

A close-up photograph of a tire tread, showing the deep grooves and sipes designed for traction. The tire is dark gray and appears to be a heavy-duty or off-road type. The background is dark and out of focus, showing some vertical lines that might be part of a building or structure.

# TIRE BASICS



# TIRE BASICS

## TIRE BASICS INTRODUCTION



## Welcome to Tire Basics!

In this first course, you will be introduced to the basic sections of a tire, how to measure a tire, the most common sizing systems, and finally how to identify a tire.

### ! Critical to Safety !

Processes that must be followed to ensure a safer working environment for our People, provide a quality service for our Customers, and adhere to Discount Tire's core values with regard to Integrity, Honesty, and doing what we believe is right.

### ! Critical to Quality !

Processes that must be followed to ensure the Quality of our work, increase overall delivery, and adhere to Discount Tire's core values with regard to Integrity, Honesty, and doing what we believe is right.



## SECTIONS OF A TIRE

Every tire can be broken down into five sections:

### Tread

The **tread** is the part of the tire that comes into contact with the road.



### Shoulder

The **shoulder** is the edge of the tire, where the sidewall and the tread meet.



### Sidewall

The **sidewall** is the section between the tread and the bead. This section of the tire contains a wealth of information about your tire such as the tire's type, size, manufacturing date, and other features.





# TIRE BASICS

## SECTIONS OF A TIRE *(continued)*

Every tire can be broken down into five sections:

### Bead

The **bead** is the section of the tire that comes into contact with the rim flange or wheel flange.

**Note:** The terms rim or wheel are used interchangeably so when referenced throughout the course, you may see them either way.



### Innerliner

The **innerliner** is a layer of synthetic rubber that seals air inside of the tire, similar to an inner tube.



### Wrap Up

All of these sections of a tire work together to keep a vehicle safe on the road. Therefore, it is important that each part is kept in good condition for the safety of the vehicle and your customer.



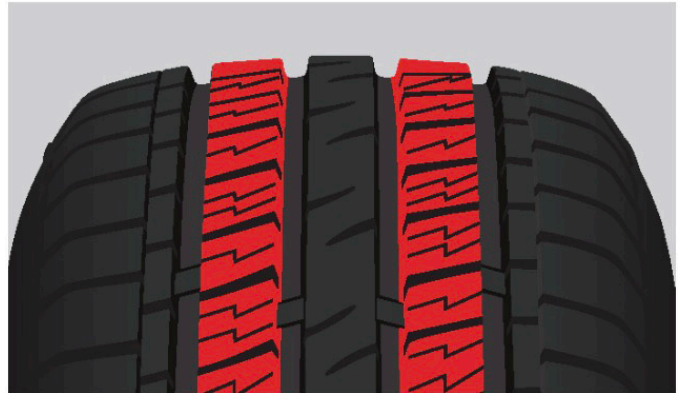


## TREAD ANATOMY

While the tread is one of the five main parts of a tire, the tread itself is made up of a number of smaller parts, each of which are designed to give the tire specific advantages for all kinds of road conditions.

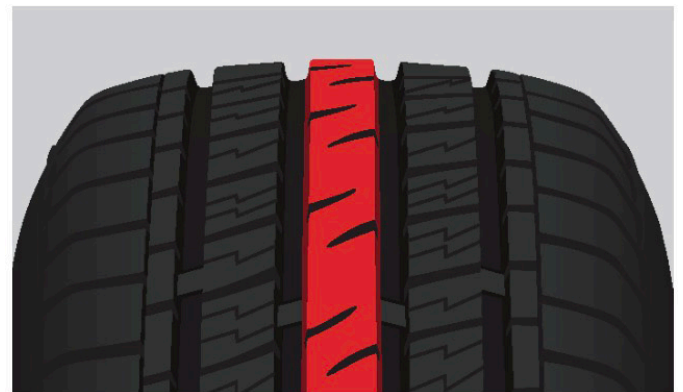
### Tread Blocks

**Tread blocks** are the patches of the tire tread that physically come into contact with the road. Different sized tread blocks and patterns determine how the tire performs on the road and how well it performs in different weather and terrain.



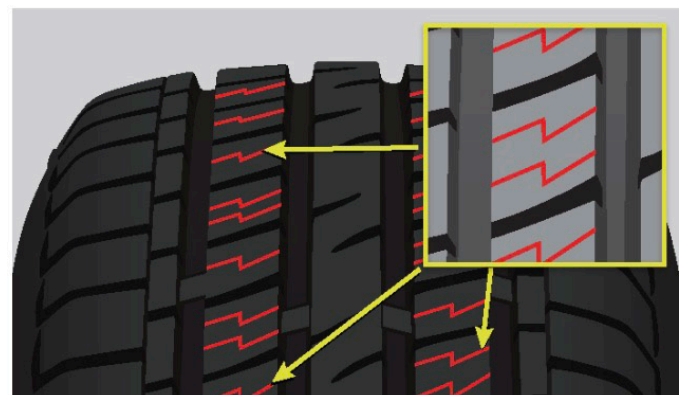
### Ribs

**Ribs** are the part of the tread that run continuously all the way around the circumference of the tire.



### Sipes

**Sipes** are the small cuts in the tire tread block. These are designed to add traction in wet weather and allow the tire to better grip the road.





# TIRE BASICS

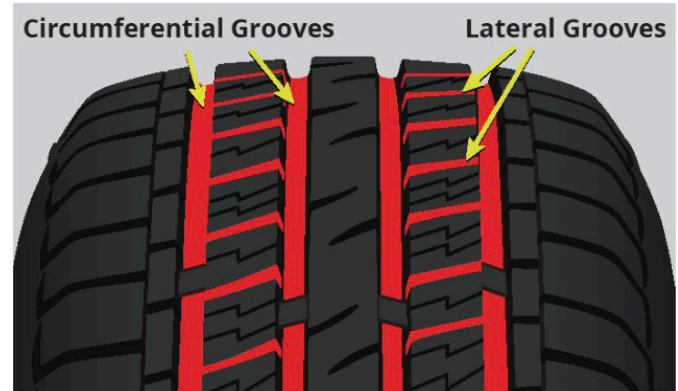
## TREAD ANATOMY *(continued)*

### Grooves

**Grooves** are the spaces between the tread blocks on a tire. There are two different types of grooves:

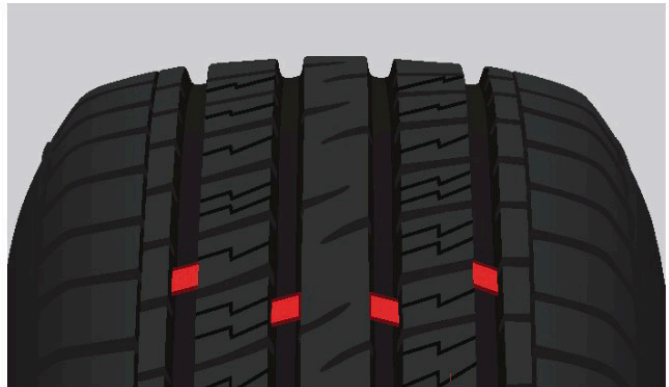
**Circumferential grooves** run the entire circumference of the tire and are the most effective way to evacuate water to reduce the chance of hydroplaning.

**Lateral grooves** run across the tire from side to side. These grooves add traction and help the vehicle start and stop.



### Tread Depth Indicator

Inside the circumferential grooves there are horizontal "bars" of rubber called **tread depth indicators**. These are visual indicators for when the tire has reached 2/32" of tread and needs to be replaced.



### Wrap Up

The differences in the design and style of these tread components is what gives each tire its unique strengths and weaknesses.

Therefore, it is important to understand each component thoroughly in order to provide the best recommendation for the customer that meets their needs.



## TIRE MEASUREMENTS

Several different measurements are taken in order to determine the correct tire size for any vehicle. This is critical for the safety of you, your team, and the customer.

Each of the following measurements is used to determine the tire size.

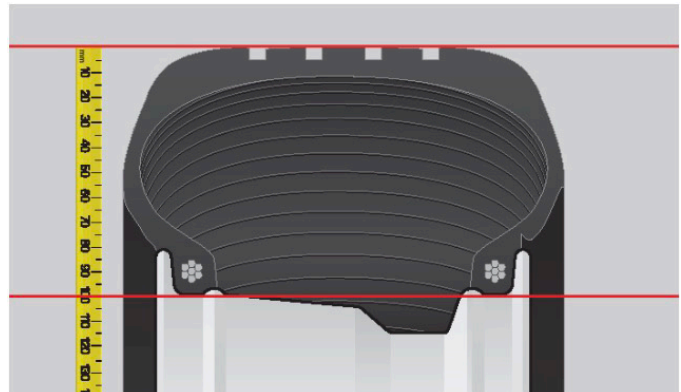
### Section Width

**Section width** is the distance from sidewall to sidewall of an inflated tire.



### Section Height

**Section height** is the distance from the bottom of the bead to the top of the tire's tread. This measurement is used to determine the aspect ratio of the tire.



### Aspect Ratio

**Aspect ratio** is the size of the sidewall height as a percentage of the section width. We will break this concept down further in the next section.



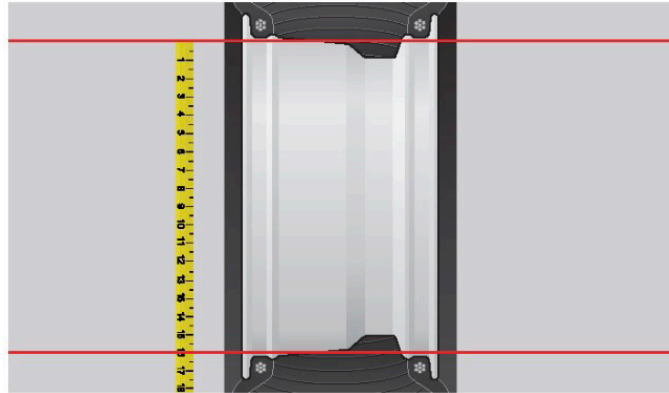


# TIRE BASICS

## TIRE MEASUREMENTS *(continued)*

### Rim Diameter

The **rim diameter** is the distance from bead seat to bead seat on the same side of the wheel.



### Overall Diameter

The **overall diameter** is the distance from the top of the tread to the bottom of the tread of an inflated tire.



### Wrap Up

All of this information together makes up what is known as a sizing system. The proper sizing system is needed to ensure a safe fitment.





## COMMON SIZING SYSTEMS

It is important to be familiar with tire sizing systems in order to ensure that the correct tire purchased is pulled, that the size and fitment is correct, and that the proper procedures are followed when changing a tire.

The two most common sizing systems are **Metric** and **High Flotation**.

### Metric Sizing System

The first character in a metric sizing system is a letter representing the **tire class**.

- **"P"** designates a P-Metric passenger constructed tire built to US standards.
- **"LT"** designates a light truck tire. LT tires are not part of the P-Metric family, but they are also built to US standards.
- The absence of a letter indicates a passenger constructed tire built to European standards.



The first number represents the **section width** in millimeters.

The second number represents the **aspect ratio**. Earlier, we mentioned aspect ratio is the section height represented as a percentage of the section width.

In this example, the aspect ratio is 55. This is 55% of the section width. Since the section width is 225 millimeters, that means the section height calculates to 123.75 millimeters.



The letter after the aspect ratio is the **tire construction**. This describes the internal composition of the tire.

- **"R"** – stands for **radial ply construction**.
- **"D"** – stands for **bias ply construction**.

Last is the **rim diameter**, which indicates the diameter of the wheel on which the tire can be mounted.



# TIRE BASICS

## COMMON SIZING SYSTEMS *(continued)*

### High Flotation Sizing System

**High flotation** tires typically come with a wider section width and are used for trucks and off-road vehicles.

High flotation sizes begin with the **tire's overall diameter**, which is a measurement of the tire's height in inches.

The second number represents the **tire width** in inches.

The next letter represents the **tire construction**.

- **"R"** – stands for **radial ply construction**.
- **"D"** – stands for **bias ply construction**.

The last number represents the **rim diameter**, which indicates the size of the wheel on which the tire can be mounted.



### CRITICAL TO SAFETY

It is important to remember that regardless of sizing system, when mounting a tire on a wheel, the size of the rim diameter must be the same as the size of the wheel. A tire with a 16-inch wheel diameter must be mounted on a 16-inch wheel.

### Load Range

Finally, high flotation and LT-metric sizes will include a letter representing **load range**. This provides a comparative idea of the tire's capacity to hold air, ability to carry weight, and will be represented by a letter.





## COMMON SIZING SYSTEMS *(continued)*

### Service Description

At the end of a sizing system, you will find the service description. This consists of the load index and speed rating. We will dive deeper into those later on.



### Wrap Up

Understanding the differences between each sizing system will ensure your customer receives the correct product and is safer on the road.



# TIRE BASICS

## CRITICAL SIDEWALL INFORMATION

The sidewall contains a great deal of information about the tire including:

- Manufacturer and model
- Manufactured date
- Size
- Maximum load capacity and inflation pressure
- Along with other important identifying information for the tire

Each of these markings is important for the safety of both you and the customer.

### DOT and Safety Markings

The Department of Transportation and safety markings provide information about a tire's creation and its compatibility with federal regulations. You will see these figures stamped on the sidewall beginning with DOT.

The first eight characters after the DOT represent **brand characteristics** in a code determined by the manufacturer. The plant code, tire size, and brand characteristics are intended for the manufacturer's internal use.



The most important information are the last three or four numbers after the brand characteristics. These numbers represent the date that the tire was manufactured. If the tire was manufactured after the year 2000, you will find four numbers.

The first two numbers refer to the week of the year in which the tire was made, while the last two numbers refer to the year it was made. In this example, 4217 means that the tire was manufactured in the 42nd week of 2017.



## CRITICAL SIDEWALL INFORMATION *(continued)*



**Recommends  
Replacement**



**Do NOT  
Service**



**CRITICAL  
TO SAFETY**

The age of your tires is an important consideration when it comes to tire safety. When it comes to tire aging, it is very simple: the older the tires are, the higher risk for failure. It is critical that we always check the manufacturing date from the DOT number on every tire you service. We recommend replacing any tire that is 6 years or more past the date of manufacture, and will not service tires that are 10 years or more past the date of manufacture. If a tire is more than 6 years old, stop any service and speak with your supervisor immediately.

### Tire Too Old

If the tire was manufactured prior to the year 2000, you will find three numbers. This is a great example of when you will stop any service and notify your supervisor immediately.

**Please note:** most tire manufacturers only stamp the manufactured date on one side of the tire.



### Manufacturer and Model

One large piece of information you will notice on the sidewall of every tire, is the manufacturer and model.







# TIRE BASICS

## CRITICAL SIDEWALL INFORMATION *(continued)*

### Maximum Air Pressure & Load Capacity

There is another set of information on the sidewall that represents the **maximum air pressure** and **load capacity**.

The maximum load capacity represents the tire's load carrying capacity when inflated to its maximum air pressure.

The maximum air pressure represents the tire's maximum operating inflation pressure.



### CRITICAL TO SAFETY

Tires should never be inflated beyond the maximum inflation pressure on the sidewall.

### Rotation Arrow

Some tires are designed to be installed on a specific side of the vehicle. In these cases, look to the sidewall for a **rotation arrow** regarding the tire's correct direction.





## CRITICAL SIDEWALL INFORMATION *(continued)*

### UTQG Markings

The Uniform Tire Quality Grade System, also known as UTQG, grades tires in three categories:

- treadwear
- traction
- temperature

The **treadwear grade** appears first. It offers a relative score describing the tire's ability to resist wear.



The **traction grade** appears next. This ranking describes the tire's ability to stop on straight, wet surfaces under controlled conditions.

The **temperature grade** comes last. It describes the tire's ability to dissipate heat and resist temperature buildup.

### Service Description

Finally, we find the **service description**. The service description represents the **load index** and **speed rating**.

The load index is a number explicitly indicating how much weight the tire can carry at different inflation pressures.



The speed rating is a letter indicating the maximum speed that a tire can safely reach and maintain, as determined by laboratory testing.

### Wrap Up

As you can tell, there is a lot of information on the sidewall of every tire. Throughout your career, you will learn how it is important to understand what each piece of information means.



# TIRE BASICS

## MATCHING TIRES WITH WORK ORDERS

In order to ensure that the right product has been pulled for a service, you must be able to properly read a work order and tire tag. Checking that the information on the work order matches the information on the tire tag and sidewall is crucial for the safety of you and the customer to ensure they receive the correct tire.

On the work order, tire tag, and tire sidewall, you will find the following pieces of information:

- Manufacturer and Model
- Size and Service Description
- Load rating, when applicable



## Work Order

As any vehicle or tire enters the Service Area, it will be accompanied by a work order. When tires are listed on a work order, you will see the following:

WORK ORDER		
Article	Qty	Description
28500	4	255 /50 R17 94W BSW
NRM		FAL FALKEN PRO G4 A/S

Labels on the work order:

- SIZE DESCRIPTION**: 255 /50 R17 94W BSW
- MANUFACTURER**: FAL FALKEN
- MODEL**: PRO G4 A/S



## MATCHING TIRES WITH WORK ORDERS (continued)

### Work Order

On this work order, you will notice the tire is an LT-Metric. It is important to review the load rating and load index because there are times where you may have the same manufacturer, model, size, and speed rating but the load rating and load index can be different.

WORK ORDER			SERVICE DESCRIPTION	
ARTICLE	QTY	DESCRIPTION	SIZE	DESCRIPTION
11304	4	LT265 /75 R16 123R E1 OWL		
NRM		MICH DEFENDER		LTX M/S
80017	4	CERTIFICATES FOR REFUND, REPLACEMENT		
80075	4	STATE REQUIRED ENVIRONMENTAL FEE - UNITS		
80224	4	WASTE TIRE DISPOSAL FEE		
80119	4	INSTALLATION & LIFETIME SPIN BALANCING		

### Tire Tag

Once you have identified all of this information on the work order, you will use it to verify correct product before installing on a wheel. To assist with this, every tire is supplied with a tire tag from the manufacturer. All of the same information will be provided on the tire tag as the work order.

<b>BFGoodrich</b>		MANUFACTURER
<b>All-Terrain T/A<sup>®</sup>KO2</b>		MODEL
ALL-TERRAIN LIGHT TRUCK TIRE		
TOUT-TERRAIN PNEU CAMIONNETTE		
<b>LT265/75R16</b>		SIZE
RWL/LBR	LRE	123/120R
<b>67179</b>		LOAD RANGE
CAI 501069	NAPN 0067179	DOT W8AT11

### Sidewall Reminder

There are times in the Service Area where a tire may not have a tire tag. It is important at this time to understand how to read a sidewall. We will use all the information we learned from the previous section on Sidewall Information to ensure we have the correct product.