Much like the U.S. Department of Transportation, The Economic Commission of Europe, or ECE, regulates the manufacturing of vehicle components. To receive ECE branded approval, tires must meet set standards for construction, durability, high-speed endurance, sidewall designation, and tire noise.

The encircled letter E and accompanying number indicate the tire’s country of origin.

### SPECIAL MOUNTING INDICATORS

**Directional Tires** typically have arrows imprinted on the sidewall. This alerts you that the arrows should be mounted so that the arrows are pointing forward.

“**This Side Out**” may be molded on the sidewall – indicating which side of the tire must be facing outward.

### CALCULATING TIRE DIMENSIONS

**Aspect Ratio** – The relationship between section height and section width. The higher the aspect ratio number, the skinnier the tire, relative to its height.

**Deflection** – The difference between a tire’s free radius and its static loaded radius.

**Free Radius** – The radius of the mounted wheel and tire assembly when the tire is properly inflated and not deformed by the weight of a load. Free radius is measured from the axel centerline to the road contact surface of the tread.

**Loaded Section Height** – The static loaded radius, minus half of the rim diameter. Loaded section height is equal to the distance from the road surface to the rim seat.
Nominal Wheel Diameter – This is the distance between the bead seats, as measured at the widest point. Nominal wheel diameter can be denoted in either inches or millimeters.

Overall Diameter – This is the maximum distance – expressed in inches or millimeters – between a properly mounted and inflated tire that is not under a load. Overall diameter is measured from the road-contacting surface of the tread on one side of the tire to the road-contacting surface on the opposite side of the tire.

Overall Width – The measure of a tire’s overall width from sidewall to sidewall – including protruding elements such as lettering and protective ribs.

Revolutions Per Mile – The number of revolutions per mile that a loaded tire makes. This number will change with load, wheel width, inflation and speed.

Rim Width – The distance between the inner and outer bead seat flanges.

Rolling Circumference – The straight-line distance traveled by a tire during one full rotation. This number will change with load, inflation and speed.

Section Height – The vertical distance between the edge of the wheel rim and the top of the tire tread of a mounted tire not under a load. Expressed in millimeters, this number is not usually marked on the tire.

Section Width – The horizontal distance between a mounted tire’s sidewalls, not under a load, and not including any protruding elements. Expressed in millimeters, this number is usually the first number in a metric designation.

Static Loaded Radius (Loaded Radius) – The distance from the centerline of the axle to the road. This refers to a properly mounted tire under a prescribed load.

Tread Depth – This is the distance from the bottom of the tire’s tread grooves – typically expressed in 1/32 increments.
Who said you wouldn’t need math after high school?

To calculate a tire’s aspect ratio, you’ll simply divide the tire’s section height by its section width.

\[
\text{Section Height} ÷ \text{Section Width} = \text{Aspect Ratio}
\]

Let’s work out an aspect ratio for our example: P195/70R15 85H

The **Numeric Sizing System** was the first tire sizing system and was used until the late 1960s. This system only provided cross section width of the tire and the rim diameter in inches. If the section width ended in zero (EX. 7.00-14 or 7.50-14), the tire had a common aspect ratio of about 92. For section widths not ending in zero (EX. 8.50-15), the tire was considered “low profile” with an aspect ratio of about 82.

**P-Metric Sizing System**

Widely used by domestic American tire manufacturers, the P-Metric – **Passenger Metric System** – was originally developed in the 1970s when compact cars were beginning to gain popularity. This system allows for smaller tire size designations. The maximum inflation pressures of P-Metric tires were raised for lower rolling resistance.
The Metric Sizing System was developed because European nations commonly use the metric system for measurement. You will find that it is basically a conversion of the Numeric System. Section widths are designated in millimeters instead of inches. Originally, tires that did not designate an aspect ratio were presumed to be 82-series. However, when 60- and 70 series tires came on the scene, the aspect ratio was added to the tire nomenclature, much like the P-Metric System.

Developed by The International Standards Organization to facilitate industry standardization, the ISO Metric Sizing System is a combination of both the Metric system and a service description. The service description designates the load index as well as a speed rating symbol. ISO Metric size designations are based on standards set by the European Tyre and Rim Technical Organization (ETRTO). These standards are not interchangeable with those set by the Tire and Rim Association (TRA) for P-Metric sizes.
### Light Truck Numeric Sizing System

Similar to the Numeric System for cars, the **Light Truck Numeric System** lists the section width, construction type and rim diameter in inches, plus the light truck designation.

**8.50R16LT**

<table>
<thead>
<tr>
<th>Section Width</th>
<th>Radial Construction</th>
<th>Light Truck Designation</th>
</tr>
</thead>
<tbody>
<tr>
<td>8.50</td>
<td>R</td>
<td>16</td>
</tr>
</tbody>
</table>

### Light Truck Metric Sizing System

*Light Truck Metric Sizing System* is essentially the same as the *P-Metric system*, except the *P* is replaced with the *LT* light truck designation. However, *LT*-Metric and *P*-Metric tires are very different in construction.

**LT275/65R18**

<table>
<thead>
<tr>
<th>Light Truck Designation</th>
<th>Section Width</th>
<th>Aspect Ratio</th>
<th>Rim Diameter</th>
</tr>
</thead>
<tbody>
<tr>
<td>LT</td>
<td>275</td>
<td>65</td>
<td>18</td>
</tr>
</tbody>
</table>

### Light Truck High Flotation Sizing System

*Light Truck High Flotation Sizing System* is also the same as the obsolete *Light Truck Numeric System* – with tire diameter added to the front. All flotation sizes begin with a two-digit number that indicates the tire's overall diameter in inches.

**31x10.50R15LT**

<table>
<thead>
<tr>
<th>Tire Diameter (in.)</th>
<th>Section Width</th>
<th>Radial Construction</th>
<th>Light Truck Designation</th>
</tr>
</thead>
<tbody>
<tr>
<td>31</td>
<td>10.50</td>
<td>R</td>
<td>15</td>
</tr>
</tbody>
</table>

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*Continental*  
*GENERAL TIRE*