

Maintaining Proper Tire Inflation Pressure

A Glance at Clean Freight Strategies

ENERGY & FUEL SAVINGS

Gallons Saved:
100 gallons

CO₂ Savings:
1.02 metric tons

Fuel Economy Increase:
.6%

MPG (original 6 mpg):
6.04 mpg

Fuel Cost Savings:
\$346

Maintaining proper tire inflation pressure can save tire maintenance costs and improve fuel economy by nearly 1 percent, saving 100 gallons of fuel and eliminating 1 metric ton of greenhouse gas emissions per year. Properly inflated tires also have fewer punctures and a longer life expectancy.

What is the challenge?

When not properly inflated, tires flex more under load. This produces heat and increases rolling resistance, which wastes fuel. Truck tires inflated 10 pounds per square inch (psi) below recommended air pressure levels can reduce truck fuel economy between 0.5 percent and 1 percent.

Heat and stress from improper inflation soften and deflect tire components, causing faster and more uneven wear, which shorten the life of the tire. Underinflated tires have more frequent punctures, increasing the risk of tire failures that could lead to costly road service and loss of revenue.

Despite the importance of proper tire inflation pressure, a recent survey of combination trucks found that less than half the tires surveyed were within 5 percent of the recommended inflation pressure. Another industry survey indicates only 8 percent of truck drivers check tire pressure with a tire gage before each trip. One reason fleets may find it difficult to keep tires properly inflated is that truck tires can lose up to 2 psi each month, even if the rim seal and valve stems are tight. A fleet may not be able to inspect or monitor its trailer tires regularly due to the fact that extended periods of time are spent away from service yards and because trailers are interchangeable. This places greater responsibility for checking tire pressure onto drivers.

What is the solution?

One way to prevent tire pressure underinflation is for fleets to have tire maintenance management systems in place to ensure that drivers and equipment maintenance personnel check tire pressure at frequent intervals and fill tires that are underinflated. This can be made easier by the use of electronic tire pressure monitoring systems that signal to drivers and maintenance personnel when a tire becomes underinflated.

Automatic tire inflation (ATI) systems monitor and continually adjust the level of pressurized air in tires, maintaining proper tire inflation automatically while the truck is in motion. One ATI system uses the vehicle's own air-brake compressor to supply air to all the tires. Once an ATI system is installed, it should not require any special attention from the drivers. This eliminates the need to check tire pressure manually, which saves time and labor while ensuring consistent and proper tire inflation.

There is some evidence that loss of tire inflation pressure can be slowed by using nitrogen gas instead of air to inflate tires. While this method is not recommended as a substitute for regular checks of tire pressure, testing by the U.S. Department of Transportation has shown that nitrogen inflation reduces the rate of pressure loss.

Savings and Benefits

ATI systems can not only extend tire life but truck fleets can also offer additional savings from reducing the risk of expensive tire failure caused by underinflation. Installing an ATI system on a truck's drive and trailer axles costs up to \$800. For a typical long-haul combination truck, annual fuel savings could reach

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100 gallons, saving \$346 in fuel costs and eliminating 1 metric ton of greenhouse gas emissions. Annual tire maintenance costs can also decrease. The cost of installing an ATI system in a long-haul truck is generally recouped in just over 2 years through fuel and maintenance cost savings.

There have been no scientific studies to document fuel savings obtained through the use of nitrogen inflation, but anecdotal reports indicate some fleets are seeing benefits from this approach. One large national fleet reported to a panel of the National Academy of Sciences that it observed a 1 to 1.5 percent reduction in fuel use after using a nitrogen inflation system. Additionally, nitrogen inflation systems typically remove oxygen and water from the inflation gas; both oxygen and water can contribute to tire aging.

NEXT STEPS

1 Trucking companies can contact tire manufacturers or their state or national trucking associations for more information about the benefits of keeping tires properly inflated.

2 Fleet operation managers can consider installing automatic tire pressure inflation systems on drive and trailer tires to help maintain proper tire inflation pressure while trucks are on the road.

3 Interested fleets can check with equipment manufacturers and truck and tire dealers for more information on ATI, nitrogen fill or other technologies developed to enhance tire maintenance and ensure proper tire inflation pressure.

