



# 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 8

JULY 2007

## Nitrogen Vs. Air in Commercial Tires

PSI can offer you a Tires 101 Class by contacting Al Cohn [acohnpsi@aol.com](mailto:acohnpsi@aol.com)

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.

### Visit us On-line

For current and back issues of

### Commercial Fleet Tire Digest

And to subscribe or submit your inquiries to be answered here, go to

[www.psitiredigest.com](http://www.psitiredigest.com)

## 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.