

COMMERCIAL FLEET TIRE DIGEST

VOLUME I INDEX

- Issue 1 November/December 2006**
Tires and Inflation Pressure
- Issue 2 January 2007**
Ambient Temperature and Its Effect on Tire Pressure
- Issue 3 February 2007**
Tires and Fuel Economy
- Issue 4 March 2007**
Are the New Wide Base Tires right for your Trailers?
- Issue 5 April 2007**
How Drivers Can Reduce Tire Costs
- Issue 6 May 2007**
Summer Season and Your Tires
- Issue 7 June 2007**
Why Tires Lose Air
- Issue 8 July 2007**
Nitrogen Vs. Air in Commercial Tires
- Issue 9 August 2007**
What Industry Statistics Say about Proper Tire Inflation
- Issue 10 September 2007**
Over Versus Under-inflation
- Issue 11 October 2007**
Preventing Tire Sidewall (Zipper) Rupture
- Issue 12 November/December 2007**
Radial Truck Tires - Did You Know?

Tires and Inflation Pressure



Happy Holidays
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May you and your
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season.

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Next to fuel, tires have been and will continue to be the #1 maintenance issue facing fleets today. Each issue of The Commercial Vehicle Tire Digest will address a topic that will help you control these costs.

Our inaugural issue focuses on a tire's worst enemy - Heat. Tires are designed to run at a given load at a specified pressure; air is what carries the vehicle load (see picture 1) so it's important to get this right.

When you run underinflated, the stresses in the tire increase dramatically and this additional stress will cause the rubber temperature to increase. As the tire gets hotter, the rubber will begin to soften, degrade. The result is that treadwear will increase and reduce your tire removal miles.

Only bad results occur when tires are run underinflated:

- Irregular tire wear develops leading to premature removals

- Tire footprint becomes longer which leads to more rubber on the road, when combined with additional heat because of running underinflated, results in more tread area punctures.

- Casing durability (retreadability) decreases because the additional heat will adversely affect the rubber properties

- Fuel economy drops significantly because of the increase heat

So why not simply overinflate your tires? Unfortunately, this just causes a whole new set of issues:

- Tire traction decreases significantly because the tire footprint becomes very small

- Vehicle will tend to "bounce" up and down the highway which creates very

unhappy drivers as well as irregular tire wear

- Fast centerline tire wear

The only way to maximize mileage, increase retreadability and maximize fuel economy is to consistently run at the recommended air pressure per the tire load/inflation tables published by the tire industry. It is important that you base it on your worst case axle load scenario. If you know the worst case load per tire you can choose the proper air pressure to maximize tire performance. However in many cases, choosing a single air pressure specification for ALL your tires, while easy for your tire guys to remember, may not necessarily maximize your fleet's tire performance. Individual vehicles or even unique axle positions, depending upon the load being carried, may need differing air pressure settings.

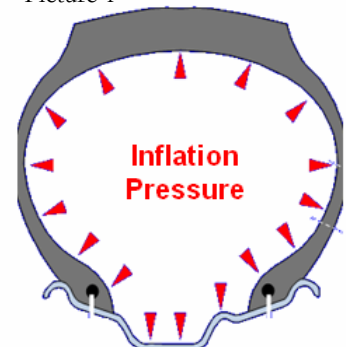
Q & A PSI ANSWERS YOUR QUESTIONS

Why do tires lose air over time?

- - Osmosis of air through the tire casing will cost you 1 - 2 PSI per month
- - Tread area punctures (typically slow leakers)
- - Leaking valve core
- - Tread and/or Sidewall impact breaks

All of these conditions are beyond your control and that is why tires will continue to be an issue with commercial trucking fleets.

Picture 1



"Air is what carries the load"



COMMERCIAL FLEET TIRE DIGEST

*The authoritative guide to reducing commercial tire expenditures from
Pressure Systems International,
the manufacturer of the Meritor Tire Inflation System by PSI™*

VOLUME 1 ISSUE 2

JANUARY 2007

Ambient Temperature and Its Effect on Tire Pressure

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see a demonstra-

tion of the new

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with the

ThermALERT™

feature that warns

of elevated wheel

end temperatures.

What is the relationship between tire air pressure and ambient temperature? Fleet managers need to fully understand this issue in order to optimize their tire performance.

Tires are designed to run at a given load at a specified inflation pressure. And that **inflation pressure is based on measuring the air pressure at typical room temperature of 70° F.** But what if you are checking tire air pressures in the middle of winter in Minnesota and it is 0° F. Under these conditions, what is the proper air pressure?

The rule of thumb is that air pressure will change 2 PSI for every 10° F change in ambient temperature.

Basis: 100 psi @ 70° F Measuring at 0° F in Minnesota, there will be a DROP in tire air pressure of approximately 14 PSI (2 psi X ((70-0)/10)) Bottom line: Tire now has 86 PSI (100 - 14)

Conversely, if you were in Phoenix Arizona in the middle of August and the ambient temperature was 120°F, the pressure would now **increase** 10 PSI to 110 PSI (2 psi X (120 - 70)/10)

The above calculations are relevant when

checking a "cold" tire.....a tire that has been sitting for at least several hours. But what happens to a "hot" tire as it runs down the highway? If you were running 65 MPH, fully loaded, and added 100 PSI into your tire before you left the terminal (ambient 70° F), after only 20 minutes, that same tire would measure 114 PSI because of the increasing tire temperatures (assuming the ambient temperature is still 70° F when you measured the tire.) This is why you should **always tell your drivers to never check a "hot" tire...**they will think it is overinflated and will start taking air out. But it is actually exactly where the tire needs to be. Tires reach a steady state air pressure after 20 minutes of riding down the highway.

By running tires at the specified air pressure, you will maximize your tire mileages, retreadability, traction and your vehicle fuel economy.

The simplest and best way to insure that your air pressure is always correct is thru the use of an automatic tire inflation system. Keeping tires running "cool" by running at recommended tire pressure is the secret to minimizing your tire expenditures.

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Q & A PSI ANSWERS YOUR QUESTIONS

Q: What happens to tire air pressure when my truck is at sea level (Philadelphia) versus a mile up the mountain (Denver, Co)?

A: Tire air pressure changes very little as altitude changes. If you measured tire air pressure to be 100 PSI in Philadelphia, that same tire would measure 102 PSI in Denver...assuming that the ambient air temperature was the same in both cities.

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VOLUME 1 ISSUE 3

FEBRUARY 2007

Tires and Fuel Economy

Fuel and tires are the largest operational costs facing most fleets today and maximizing fuel economy is always a challenge. Many factors affect vehicle fuel economy including:

Vehicle Make & Model - Drivers
- Tires - Roads - Routes - Loads - Speed

For a typical 80,000 pound GVW tractor-trailer running at highway speeds of 65 mph, the approximate horsepower requirements are:

-Aerodynamic Drag	35%
-Driveline Losses	15%
-Engine Accessories	10%
-Tire Rolling Resistance	40%
	100%

The faster a vehicle speeds down the highway, the more heat is generated in the tire casing, leading to increased tire rolling resistance & lower fuel economy. Going from 55 to 65 mph increases fuel consumption approximately 15%.

Rule of Thumb: Every 1 mpg increase in speed decreases miles per gallon by 0.1 mpg.

The heavier your loads, the same concept holds true: additional heat generated by the increased tire deflection leads to lower fuel economy.

Tires are designed to run at a given load and inflation pressure. Running 18 tires 30% underinflated will cost you 5% in actual vehicle fuel economy. 10% underinflation will be a ONE 1% penalty in fuel and 20% underinflation will be over 2% loss in fuel economy.

Trailer tires account for approximately 40% of the tire rolling resistance on a typical tandem axle tractor-trailer. Numbers vary depending on specific vehicle and type of tire.

Maintaining proper tire inflation pressure is critical to maximizing your fuel economy. Dual tires which have varying tire pressures (IE. 100 PSI outside dual, 70 PSI inside dual) will increase tire rolling resistance significantly. Tire revolution per mile changes with inflation pressure and dual tires will see severe irregular wear conditions develop, which leads to even lower fuel economy.

Most tire manufacturers have "fuel efficient" tires in their product portfolios. Typically there is a tradeoff in removal miles when you purchase fuel efficient tires so it is important to work closely with your tire professional when purchasing these tires.

Using automatic tire inflation systems will insure that you maximize your fuel economy in your fleet.

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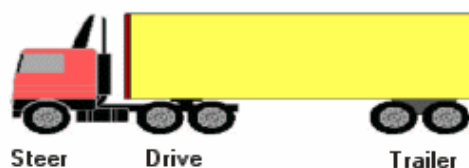
Q & A PSI ANSWERS YOUR QUESTIONS

Q: We have started to move our fleet of over the road tractors and trailers to the new Wide Base tires. We have PSI tire inflation systems on the trailers.

Would we benefit further by converting the tires to Nitrogen?

A: Today's commercial truck tires are built with tire innerliners that are compounded to minimize air diffusion through the tire casing. Tires actually lose very little air due to osmosis through the tire casing. Primary air loss of a tire is due to punctures and bad valve stems/cores. Air is comprised of 79 % Nitrogen. Using pure Nitrogen in place of air will have only a minimal effect on rate of diffusion through the tire casing.

Fuel Economy Contribution



TIRE COMBINATION	STEER	DRIVE	TRAILER
All Rib Tires	14%	41%	45%
Rib/Lug/Rib	14%	49%	37%



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Technology at the
ArvinMeritor booth
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VOLUME 1 ISSUE 4

MARCH 2007

Are the New Wide Base Tires right for your trailers?

Over the last several years, there has been a lot of excitement generated by the latest innovation in the tire industry: Replacing dual tires with only one tire.

There are (2) main advantages to replacing one tire with two.

-Weight savings can add up to as much as 1,300 pounds depending on whether you are replacing both the drive and trailer tires and whether you are using them with aluminum wheels in place of steel.

-Fuel economy is the other obvious advantage because of the reduced rolling resistance of only one tire and one wheel.

Other advantages include:

-Easier maintenance (no inside duals to worry about)

-Eliminate dual matching concerns

-Improved brake cooling

-Improved, softer ride because the tire is so wide the vehicle is not susceptible to the normal road rutting condition that occurs over time.

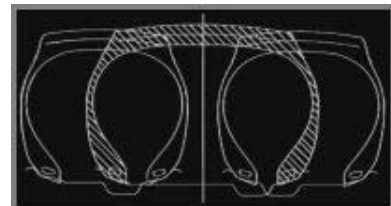
It is important to understand

that one 445/50R22.5 is NOT double two 11R22.5 tires. A conventional trailer tire size is 11R22.5 and the most common wide base tire size is 445/50R22.5. So using (2) 11R22.5 tires gives an overall tire footprint of 124 sq inches. Using one 445/50R22.5 has a footprint of 111 sq inches (10% less contact area). The wide base tire is doing more "work" than two duals, which results in the tire being more sensitive to running overloaded and under inflated. Heat will also become a big issue if the wide base tire is not properly inflated. Running even 10% under inflation will lead to premature tire removal because of irregular wear and tire durability issues. Most fleets that are running these wide base tires use an automatic tire inflation system because maintaining proper inflation of the 445/50R22.5 is so critical. Also, when running single tires, if you experience a puncture, there is NO limp home capability unless your trailer is equipped with a tire inflation system.

Fuel economy is a hot button

for most fleets today and using the new wide base tires will improve your fuel economy, but by how much? The answer is - "it depends". We have seen reported numbers from 1% to 4%, but there are many variables that can affect vehicle fuel economy. Drivers, roads, loads, vehicle make and model all contribute to this equation. Running a serious test in your fleet under your specific operating conditions is the only way to determine if the new wide base tire is right for your fleet.

For fleets that haul loads that gross out in weight, such as grain and produce, the additional weight savings of using wide base tires can increase payload and daily revenues. For these fleets, using wide base tires is likely a no-brainer.



Q & A PSI ANSWERS YOUR QUESTIONS

Q. How are mileages and retreadability of the new wide base trailer tires?

A. Since trailer tires are running on a free rolling position, removal mileages of the wide base tires are equivalent to dual tires. The jury is still out on retreadability. Since one single tire is not double two tires, the wide base tire is doing additional "work" which tends to generate additional heat. Running low inflation pressure will compound this issue. Keeping tires running cool is the best way to maximize retreadability.



COMMERCIAL FLEET TIRE DIGEST

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VOLUME 1 ISSUE 5

APRIL 2007

How Drivers Can Reduce Tire Costs

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contacting
Al Cohn
[acohnpsi
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Tires are the #1 maintenance cost for commercial trucks and drivers have a major impact on helping fleets reduce this expenditure. Commercial tires continue to increase in price because of the escalating cost of raw materials. Cost for three of the major raw materials for tires have increased significantly over the last few years: Natural rubber costs have more than doubled and steel has also shown double digit increases: Oil is the other major raw material for tires (rubber chemicals are all derived from oil), and with oil at over \$60.00 a barrel, the impact on tire costs are significant. Tire companies continue to raise prices just to keep up with their cost for these raw materials.

The 18 tires on a typical tractor-trailer cost anywhere from \$4000 - \$6000, depending upon the specific tire type/design. Running retreads on both the drive and trailer position will keep the tire costs on the lower end of the range. It is important that fleet drivers appreciate that new tires and retreads are a significant investment and can make or break a fleet in the same way that Owner-Operators understand this.

So what can drivers do to maximize the fleet's investment in tires?

*The morning walk-around is critical and kicking the outside tires is not enough. They should also check air pressures with a calibrated gauge because tires are designed to run at a given load and inflation pressure. If the tire is underinflated only bad things will result. Irregular wear will develop, fuel economy will get worse, retreadability will be reduced, and tires will not reach their target removal miles.

*Drivers need to look for any signs of irregular wear which is an early warning sign for underinflation and/or vehicle alignment issues. The tire tread should be wearing smoothly. If not, the technicians need to check out the vehicle.

*Drivers should rub their hand over the tire tread and sidewall looking for any signs of punctures or damage.

Drivers have an enormous impact on maximizing tire mileage. A recent study of a small fleet in the Northeast revealed some interesting results. Ten (10) drivers were assigned to specific tractors married to specific trailers. The ten (10) vehicles had similar payloads and similar routes. The study revealed that **there was a direct correlation between tire performance and driver.** Tires had the fastest treadwear rates on vehicles assigned to drivers who drove fast, made sharp turns, and were hard on their brakes. Age and experience of the drivers was also important. One driver who had been driving for 35 years had the best looking tires and the best treadwear. A 25-year-old driver with 6-months experience had the fastest treadwear and tires with irregular wear. So what did this fleet do to insure that tire performance improves? They have various contests with prizes to the drivers who get the best miles per 32nd of tread wear on their tires.

Fleets should implement a Tires 101 class on a regular basis for their drivers. Just 20 minutes to remind drivers of the impact that they can have on the tires can go a long way to reducing your annual tire expenditures.

Q & A PSI ANSWERS YOUR QUESTIONS

Q. I'm a driver and I use a standard stick gauge to check my tire pressure. How accurate of a reading will I get from this gauge?

A. That depends. Even when new, the stick gauges purchased at truck stops and other similar locations are only accurate to +/- 3 PSI. And, if stick gauges are dropped, they can get out of calibration pretty easily. We advise that these gauges initially be calibrated to a master gauge and then checked on some type of routine basis after that. This practice should ensure that this tool is as accurate as possible in measuring your tires' air pressure.

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VOLUME 1 ISSUE 6

MAY 2007

Summer Season and Your Tires

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Al Cohn**

[acohnpsi
@aol.com](mailto:acohnpsi@aol.com)

Have you noticed an abundance of "alligators" (truck tire pieces & parts) on the highways during the hot, summer season? If you're driving through states like Arizona, New Mexico, Nevada, Texas and Florida during the summer months, it appears that these road alligators are everywhere. They can be very dangerous for vehicles that not only run over them, but for those vehicles that make sudden lane change maneuvers to avoid the rubber on the road. Most of the public believe that these road alligators are "bad" retreads. But alligators are both new and retreaded tires.

Any tire, regardless if it is a new tire or a retread that runs with little or no air, will eventually fail, because tires require air to carry the load. When tires are underinflated, the excessive heat generated by the increased tire deflection will cause the rubber compounds to break down and lead to failure. Over 90% of the alligators found on the road are due to running underinflated, very few are actually due to a bad retread.

During the summer season, when the ambient temperatures can get well over 100° F, and some road temperatures can reach almost 200° F, the heat problems caused by underinflation are more extreme. Tires that are run underinflated will be more prone to failure in these temperatures. A very famous tire engineer once stated,

"Heat is to tires as Kryponite is to Superman"...in other words, it's worst enemy. Taken all together, hot summer temperatures, underinflated tires, heavy loads, and traveling at high speeds (not that this ever happens), and you have a recipe for tire disaster.... that's exactly why you see more alligators on the highway in the summer season.

What can fleets do to minimize tire related issues during the summertime months?

- Tire pressures need to be checked more frequently in the summer.

- *If you normally check air once a month, check twice a month

- *If you normally check air once a week, check twice a week

- *Make sure your tire gauges are checked versus a master gauge

- Plan your tire program around mounting new, deep tread depth tires prior to the winter season

- *When summer hits, the tires will be worn down and generate less heat

- Inspect tires for punctures and damage more frequently in the summer months.

- *Tire punctures tend to increase during the summer because the tread rubber becomes hotter and "softer" and acts as a magnet to nails and road debris

- Initiate a tires 101 review course for your drivers with emphasis on summer heat issues.

Using automatic tire inflation systems where the air is automatically added whenever the tire is below the recommended specification, is the best and most practical way to insure that your tires do not become alligators on the road.



Q & A PSI ANSWERS YOUR QUESTIONS

Q. My radial truck tires are speed rated at 65 mph. Is it OK to run at 70 or 75 mph without causing damage to the tire?

A. The Tire & Rim Association publishes a table to specifically address this issue. If running your vehicle between 66 - 70 mph your maximum tire load capacity decreases by 4% with an inflation pressure increase of 5 PSI. If you travel at 71 to 75 mph, then the maximum tire load capacity decreases by 12% with the same inflation increase of 5%.

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VOLUME 1 ISSUE 7

JUNE 2007

Why Tires Lose Air

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[acohnpsi
@aol.com](mailto:acohnpsi@aol.com)

At many trucking operations, this is a big mystery - why do my tires lose so much air?

Our Tire Digest column this month may answer that question for you, and once you fully understand the "why", then you can begin to concentrate on how to maintain the proper tire inflation at all times.

There are four(4) primary reasons why tires lose air:

1. Tire punctures in the tread area are the #1 cause of air loss in commercial truck tires. And it is not catastrophic type failures....it is predominately slow leakers caused by nails and other sharp objects. Tread punctures typically can cause a tire to lose a few pounds of pressure every day. This may not sound like very much but in just a week, a 100 PSI truck tire can be down to 80 PSI. Punctures can occur anywhere but city driving leads to a higher incidence of punctures.

2. Osmosis of air through the tire casing is another reason why tires lose air. Today's truck tires are designed with steel belts and excellent innerliner compounds that are meant to keep air from escaping. However, air will still slowly escape over time, maybe 1 to 2 PSI per month. So in a year, that 100 PSI truck tire will be down 10 to 20% (to 80 - 90 PSI). 20% underinflation can cost you almost 2% in vehicle fuel economy.

3. Leaking valve cores will also lead to a

loss in tire inflation pressure. In addition, these valve cores, in the cold weather, can stick and freeze up - which just makes the problem worse. Many fleets will not even go to the trouble of checking their tires in the winter because of sticking valve cores.

4. The most obvious reason why tires lose air is tire damage primarily due to hitting curbs. Sidewall cuts and snags can lead to loss of air. This condition can be significantly reduced through driver education.

Experts have been preaching for years the importance of inspecting your tires on a regular basis for damage, irregular wear, and inflation pressure. In reality it just does not happen frequently enough....because it takes time, effort, and money to do it properly. Using automatic tire inflation systems which adds air to the tire whenever it is below the fleet's recommended specification, is the only way to insure that your tires are running at the proper pressure at all times. For instance, even with multiple nail punctures (those slow leakers), air is added to the tire as required.

There are serious financial benefits for a fleet to keep their tires properly inflated. Maximizing fuel economy, improving tire removal mileage, improving retreadability, and reducing tire related road side service calls are the critical reasons to keep those tires inflated. Reduce tire expenses and add to the bottom line by keeping tires always at the recommended air pressure is the tip of the month.

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Q & A PSI ANSWERS YOUR QUESTIONS

Q. How do I determine the best air pressure for my tires?

A. Air is what carries the load. To calculate the recommended air pressure for your tires, you must determine the worst case load that the tire will see. For example, if your first trailer axle (4 tires) weighs 18,760 pounds fully loaded, take 18,760 lbs and divide by 4 tires (4,690 lb per tire). Now use the Load/Inflation tables found at the websites of any of the tire companies. A 295/75R22.5 tire would require **90 PSI** to carry the load. Different sizes require different pressures based on the worst case load scenario.

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VOLUME 1 ISSUE 8

JULY 2007

Nitrogen Vs. Air in Commercial Tires

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Before discussion about nitrogen vs. air in commercial tires – a little science review will be helpful. What is the most abundant element in the earth's atmosphere? Surprisingly to many, the correct answer is nitrogen. The air we breathe is comprised of 78.1% nitrogen and 21% oxygen. Nitrogen, as a gas, is colorless, odorless, and generally considered an inert element. Oxygen, which is very reactive, combines with many elements. Oxygen molecule size is smaller than Nitrogen which is the theory on why Oxygen has a slightly higher diffusion rate versus Nitrogen.

OK, so about your tires - in the 1946 Journal of Applied Physics, there is the following quote, "Nitrogen molecules are less likely to escape from the inside of a tire compared with air". However, tire design has changed considerably in the last 60 years. Today's major brand commercial radial tires are constructed with a chloro or bromobutyl innerliner compound which extends from bead to bead. It has (1) primary purpose, to minimize air diffusion through the tire casing. These innerliner compounds were previously designed with only butyl rubber; but years ago, it was discovered that by using chlorobutyl or bromobutyl rubber as the primary ingredient for tire innerliners, the diffusion rate dropped dramatically.

A tire may lose 1 – 2 psi per month because of diffusion. Some tire brands lose less than 1 psi per month while others can lose 2 psi or even slightly more per month.

With the advent of portable Nitrogen generating equipment, many fleets are experimenting with using Nitrogen in place of air in their tires. A few considerations:

*Air is 78% Nitrogen already

*It is impossible to remove 100% of the air

from a tire and replace it with Nitrogen

*The #1 reason why tires lose air is because of slow leaking punctures in the tread area (not osmosis)

*Tire running temperature reduction with nitrogen is so negligible that the tire companies have never been able to document a mileage or a fuel economy improvement

The major tire companies have weighed in regarding using Nitrogen in place of air in commercial tires:

Bridgestone: "We have not seen any fleet data on the positive use of nitrogen. It has not been proven as a cost efficient replacement for air for commercial truck application. All the other possible positive impacts of nitrogen use could be achieved with the use of dry air and a good maintenance program."

Michelin: "We know of several fleets that are running nitrogen and/or testing it. They run it for various reasons: "better fuel economy", "increased mileage" and/or "better pressure maintenance". There is a lot of anecdotal information but very little good statistical data. I have not had a fleet say they are getting better fuel economy from running Nitrogen, it is hard to measure and quantify. I have seen some data on treadwear of Nitrogen vs. air and what I saw was inconclusive. Clean, dry air and a good tire pressure maintenance program is the key!"

Goodyear: "Nitrogen inflation appears to have quite small, perhaps insignificant advantages for over-the-road truck tires."

You can be sure that tire companies want their tires operating at proper air pressure to maximize mileages, fuel economy, and retreadability so their opinions about the possible benefits of filling tires with Nitrogen should be seriously considered.

Monitoring your tires & your tire pressure on a frequent basis is highly recommended. Of course, using an automatic tire inflation system that adds air whenever the pressure falls below specification is the best way to be sure you are maintaining the proper tire pressure at all times.

Q & A PSI ANSWERS YOUR QUESTIONS

Q. How often should I check my tire air pressures? **A.** Check with a calibrated gauge once per week if you are on the highway. Check more frequently if you see off-the-road conditions.

COMMERCIAL FLEET TIRE DIGEST

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VOLUME 1 ISSUE 9

AUGUST 2007

What Industry Statistics Say about Proper Tire Inflation

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The Federal Motor Carrier Safety Administration (FMCSA) has published several studies over the years about commercial tire pressure maintenance.

By definition, a tire is considered "flat" and should be removed from service and thoroughly inspected when that tire is 20% below recommended air pressure. A typical commercial truck tire operates at 100 PSI. If the tire is measured to be 80 PSI, then that tire must be removed from the vehicle. Air is what carries the load and when the air pressure drops significantly, this will lead only to negative performance results.

Research performed by the FMCSA has revealed that 7 % of all tires are underinflated by 20 PSI or more. And only 45% of all tires are within +/- 6 PSI of their target pressure. Tires and tire related costs continue to be the single largest maintenance cost for fleets today. And with tire prices continuing to rise because of the high cost of raw materials (oil based), the tire related maintenance costs will just continue to escalate.

The FMCSA points out that for the average fleet operator, tire underinflation increases the annual procurement costs for both new and retread tires between 10 - 13%.

Fuel economy drop due to tire underinflation is conservatively stated at 0.6%. If all 18 tires were underinflated 20%, the loss in fuel economy would be over 2%. At today's fuel prices - the total additional cost to a fleet would be completely unacceptable.

On top of the increased fuel & tire costs, tire underinflation is responsible for about one (1) road call per year per tractor-trailer. The average downtime associated with a roadside service call is over 2 ½ hours and costs several hundred dollars, which is not good for the bottom line or "just-in-time" delivery. The government estimates that tire underinflation increases tire related costs from \$600 - \$800 annually per tractor-trailer. The ROI (return on investment) for running an automatic tire inflation system is typically under one (1) year for most fleet operations.

NHTSA also reports that commercial vehicle tire underinflation is directly linked to stopping distance and handling and therefore overall safety. NHTSA points out, that properly inflated tires could help prevent or limit crashes even when the tires are not the initial cause of the crash.

Bottom line: Checking your tires on a regular basis for both air pressure and any signs of irregular wear is essential if a fleet wants to maximize mileage, increase fuel economy, and maximizing retreadability.

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Q & A PSI ANSWERS YOUR QUESTIONS

Q. I recently initiated an evaluation with PSI tire inflation systems on 10 trailers and 10 trailers as the control without any inflation system. I have 1,000 trailers in my fleet, Is my sample size large enough to make it a meaningful test?

A. Whenever you run an evaluation of any kind of product (including tire inflation systems), it is important that you spend the time putting together a "serious" test. At the end of the test, you must be able to be in a position to determine that product A is equal, better, or worst than product B. Otherwise you would have wasted a lot of time and money.

The Technology Maintenance Council (TMC) recommends a minimum sample size of 30. There are so many variables to consider when designing a test such as route, load, trailer make and model, and driver. Sample size needs to be large enough to take those variables into account. It is also important to determine what data will be collected. In your case you need to keep track of removal tire mileages, roadside tire related service calls, and # of tires that were successfully retreaded.

COMMERCIAL FLEET TIRE DIGEST

*The authoritative guide to reducing commercial tire expenditures from
Pressure Systems International,
the manufacturer of the Meritor Tire Inflation System by PSI™*

VOLUME 1 ISSUE 10

SEPTEMBER 2007

Over Versus Under-inflation



Trailer tire showing signs of irregular wear aggravated by improper inflation

Courtesy of the TMC
Radial Tire Wear
Conditions Analysis Guide

MTIS™ will be featured at the ArvinMeritor Booth (#104) at the IANA Intermodal Expo being held November 10-13 at the Georgia World Congress Center in Atlanta.

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Most things in life and in business have tradeoffs – the good vs. the bad. The objective for your business is to maximize the specific attributes that work best and that give the fastest and best ROI (Return on Investment).

The decision to over-inflate tires, or possibly to run under-inflated tires, has serious implications to how well you meet these objectives.

Over-inflating tires

Some fleets prefer to over-inflate their tires for several reasons:

-It may be considered a safety factor if the tractor and/or trailer will not be seen for long periods of time. This can be especially true for some trailers, where it is possible they may not be seen in the shop for up to a year. By initially over-inflating the tires by 15% to 115 psi, at the end of that year the tire could still maintain a safe 100 psi level even though air is lost through osmosis. Note: If the tire has nail puncture causing a slow leak, it could be down to 60 to 70 psi or even lower.

-Another reason fleets may prefer to over-inflate is to improve fuel economy. Over-inflating will improve fuel economy slightly to start but eventually the tire will develop uneven wear, which leads to very early tire removal mileage. Also, tires will start developing cupping wear because of the bouncing. Once uneven wear develops, fuel economy will get worse....not better.

Tire over-inflation is typically not an issue for trucking fleets because of significant negative trade-offs to this practice, in addition to the increased wear characteristics mentioned above:

When tires run overinflated, the ride experienced by the driver becomes quite "bouncy" which they don't like. Keeping good drivers is still a major issue and over-inflating tires will not help driver retention.

-Traction is adversely affected as well with over-inflated tires. The tire footprint becomes very small and the result is an increase in vehicle stopping distance.

-Many fleets also report increased sidewall blowouts when they run up against curbs when tires are over-inflated.

Under-inflation

So are there any benefits from running your tires underinflated? The answer is NO. There are actually no "trade-offs" to this practice as **tire underinflation will only lead to problems, with no correlating benefits.**

The negatives of running tires underinflated are numerous:

-Mileage is significantly reduced because uneven wear will develop (tire footprint becomes long and distorted)

-Roadside service calls will increase because of increased punctures (combination of the longer footprint plus added heat caused by the stresses of increased flexing of the sidewall)

-Fuel economy will drop – as an example your fuel economy will be reduced by over 2% if tires are underinflated by 20%.

-Retreadability is also reduced because of the additional heat generated at low tire pressures.

The bottom line is that tires need to run at recommended pressure ALL the time in order to maximize fuel economy, mileage, traction, retreadability and to reduce roadside service calls. This is accomplished by running tires at recommended air pressure based on your worst case load scenario. It is important to understand all the factors of tire inflation when designing your tire program so that you can meet the objectives for your business.

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VOLUME 1 ISSUE 11

OCTOBER 2007

Preventing Tire Sidewall (Zipper) Rupture



Courtesy of the TMC
Radial Tire Wear
Conditions Analysis Guide

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We all know how important it is to maintain proper tire inflation pressure to:

- Maximize fuel economy
- Maximize tire removal mileage
- Minimize irregular tire wear
- Maximize retreadability
- Reduce roadside service calls

But a potentially dangerous condition can develop when radial tires run with little or no air for an extended period of time. This condition is technically called a circumferential upper sidewall rupture. The more common name is a "zipper break" or "zipper rupture".

To understand this condition, think of the individual steel wires running through the sidewall as "paper clips". When a tire is running the recommended pressure, those wires are in tension. But if a tire runs significantly under inflated (with little or no air) for an extended period of time those wires or "paper clips" are no longer in tension. In this condition, the tire sidewall will flex significantly more than normal as the tire now rotates underinflated and overloaded. What happens if you keep bending a paper clip? It will eventually break. The same analogy holds true here. The sidewall wires will continue to weaken as the tire runs with little or no air (inside duals are especially prone to this condition).

After the retread process is when extra caution is required.

It is very difficult to determine if a radial truck tire ran with little or no air for an extended period of time. Even if the tire is inspected before and after retreading, there is no guarantee that the technician can determine if the tire ran significantly underinflated for a long period of time. Tires that have those weakened wires in the sidewall are the suspect tires that have the potential to experience a zipper

rupture.

Caution is required during the inflation process.

If a tire is going to zipper, it will occur when the tire is remounted and inflated before going back into service, either as a new tire that had a puncture repair or as a new retread.

A safety cage is absolutely required when inflating a truck tire.

If a zipper rupture occurs, you want it to happen inside the cage, otherwise people can be injured. As an added precaution, tires should be 20% overinflated inside the safety cage to insure that if the tire is going to rupture, it will do so INSIDE the cage.

The Rubber Manufacturers Association publishes a wall chart that explains the proper procedure when inflating tires along with the procedure for checking tires for possible zippers. Contact the RMA at www.rma.org to order your wall charts. Or you can call the RMA at 800-325-5005 X-242 and order: Publication 33#2 23/95 "Inspection Procedures for Identification of Potential Zipper Ruptures in Steel Cord Radial Medium & Light Truck Tires plus Wall Chart".

Remember air inside the tire is what carries the load

- Running underinflated with little or no air for an extended period of time will cause severe sidewall deflection, generate a high amount of heat, and the sidewall wires may become weakened.
- To prevent possible zipper ruptures occurring when a tire is put back into service because of a puncture or as a retread, always inflate the tire in a safety cage and follow all safety precautions.
- Using automatic tire inflation systems to insure that your tires are always running at recommended tire inflation pressure is one approach to significantly reducing zipper ruptures from occurring at your fleet.

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VOLUME 1 ISSUE 12

NOVEMBER/DECEMBER 2007

Radial Truck Tires – Did You Know?

Today's radial truck tires are an engineering marvel. Depending on the specific make and model, a radial truck tire can have 15 different components. Each component (tread, sidewall, bead) is comprised of 10 – 15 different ingredients. There are different types of rubbers, carbon black, resins, accelerators, curatives, and even wires. Each compound is like making a cake; because if you change one ingredient the properties of that compound can change dramatically. Tire designers and those formulating compounds work together to design and develop the best tire for a specific application and wheel position. Thanks to computer modeling techniques such as finite element analysis, tire designers can make minor changes and determine in a very short time what effect those changes will have on tire performance.

The most popular line-haul tire size is the 295/75R22.5. A typical line-haul fleet averages about 10,000 miles per month or 120,000 miles per year. A 295/75R22.5 steer or trailer tire will rotate approximately 515 revolutions per mile. This might not sound like very much until you multiply 515 by 120,000 miles per year. In one (1) year, that tire tread will be pressed against the pavement 61.8 million times! To survive that many yearly revolutions, the tires must always be properly inflated.

As you probably know, air is what carries the load and recommended tire pressures are based on your worst case load scenario. What happens if you run overloaded?

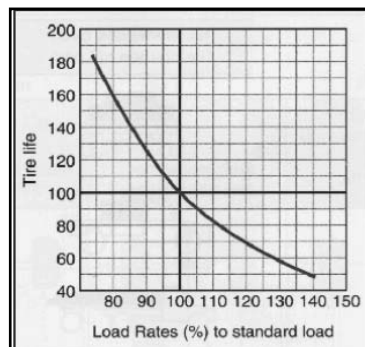


Chart courtesy of TMC RP-235

The graph shows that if you run just 10% overloaded, tire removal miles will drop a dramatic 20%. Twenty percent overloaded would reduce your tire life by 30%. The data assumes that you are NOT running at over the recommended tire speed rating. What happens if you do run at speeds greater than what the tire manufacturers recommend? Running faster will generate more heat and excess heat always reduces tire performance. Tire mileages will decrease even faster as speed increases.

If your tire air pressures are less than specification, your tires are underinflated and now there are additional consequences as the following graph demonstrates:

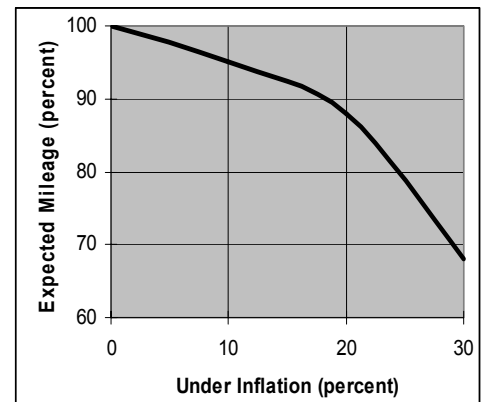


Chart courtesy of TMC RP-235

The graph reveals that running your tires 10% underinflated will cost you 10% in removal miles. And if those inside duals that have not been checked for the last year are down 30% in PSI, mileage will have been reduced over 30%.

It's pretty clear that running your tires at recommended load, inflation, and speed will allow your tires to get maximum mileage, maximum retreadability, and result in the lowest cost per mile. Additional cost advantages result from achieving the best fuel economy.



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joyous holiday
season.

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