

1. Check tire pressures and adjust at least once a month.

According to studies conducted by the [National Highway Traffic Safety Administration](#) (NHTSA) on tire-related crashes, the leading cause of tire failure is underinflation.

Underinflation can have many causes, including a gradual loss of pressure through membranes in the tire itself. It is typical for pressure to drop approximately 1 psi per month and 1 psi for each 8-degree loss in ambient temperature.

Underinflation has immediate effects on vehicle handling (as well as fuel consumption), but its potential impact on overall safety and tire life are even greater. It results in premature and uneven tread wear on the outer edges. Underinflation also increases stress on the carcass itself, through flexing and overheating, which can lead to structural failures such as tread separation.

That's why it is imperative to check and adjust tire pressure at least once a month and before every long trip (over 250 miles). Recommended pressures are printed on a label located on the driver's doorframe or in the glove box.

2. Inspect tires regularly for abnormal wear or damage.

To ensure maximum tire life and safety, give your tires a visual inspection at least once a month and before long trips. This is easily done at the same time you check pressures.

Look for:

- Excessive or uneven tread wear, which may indicate improper inflation or steering and suspension misalignment;
- Cracks or bulges on the sidewalls or tread;
- Chunking of the tread or any indication of tread separation from the

carcass;

Signs of puncture, or nails, screws, glass, pieces of stone or any foreign object imbedded in the tire.

If you detect any of these conditions, take the vehicle in for further diagnosis immediately. In most cases, punctures can be repaired if their size is not excessive.

In general, external "plugs" are not recommended. Repairs should be made from the inside, and a complete inspection made while the tire is off the rim. Sealing compounds and other emergency aids should be treated only as a means of moving the vehicle to a safe location for repair.

If abnormal tire pressure loss occurs, check the valve stems for leakage, as well as the tire itself.

3. Rotate tires every 6,000 miles or according to owner's manual.

Tire rotation is essential to achieve even tread wear and maximum tread life. On [front-wheel-drive](#) cars, for example, most of the braking, steering and driving forces are carried by the front tires, which inevitably wear much faster.

A "cross-rotation pattern"—that is, moving the left-front tire to the right-rear axle, the right-front tire to the left-rear axle, etc.—can best balance tread wear and maximize tire life. That sequence can be performed on any vehicle equipped with four non-unidirectional tires. Designated by an arrow on the sidewall, unidirectional tires must be rotated only front to rear and rear to front, on the same side of the vehicle, so their direction of revolution does not change.

All-wheel-drive and four-wheel-drive vehicles are best suited to a lateral rotation—left to right and right to left—at the same end of the vehicle.

4. Maintain tires in proper balance.

Out-of-balance tires can not only cause uneven tread wear and an uncomfortable ride but also excessive wear on the suspension and other components. An out-of-balance tire can be detected by a severe thumping, usually most pronounced at highway speeds.

If such a condition occurs, have your tires dynamically balanced as soon as possible. An experienced technician can usually determine which tire is out-of-balance by driving the car.

Tire balancing involves placing weights in appropriate places on the bead or inner circumference of the wheel. Tires should always be balanced when first installed, and whenever they are remounted.

5. Maintain steering and suspension in proper alignment.

Misalignment of the steering and suspension, either front or rear, can not only adversely affect the steering feel and stability of a vehicle, but also cause rapid and uneven tire wear. If not corrected, this misalignment can ruin a tire in a short time and distance.

If you feel the steering "pulling" in one direction or another when traveling straight ahead on a flat road with no crosswind, or if you notice uneven wear on the tires, particularly front tires, you should have the alignment checked and adjusted as soon as possible.

Alignment should also be checked after a vehicle has been involved in a collision or if it is used continuously on rough roads, particularly those with large potholes.

6. Never overload a tire.

Overloading is the second leading cause of tire failure, next to

underinflation.

All tires are designed to operate within a maximum load range designated by a code on the tire sidewall. Exceeding this can result in both excessive wear and reduced tire life due to structural damage, including the potential for sudden failure.

In most vehicles, the maximum passenger and cargo load for which the vehicle and tires are designed is printed on the same label that designates recommended tire pressures. That load, particularly in the case of trucks and SUVs, *may be substantially less than the vehicle is physically able to contain*. It is critical that the maximum allowable load never be exceeded.

When determining the actual load in your vehicle, don't overlook the tongue-weight of a trailer if you are trailer towing, since it also acts directly on the vehicle's tires.

7. Avoid overheating tires.

Heat, like load, is the enemy of tire life. The higher the heat it is subjected to, the shorter the tire's life—in terms of both tread wear and structural resistance.

High speeds²__\$!@%#!#__2_bing_11pxw.gif", high loads, underinflation, coarse pavement or concrete, and aggressive driving, including high cornering loads and hard braking, all contribute to high tire temperatures. Combined with high ambient temperatures and continuous use, they can create extreme circumstances and cause sudden tire failure.

To maximize tire life and safety, therefore, it is important to minimize the simultaneous occurrence of such conditions. Be particularly vigilant at high temperatures and adjust your driving style to consider its effect on tire life and performance.

8. Replace tires when required.

Your vehicle's tires should be replaced if:

Any portion of the tread is worn to the "wear indicator bars"—lateral bars molded into the tire grooves at about 20 percent of their new tread depth—or to a depth, as measured in a groove, of 1/16th inch or less. Tread wear is severely uneven (in which case have the wheel alignment checked) or the center is worn much more than the edges (be more vigilant about tire pressures).

The tire sidewalls are severely cracked or there are bulges anywhere on the tire.

There is any indication of tread separation from the tire carcass.

The tire has been punctured and cannot be satisfactorily repaired.

There are other reasons you may need new tires, as well. If you have been running on winter tires, then a change is in order in the spring. Using snow tires on dry roads accelerates their wear significantly and diminishes both traction and handling ability.

9. Install tires in matched pairs or complete sets.

Installing different tires on the left and right sides can significantly upset the handling balance of a vehicle—not to mention its ABS operation. For that reason, it is imperative that tires be installed in front or rear pairs, or complete sets.

Those pairs should be the same construction, size, brand and type, with approximately the same tread wear. In most cases, if you have to buy one new tire, you should buy a pair. It is essential that side-to-side pairs be the same and highly desirable that front and rear pairs also be matched, except in cases such as high-performance cars with larger tires in the rear.

If you replace only two, the new tires should generally go on the rear wheels, regardless of whether the vehicle is FWD, RWD, or AWD. It is

important to maintain maximum traction at the rear wheels to ensure stability. Putting new tires on the front and nearly worn-out tires on the rear wheels of any vehicle is a recipe for instability. It is thus very important to avoid dramatic differences in tread wear, front-to-rear.

Under no circumstances should you have tires of different construction (radial and bias ply) or different classification (all-season and winter) on opposite ends or sides, since handling can be adversely affected.

10. Select the right tires for your vehicle and driving environment.

Recent improvements in "all-season" tires have substantially advanced the concept of one-tire-for-all-needs. On the other hand, more specialized tires than ever are now available for high performance, rain, snow, ice, off-road and touring. Some are even uni-directional, "run-flat" and even "green."

Most drivers are happy just to know they have "all-season" tires, and that is the way most new vehicles are equipped. These are a benign compromise, sacrificing exceptional capability in any one area of performance for acceptable capability in all.

Within that premise, however, there are huge variations in actual performance. Unfortunately, factors that improve one tire characteristic tend to diminish another. For example:

- A hard tread compound may enhance tread life and fuel economy but detract from both wet and dry traction;

- Short, stiff sidewall construction may enhance cornering power and directional stability but detract from ride quality;

- A wide tread with minimal grooving may enhance dry grip but detract from traction in wet and snowy conditions;

- An aggressive, open tread may enhance snow traction but aggravate tire noise and sacrifice tread life on pavement.

In addition to dry asphalt, tires may be expected to function on mud, snow,

ice, sand or gravel, in temperatures from above 140°F to below -40°F. You get some idea of the multiple tradeoffs designers have to make.

Just consider that exceptional virtues are probably achieved at the expense of others. Determine what your primary needs are, and narrow your choices accordingly. Then, if possible, drive a similar vehicle equipped with the tires you are considering.

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