

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™*

10 ISSUE 1

JANUARY 2016



10-Carat Diamond Edition

The first issue of
the Commercial
Fleet Tire Digest
was published in
December 2006.

January 2016
marks the
100th edition.

Maximizing Tire Cost:Value Ratio

As the price of commercial tires continues to remain at all-time highs, fleet managers have the responsibility of reducing tire cost/mile through maximizing tire removal mileage, increasing retreadability, improving vehicle fuel economy, and eliminating tire related roadside service calls.

Tires can be purchased at many price points. The real tire cost is the total cost of ownership over multiple retreads. A specific tire model may have a high initial acquisition cost but that should not necessarily deter the fleet manager from making the purchase. This particular tire may average the highest number of retreads per casing as well as yielding great miles/32". This is why tire cost/mile over the entire casing lifecycle makes the most sense when choosing which steer, drive, and trailer tires should be purchased for your vehicles.

The two most important criteria to maximizing tire removal mileage are (1) maintaining proper tire pressure (based on the vehicle load) and (2) reducing/eliminating irregular wear. If irregular wear develops, tire removal mileage will drop significantly. When the tire is not being worn smoothly and evenly, fuel economy will also decline. If the tires have developed irregular wear such as "cupping" they tend to hop down the road, which not only leads to premature tire removal, but dramatically decreased fuel economy. Choosing the proper tire pressure is always based on the worst case load the tire will see in your service vocation or duty cycle. When the tire footprint is optimal based on the pressure and load, tire life is maximized to its fullest potential. Tires are designed to run at a wide range of pressures as the vehicle rolls down the highway.

Tire pressures typically increase 15% after about thirty minutes running fully loaded at 65 mph. Tire companies preach to never take air out of a hot tire; their tires are designed to take this pressure increase into account.

All of the tire companies and the Rubber Manufacturers Association (www.rma.org) publish load/inflation tables. For a given load and tire, the recommended pressure is listed. These tables are based on an ambient temperature of approximately 70 F.

Tire underinflation is always the most serious issue when it comes to tires. Everything is bad when tires run underinflated. The footprint becomes long and elongated, which in combination with the extra flexing of the tire sidewalls, leads to increased heat, more punctures, lower mileages, and reduced retreadability. Keeping the tire casing running cool is the secret to maximizing the number of rereads per casing. When the tire is running cool is also when the tire fuel economy is maximized. Heat is to tires what Kryptonite is to Superman.

Keeping both inside and outside dual tires running within five psi of each other will also help considerably in maximizing tire mileages. When the inside duals are running at 70 psi and the outside duals are at 100 psi it's the worst scenario for tires to develop irregular wear. The tire revolutions per mile change dramatically when a tire is at 70 psi versus 100 psi with the result being uneven and irregular wear.

It is always a good idea to work with your tire professionals to help to understand and to optimize your fleet tire program and keep cost/mile in check.

Q&A PSI ANSWERS YOUR QUESTIONS

Q. My shop uses the standard stick-type pressure gauges to measure tire pressures. There always seems to be a big spread of results depending on which gauge is used. Any recommendations?

A. Regardless of manufacturer, brand new out of the box stick pressure gauges have an accuracy of only +/- 3 psi. Depending on which gauge is used, a tire with 100 psi can be measured to be 97 psi with gauge 1 and 103 with gauge 2. Best solution is to confirm gauge accuracy versus a master gauge on a frequent basis.

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10 ISSUE 2

FEBRUARY 2016

Greenhouse Gas Phase 2 Initiative

EPA is scheduled to announce the GHG-2 final rulemaking about mid-year 2016 following the completion of the comment period in late 2015. In order to reduce greenhouse gasses, vehicle fuel economy of both the tractor and trailer will have incremental improvement targets over the next 10+ years. These new regulations will go into effect beginning with model year 2018. This will mean that vehicles, both tractors and trailers, built as early as 2017 must meet these new EPA regulations.

Greenhouse Gases- Phase 2 EPA Guidelines for CO₂ & Fuel Consumption Improvements

MODEL YEAR	% IMPROVEMENT
2018	6%
2021	8%
2024	10%
2027	12%

Some of the potential strategies for curtailing greenhouse gases include:

For Engines:

- Combustion optimization
- Friction reduction
- Improved and increased air handling
- Improved emissions aftertreatment
- Waste heat recover

For Tractors:

- Improved aerodynamics
 - Wheel covers
 - Reduced tractor to trailer gap
 - Low rolling resistance tires
- Improved powertrain efficiencies
- Idle reduction technologies
- Weight reduction

For Trailers:

- Weight reduction
- Trailer sideskirts
- Automatic tire inflation
- Low rolling resistance tires
- Wheel covers
- Rear trailer aerodynamic devices

This new EPA GHG-2 rulemaking affects trailers for the first time. In GHG-1 only the tractor had fuel efficient guidelines. The trailer rulemaking varies depending upon the specific type of trailers. For example for non-box trailers, which includes tankers, flatbeds & other vocational trailer configurations, only two of the many technologies will be required based on the non-finalized proposed rulemaking. Low rolling resistant tires in combination with automatic tire inflation systems are proposed as mandatory.

In the most prevalent box type trailers, which includes both vans and reefers, fleets will have a wide range of technologies available to help make their fuel economy improvements. Of course low rolling resistance tires and automatic tire inflation will be an obvious choice for fleets but additionally box type trailers have a plethora of aerodynamic devices to choose from.

It is also important to note that there will be possible exemptions and exceptions for trailers operating in specific service vocations. Log haulers, some lowboys, grain hoppers, and some off-highway trailers may be exempt from meeting these new GHG-2 regulations.

The original equipment trailer manufacturers will have the responsibility to insure that the vehicles they produce meet these new greenhouse gas regulations. By a complicated formula, a trailer OE may produce some trailers that do not meet all the fuel efficient standards but the "average" fuel efficient improvement target must be met for everything that they produce.

Of course, the entire industry is waiting for the final rulemaking so that future vehicle purchase standards can be met and exceeded.

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VOLUME 10 ISSUE 3

MARCH 2016

Measuring Success of Your Tire Program

Stop and see
us in
Booth 12045
at
Mid America
Truck Show
in
Louisville
March 24-26

With the average price of a commercial truck tire at around \$500, fleets take tires very seriously. A successful tire program can be measured in many different ways. Overall low cost/mile is an obvious objective for every fleet. Cost/mile can be calculated for the original tire tread and for each subsequent retread. The overall cost/mile should include the total tire cost including repairs and retreading from birth to death over multiple retreads.

Cost/mile calculations should be determined separately for steer, drive, trailer, and dolly wheel positions. If all vehicles are running in the same service vocation, the calculations will be straightforward. However, if your fleet runs vehicles under various duty cycles such as linehaul, pickup and delivery, regional or mixed service, then a separate cost/mile calculation must be determined to make an appropriate apples-to-apples comparison.

Conducting a scrap tire pile survey and understanding the results are very important pieces of a tire program. This is where you learn what is working and what needs improvement. Tires in the scrap pile need to be analyzed on a regular basis to see what is going on with your tires. Recording information such as tire make & model, number of retreads, remaining tread depth, tire wear patterns, and probable cause of removal must be recorded into a database for further analysis. If your fleet's goal is to shoot for two retreads per casing then the scrap tire pile analysis should reveal very few new tires and first retreads. If you find the number one reason for removal is tire damage from hitting the curbs and running over large puncturing objects, then driver education may be recommended. Maybe

one tire brand is making it to the second retread and another has casing issues and early tire removals during the life of the second retread. This type of valuable information is necessary to determine how to improve tire performance.

If the tread depth of tires in the scrap pile is high, then it is important to determine the cause. Why is that tire coming out of service prematurely? It may be failing because of a casing issue. A successful tire program would show that most tires in the scrap pile are worn smooth to the legal tread depth limit of 4/32" for steer tires and 2/32" for all other wheel positions.

Vehicles misaligned will certainly lead to tire irregular wear and early removals. Running tires underinflated is a major reason why tires end up in the scrap pile early. When tires run underinflated, the tire sidewalls flex excessively and tire deflection increases. The result is excessive heat which leads to serious casing issues. Air is what carries the load, so running underinflated will only lead to problems. Heat is a tire's worst enemy. When the tire is running properly inflated, the footprint is optimal, tire mileages and fuel economy are maximized, and casing retreadability improves dramatically. If tires run with little or no air for an extended period of time, it can lead to those dangerous road alligators seen on the highway.

The bottom line is to review tire cost/mile numbers on a regular basis and to physically inspect tires that have been removed from service. Drivers are the early warning system to identify tire issues. It is always a good idea to work with your tire professionals who can assist in optimizing your fleet's tire program.

Q&A PSI ANSWERS YOUR QUESTIONS

Q. When does the new GHG-2 regulations for reducing greenhouse gasses and improving vehicle fuel economy go into effect?

A. Sometime during spring or summer of this year the final rulemaking will be announced by EPA. It will be effective with model year 2018 which may mean tractors and trailers built in 2017 with a model year 2018 designation will be affected.

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Designing a Good Tire Evaluation

Commercial trucking fleets are always trying to lower their tire cost/mile. According to the September 2015 study by ATRI the average cost per mile in 2014, depending on the specific service vocation, had increased to .029 per mile in 2009. Maximizing tire removal miles and increasing the number of tire casings that can make it through multiple retread cycles will keep tire cost/mile numbers low. The tire make and model that you are running in your fleet on steer, drive, and trailer positions can have a major impact on your tire cost/mile number.

Tires may all look round and black but they do not all have the same performance characteristics. The materials and construction that go into the development of a radial truck tire can be quite different from one tire make/model to another. Additionally, tire manufacturers introduce new tires on a continuing basis.

So how do you know if making a tire change in your fleet will be advantageous? The only way is to track tires on a given number of tractors and trailers. In RP230B, TMC recommends a sample size of thirty. Tracking tires on thirty vehicles is what it takes to do a statistically sound tire evaluation. For small operations with few trucks and trailers, a reduced number of vehicles can be evaluated as long as they represent a meaningful percent of the total fleet size.

Why such a large recommended sample size? It's because there are many parameters that can affect tire removal miles:

- Driver
- Route (Service Vocation)
- Load
- Vehicle Make/Model
- Speed
- Vehicle Alignment
- Tire Inflation Pressure

The driver has a huge effect on tire performance. Industry studies done over the years show that the driver can affect tire mileages by up to 30%. An aggressive

driver with turning and braking can scrub the tread off tires very quickly.

Vehicle route also plays a big role in tire mileage. Travelling over hills and mountains is a lot tougher on tires than running on flat terrain.

And weight matters: If a driver is hauling a load of paper chips, fuel economy and tire removal mileages are typically very good when compared to a driver hauling steel products.

Of course the specific vehicle make/model, and in what type of operation they are used, has a major impact on tire removal mileages. For instance, "Steer Tire A" may average 200,000 miles to removal on one vehicle model running in linehaul service while the same steer tire may see only 175,000 miles on a different vehicle configuration.

The faster a vehicle travels down the highway, the more friction and therefore heat is generated by the tire. Heat is a tire's worst enemy and the result is the rubber becomes hotter and softer, and tire miles are reduced.

Vehicle alignment of both the tractor and trailer are crucial to tires running smoothly and evenly down the highway. In some cases, while the tractor may have perfect alignment the trailer may not. This will adversely affect not only trailer tire wear, but the tractor tires will also be affected with uneven wear.

Maintaining proper tire inflation pressure is not only important to maximizing fuel economy but tire mileages will be reduced if they are not running at the recommended tire inflation pressure which will lead to excessive tire heat buildup and early tire removals.

It is obvious that with so many variables affecting tire mileage the sample size needs to be significant to run a serious tire evaluation. Running only a few tires on an evaluation will lead to inconclusive results and waste a lot of time and effort. It's always a good idea to work with your tire professional when designing a test to evaluate a new tire design in your fleet.

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VOLUME 10 ISSUE 5

MAY 2016



Have a Happy
and Safe
Memorial Day.
Please
remember all
men and women
who have died
in military
service to the
United States.

Bicycle Tires & Truck Tires...A Lot of Similarities

In the recent May issue of my monthly *Bicycle* magazine there was a most interesting article that caught my attention. This was the first time I could recall a story about bike tires. The title was "Treat Yourself to a Floatier, More Comfortable Ride with a Set of 28 mm Tires".

In the bicycle world, the industry standard for road bikes is for tires to have a width of 25 mm or slightly under an inch. Just a few years ago 23 mm was the standard width, but now the new trend is 28 mm wide tires. This new wider size is similar in concept to the commercial widebase 445/50R22.5 tire.

According to the opening line of the article, "Tires & tire pressure are the easiest and least expensive way to change the way your bike rides". These wider bicycle tires are much better at absorbing road shock and provide more traction. Serious bikers hit the road for several hours and comfort is very important. When you talk to truckers who are running widebase tires on their tractor and trailer, their first comment is that the ride is just so much better with the wider tires. Widebase tires are not affected by road rutting like dual tires which is the primary reason why drivers like the way the vehicle drives with these wider tires.

takes more effort to pedal a bike with lower tire pressure (tire rolling resistance is higher at the lower pressure). It is exactly the same for truck tires, running lower tire pressures will increase the rolling resistance which leads to a decrease in fuel economy.

Another negative to riding on 28 mm bike tires is that they are heavier and less aerodynamic. People that race bikes prefer the lightest weight bicycle which allows them to pedal at high mph. Again, lighter is good for improved rolling resistance. In the case of widebase tires, one tire is replacing two duals. Plus there is only one wheel compared to two dual wheels. There is a big weight savings for fleets who run widebase tires & aluminum wheels of up to 1,000 pounds per vehicle. This leads to improved fuel economy.

Lowering tire pressure in bike tires makes them more difficult to pedal. Some people prefer low tire pressure because the comfort factor is so much greater. With widebase tires, running tires with low pressure will lead to a significant tire heat buildup which is really bad news for truck tires. Heat is a tires worst enemy and will lead to reduced mileage, reduced retreadability, and early tire removals. Generating too much heat is not ever an issue for bicycle tires.



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Widebase and the new wider bicycle tires have more rubber on the road. This longer tire footprint is good for traction and tends to absorb road shock better versus the narrower tires.

The same *Bicycle* article explains that lowering your bicycle tire pressure will also help ride comfort since the tire footprint is longer (more rubber on the road at the lower pressure). The negative is that it

Q&A PSI ANSWERS YOUR QUESTIONS

Q. One of my trucks was put out of service after a highway inspection because of a flat tire. What is the definition of a flat tire?

A. The official definition used by CVSA, the Commercial Vehicle Safety Admin for a flat tire is 50% or less of the max tire pressure molded onto the tire sidewall.

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VOLUME 10 ISSUE 6

JUNE 2016

Understanding Low Rolling Resistance Tires

Look for
an
announcement
soon
on our new
and
expanded
facility.

Every commercial tire manufacturer markets low rolling resistance (LRR) tires. The major benefit of specifying them is to improve vehicle fuel economy and there is normally a price premium associated with these tires.

SmartWay publishes a list of verified LRR new tires and retreads on their website. <https://www.epa.gov/verified-diesel-tech/smartway-verified-list-low-rolling-resistance-lrr-new-and-retread-tire>

As of June 1, this list is comprised of 678 specific tire makes & models. This verified technology list of LRR tires assume the tires will be used on class 8 long-haul tractors and trailers.

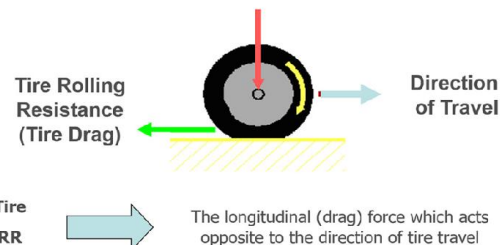


To make the SmartWay verified LRR list, tires are run on a 67" wheel dynamometer at 50 mph. If the measured tire rolling resistance (RR) shows a 3% or more improvement versus a baseline tire, then that tire make and model can make this verified list. The actual tire rolling resistance assumes the tire is running properly inflated. In the real world this is a big issue, especially on poorly maintained trailer tires. THIS IS ONE OF THE REASONS WHY AUTOMATIC TIRE INFLATION SYSTEMS ON TRAILERS HAS BECOME SO POPULAR WITH FLEETS

So what exactly is rolling resistance?

During the official SAE wheel dynamometer test, a tire is run at the rated load and inflation at 50 mph. The rolling resistance is measured in units of pounds. The lower the number the lower the tire rolling resistance which will result in improved vehicle fuel economy.

Keep in mind that all tires are not created equal. Just because a tire makes the SmartWay verified list does not imply that all these tires have the same improved rolling resistance.



In a recent evaluation of four popular LRR tire makes/models, the actual tire rolling resistance of a 295/75R22.5 load range G tire run under fully loaded conditions ranged from 20 to 24 pounds at 100 psi. The same tires run 30% underinflated, as found on many inside dual tires, revealed RR values from 22 – 29 pounds.

As a comparison, a 445/50R22.5 widebase tire run fully loaded at the recommended tire air pressure resulted in RR of 44 pounds. If that tire ran underinflated, the RR increased to 49 pounds, which is an average increase of 10% rolling resistance.

The only serious way to determine the actual fuel economy improvement that your fleet may see by specifying LRR tires is to run a real world field evaluation such as SAE Type II Fuel Economy Test Procedure J-1321.

There are many factors that will impact fuel economy which include: vehicle make/model, the driver, routes, loads and speeds.

The driver alone can impact vehicle fuel economy by as much as 35%. The higher the vehicle speeds the worse the fuel economy. As vehicle speeds increase, fuel economy decreases. On the flip side, more aerodynamic devices such as full side skirts, nose cones, wheel covers, and reducing the gap between the tractor and trailer will all help improve fuel economy and reduce your overall cost/mile.

If you choose to run LRR tires in your fleet, work with your tire professional so you make the best choice of which make/model to purchase.

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VOLUME 10 ISSUE 7

JULY 2016

What's all that rubber on the side of the road?



Enjoy a
Safe and
Happy
Summer

I saw a significant amount of rubber on the road during a recent road trip from Atlanta to Birmingham with ambient temperatures well over 90°F under bright sun and traffic moving along the interstate at speeds exceeding 70 mph.

What is it about summertime that increases those very dangerous tire pieces and parts commonly known as "road alligators"?



Heat is a tire's worst enemy. Under normal operating speeds, at proper load and inflation, tires will run "cool" and have no performance related issues. But, when tires run underinflated, especially in combination with excessive speed and high loads, the tire footprint area and sidewall deflection will lead to extreme heat buildup in the rubber compounds. During the summer months, with high ambient temperatures and much hotter road surfaces, those underinflated tires are prone to even higher rubber temperatures. The rubber will actually start chemically breaking down inside the tire casing, which can lead to a tire blowout and rubber on the road.

Air is what carries the load - so when a tire is run underinflated it can no longer support the load properly and the heat buildup is significant. In many cases, the inside dual tires are the least maintained wheel position on a vehicle when it comes to proper tire inflation pressure. If the heat becomes high enough, the tire will fail. When that tire runs flat, now the outside dual is handling a much higher load and will be the next tire to possibly have a major issue. It is a domino effect.

In several studies commissioned by NHTSA and the Technology and Maintenance Council (TMC) of the American Trucking Association, it has been concluded that more than 90% of the rubber debris found on the road is due to running a tire with little or no air for an extended period of time.

The uneducated motoring public believes that the rubber on the road is due solely to "bad" retreads. This is just not the case but it is the perception. If a new tire or a retread is run underinflated, it can eventually fail. This is why it is so important to keep tires properly inflated to make the roads safer by eliminating most road alligators. Tire pressure monitoring systems (TPMS) and automatic tire inflation systems (ATIS) for trailer tires are two popular solutions. TPMS relies on the driver to physically stop and find air when the warning light is illuminated in the cab while ATIS will simply add air to any low trailer tire as the vehicle is rolling down the highway.

Nearly every year, a senator or congressman runs over a road alligator which causes damage to their personal car. The result is new proposed legislation to ban retreads in their home state. This misconception can be prevented by simply keeping tires properly inflated.

Q&A PSI ANSWERS YOUR QUESTIONS

Q. What are the current commercial tire aging standards?

A. There is no official rulemaking when it comes to truck tire casing age limits. Fleets typically have their own standards based on casing retreadability data. Some fleets have 5 year casing age limits while others use 7 years. Some fleets have been reported as high as 10 years for their casings. Industry data has been very difficult to generate. It is very dependent on environment and operating conditions.

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AUGUST 2016

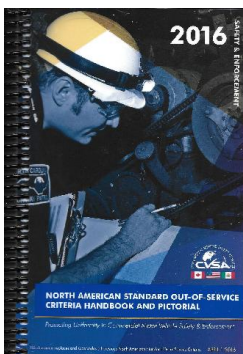
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Every April, the Commercial Vehicle Safety Administration (CVSA) publishes an updated handbook titled *North American Standard Out-of-Service Criteria Handbook and Pictorial*. This is the bible for inspectors to use when inspecting commercial vehicles for safety related violations.

The necessity for all enforcement personnel to implement and adhere to these standards is:

- Matter of law
- Perceived as necessary by the society CVSA is protecting
- Professional obligation

There are three levels of inspections:

- Level 1: Complete vehicle and driver inspection
- Level 2: Walk-around driver and vehicle inspection
- Level 3: Driver and credential inspection

Part Two of this four-part CVSA handbook covers vehicle out-of-service (OOS) criteria. Tires are just one of many vehicle items reviewed in this important section. Some examples:

- If a flat tire is discovered by a CVSA inspector, the vehicle is immediately put out of service. An expensive, emergency roadside service call would be required to either repair or replace the flat tire. By definition, a tire is flat when the measured air pressure is 50% or less than the pressure molded into the sidewall of every truck tire. A tire would be considered flat during a roadside inspection, for example, if a tire is measured at 50 psi and the sidewall states 120 psi maximum pressure; the driver would not be allowed to TRAVEL to even the next

truck stop a mile away to inflate the tire. He is out-of-service and a roadside service call is required.

- Tread depth is another OOS criteria. The legal limit for steer tires per the DOT is 4/32" remaining tread depth, but the current CVSA guideline is for the vehicle to be put out-of-service only when two adjacent major tread grooves have less than 2/32" of tread remaining. For drive, trailer, and dollie tires, the DOT legal tread depth limit is 2/32". For these tires, the CVSA considers a tire unsafe if two adjacent major grooves have tread depth measurements 1/32" or lower, and the vehicle would be placed out-of-service. Many tires have stone ejectors molded into the bottom of the grooves. It is always important to NOT measure the tread depth on top of these stone ejectors because you would get a 2-3/32" shallower tread depth reading.
- If any steel or fabric material is showing in the tread or sidewall, the tire would also be considered a safety concern and the vehicle would be placed out-of-service.
- Visually observable tire shoulder and/or sidewall bulges also leads to an out-of-service condition. The exception is any bulge 3/8" or smaller would be permitted.
- Commercial tires have the maximum load molded into every tire sidewall that the tire can handle at a given pressure. Load/Inflation tables need to be used to determine if the pressure in the tire can legally carry the load the inspector actually measures on a specific tire. If the pressure does not meet the minimum pressure required to carry the load, the vehicle will be put out-of-service.

Contrary to popular belief, retreads are allowed to run by law on the steer axle of commercial vehicles. The only exception is that retreads are NOT allowed to run on passenger carrying commercial vehicles which include busses.

Contact the CVSA via their website at www.cvsa.org to find out more details about their out-of-service criteria and to order your own copy of the 2016 handbook.

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VOLUME 10 ISSUE 9

SEPTEMBER 2016

Protecting Your Casings for Retreading

P.S.I.
and Meritor
Host Annual
Fleet
Technology
Event
in
San Antonio,
Sept 13-14

I visited my local truck stop last week to check out pricing for the latest fuel efficient premium steer, drive, and trailer tires for linehaul service. The prices quoted are for the most common linehaul 295/75R22.5 LR G tires. Steer and drive tires were quoted at approximately \$600 each and trailer tires very close to \$500. After adding \$25.23 in FET tax for each tire, an owner/operator or small fleet is looking at a cost of over \$10,000 to outfit each of his tractor-trailers with 18 new tires. This significant investment is the reason why tires are taken so seriously.

Tire cost is a major reason why more than 85% of fleets retread today. That's because retreads are a third to half the cost of a new tire. The good news is that today's commercial truck tires are designed to be retreaded multiple times. Protecting the investment in your casings is critical to reducing your tire budget and lowering cost/mile. Casings can make it realistically to one million miles with implementation of a serious tire casing program. Tire casings that are taken care of diligently should last a minimum of one retread and often two retreads in linehaul service. Tire casings in pickup & delivery service can expect up to three or four retreads.

One of the best ways to maximize the retreadability of your tires is to maintain proper tire inflation pressure. Air is what carries the load. Refer to published "load-inflation" tables for the correct "cold" tire inflation pressure for your worst case load scenario for a given axle and tire to determine the best inflation pressure. "Cold" is really a misnomer here....by definition a tire is cold when it is not hot! The load-inflation tables are actually based on a cold temperature of 70° F. Tire pressure will

increase about 15% after running on the highway at 65 mph and fully loaded. It can take a tire several hours to cool down after coming off the highway. It makes little sense to check air in a "hot" tire. The best time to check air pressure is during the morning driver walk-around when it will be the most accurate. Always utilize a calibrated tire pressure gauge when measuring tire pressures.

The major ingredient in commercial truck tires is natural rubber. If a tire is running underinflated, the casing becomes significantly hotter because of a combination of the longer tire footprint (18% more rubber on the road at 80 psi versus 100 psi) and the additional flexing of the sidewalls will heat up the natural rubber. When the steel belt package reaches around 200° F, the natural rubber based compounds will start reverting (rubber compounds inside the tire start decomposing due to excessive heat). This is unnoticeable until the retreader rejects the casing for retreading and can be a major blow to the tire budget.

Another tip for maximizing retreadability is to protect the casing from cuts and stone penetration. Running the tread down too low will make the casing more susceptible to damage. Many fleets have target tread depth removals in a 6-8/32" range for steer and drive tires and 2-4/32" for trailer tires. The tradeoff is that removal mileage will be down slightly, but protecting the casing to insure the next retread is most important.

It's always a good idea to evaluate any retreader to be sure they meet your vendor quality standards. Always work with your local tire professional to design a tire program for your specific service vocation.

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Q&A PSI ANSWERS YOUR QUESTIONS

Q. My tires seem to lose air without even any nail punctures. What is "normal" air loss?

A. It depends on the quality of the materials used in the manufacturing of the tire casing. Tires typically lose 1-3 psi per month through casing osmosis. Tires also may lose air through leaking valve cores.



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 10 ISSUE 10

OCTOBER 2016

Maintaining Proper Tire Air Pressure

Trailer manufacturers received net orders for 14,000 trailers in August, according to a report compiled by FTR.

August net trailer orders were up 48% from July. Despite the increase, orders were down 48% compared with August 2015.

*Trailer-Body Builders
September 20, 2016*

Maintaining proper tire air pressure is still the primary issue facing commercial trucking fleets today. With the average price of a radial truck tire in the \$500 range, fleets take tires and their tire program very seriously.

Air is what carries the load so air pressure is critical to all the important tire related issues including:

- Maximizing tire removal mileage
- Maximizing fuel economy
- Increasing retreadability of the tire casing
- Reducing tire related roadside service calls

So why is maintaining proper tire inflation so difficult? There are only a few reasons why tires lose air:

- Osmosis through the tire casing over time
- Leaking valve cores
- Punctures
- Shoulder/sidewall curbing & impact breaks

Tires will lose several psi per month depending on the specific make/model. A tire is similar to a balloon. Air is going to permeate through the casing over time. Some tires are manufactured with rubber compounds that tend to trap the air better than other tire designs. Tires may all look black and round, but the composition of the rubber compounds have a major impact on the tire's performance including air retention. This is one of the reasons why one tire brand may have a higher cost versus another.

Leaking valve cores are always an issue. Tire valve cores should be tightened to about 4 in-lbs. There are tools available that are pre-torqued to this measure eliminating the issue of over and under tightening a valve core.

The number one reason why tires lose air is slow leaking punctures in the tread area.

A #20 penny nail penetrating a tire tread groove can lead to losing several psi per day. Within just a few days the air pressure will be significantly low leading to all kinds of issues.

When the inside dual, for example, is down to 70 psi and the outside dual is at 100 psi, the result is that the low pressure tire will have significantly different rotations per mile (rpm) developing irregular wear as this tire is being dragged along next to the larger diameter 100 psi tire. Once the tire begins developing irregular wear, the tire tread is no longer smooth and even also adversely affecting tire fuel economy. It is the industry standard that duals should always be within five psi of each other.

A little known fact is that when a tire is underinflated, the footprint is longer and the rubber compounds will become softer and hotter due to the excessive flexing of the tire sidewall. This long footprint, in combination with the hotter/softer rubber, will lead to an increase in punctures and an increase in tire-related roadside service calls. There is 18% more rubber on the road on a 70 psi tire versus a fully loaded 100 psi tire.

Historically, trailer tires are the least maintained wheel position on any vehicle. Tire air pressure surveys always reveal a significant amount of low tire pressures at this position and is the reason why automatic tire inflation systems have become the standard for trailer tires. Air is automatically added to any low trailer tire as the vehicle is moving. A light will be illuminated that the driver sees in his side mirror to let him know the system is working and adding air to a low tire. When this light is activated, the driver needs to let maintenance know so the low tire or tires can be properly repaired at the first available opportunity.

Fleets that use a drop & hook approach have more challenges to maintaining proper inflation pressure. When trailers sit in a yard (likely maintained by the shipper), they are without access to air. When it comes time for the driver to pull the trailer, they have little to no options to address a low pressure situation.

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VOLUME 10 ISSUE 11

NOVEMBER/DECEMBER 2016

Understanding Fuel Economy, Tires & GHG-2

Read "How
Proper Tire
Practices Can
Reduce Road-
side Service
Calls" by Al
Cohn in the
October issue
of Fleet
Equipment

[Full article click here](#)

The recently announced final rulemaking for Greenhouse Gas – Phase 2 (GHG-2) has the OE truck & trailer manufacturers along with commercial fleets trying to fully understand the comprehensive, complex 1,692 page primary document. This final rulemaking was published on August 16, 2016. The 1,116 page Regulatory Impact of GHG-2 was also released.

The industry trade press has described the new regulation:

- "Impossible read"
- "Obviously written by lawyers"
- "Complicated"
- "A lot of information to digest"

GHG-2 goes into effect on January 1, 2018. Over the course of the following ten years, the fuel economy standards become more stringent. Every three years vehicle fuel economy must be improved. The net benefits of implementing this rulemaking is estimated to be 196.5 billion dollars during this ten-year period.

The rulemaking is divided into 4 categories:

- Combination Tractors (tractors pulling trailers)
- Trailers
- Heavy Duty Pickup Trucks & Vans
- Vocational Vehicles

There are different standards depending on the specific category. To make it even more complicated, each category is divided into additional sub-categories. Trailers, for example, have over ten sub-categories depending on the trailer length and type of service vocation. There are different regu-

lations for box trailers and non-box trailers that include container chassis, tankers, and flat beds.

The goal of GHG-2 is to reduce Greenhouse gas emissions 28% below 2005 levels with an 80% reduction by 2050.

Tires and tire inflation play a major role in improving vehicle fuel economy and reducing greenhouse gasses. Low rolling resistance tires (LRR) will improve fuel economy at least 3% over existing non-LRR tires. SmartWay publishes a list of several hundred new tires and retreads that are SmartWay verified. To make this verified list the tires must only meet a minimum laboratory tire rolling resistance value. Every fleet must do their own fuel economy testing to determine which tire make/model delivers the best fuel economy in their fleet operation.

It is obviously a good decision to spec LRR tires; but if tire pressure is not maintained, then a fleet will no longer continue to receive the fuel economy benefit. As a result, if a fleet specifies automatic tire inflation (ATIS) on their trailers, there is an additional incentive of 1.2% assigned by GHG-2. If TPMS (Tire Pressure Monitoring System) is specified in place of ATIS, GHG-2 regulation has assigned a lower value of 1.0%. With TPMS, tires will continue to run underinflated until human intervention is required to add air to the low pressure tires.

The onus for meeting the new fuel efficient standards is on the OE tractor and trailer manufacturers. If they do not meet their goals beginning in 2018, they will incur hefty financial penalties. Fleets need to work closely with their tractor and trailer OE's to design the most fuel efficient vehicles for the future.

Q&A PSI ANSWERS YOUR QUESTIONS

Q. I have been experiencing fast shoulder wear on both steer tires on several vehicles. It is evident at about 75,000 miles. What causes this condition?

A. When the outside shoulders of both steer tires have fast wear, then there is too much toe-in. If the inside shoulders of both steer tires see fast wear then the issue is a toe-out alignment condition.

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