ensure long-term tire and repair durability.

☑ **A patch is applied to the interior of the tire and the puncture hole is filled with a suitable plug/stem filler.** This helps ensure that the interior of the tire is adequately sealed to prevent inflation pressure loss and prevents contamination of the steel belts and other plies from the elements (such as water) in the outside world.

Additional notes about tire repairs:

- Not all punctured or damaged tires can be properly repaired; consequently, some tires must be replaced. NEVER repair a tire with any of the following conditions:
  - Wear to the tire's built-in treadwear indicators or to 2/32 inch (1.6 mm) remaining tread depth in any area of the tread.
  - With a puncture larger than 1/4 inch (6 mm).
  - With a puncture or other damage outside the repairable tread area (as shown in the graphic).
  - With a pre-existing, improper repair.
- Any tire repair done without removing the tire from the wheel is improper. The tire must be demounted from the wheel and the interior inspected for damage that may not be evident on the exterior of the tire.
- Using only a plug/stem, or using only a patch, is not a safe or proper repair. A patch must be applied to the interior of the tire and the puncture hole must be filled with a suitable plug/stem filler to prevent inflation pressure loss and contamination of the steel belts and other plies.
- NEVER substitute a tube for a proper repair or to remedy an improper repair.
- Tubes, like tires, should only be repaired by a qualified tire service professional.
- Some vehicle manufacturers do not recommend using repaired tires. Consult your vehicle owner's manual or contact the vehicle manufacturer before operating a repaired tire on your vehicle.

ASK how your tire will be repaired. ALWAYS insist on a proper tire repair.

Emergency/Temporary Sealant or Filler Repairs: An emergency/temporary sealant or filler injected into the tire, such as by aerosol can or injection/squeeze-tube, is not a proper repair and voids the tire Limited Warranty. A tire injected with such sealant/filler must be replaced by a qualified tire service professional as soon as possible.

SAFETY WARNING

Tell the tire service professional if you have used an aerosol fixer to inflate/seal the tire. Aerosol fixers could contain a highly volatile gas. Always remove the valve core outdoors, away from sources of excessive heat, flame, or sparks and completely deflate the tire before removing it from the wheel.

Speed Rating: The tire's speed rating is void if the tire is repaired, retreaded, damaged, abused, or otherwise altered from its original condition. Thereafter, it should be treated as a non-speed rated tire. See "Tire Speed Ratings" in this manual.

Improper repair voids the tire Limited Warranty. See "Limited Warranty" in this manual.

RFT (Run-Flat Technology) Tires: In addition to the above, there are recommendations specific to the repair of RFT tires; see "RFT Tires with Run-Flat Technology" in this manual.

TIRE MOUNTING AND OTHER SERVICING

SAFETY WARNING

Removing and replacing tires on wheels can be dangerous. Attempting to mount tires with improper tools or procedures may result in a tire explosion causing serious personal injury or death. This is only a job for a qualified tire service professional. Never perform tire service procedures without proper training, tools, and equipment.

This manual is not intended to provide proper training or service procedures for tire mounting, demounting, balancing, rotation, or repair. Please leave these tasks to qualified tire service professionals. For your safety and that of others:

- Always stand well clear of any tire mounting operation. This is especially important when the service operator inflates the tire. If the tire has been improperly mounted, it may burst with explosive force causing serious personal injury or death.
- Tires must match the width and diameter requirements of the wheels. For example, 16 inch diameter tires must only be mounted to 16 inch diameter wheels. Radial tires must only be mounted to wheels approved for radial tires.
- Wheels must be free of cracks, dents, chips, and rust. Tires must be free of bead damage, cuts, and punctures.
- Never inflate a tire beyond 40 psi (275 kPa) to seat the beads. Be absolutely certain beads are fully seated before adjusting inflation pressure to the level recommended for vehicle operation.

- Never put flammable substances in tire/wheel assemblies at any time. Never put any flammable substance into a tire/wheel assembly and attempt to ignite to seat the beads.
- Always stand well away from the work area when tires are being spin balanced either on or off the vehicle.

HIGH PERFORMANCE, LOW ASPECT RATIO TIRES

Many new vehicles come equipped from the factory with high performance and/or low aspect ratio tires. Generally, these tires provide increased vehicle handling capability, but may also have numerous engineering performance trade-offs associated with their designs.

- Low aspect ratio tires, with reduced sidewall height, may be more susceptible to damage from potholes, road hazards, and other objects such as curbs. This is true for the wheels as well. Therefore, as with all other tires, it is important to drive with care and maintain proper inflation pressure and load conditions. See "Tire Inflation Pressure" and "Tire Damage, Inspection and Service Life" in this manual.
- Some sports cars and other vehicles with enhanced handling performance, including sedans and light trucks/SUVs, may be originally equipped with high performance tires that are more optimized for warmer weather use. Colder, winter weather traction may be reduced for these types of tires. Winter tires may be recommended by the vehicle manufacturer for colder weather application. See "Winter Tires," the next section in this manual.
- High performance tires may also wear more quickly, ride more firmly, and produce more noise during operation.

Consult your vehicle owner's manual and tire information placard, or a qualified tire service professional, for more information and specifics regarding these types of tires.

WINTER TIRES

SAFETY WARNING

Winter driving presents special challenges for vehicle mobility. The use of winter tires (including studs and chains)—while improving traction performance in snow and ice—requires special care with regard to acceleration, braking, cornering, and speed. It is important to drive with care, not only on snow and ice, but on dry and wet roads as well.

In winter driving conditions, vehicle control and safe operation under braking and cornering is especially dependent upon the rear tires. For this reason, winter tires are best applied to all wheel positions. Some vehicles have specific recommendations regarding winter tire use; consult your vehicle owner's manual and tire information placard.

• If winter tires are to be applied to the front axle of any vehicle, they must also be applied to the rear axle for safe operation. This applies to all passenger cars and light trucks, including front wheel drive, 4x4, and all-wheel-drive vehicles.
• If winter tires are to be applied to the rear axle of any vehicle, it is recommended that they also be installed on the front axle.
• It is generally acceptable to apply a tire with a lower speed rating than your original tires for use in winter weather conditions; however, speed should be reduced accordingly. All winter tires should be the same speed rating. See "Tire Speed Ratings" in this manual.
• Winter tires used in warm weather conditions may wear more rapidly.
• Studded winter tires follow the same recommendations as above; consult a qualified tire service professional for information regarding any seasonal restrictions.

HIGH SPEED DRIVING

SAFETY WARNING

Driving at high speed is dangerous and can cause an accident, resulting in serious personal injury or death.

• Regardless of the speed and handling capabilities of your car and its tires, a loss of vehicle control can result from exceeding the maximum speed allowed by law or warranted by traffic, weather, vehicle, or road conditions.
• High-speed driving should be left to trained professionals operating under controlled conditions.
• No tire, regardless of its design or speed rating, has unlimited capacity for speed, and a sudden tire failure can occur if its limits are exceeded. See "Tire Speed Ratings," the next section in this manual.

Refer to your vehicle owner's manual for any tire pressure recommendations for high speed driving.

TIRE SPEED RATINGS

A tire bearing a letter "speed rating" designation indicates the tire's speed capability according to standardized laboratory tests. This speed rating system is intended to permit comparison of the speed capabilities of different tires. When replacing your tires, consult your vehicle owner's manual and tire information placard for recommendations, if any, concerning the use of speed rated tires.

• To avoid reducing the speed capability of the vehicle, replace a speed rated tire only with another tire having at least the same speed rating. It is the "top speed" of the "slowest" tire on the vehicle which limits the vehicle's top speed without tire failure.

- The tire's speed rating is void if the tire is repaired, retreaded, damaged, abused, or otherwise altered from its original condition. Thereafter, it should be treated as a non-speed rated tire.
- Non-speed rated tires are usually for ordinary passenger car or light truck service and not for high speed driving.
- For winter tires used in cold weather conditions, it is generally acceptable to apply a tire with a lower speed rating than your original tires; however, speed should be reduced accordingly. All winter tires should be the same speed rating. Some vehicles have specific recommendations regarding winter tire use; consult your vehicle owner's manual and tire information placard. See "Winter Tires" in this manual.

These speed ratings are based on standardized laboratory tests under specific, controlled conditions. While these tests may relate to performance on the road, real-world driving is rarely identical to any test conditions. Your tire's actual speed capability may be less than its rated speed since it is affected by factors such as inflation pressure, load, tire condition (including damage), wear, vehicle condition (including alignment), driving conditions, and duration at which the speed is sustained. Use the following chart to compare the speed ratings of tires. Remember: regerdless of the tire's speed rating, drivers should obey speed limits and adjust their speed based on traffic, weather, vehicle and road conditions.

Speed Symbol	**Speed Category***	
	mph	**km/h**
M	81	130
Q	99	160
R	106	170
S	112	180
T	118	190
U	124	200
H	130	210
V	149	240
Z**	>149	>240
W	168	270
Y	186	300
(Y)***	>186	>300

The tire's speed rating designation appears on the tire sidewall with the tire size. Examples:

P275/40ZR17	max > 149 mph (240 km/h) ****
P275/40R17 93W	max = 168 mph (270 km/h)
P275/40ZR17 93W	max = 168 mph (270 km/h)
P275/40ZR17 93Y	max = 186 mph (300 km/h)
P275/40ZR17 93(Y)	max > 186 mph (300 km/h) ****

* In standardized laboratory tests that relate to highway speeds. Actual tire speed and performance capability

depend on factors such as inflation pressure, load, tire condition, wear, and driving conditions.

** Any tire having a maximum speed capability above 149 mph (240 km/h) may, at the tire manufacturer's discretion, include a "Z" in the size designation (i.e. P275/40ZR17).

*** For tires having a maximum speed capability above 186 mph (300 km/h), a "Z" must appear in the size designation and a "Y" marked in brackets (as shown) in the service description.

**** Consult the tire manufacturer for maximum speed capability.

TIRE SPINNING

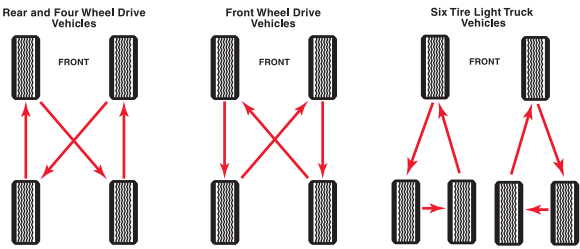
SAFETY WARNING

Spinning a tire to extract a vehicle stuck in mud, ice, snow, or wet grass can be dangerous. A tire spinning at a speedometer reading above 35 mph (55 km/h) can in a matter of seconds reach a rotation speed capable of disintegrating a tire with explosive force. Under some conditions, a tire may be spinning at a speed twice that shown on the speedometer. This could cause serious personal injury or death to a bystander or passenger. Never spin a tire above a speedometer reading of 35 mph (55 km/h).

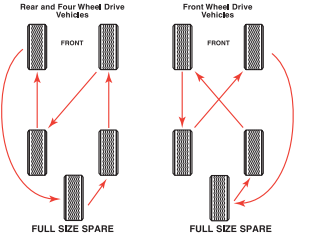
RADIAL TIRE ROTATION

The purpose of tire rotation is to minimize irregular or uneven wear caused by maintaining a tire in one rotation direction and one position over an extended period. Rotate tires as recommended by the vehicle manufacturer or every 5,000 miles (8,000 km). Individual tire pressures must be checked after rotation and adjusted to the vehicle manufacturer's recommendation for the tire's new location on the vehicle. Vehicle alignment should be checked if irregular wear is evident.

For vehicles with a "temporary use" spare tire, follow the vehicle manufacturer's recommended pattern for rotation, or, if not provided, the following may be used:



If your spare is the same size, load rating, and type of tire as your road tires, it should be included in the tire rotation process. For vehicles with a "full-size" spare, the following rotation patterns may be used:



Note:

- Never include a "temporary use" spare tire in the rotation.
- Tires with directional tread patterns must be rotated so the direction of revolution does not change; this may require demounting/mounting the tires.
- Special attention should be given if your vehicle is equipped with a Tire Pressure Monitoring System (TPMS). Rotation of your tires may affect the system; consult your vehicle owner's manual or a qualified tire service professional.
- Some vehicles may have different size tires/wheels on front and rear which would restrict rotation. Always check and follow the vehicle manufacturer's rotation recommendation.
- To use a full-size spare in the rotation pattern on vehicles with dual rear wheels, consult your vehicle owner's manual for the recommended procedures or consult the vehicle manufacturer.

TIRE REPLACEMENT AND TIRE MIXING

SAFETY WARNING

Driving your vehicle with an improper mix of tires is dangerous. Your vehicle's handling characteristics may be seriously affected. You could have an accident resulting in serious personal injury or death. Consult your vehicle owner's manual, tire information placard, and a qualified tire service professional for proper tire replacement.

Unless otherwise specified by the vehicle manufacturer, it is recommended that all road tires be the same size, type, and speed rating. Never mix different size tires on an axle, except for temporary use of a spare (see "Your Spare Tire," the next section in this manual).

When it is necessary to replace one or more tires, consider that applying new tires in pairs on an axle, or to all wheel positions, helps to optimize vehicle performance and avoid malfunction of mechanical or electronic vehicle systems (i.e. drive-train/transmission, anti-lock brakes, traction control).

Replacing Fewer Than Four Tires: Whether your vehicle is front-, rear-, or all-wheel drive, if your rear tires lose traction because of hydroplaning on a wet road, an

oversteer skidding condition may result and lead to loss of control, particularly in a turn. Generally, new tires provide increased resistance to hydroplaning due to their full tread depth. With the new tires on the rear, the oversteer skidding condition may be more easily avoided. Therefore, if replacing only one or two tires at a time:

- Two new tires should be placed on the rear axle.
- One new tire should be paired with another tire from the vehicle with the deepest tread depth, and then both should be placed on the rear axle.

Winter Tires: See "Winter Tires" in this manual.

Speed Rating: See "Tire Speed Ratings" in this manual.

Additional or alternate recommendations may apply for some vehicles. Always refer to and follow the vehicle manufacturer's tire replacement and tire application recommendations; consult your vehicle owner's manual and tire information placard.

YOUR SPARE TIRE

Consult your vehicle owner's manual for proper application of your spare tire. Your car may be equipped with a "temporary use" spare tire; this spare may differ in size and construction from the other tires on your vehicle.

SAFETY WARNING

Check inflation pressure before use. Failure to have proper inflation pressure when using your spare tire can result in serious personal injury or death. See "Tire Inflation Pressure" in this manual.

SAFETY WARNING

Mounting a "temporary use" tire on a wheel which is not specifically designed for it, or placing another type tire on a wheel designated for temporary use can be dangerous. Your vehicle's handling characteristics can be seriously affected. You could have an accident resulting in serious personal injury or death. Consult your vehicle owner's manual for proper application of your "temporary use" spare tire.

The spare tire in your vehicle is intended to be used as a spare when needed. The spare tire carrier is not intended to be used for long term storage, except for "temporary use" tires. If your spare is the same size, load rating, and type of tire as your road tires, it should be included in the tire rotation process; see "Radial Tire Rotation" in this manual.

The spare should be included in regular tire inspections and inflation pressure checks. **In addition, your spare should be replaced 10 years after date of manufacture, regardless of condition or tread depth**. For more information, see "Tire Damage, Inspection and Service Life" in this manual.

TIRE STORAGE

Tires should be stored indoors in a cool, dry place. Water should not be allowed to collect inside them. Tires should be placed away from electric generators/motors and sources of heat such as hot pipes. Storage surfaces should be clean and free of grease, gasoline or other substances which can deteriorate the rubber.

SAFETY WARNING

Improper storage can damage your tires in ways that may not be visible and can lead to a failure resulting in serious personal injury or death.

The spare tire in your vehicle is intended to be used as a spare when needed. The spare tire carrier is not intended to be used for long term storage, except for "temporary use" tires. For more information, see "Your Spare Tire" and "Radial Tire Rotation" in this manual.

TIRE REGISTRATION

Registration of your tires is an important safety precaution since it enables the manufacturer to notify you in the event of a recall. When you purchase replacement tires, the retailer will provide a registration card on which the tire identification numbers have been recorded; fill in your name and address on the card and mail it promptly. Some retailers may submit the registration for you. You do not need to register tires which come as original equipment on new vehicles—the vehicle and tire manufacturers handle that for you.

TIRES with RUN-FLAT TECHNOLOGY

If your vehicle is equipped with Firestone brand RFT tires, this chapter presents specific maintenance and safety issues associated with these tires that are in addition to those covered elsewhere in this manual.

What is RFT? Run-Flat Technology tires are extraordinary tires that utilize specially designed components to temporarily support your vehicle in the event of inflation pressure loss, such as from a puncture. This gives you the ability to drive to a convenient and safe location to change your tire (if equipped with a spare) or have it inspected for possible repair or replacement.

Naturally, certain run-flat and low pressure operating limitations apply, which vary according to the specific self-supporting tire design. Like all tires, during normal operation, they must be properly inflated and maintained. Regardless of the design or quality, no tire is indestructible.

RFT—How to Identify: irestone brand tires are marked on the sidewalls, near the wheel, with the RFT logo (shown above).

RFT INFLATION PRESSURE

Like other tires, RFT tires need proper inflation pressure maintenance for safe operation and to achieve the maximum tire life and performance. Check inflation pressures monthly and before long trips or carrying extra weight. Use an accurate tire gauge and check pressures when the tires are cold. Follow the vehicle manufacturer's recommendation for inflation pressure settings as indicated on the vehicle tire information placard and/or in the vehicle owner's manual. Do not forget the spare, if applicable. See "Tire Inflation Pressure" in this manual.

TIRE PRESSURE MONITORING SYSTEM (TPMS)

A functioning tire pressure monitoring system (TPMS) must be used with your RFT tires. Because these tires ride so well even without inflation pressure, the TPMS may be necessary to alert you of an inflation pressure loss condition. When alerted, follow the instructions in your vehicle owner's manual and see "Run-Flat or Low Tire Pressure Operation," the next section in this manual.

The vehicle or TPMS manufacturer may advise checking the TPMS regularly to confirm it is in working order. In addition, a new pressure sensor, certain components, or

reprogramming may be necessary when a tire is serviced. Consult your vehicle owner's manual, vehicle manufacturer, or a Certified Firestone Run-Flat Retailer for questions regarding TPMS operation and service.

RUN-FLAT or LOW TIRE PRESSURE OPERATION

SAFETY WARNING

Serious personal injury or death may result from a tire failure or accident due to improper run-flat or low tire pressure operation. Read and follow the instructions below, and the other maintenance and safety recommendations elsewhere in this manual.

General Instructions

The Tire Pressure Monitoring System (TPMS) required in your vehicle may have different methods of alerting you when your tire has lost inflation pressure. Consult your vehicle owner's manual for the details of your TPMS. **Once the TPMS has indicated that a tire has reduced inflation pressure, the run-flat mode of operation has commenced.** During this phase of operation, please follow these instructions:

- **Reduce speed as much as safely and reasonably possible; do not exceed 50 mph (80 km/h).** The greater the speed, the less distance the tire can travel.
- **Avoid abrupt or aggressive acceleration, braking, or cornering maneuvers as much as safely and reasonably possible.** Pot holes and other road hazards should be avoided. Careful driving limits potential damage to the tire, wheel, and vehicle.
- **Proceed to a safe and convenient location for tire service as soon as possible.** Take note of your odometer; your operation distance is limited. See "Distance—How Far You Can Drive," the next section in this manual.
- **If an unusual vibration or vehicle handling difficulty arises, stop driving as soon as safely and reasonably possible.** The tire may be about to suddenly fail. Release the accelerator and gradually reduce speed. The tire must be replaced before proceeding.
- **If towing a trailer, stop driving as soon as safely and reasonably possible.** In this condition, it is potentially dangerous to operate a vehicle/trailer combination. If possible, disconnect the trailer and proceed as noted above. Do not continue to tow any trailer until proper tire service or replacement has been performed.
- **Do not touch a tire recently run-low or run-flat (it may be very hot).** Allow the tire to cool before handling.

DISTANCE—HOW FAR YOU CAN DRIVE

RFT tires are capable of operating up to the distance of 50 miles (80km) at a maximum speed of 50 mph (80 km/h) in run-flat or low pressure operation. However, the distance capability may be less (or more) depending upon the actual vehicle application and specific operating conditions.

Factors affecting run-flat or low tire pressure operating distance include vehicle speed, load, and maneuvering; the amount of inflation pressure loss; the extent of any tire damage; and ambient temperature. To maximize the distance capability in a run-flat or low pressure condition:

- Reduce vehicle speed as much as safely and reasonably possible. Do not exceed 50 mph (80 km/h).
- Avoid abrupt or aggressive acceleration, braking, or cornering maneuvers as much as safely and reasonably possible. Avoid pot holes and other road hazards.

Higher vehicle loads (such as with more passengers or cargo) and higher ambient temperatures decrease the distance capability of an RFT tire in run-flat or low pressure operation.

Note:
- If the sidewall of the RFT tire specifies a run-flat or low pressure distance limitation, do not exceed the specified distance.
- The distance capability of the vehicle is limited to the distance capability of the specific RFT tire that is operating in a run-flat or low pressure condition.
- For original equipment specification RTF tires applied to vehicles originally equipped with these tires, see the vehicle owner's manual for distance limitations during run-flat or low pressure operation.

If in doubt about the distance capability of an RFT tire, do not exceed 50 miles (80 km) in run-low or low pressure operation. Seek tire service as soon as possible to minimize tire damage.

SPECIAL SERVICE and REPAIR ISSUES

Authorized RFT Service Centers
Because of the advanced technology and design of RFT tires and the required tire pressure monitoring systems (TPMS), only qualified tire service professionals with the proper equipment and training should service RFT tires. For instance, the use of tire mounting equipment that is unsuitable for an RFT tire may damage the tire beyond repair. Therefore, it is recommended to go to an authorized Bridgestone or Firestone brand tire retailer for service and replacement.

Inspection after Run-Flat or Low Pressure Operation
Following run-flat or low tire pressure operation, or in the event of any other tire damage or unusual condition, it is very important to obtain a proper and complete tire evalua¬tion as soon as possible.

Rotation
Follow the vehicle manufacturer's recommendations, or rotate every 5,000 miles (8,000 km) per the recommenda¬tions in this manual (see "Radial Tire Rotation"). In some cases, TPMS devices require reprogramming with each tire rotation.

RFT Tire Replacement
Do not replace or mix RFT tires with conventional tires, unless on an emergency/temporary basis. Conventional tires do not have run-flat capability and the handling char¬acteristics of the vehicle with these tires may be different. If a conventional tire is used on an emergency/temporary basis, verify that its size, load capacity, inflation pressure, and speed rating specifications meet the requirements of the vehicle. Replace any conventional tire with the proper RFT tire as soon as possible.

RFT Tire Damage and Repair
No tire, regardless of its design or quality is indestructible. RFT tires can be ultimately rendered unusable due to a puncture or other road hazard as well as from improper low tire pressure operation. Some punctures may be repaired under certain restrictions and prescribed procedures. An improper repair is unsafe and will void the Limited Warranty.

When driven flat or with low pressure, factors affecting repara¬bility include vehicle speed, load, and maneuvering; the amount of inflation pressure loss; and ambient temperature. In any situation, the extent and location of direct damage from a puncturing object or other road hazard are also critical factors.

RFT tires are not repairable in any of the following situations:

- If the tire was operated with inflation pressure less than 15 psi (100 kPa).
- Abrasion or other damage is present on the exterior tread, sidewall or bead areas.
- Abrasion, wrinkling, or separation is present on the tire interior.
- Any condition or damage is present that disqualifies repair of a conventional tire.

A qualified tire service professional should fully inspect your tire, inside and out, to determine if the tire can be repaired. Tire damage is not always visible from the outside and the tire must be removed from the wheel for a complete inspection. For more information, see "Tire Repairs" in this manual.

Note: Some vehicle manufacturers do not recommend using repaired tires. Such recommendations apply to RFT tires. Use of RFT tires deemed non-reparable may result in damage to vehicle, injury, or death. Consult your vehicle owner's manual or contact the vehicle manufacturer before operating a repaired tire on your vehicle.

REFERENCE INFORMATION

TIRE SIDEWALL LABELING

A lot can be learned by reading the tire's sidewall. The following figures show typical information on the sidewall of passenger (Figure 3) and light truck tires (Figure 4):

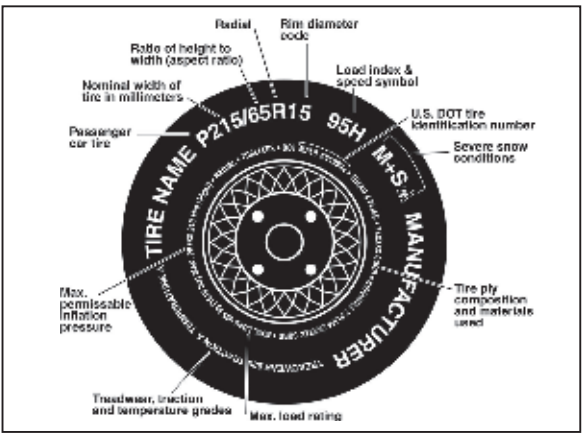


Figure 3: Typical Passenger Tire Markings

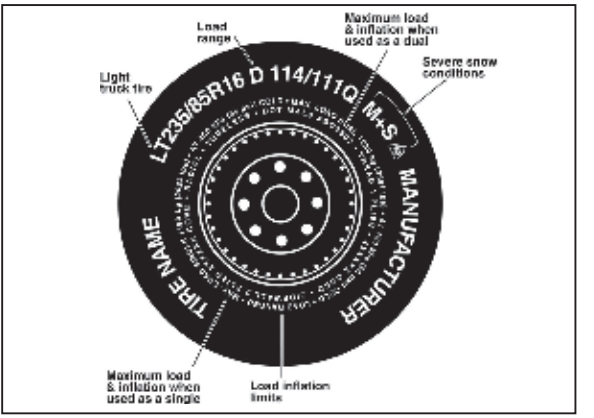
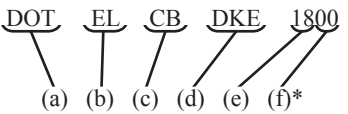


Figure 4: Typical Light Truck Tire Markings

Tire Size, Load Range, Load Index, and Speed Symbol:

Examples:	Tire Size	Load Index	Speed Symbol	Load Range
Figure 3	P215/65R15	95	H	--
Figure 4	LT235/85R16	114/111	Q	D

DOT Symbol and Tire Identification Number: The "DOT" symbol constitutes a certification that the tire conforms to applicable U.S. Department of Transportation motor vehicle safety standards (for tires). Following the "DOT" symbol is the tire identification number, also known as the DOT serial number or code. For example:



(a) DOT Symbol
(b) Plant of Manufacture Code
(c) Tire Size Code
(d) Tire Manufacturer's Code
(e) Week of Production (01-53)
(f) Year of Production (last two digits of year)*

* For tires produced from 2000-on. In the example above, the tire was produced in the 18th week of 2000. For tires produced prior to 2000, there is one digit in group (f) which identifies the last digit of the year of production, i.e. "329" would likely signify the 32nd week of 1999, but could possibly signify the 32nd week of 1989. If in doubt, consult a qualified tire service professional.

The DOT symbol and tire identification number can be found on at least one sidewall near the wheel. The other sidewall may have a partial serial code that excludes (e) and (f) above.

Maximum Load and Inflation: The maximum load and maximum inflation pressure is marked on each sidewall in metric and English units. For example:

MAX LOAD 685 kg (1510 lbs) AT 240 kPa (35 psi) MAX PRESS

Note: The load and inflation values marked on the tire sidewall are maximum permissible values for the tire only. Never assume that these values are the actual recommended load capacity or tire pressure values for your vehicle. See "Tire Inflation Pressure," "Tips for Safe Tire Inflation," and "Tips for Safe Loading" in this manual.

Ply Composition and Materials: The actual number of plies in the sidewall and tread area and the generic name(s)

of their cord material(s) are marked on at least one sidewall. For example:

TREAD 2 PLY POLYESTER + 2 STEEL
SIDEWALL 2 PLY POLYESTER

Radial: Radial ply tires will have the word "radial" on at least one sidewall. An "R" in the tire size designation also indicates radial ply construction.

Tubeless or Tube Type: Tires are marked as either "tubeless" or "tube type," whichever is applicable, on at least one sidewall.

UNIFORM TIRE QUALITY GRADING

The Uniform Tire Quality Grading ("UTQG") standards are intended to assist you in making an informed choice in your purchase of passenger car tires by providing information indicating relative performance of these tires in the areas of tread wear, wet braking traction (straight-ahead), and temperature resistance. All passenger car tires must conform to federal safety requirements in addition to these grades.

Treadwear
The treadwear grade is a comparative rating based on the wear rate of the tire when tested under controlled conditions on a specified government test course. For example, a tire graded 150 would wear one and one half (1½) times as well on the government course as a tire graded 100. The relative performance of tires depends upon the actual conditions of their use, however, and may depart significantly from the norm due to variation in driving habits, service practices and differences in road characteristics and climate.

Traction
The traction grades, from highest to lowest, are AA, A, B, and C. Those grades represent the tire's ability to stop on wet pavement as measured under controlled conditions on specified government test surfaces of asphalt and concrete. **Warning:** The traction grade assigned to a tire is based on straight-ahead braking traction tests, and does not include acceleration, cornering, hydroplaning, or peak traction characteristics.

Temperature
The temperature grades are A (the highest), B, and C, representing the tire's resistance to the generation of heat and its ability to dissipate heat when tested under controlled conditions on a specified indoor laboratory test wheel. Sustained high temperature can cause the material of the tire to degenerate and reduce tire life, and excessive temperature can lead to sudden tire failure. The grade C corresponds to a level of performance which all passenger car tires must meet under the Federal Motor Vehicle Safety

Standard No.109. Grades B and A represent higher levels of performance on the laboratory test wheel than the minimum required by law. **Warning:** The temperature grade is established for a tire that is properly inflated and not overloaded. Excessive speed, underinflation, or excessive loading, either separately or in combination, can cause heat buildup and a possible tire failure.