



Tire 101 was provided by TrailerTireSafety.Com and authored by Tom Wilson.

TIRES 101

TRAILER TIRE CONSTRUCTION

Trailer-Tire Safety - Introduction

To paraphrase Thomas Edison, most people don't recognize opportunity because it comes calling wearing overalls. When it comes to getting the most from trailer tires, the best chance to enjoy good tire life and avoid blowouts does come mainly in work clothes. Excitement or romance have little to do with checking tire pressures or studying load ratings, but such effort pays major performance and safety dividends.

In fact, considering your trailer as a vehicle, there is no other area where so little time and effort can pay off so handsomely. There's also no other area so commonly overlooked. Because tire underinflation can lead to a rather large inconvenience at best and a tragedy at worst, we're here to discuss trailer tires and how you relate to them. While there is plenty to know about the tires you tow on, in the end it really boils down to buying the right tires and keeping them properly inflated.



Trailer-Tire Construction

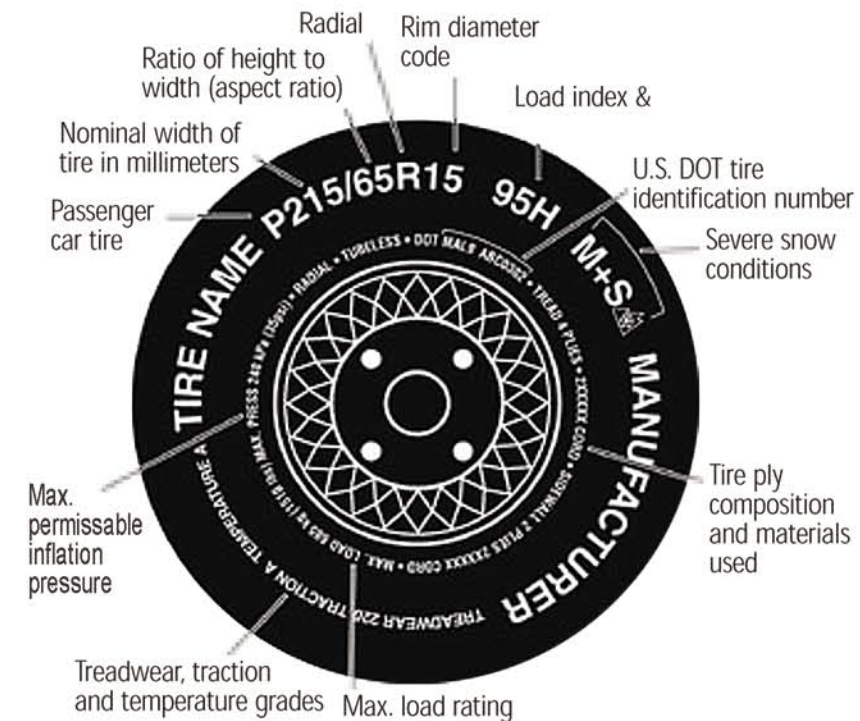
Commonly encountered tires are P (passenger car), LT (light truck) and ST (special trailer). While each tire series shares basic construction methods, such as bias or radial belts, a bead, tread plies and so on, the details vary meaningfully among the three. Considerations in designing tires used on trailers include the need to carry heavy loads, the relative lack of cornering loads, long duty cycles (the tires can be expected to sit for a year, then rotate for days on end during long trips). Furthermore, because the design of most trailer suspensions date back many decades, ST tires are designed for as soft a ride as possible so they don't transmit too much shock to the trailer and its contents.

Trailer-tire sidewall stiffness is a compromise between P and LT designs. The desire for stiffer sidewalls is still occasionally cited as the reason for choosing a bias-belted trailer tire. While passenger-car tires are nearly all radials these days, ST tires are still available in bias-belted construction. Radial trailer tires are superior in all respects to bias-belted tires except in sidewall stiffness. Reduced tire heat, lower rolling resistance, and softer ride are among the benefits of radials, not to mention extended wear. On the road, ST tires share some characteristics of passenger-car tires, but are closer to the design of light-truck tires. Trailer tires typically employ heavier steel or polyester cords and somewhat lighter sidewall construction than light-truck tires, and trailer tires typically run lower air pressures than their truck counterparts. This gives ST tires good load-carrying capacity, but with the desired softer ride, ST tires also have the advantage of rubber compounds that are specifically designed to resist deterioration from the elements, including sunlight and ozone, during extended storage.

TIRE INFLATION & TOOLS

Tire Inflation

A tire's ability to carry weight and its heat-building characteristics are directly related to inflation pressure, and maintaining it is one of the most important safety procedures on any RV owner's checklist. The higher the



pressure, the more weight the tire can support, up to, but not exceeding, its maximum cold-inflation pressure listed on the tire sidewall; the only exception is light-truck tires, which may be inflated as much as 10 psi over the cold-inflation pressure listed on the sidewall. Allow inflation pressure to drop, and the tire can become dangerously overloaded, resulting in excessive heat buildup and possibly resulting in a blowout. Even a short period of significant underinflation can cause damage that is not immediately evident, but which can result in destruction of the tire somewhere down the road.

Using the correct air pressure for the load also means a cooler-running, longer-lasting trailer tire. Proper inflation assures best fuel-and-tire mileage, not to mention overall handling. In fact, the Rubber Manufacturers Association says that any tire run at less than 80 percent of the inflation pressure required for a given load should be inspected for damage.

Tires that are not loaded to their maximums do not require maximum air pressure, and load-inflation tables provide the values that can be used to set air pressure for vehicles whose tire loads may be considerably less than maximum—rear tires on lightly loaded pickup trucks, for example. However, trailer weight does not fluctuate significantly with variances in fresh and waste

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water and supplies, and trailer owners should always inflate to the maximum pressure listed on the tire sidewall. The inflation figures are for cold tires; if you check pressure after the tire has been driven and thus warmed, you'll find it higher. This pressure rise is normal and accounted for in the maximum cold-pressure rating.

Inflation Tools

Adjusting tire pressure can take a few minutes, but it isn't difficult. Having a small compressor at home is a help because the work can be done at your leisure, when the tires are cold. If you must move the trailer to a source of compressed air, the strictest definition of a cold tire is one that has traveled a mile or less, or has cooled for three to four hours. Ambient temperature is also a consideration when setting tire pressures. A 10-degree rise in ambient temperature equates to a 1 psi change in tire pressure. Thus, if you set your tire pressures on a cool 58-degree F spring day, they will magically rise 2 psi the following day should a weather front come through and pop the temperature up to 78 F. Dropping temperature lowers tire pressure the same 1 psi per 10 degrees.

A very real variable is sunlight. Tires in the shade versus those sitting in the sun can have definite pressure differences. Testing by a large tire retailer has shown a 3 psi rise in tires left in the sun all day versus those in the shade. This applies to shade versus sun sides of the trailer, moving the trailer from a cool building into the warm sun and so on. Clearly, setting pressures even in morning light and temperatures simplifies the job.

An accurate pressure gauge is mandatory. Service station gauges found on the end of air hoses are often inaccurate; the common pencil-type gauge is a better choice. Better yet is a round-dial gauge with a short length of hose. Coupled with its large, accurate and easy-to-read dials, it makes measuring

pressures much easier. A selection of air chucks may also prove useful, depending on the style of valve stems on your wheels. A visit to a local auto-supply store should net you the necessary air chuck if the common acorn head won't work.

Because ambient temperature affects tire pressure and tires naturally leak a little air—1 to 2 psi a month is considered normal—it's important to check tire pressures once a month. Weekly pressure checks are advisable during trips, along with visual inspection every day.

Tire Size

In theory, tires installed by trailer manufacturers should be capable of carrying at least the maximum load the trailer is rated to carry (its gross vehicle weight rating, or gwvr). If you suspect that your tires are overloaded—indicated by tire failures or improper wear (which also may be caused by improper suspension alignment or a bent axle)—and have decided to upgrade with higher-rated tires, you'll need to know how much weight your tires are carrying in order to select tires with appropriate maximum load capacity, and this requires a trip to a public scale. Weighing the trailer is required to see if the manufacturer has made the right choice, or if your collection of antique books has pushed weight beyond what the manufacturer had intended. If so, selection of larger tires may seem apparent, but the higher-capacity tires should not lead to overloading of wheels (check ratings on inside of wheel rims) or axles (ratings for which are posted on identification stickers on trailer exteriors, usually toward the front). If an overload potential exists, you're better off reducing weight in the trailer so you

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can retain the original tire size/load rating. In a tire-size change, wheel suitability must be checked, and clearance in wheel housings must be adequate. Hitch adjustment may be necessary if the replacement tire is larger in diameter than the original.

All tires should be the same size. Unmatched tire sizes guarantee uneven tire loading, which may mean at least one overloaded tire. The trailer's dynamics and stability can be adversely affected by mismatched tires as well. Likewise, mixing bias-ply with radial-ply, for example, may lead to handling problems. Of course, there are contingencies where the only spare may be a mismatch. If at all possible, wait for the proper replacement tire to be brought to the trailer. Failing that, use a mismatched spare like the mini-spare in a car. Limit speed to 35 mph or less, and keep the mileage as low as possible.

In most cases, replacement tires can be chosen based on the load rating of the original tire (listed on the sidewall) if it provided good service and if weight readings indicate that overload is not a factor. If you suspect that your tires are overloaded—indicated by tire failures or improper wear (which

also may be caused by improper suspension alignment or a bent axle)—and have decided to upgrade with higher-rated tires, you'll need to know how much weight your tires are carrying in order to select tires with appropriate maximum load capacity, and this requires a trip to a public scale. It will not only reveal any possible overload, but weight bias to one side can be measured. Weigh your fully loaded trailer axle-by-axle, and if possible, side-to-side. This is easily done on truck scales by simply rolling onto the platform one axle at a time and then doing a little subtraction from the total weight. Make sure the aprons of the scale are level with the scale. Side-to-side measurements are possible when there is sufficient room on the side of the scales to run one side of the truck and trailer on the scale at a time. If you're lucky, you may encounter a segmented platform scale, where the scale is divided to allow axle measurements at the same time. Going in the other direction, a single-axle scale can only measure one axle at a time, but a little addition can furnish any combination of axle or total weights you'd like to see.

If it turns out that the trailer is overloaded, you can face the music and remove some weight, or choose to increase tire capacity while taking care not to overload wheels or axles.

-Tom Wilson

