



Where the Rubber Hits the Road: Corvette Tire Basics

Tires play a critical role in the performance and safety of your Corvette. With all that's literally riding on your tires, Mid America Motorworks has put together a quick checklist of the basics to look for when selecting new tires.

Tire Terminology

While some terms associated with tires are no brainers, others could leave you scratching your head. This list of basic terms will equip you with the knowledge to make the very best decisions for your tire upgrade.

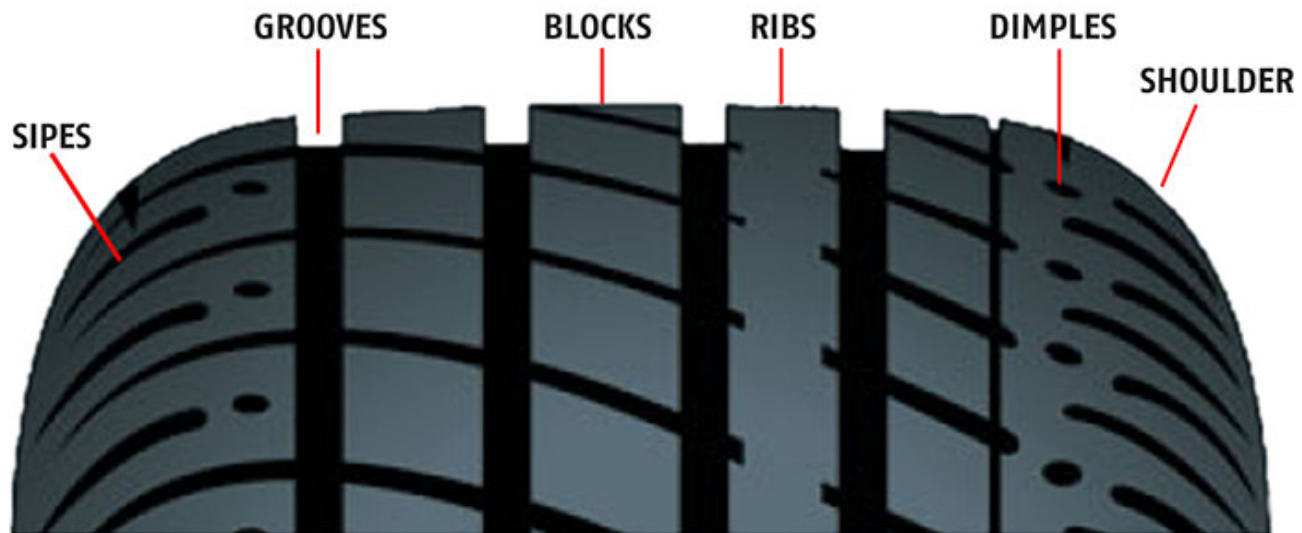
Aspect Ratio – The tire's section height in relation to its section width, as a percentage. For example, a 60-series tire features a sidewall that's 60 percent as tall as the tire's section width. A 50-series tire will feature a shorter sidewall, at 50 percent of section width. A 35-series tire will feature an extremely short sidewall (only 35 percent of section width), etc. Aspect ratio = Nominal section height divided by nominal section width times 100. **EXAMPLE:** If section height is 3 inches and section width is 10 inches, $3/10 \times 100 = 30$, which would mean that this tire features an aspect ratio of 30 (a 30-series tire).

Asymmetric Tread – One side of a tire's tread has a different design than the other side, rather than a mirror image from side-to-side. With differing inner and outer treads, engineers can design a tire for maximum performance. The outer half of the tread is designed for high cornering stresses and the inner tread is designed for straight-line stability and good water dispersion.

Blocks – Individual sections of rubber defined by the grooves surrounding them. The faces of the blocks make contact with the road.

Contact Patch – The total area of the tire that contacts the road surface at any given time. Often this area is about the size of a small book, but the size and shape of the contact patch depends on the speed and tire dynamics in any given condition. The patch is different during cornering than traveling straight ahead, for instance. Typical passenger car tires with a 60 aspect ratio usually have a contact patch that's longer than it is wide. Low-profile performance tires usually have a contact patch that's wider than it is long. At very high speeds, the vehicle tends to lift, making the contact patch narrower, which is why performance tires are usually so wide. Inflation pressure can also change the area of the contact patch.





Dimples – The indentations in the tread blocks or ribs that help cool the tire.

Free Radius – The radius of the tire/wheel assembly that isn't affected by load. This is the distance from the wheel axle centerline to the top of the tire tread face.

Lateral Grooves – The grooves that lead from the center of the tread to the outer edges. They can be straight or curved. Lateral grooves are generally 3mm or wider. Narrower than 3mm, these grooves may be called sipes (see definition). Larger lateral grooves also help direct water from under the tire.

Loaded Radius – The distance from the wheel axle centerline to the ground, drawn vertically. This is the distance from the vehicle hub centerline to the ground when the tire is inflated and when the tire supports vehicle weight.

Loaded Section Height – The loaded radius, minus half of the nominal rim diameter.

Longitudinal Grooves – The grooves that run the circumference of the tire and are designed to channel water away from the tire and the road, preventing hydroplaning and possible loss of vehicle control. The new breed of super rain tires often has a deep longitudinal channel down the center of the tire.

Overall Diameter – The outside diameter of the tire when mounted and inflated, but with no vehicle load.

Ribs – Any easily recognized pattern of tread blocks that make up the contact band around the circumference of the tire.

Section Height – The distance from the bead to the tread face.

Section Width – Also called "overall width," this is the maximum width of the cross section of an unloaded, mounted and inflated tire (the widest point of the tire when mounted and inflated, but with no vehicle weight).

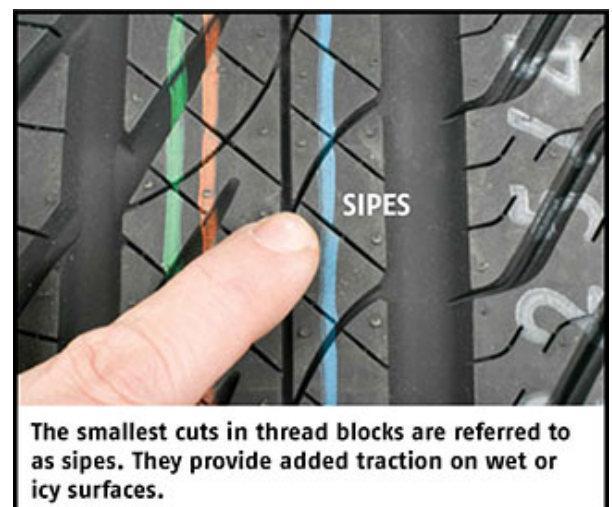
Sipes – Very narrow slits in the tread that improve traction in water, snow, ice and loose dirt. Basically, they act like squeegees that squirm to help move water from the tread blocks.

Shoulder – The area of transition between the sidewall and the tire's tread (both inboard and outboard sides) is the shoulder. This is the area responsible for lateral grip in cornering maneuvers. It's usually slightly rounded to give a progressive steering response.

Symmetric Tread – The treads on both sides of the centerline of the tire are mirror images of one another.

Tread Width – The distance measured from the inner tread shoulder to the outer tread shoulder. Tread width isn't to be confused with section width, as section width is always greater.

Unidirectional – A tire that is designed to rotate in one direction only. The tread design will move water well in only the proper direction. These tires will have arrows or other markings on the sidewall describing the proper operating rotation. If



mounted in the incorrect rotational direction, you won't damage the tire but you won't be able to take full advantage of the tire's performance.

Void Ratio – The amount of space between the tread block surface compared to the space taken up by the grooves (or voids) is the void ratio. A low void ratio has less groove area and more tread area. A typical rain tire will have a larger void ratio than a high-performance tire designed for dry driving.

Use Your Sidewalls!

The sidewall of a tire offers an abundance of information, including the tire's size, maximum inflation, serial number, manufacturing location and tread wear rating. In essence, this information serves somewhat as an owner's manual for that specific tire.

Tire Dimensions

Three sizing systems are employed today to determine tire dimensions for passenger tires—P-Metric, European Metric and Alpha-Numeric. The most common system is P-Metric.

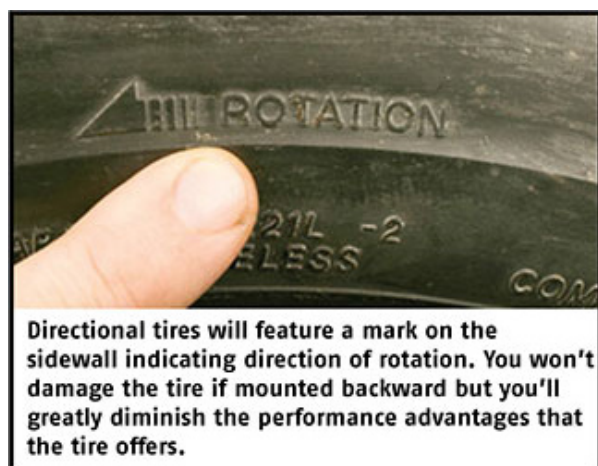
The size designation indicates the following:

- Cross section in millimeters
- Aspect ratio
- Type of construction
- Appropriate rim diameter

European Metric (also called Metric) is similar. No letter "P" is used as a prefix. The three-digit number at the beginning indicates cross section in millimeters. The next letter indicates the speed rating. An "R" following this indicates that the tire is of radial construction and the final two-digit number indicates rim diameter in inches. If the aspect ratio is lower than 82, a slash, followed by the aspect ratio number, will follow the section width number.

A European 155SR13 metric tire with an 82 aspect ratio indicates that it has a 155mm section width, an S speed rating, radial construction, and is intended for a 13-inch wheel.

Alpha-Numeric tires originated in the 1960s. This sizing system features a load-based identification approach where the first letter designates the tire's load carrying capacity. For example, a BR60-13 tire features a "B" load rating, radial construction, a 60-series aspect ratio and a 13-inch rim requirement. The alpha (letter) character can range from A–N, depending on load capacity. The higher the letter, the higher the load rating. Alphanumeric sizes are in popular demand for muscle car restorations where the original size/type tire is desired.



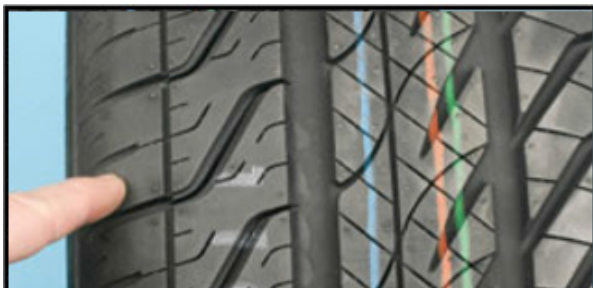
Water Handling

Traction grades, found on tire sidewalls, are used to determine how well a tire will control and stop a vehicle on a wet road or surface. Testing is typically performed in a straight-line braking scenario on a controlled wet-surface test pavement, including concrete and asphalt. The resulting data helps tire manufacturers assign ratings to each tire. Ratings of A, B or C are assigned, with tires rated "A" having the highest traction. Three "grade rating" numbers will typically appear on the tire sidewall: the treadwear rating, traction rating and temperature rating.

A tire contacts the road in what's called the "contact patch." This is the footprint that a tire creates as it rolls down the road. Larger-profile/lower-aspect ratio performance tires create a larger footprint, which may aid in dry traction (taking advantage of more rubber on the road for increased grip). However, in wet weather, this larger footprint can potentially degrade traction because of the larger water wedge



Angled grooves, referred to as lateral grooves, direct water out from the longitudinal grooves to aid in water evacuation. Water is collected in the main grooves and directed out of the tread area via lateral grooves.



Shoulder blocks may vary in size between outboard and inboard shoulders, depending on the specific design. A tire that is marked "this side out" or "this side in" will feature larger shoulder tread blocks on the outboard side.

that can be created (a narrower tire may "slice" through water better than a very wide tire).

In response to this trait, tire manufacturers go to great extents to design tread patterns and compounds that will resist the phenomenon called "hydroplaning."

Hydroplaning occurs when a tire encounters a wedge of water between the tread and the road surface. This can cause temporary directional pull and loss of control. While virtually any vehicle and tire combination has the potential to hydroplane when the limit is reached where water can't evacuate quickly enough between the tire and road, it's important to understand that a number of factors can combine in order to experience hydroplaning. These include vehicle speed, tread design, tread depth, tread compound, tire width, vehicle weight and water depth.



Speed Ratings

Speed ratings indicate the tire's performance characteristics, as well as the speed at which a tire model has been tested and verified. Just because a tire is rated at 149 mph, that doesn't mean that you should attempt to operate the vehicle on a public roadway at that speed. If you want to play, rent some time on a race course. You shouldn't select a tire by focusing on the mph speed number, because it is unlikely that you will drive at those speeds while on public roads.

The high-speed rating is a clear indication that the tire has high performance design, material and construction features that will enhance the traction, steering response, lateral control and braking of the vehicle at legal highway speeds. The design and construction of the tire has been enhanced, offering the side benefit of high-speed capability.

Speed ratings are based on laboratory tests, where the tire is loaded against a large-diameter metal drum to reflect its appropriate load and run at increasing speeds in 6.2 mph steps in 10-minute increments until the tire's required speed has been met.

Beginning in 1991, speed ratings have been placed immediately following the load index number, for example 225/50R16 89S. When Z-rated tires were first introduced, they were thought at the time to reflect the highest tire speed rating that would ever be required, with the Z rating indicating that the tire was capable of speeds "in excess of 149 mph."

Eventually, the tire industry added W and Y speed ratings (with W indicating a rating of 168 mph; and Y denoting 186 mph). A Z rating may still appear on the tire on its own (indicating a rating of 149 mph+), but may also appear in addition to a W or Y rating symbol. Some tires may feature a rating symbol of Y (following the load index), with the load index and speed rating encased in parenthesis. Example: 285/35ZR19 (99Y). If the Y is seen within parenthesis, this indicates a speed rating "in excess of 186 mph."

Tires referred to as "Ultra High Performance" include those featuring V, Z, W, Y and (Y) speed ratings.

Decoding Speed Rating Marks

M	81 mph
N	87 mph
P	93 mph
Q	99 mph
R	106 mph
S	112 mph
T	118 mph
U	124 mph
H	130 mph
V	149 mph
W	168 mph
Y	186 mph
(Y)	186 mph +
Z	149 mph +

No matter your driving style or needs, performance and handling gains can be acquired with the right choice of tires.

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