



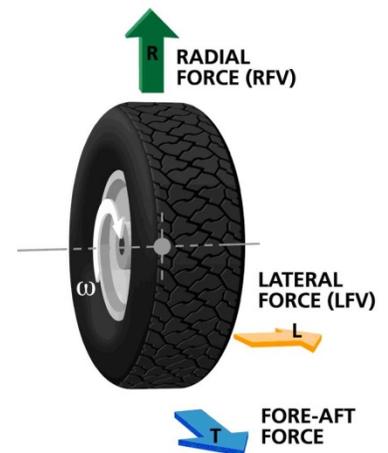
Comprehensive Guide to Understanding Your Tires

Article by: Anthony Ricci, President Advanced Driving & Security Inc.

There are many styles of vehicles on the road today. We could travel to all ends of the earth, but one thing would remain the same no matter what kind of car or truck we looked at: they all sit on 4 pieces of rubber called tires. These four tires are arguably the single most important feature on any vehicle, yet they are probably one of the most overlooked.

Take a second and really concentrate on what the tires on your vehicle go through on a typical Sunday drive. Firstly, they have to be strong enough to hold the right amount of air pressure to support the entire vehicle. Secondly, they have to put up with the stress of rolling around all day on hot asphalt. Every rotation the tires make causes friction, which in turn causes huge amounts of heat build up. Think of rubbing your hands together very quickly and how fast they start to warm up - now imagine rubbing your hands together at highway speeds for hours at a time! Finally, as those tires are heating up we are going to introduce them to a variety of forces which will push, pull, stretch, twist, distort, and add stress to the most important component related to basic car control. How would you like to be your tires, responsible for controlling this 4000-pound vehicle at high rates of speed, with a driver whom takes you for granted and has very little knowledge of how you work?

So now that you understand the stress your tires face every time you take them on the road, what can you do to start respecting your tires and avoid possible flats and blow outs? First, we need to recognize what it is our tires do, and even more importantly - what they cannot do. I'm sure we can all agree that our vehicles have at least 3 basic functions: go, stop and turn. Anytime the driver uses the gas pedal, brake pedal or steering wheel, one of these basic functions is put into action and weight is being transferred in a given direction. If the vehicle is accelerating or decelerating in a straight line, the weight is either going to the rear or the front of the vehicle. This weight applies a longitudinal force, which goes through the car's suspension system and eventually ends up pressing down on the tire's contact patch (the space of the tire that is connecting your vehicle to the ground). When the driver turns the steering wheel a sideways force, known as lateral force is applied to the vehicle. These lateral forces also end up at the tire contact patch. The amount of force generated will depend on speed (for longitudinal force) and sharpness of the turn (for lateral force). Now we know that everything has limits. Although the tires' basic function is to keep the vehicle on the road, even the most high quality performance tire can only be asked to perform at 100% of its capability. Meaning that once the force exerted on the tire exceeds its capabilities, it will - no matter how good - begin to slide or skid (lose adhesion).



Secondly, we need to keep in mind the signs of wear that our tires will show over time. In a normal situation, the tread on your tires will wear down at a roughly equal rate evenly across the surface of the tire. Additionally, both front tires and both rear tires should generally wear at the same rate. Depending on front-wheel drive or rear-wheel drive, either the front set or rear set should wear more quickly than the other - this is normal. However, if your vehicle is improperly aligned, has suspension issues, or if the tires are under or over inflated, abnormal tire wear can occur. *Camber wear* can occur if your tire leans too far in or out, and will result in a rapid wear down of the inside or outside tread of your tire, while the remainder of the surface shows little signs of wear. *Toe wear* can occur if your tires are not parallel to each other and are pointed too far in or too far out, and will result in a smooth feeling when you run your hand over the tread



in one direction and a rough feeling in the opposite direction. *Cupped wear* usually indicates a suspension issue or unbalanced tires, and will look like scalloped dips along the edge of the tire tread. If your tires are under inflated they will experience significant wear on the outer ends of tread, and if your tires are over inflated they will show signs of significant wear at the center of the tread. Your tire pressure should be regularly checked with an accurate tire pressure gauge to avoid this kind of wear. If your tires are showing signs of abnormal wear,

you should consider taking your vehicle to a qualified service professional to be examined. Ultimately this will result in a safer driving experience for you and those around you.

Now we understand what our tires experience and the demands that are put on them, and also the kinds of wear that they will show over the length of tire life. But how do we know when our tires have reached their end and need to be replaced? A common tire tread gauge tool can most likely be found under the cushions of your couch or the cup holder in your car. All you need is a penny and a quarter. Take the penny, with Lincoln's head facing downward, and place it in several tread grooves along the tire. If only part of Lincoln's head is covered by the tread, you have roughly 2/32" of tread left and should consider replacement - as most state laws



consider tires to be worn out when they've reached 2/32" tread depth. Now take that quarter, holding it the same way with Washington's head facing downward, and place it in the same tread grooves as with the penny. If the top of Washington's head is always covered by the tread, you have roughly 4/32" of tread remaining. And to find out if you have 6/32" or more remaining, take the penny back out, but flip it around to show the Lincoln Memorial. Flip it upside down and place it in the tread grooves. If the top of the memorial is always covered, you've got roughly 6/32" of tread remaining. This is a great trick to use when your tires are reaching the end of their life and you need to monitor their wear closely to avoid possible flats and blow outs.

Before reading this you may not have given a lot of thought to those four pieces of rubber keeping your vehicle connected to the road. But after understanding the demanding conditions we put our tires in, the types of stress exerted on them every time we take the car for a drive, and the kinds of wear patterns that can arise due to different situations, it is a lot easier to realize just how important (if not the most important) tires are to the safe operation of our vehicles. So next time you're heading out to take a drive, give yourself a few extra minutes to closely inspect the state of your tires. You never know, you just might find something that could end up saving your life, or at least your car's life!