

# Nitrogen Use

## Inflating your Tires With Nitrogen

Some retailers are advocating inflating tires with Nitrogen. This may provide certain benefits compared to air inflated tires.

Nitrogen is present as a component of air; it accounts for 78% followed by Oxygen at 21% and other gases at 1% and moisture being a final component of air. Nitrogen in its purest form is a naturally occurring, non flammable, dry, inert gas that can be used for tire inflation without negative environmental impacts.

Over time, air will slowly seep through the tread and sidewall of a tire, resulting in a gradual under inflation of tires, if not periodically topped up. Since a nitrogen molecule is larger than oxygen, it will not seep out as fast as it does with air inflated tires. This means that the gradual decrease in tire inflation pressure with air filled tires (approximately 1 to 2 pounds per square inch (PSI) per month) will be less for tires inflated with nitrogen.

Nitrogen inflation has another potential advantage over air. Nitrogen inflation reduces the amount of moisture, in the form of water vapour, in a tire. The presence of moisture (normally present in air) is the main reason tire inflation pressure varies with temperature. As the air in a tire heats or cools, typically inflation pressure may change by 2 PSI for every 5 degree Celsius change in temperature. This variation can normally be expected to be less for nitrogen inflated tires.

Another potential benefit of reduced levels of moisture in a nitrogen inflated tire is reduced degradation of the tire components over time, caused by oxidation. Normally, the life of a passenger tire is determined by tread wear, rather than aging of the tire, so this may not be a significant factor in many cases.

Consumers interested in nitrogen inflation should evaluate the cost/benefits by consulting a tire specialist.

## Who Else Uses Nitrogen?

**NASCAR** - NASCAR teams use Nitrogen because it allows them to more accurately predict tire pressure fluctuation. Nitrogen fluctuates with temperature change, but it does so less than when water vapour is present. In addition, higher Nitrogen levels eliminate the explosive properties of Oxygen (Oxygen loses its explosive properties at around 9% or less).

**Commercial Airlines** - The Federal Aviation Administration requires Nitrogen in aircraft tires because it reduces the potential for water vapour freezing at high altitudes. In addition, airlines such as Boeing use Nitrogen membranes or "OBIGGS" on-board inert gas generation systems (OBIGGS) to layer fuel tanks with inert Nitrogen. Again, this reduces the potential for explosions.

**Government Agencies** - NASA and the U.S. military use Nitrogen for many of the same reasons it's used in commercial aircraft.

**Food Processors and Packagers** - Oxygen hastens both the chemical breakdown and microbial spoilage of many foods such as meats, potato chips, dairy products and cookies. To help preserve foods longer, processors and packagers often use modified atmosphere packaging (MAP) and controlled atmosphere packaging (CAP) that replaces some or all of the Oxygen in the air inside the package with Nitrogen.

**Industry** - Many industries use Nitrogen because of its dry and inert properties. Nitrogen is used in electronics manufacturing to eliminate moisture. It is used in chemical manufacturing to reduce oxidative degradation of the product. It is also used to prevent explosive conditions due to its inert characteristics.

### **How is Nitrogen separated from other gases in air?**

Hollow fibre membrane tubes are the heart of any Nitrogen tire inflation system. Just like tire rubber, the membranes are permeable. When thousands of these permeable tubes are filled with air at high pressures, smaller molecules leak out while the larger Nitrogen molecules travel through the tubes into a holding tank to fill your tires or for other uses such as detecting leaks in air conditioning systems.

**Whether your tires are inflated with air or Nitrogen, measuring tire pressure at least “once a month” is critical. Drivers will benefit by increased safety, handling and braking performance, longer tire service life, better fuel economy and reduced greenhouse gas emissions that contribute to climate change and affect air quality.**