GENERAL INFORMATION

WHAT’S INSIDE A TIRE

The tire’s **INNERLINER** -- keeps air inside the tire.

The **CASING (or CARCASS)** – the internal substructure of the tire.

The tire’s **BEAD** -- assures an airtight fit with the wheel and efficient transfer of forces from the wheel to the carcass of the tire.

**BEAD FILLER** – reduces flex and aids in deflection.

A Tire’s **BODY PLIES** – withstands the forces of the tire’s inflation pressure, provides the mechanical link from the wheel movement to the tread area and flexibility to supplement the vehicle’s suspension system.

The **SIDEWALL** -- protects the side of the tire from road and curb attack from atmospheric degradation.

A tire’s **BELTS** -- stabilize and strengthen the tread, allowing forces to be efficiently transferred to the tread area.

Its **BELT EDGE INSULATION** – helps to reduce friction.

The **TREAD** -- provides the frictional coupling to the road surface to generate traction and steering forces.
**TIRE BASICS**

**GENERAL INFORMATION**

**TREAD ELEMENTS**

- **Ribs** are a pattern that includes grooves around the tire in the direction of rotation.
- **Lugs** are the sections of rubber that make contact with the terrain.
- **Tread blocks** are raised rubber compound segments on the outside visible part of a tire.
- **Sipes** are small lateral cuts made in the surface of the tread to improve traction.
- **Kerfs** are shallow slits molded into the tire tread for added traction – this term often used interchangeably with sipes.
- **Grooves** are circumferential or lateral channels between adjacent tread ribs or tread blocks.
- **Shoulder blocks** are the tread elements of segments on the tire tread nearest to the sidewall.
- **Voids** are the spaces that are located between the lugs.
GENERAL INFORMATION

READING A TRUCK SIDEWALL

It’s important that you learn how to read the sidewall of a tire. You’ll find that these designations give you a great deal of important information -- from the tire type to its width, wheel diameter, load index, speed rating, inflation rate and more.

You’ll find important information like:
- Tire Width
- Wheel Diameter
- Load Index
- Speed Rating
- Inflation Rate

CODE NUMBERS REFER TO INFORMATION ABOUT YOUR CONTINENTAL TIRE:

A3 – FACTORY CODE
(A3 - Continental Mt. Vernon Plant)

DF – SIZE CODE
(DF - 275/80R22.5)

2A3 – MANUFACTURER’S CODE
(2A3 - Tire Type - Ex. - HDL2 DL LR G)

12 – PRODUCTION WEEK

09 – PRODUCTION YEAR
(Prior to year 2000, this was a single digit number)

Pattern Name – this marking indicates the tread design.

Size Designation – Truck tires are either radial or bias construction and size is indicated in a number of different ways. TRA standards are used in the US and ETRTO indicates European standards.

Load and Pressure Marking – This marking indicates maximum load and inflation pressure.

Tire Construction Information – This marking indicates the number and type of plies used to construct the tire.

DOT Identification Number – This number refers to where and when the tire was built.

The last four digits tell you the date that the tire was manufactured.
GENERAL INFORMATION

TIRE TYPES AND DESIGNATIONS

TUBELESS TIRE

<table>
<thead>
<tr>
<th>11.00</th>
<th>Nominal Section Width (Inches)</th>
</tr>
</thead>
<tbody>
<tr>
<td>R</td>
<td>Radial Construction</td>
</tr>
<tr>
<td>22.5</td>
<td>Nominal Rim Diameter (inches)</td>
</tr>
<tr>
<td>H</td>
<td>Load Range</td>
</tr>
</tbody>
</table>

LOW ASPECT RATIO TIRE

<table>
<thead>
<tr>
<th>395 / 75</th>
<th>Nominal Section Width (Millimeters) + Aspect Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>R</td>
<td>Radial Construction</td>
</tr>
<tr>
<td>22.5</td>
<td>Nominal Rim Diameter (inches)</td>
</tr>
<tr>
<td>J</td>
<td>Load Range</td>
</tr>
</tbody>
</table>

Customers may prefer Low Aspect Ratio Tires for:
- Ride height
- Lighter weight
- Improved fuel economy

However, drivers should be aware that low aspect ratio tires are more susceptible to sidewall damage.

Ply Rating – represented as a number, this marking indicates a tire’s maximum recommended load for specified service and does not necessarily pertain to the actual number of plies used to construct the tire.

Load Range – represented as a letter, this marking directly corresponds to the ply rating.

PLY RATING + LOAD RANGE CHART

<table>
<thead>
<tr>
<th>Ply Rating</th>
<th>14</th>
<th>16</th>
<th>18</th>
<th>20</th>
</tr>
</thead>
<tbody>
<tr>
<td>Load Range</td>
<td>G</td>
<td>H</td>
<td>J</td>
<td>L</td>
</tr>
</tbody>
</table>
LOAD INDEX

The load index (or load range) is a numerical designation that indicates the maximum load capacity a tire can carry while operating at the speed indicated by the tire’s speed symbol.

Suffixes Used in Truck Tire Designations

Suffixes are used, when necessary, as part of tire designations to differentiate between tires for service conditions which may require different loads and inflations, and also for tires that must be installed on different types of rims.

Truck-Bus

LT – This suffix is intended to differentiate among tires from Passenger Car, Truck-Bus and other vehicle designations. Light Truck tires can be used for service on some Trucks, Buses, Trailers and Multipurpose Passenger Vehicles in normal highway service (with a 15-degree tapered bead seat rim, or a 5-degree tapered bead seat rim with specified rim diameter of nominal minus .032”).

Example: 7.00-15LT

ML – This suffix designates tires suitable for Mining and Logging and intermittent highway service.

MH – Tires for Mobile Homes

HC – Identifies a heavy-duty tire designated for use on “HC” 15-degree rims used on Trucks, Busses and other vehicles.

ST – Special tires for Trailers in Highway Service.
GENERAL INFORMATION

Off-Road
NHS – Not For Highway Service

TG – Tractor-Grader tires, not for highway service

K – Compactor tires for use on 5-degree drop center rims, or semi-drop center rims, with nominal minus .032 diameter.

Industrial

NHS – Not For Highway Service
SS – Off-highway service such as mini-loaders and skid-steer loaders.

CALCULATING TIRE DIMENSIONS
GENERAL INFORMATION

CALCULATING TIRE DIMENSIONS (Definitions)

Aspect Ratio -- The relationship between section height and section width. The higher the aspect ratio number, the more narrow the tire, relative to its height. To calculate a tire’s aspect ratio, you’ll simply divide the tire’s section height by its section width.

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 axle 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.

Overall Diameter – The diameter of an inflated tire at the outermost surface of the tread, including 24-hour inflation growth.

Tire (Overall) Width – The width of a new tire, including 24-hour inflation growth, and including protective side ribs, bars and decorations.

Revolutions Per Mile – Measured number of revolutions for a tire traveling one mile. This can vary with speed, load and inflation.

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 also change with load, inflation and speed.

Section Height – Half the distance between the overall diameter and the nominal rim diameter.

Section Width (Loaded Section Width) – Linear distance between the outside of sidewalls of an inflated tire (exclusive of markings, etc.)

Static Loaded Radius (Loaded Radius) – The distance from wheel axle centerline to supporting tread surface at a given load and pressure in a static condition.

Tread Depth – This is the distance from the bottom of the tire’s tread grooves – typically expressed in 1/32 increments.
GENERAL INFORMATION

CALCULATING TIRE DIMENSIONS (Definitions)

**Tread Width** – Distance across tread from shoulder to shoulder

**Width Loaded** – Tire width (overall) under rated load conditions.

**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.

**Minimum Dual Spacing** – It is the minimum dimension recommended between rim centerlines for dual wheel installation.

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

Section Height ÷ Section Width = Aspect Ratio

**Conversion Factors**
Following are some formulas to help you convert tire sizing from European systems to US standards and vice versa.

Kilograms x 2.205 = lbs.
mm x .03937 = inches
kPa x .145 = psi

PROPER APPLICATION OF TRUCK TIRES

Tires must always be selected based on the vehicle manufacturer’s specifications. Installing improperly sized tires may cause serious handling problems including decreased steering stability, loss of control and tire failure.

**Vehicle Conditions -- Alignment**
Proper alignment is crucial to assure the best tire performance and to protect against irregular tire wear.

**Camber** – refers to the degree at which tire slants – inward or outward -- from a vertical position. When the distance between tires is greater at the top of the tires, it is referred to as positive camber.
TIRE BASICS

GENERAL INFORMATION

PROPER APPLICATION OF TRUCK TIRES

Toe – refers to the direction that tires are pointed in comparison with the vehicle’s centerline. Tires with toe-in experience a shorter lifespan.

TOE-IN

TOE-OUT

Irregular tire wear can occur when a vehicle has not undergone routine maintenance -- especially with leaf-spring assemblies. Vehicle geometry can change when front axle springs are not adjusted and lubricated. Rubber bushings on the radius arms, or torque rods, should also be checked for wear. When the radius arms are not parallel, trailer tires experience irregular wear.

Trailer misalignment can cause a lot of irregular wear on steer tires. When a vehicle’s axles are not perpendicular to the vehicle’s centerline, the misaligned drive and trailer tires create a thrust angle – to the left or the right of the truck or trailer. The result of thrust angle is a condition known as off-tracking -- due to asymmetrical force to the front axle. Tandem axles must always be perpendicular – with less than 3 millimeters variance -- to avoid these problems.
It bears repeating that — for safety’s sake — you should always replace tires with tires of the same size, type and construction. Mixing tires of different construction (bias and radial), type (winter and summer) or size — on the same axle — can result in decreased steering performance, reduced driving stability and premature wear.

Always replace tires with tires of the same size, type and construction.

**DUAL ASSEMBLIES**

When tires with different diameter or inflation pressure are paired, the smaller tire will experience erratic wear while the larger tire will carry the bulk of the load and will wear out prematurely because of lower contact pressure on the footprint. Inflation pressures differences in dual assemblies should never exceed 5 psi.

Also, either too much or too little space between dual assemblies has the potential to reduce the service life of tires. Always maintain minimum dual spacing in order to allow sufficient airflow to dissipate heat and to avoid tire damage due to close contact.

Tires in dual assemblies need to be matched to within a tolerance of not more than 0.25” in diameter, and 0.75” in circumference.

Rule of thumb - no more than four 32nd difference in tread.
GENERAL INFORMATION

DUAL SPACING

TIRE ROTATION

Routine tire rotation ensures a longer tire life and helps prevent irregular wear. Be sure to rotate tires to three times, depending on wear conditions, during the tire’s life cycle.

Front Tire Rotation
• Switch left and right tire and rim assemblies.

Drive Axle Rotation
• For dual assemblies ensure that the tires are within ¾” circumference of each other.
• Always take into consideration tire wear when determining the best rotation position.