



BUMPER TO BUMPER

TIRES

A guide created by
TBS Factoring Service

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TIRES

CREATED BY TBS FACTORING SERVICE

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LET'S BE FRIENDS





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BUMPER TO BUMPER

TIRES

Commercial truck tires are one of the largest operating expenses for most truck owner-operators. Extending the lifespan of tires helps save money. Getting the most out of tires—maximum mileage, safety, and wear—begins with:

1. *Appropriately “spec’ing” tires for the intended application.* Selecting the proper tire size, type, and tread design helps ensure satisfactory performance. Tires are application-specific and designed to deliver different performance criteria in different applications and under different conditions. Therefore, it is important that truck owner-operators understand vehicle application, road conditions, and operating environment. Other considerations are the tire manufacturer, tire dealer, price, availability, and warranty coverage.
2. *Buying high-quality commercial truck tires.* Purchasing cheap tires may seem like a way to save money, but it will end up costing more money over time. High-quality tires last longer and reduce the amount of maintenance.
3. *Staying on top of preventive tire maintenance.* This helps control and reduce tire costs because many tire-related issues are preventable.

PROPERLY MAINTAINED TIRES PROVIDE:

- A more comfortable ride
- Vehicle stability
- Quicker steering response
- Traction
- Stopping ability
- Longer tire life
- Improved fuel economy



CHAPTER #1

TIRE INFLATION



Without a doubt, the single most critical factor for maximizing tire life and minimizing the chance of a catastrophic tire failure is maintaining the proper inflation pressure for a given tire size and load. Once proper tire inflation has been determined, it should be consistently maintained at that level.

Improper tire inflation can lead to a host of problems, including increased wear, impact damage, irregular wear, and blowouts. Proper tire inflation helps maximize tire tread wear, increases casing re-treadability, improves fuel economy, and lowers cost per mile.

Although a common practice, tire inflation pressure cannot be accurately estimated by kicking or thumping a tire. Trying to determine if a tire needs air by thumping it is as effective as trying to determine if a vehicle's engine needs oil by thumping on the hood. Inflation pressure should be checked using a tire gauge that is in good condition and calibrated.

Always check tire inflation pressure when tires are cold. Tires are considered cold when they are approximately the same temperature as the surrounding air, typically when the vehicle has been parked for three hours or more, or before a vehicle has been driven less than one mile.

A WASTE OF TIME

Thumping a truck's tire with a wooden bat, hammer, wrench, etc., to ensure proper air pressure is a waste of time, say truck tire professionals. Accurate inflation pressure cannot be determined by the distance or sound of the thumping item rebounding from the tire.

With increasing roadside vehicle safety and CSA (Compliance, Safety, Accountability) points counting against both the driver and their company, the smart thing is to use a calibrated tire pressure gauge to take the guesswork out of tire inflation pressure.

TIRE INFLATION (CONTINUED...)

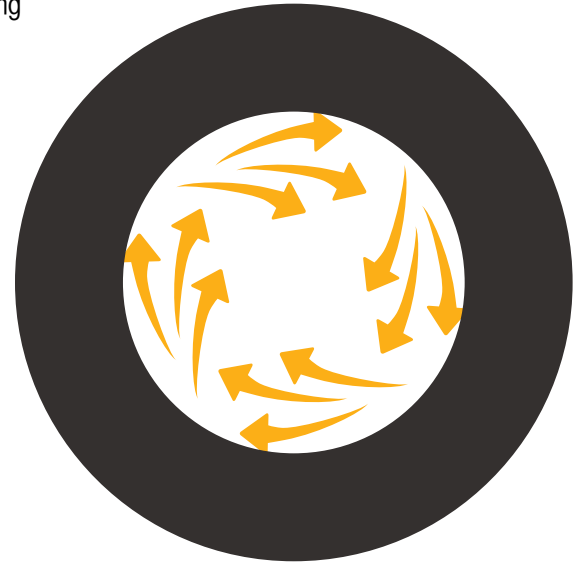
It's not the tire, but the air *inside* the tire, that carries the weight of a vehicle, absorbs shock, and keeps the tire in its proper shape so that it can perform as designed. In addition, tire inflation pressure influences handling, traction, braking, load-carrying capability, and fuel economy.

When tires are not properly inflated, they flex more than they were designed to. This bends the tire's rubber and steel (used within the rubber to provide additional operating characteristics) and generates heat.

Heat is a tire's worst enemy. It dramatically accelerates tire wear, shortening the life span of the tire. Plus, heat increases rolling resistance, increasing fuel consumption and wasting fuel.

Trucking industry statics show:

- The number one cause of road breakdowns is tire related
- Tire-related costs are the single largest maintenance expense item for commercial vehicle fleets
- A constant 20 percent underinflation increases tread wear by 25 percent and reduces the tire's lifetime by 30 percent
- Improper tire inflation increases total tire-related costs by approximately \$600 to \$800 annually per tractor-trailer combination



HEAT: ENEMY #1

Heat is the number one nemesis of a tire.

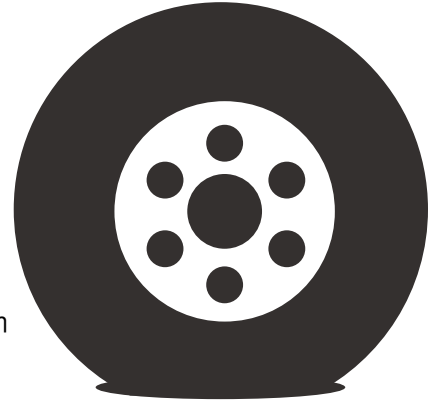
As a tire rotates, its sidewalls flex, creating heat. If the tire inflation pressure is enough to carry the load of the vehicle, then the heat created by the flexing is minimal and does not damage the tire. But when the inflation pressure is not enough to carry the load, increased flexing creates additional heat.

If the heat is allowed to build up long enough, the bonds between the tire's plies and rubber components start to break down. This shortens tire life and can ultimately lead to a blowout.

TIRE INFLATION (CONTINUED...)

A tire's footprint—the area contacting the road—changes as tire pressure increases and decreases. This affects the load the tire can support and the tire's traction. It also causes heat buildup and irregular wear. Both overinflation and underinflation negatively impact a tire.

- **Underinflation:** This is the leading cause of tire failure. Underinflation causes excessive heat buildup and can cause internal structural damage. A direct correlation exists between how much a tire is underinflated and how much faster it wears.



Underinflated tires have more frequent punctures and are more prone to premature failures, increasing the risk of costly road service, downtime, and loss of revenue.

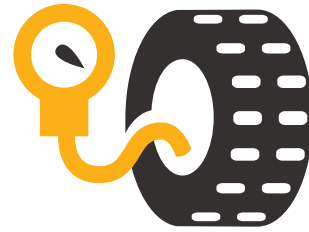
- **Overinflation:** This makes tires hard and stiff, causing a rougher ride. Overinflated tires are more vulnerable to cutting, punctures, sidewall issues, and impact damage.

Overinflated tires can suffer irregular wear, especially in the crown area. They can also reduce traction because the excessive pressure reduces the amount of rubber in proper contact with the road.

BAD STUFF HAPPENS

Increased tire wear, irregular tread wear, reduced casing durability, and lower fuel economy are some of the unnecessary costs incurred from tires that are not properly inflated.

CHAPTER #2



AUTOMATIC TIRE PRESSURE SYSTEMS

Automatic tire pressure monitoring and inflation systems increase tire life, maximize the value of the tire casing for re-treadability, lessen tire maintenance costs, and reduce the risk of tire failure and the costs associated with vehicle downtime. These systems eliminate the need to check tire pressure manually, saving time and labor while ensuring consistent and proper tire inflation.

Two types of systems address tire pressure:

- **Tire pressure monitoring systems:** These monitor tire inflation pressure and temperature and provide real-time data. If there is a problem, these systems will deliver alerts to the driver via an in-vehicle display. It is the responsibility of the driver to stop and get air or address the issue.
- **Automatic tire inflation systems:** These initiate periodic system and air pressure checks while a truck is in motion. They automatically add air pressure when the tire is below the truck owner-operator's specified air pressure to maintain optimal tire inflation. A driver does not need to stop and add pressure.

TOP CAUSE OF TRUCK PROBLEMS

Tires are the leading cause of truck problems, accounting for more than 50 percent of all roadside failures. Most tires fail because of improper inflation, low tread depth, and misaligned axles, which accelerate tire wear.

CHAPTER #3

COMPRESSED AIR OR NITROGEN INFLATION?

Some truck owner-operators inflate their tires with nitrogen instead of compressed air. Why?

Over time, the pressurized air inside a tire slowly migrates through the rubber. Even a well-maintained truck tire, on average, will lose about 1 or 2 pounds per square inch (psi) per month of inflation pressure from air passing through its sidewalls.

Changes in temperature affect air, which in turn affects the rate of air loss from a tire. The air inside a tire expands when heated and contracts when cooled. More air is lost in hot weather.

Nitrogen—an inert, non-combustible, non-flammable gas—is basically dry air with the oxygen removed. Ambient air contains nearly 79 percent nitrogen and 21 percent oxygen.

The key benefit to nitrogen tire inflation is that it slows the natural pressure loss in tires because its molecules are slightly larger (denser) than oxygen molecules.



IT'S BEEN YEARS

Nitrogen tire inflation has been used in certain applications for years, primarily because it does not support moisture or combustion. Applications include:

- Racing tires for IndyCar, Formula 1, and NASCAR
- Commercial and military aircraft tires
- Heavy duty equipment tires, such as earthmovers and mining equipment
- Space shuttle tires

COMPRESSED AIR OR NITROGEN INFLATION? (CONTINUED...)

A tire inflated with nitrogen will retain a constant pressure longer than one filled with air. This minimizes the headaches caused by underinflation or mismatched inflation across sets of dual tires.



Under the same circumstances, it might take a truck tire inflated with nitrogen about three months to lose 2 psi.

Nitrogen will not fluctuate as much as air. What's more, nitrogen provides constant pressure and is less susceptible to diffusion caused by changing temperatures.

Regular compressed air contains water, so when it is heated up, it expands rapidly and unpredictably. This could cause tires to over-expand and work against the rubber's effectiveness.

On the other hand, nitrogen—because it is a much drier substance—does not summon as much moisture as regular air when compressed into a tire. Because nitrogen-filled tires do not have as much moisture, they are less prone to expansion than those filled with only compressed air.

OKAY TO MIX?

Can nitrogen and compressed air be mixed in a tire in instances where a nitrogen-inflated tire needs some additional pressure and nitrogen is not available? The answer is yes. There is no risk in mixing the two together.

While the full benefit of just-nitrogen-filled tires is not attained, a mix still has benefit. The mix has less water vapor and oxygen than tires that are entirely filled with compressed air.

Manufacturers of nitrogen inflation systems advise that any tire containing both nitrogen and air be purged and then re-inflated with the proper amount of nitrogen as soon as possible.

CHAPTER #4

RECOMMENDED TIRE MAINTENANCE PRACTICES



Commercial truck tire manufacturers stress the importance of established routine tire maintenance. Doing so lowers per-mile tire costs by maximizing tire life, having fewer premature tire removals and tire failures, and getting better re-treadability. Among the manufacturers' recommended practices:

1. *Determine and maintain proper inflation levels for the application.* The biggest influence on tire life is inflation pressure because tires are designed to run at specific pressures based on the total load. This information can be found in tire load charts that are available from the tire manufacturer.

2. *Establish a good inflation maintenance program.* Tire pressure is difficult to maintain because tires naturally lose air over time and valve caps can leak through small punctures. Air pressure should be checked at least once a week using a calibrated air gauge.

3. *Alert drivers to the importance of avoiding tire sidewall impact.* Encourage drivers and technicians to inspect tires regularly for sidewall wear and damage and uneven or excessive tread wear.

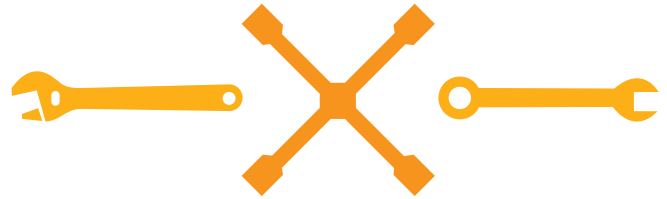
GO WIDE?

Wide base tires, introduced in 2000, take the place of the standard dual tire configuration on a tractor or trailer. Compared to dual tires, wide base tires are larger in size and have a much wider contact patch.

Typically, one wide base tire can carry as much weight as two dual tires but will have a lower tire and rim weight. This allows for improved fuel economy and increased payload, which can be beneficial for weight-sensitive fleets looking to increase their cargo.

Wide base tires are easier to maintain than dual tires because there is no inside dual tire pressure to match or maintain, and mismatched dual tires and height is eliminated. With fewer tires to check air pressure and tire condition, vehicle inspection time is lessened. Plus, the use of wide base tires reduces tire and rim inventory.

RECOMMENDED TIRE MAINTENANCE PRACTICES (CONTINUED...)



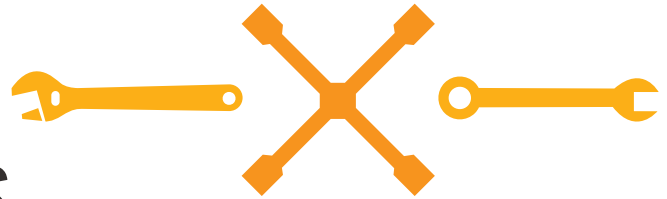
4. *Establish a total vehicle alignment maintenance and inspection program.* A common cause of early tire wear-out and irregular tire wear is out-of-spec alignment conditions. For more detailed information on vehicle alignment, check out our Total Vehicle Alignment e-book.
5. *Mount and balance tires correctly, otherwise tire runout can result.* This is a condition in which a tire or rim is out of round when rolling, causing up and down vibrations and “wobble” in a wheel or tire.
6. *Perform regular visual and manual inspections of tires.* While looking over tires, also run a hand over the tread and feel for abnormalities, such as bulges, cuts, or irregularities. This can provide useful information and catch wear trends before they have done too much damage. If corrected early enough, bad wear patterns can be countered and tire life extended.
7. *Rotate tires.* Tire rotation promotes even tread wear and can net extra miles in tread life. Drive tires should be rotated between forward and back positions at least once to even out wear. Rear tires of a tandem axle typically will wear quicker than the forward positions.

WHAT A DRAG

The energy lost from drag and friction of a tire rolling over a surface is known as rolling resistance.

The Alternative Fuels Data Center estimates that 15 to 30 percent of heavy duty truck fuel consumption is used to overcome rolling resistance. Installing low rolling resistance tires can improve fuel economy by more than 10 percent for heavy duty vehicles.

RECOMMENDED TIRE MAINTENANCE PRACTICES (CONTINUED...)



8. *Replace tires with matching ones.* For optimum tread wear, tires need to be as alike as possible across the same positions. If a tire must be pulled due to irregular wear or a road hazard, it should be replaced with a tire that matches the existing one.
9. *On dual assemblies, the outside diameters and tread depths should be as close as possible.* A good rule of thumb is no more than 2/32-inch tread depth difference between duals. Also, have the same tread design on both positions of an axle.
10. *Check and replace worn wheel and suspension components.* These can be the hidden enemies of tire life.
11. *Develop a good recordkeeping system.* Track tire performance and costs and use the data to make wise tire decisions.

SMART TIRES

In 2004, the U.S. Environmental Protection Agency (EPA) launched its SmartWay program—a public-private program to help improve supply chain fuel efficiency.

Commercial truck tires that meet EPA-mandated test criteria earn a SmartWay certification. This identifies that the tire reduces transportation-related emissions.

The EPA defines low rolling resistance (LRR) technology as any tire and re-tread that reduces rolling resistance and provides a fuel or emissions benefit for the engine.

A list of SmartWay verified LRR new and re-tread tire technologies can be found on the EPA's website at: <https://www.epa.gov/verified-diesel-tech/smartway-verified-list-low-rolling-resistance-lrr-new-and-retread-tire>

CHAPTER #5

CSA INSPECTIONS

Compliance, Safety, Accountability (CSA) is a data-driven safety, compliance, and enforcement program by the Federal Motor Carrier Safety Administration (FMCSA). Rolled out in 2010, CSA is designed to improve safety and prevent commercial motor vehicle crashes, injuries, and fatalities.

CSA examines carrier and driver safety performance and potential crash risk under the Safety Measurement System (SMS). SMS, which replaced the SafeStat system for identifying unsafe carriers through safety audits, uses seven Behavior Analysis and Safety Improvement Categories (BASIC):

- Unsafe Driving
- Hours-of-Service Compliance
- Driver Fitness
- Controlled Substances/Alcohol
- Vehicle Maintenance
- Hazardous Materials Compliance
- Crash Indicator



CSA tire violations are found under the Vehicle Maintenance BASIC and have a major impact on CSA scores. The most severe tire violations are weighted at 8; less severe at 3.

Eight-point tire violations include: flat tires; audible air leak; exposed fabric, ply, or belt material; tread or sidewall separation; and not CSA tread-depth compliant.

POINTS YOU DON'T WANT

To avoid tire maintenance violations under the Federal Motor Carrier Safety Administration's Compliance, Safety, Accountability (CSA) program, drivers should perform a thorough pre-trip vehicle inspection to ensure that truck, tractor, and trailer tires are in good shape. Key things to check:

- Proper tire pressure
- Irregular wear
- Tread depths
- Suspension components

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