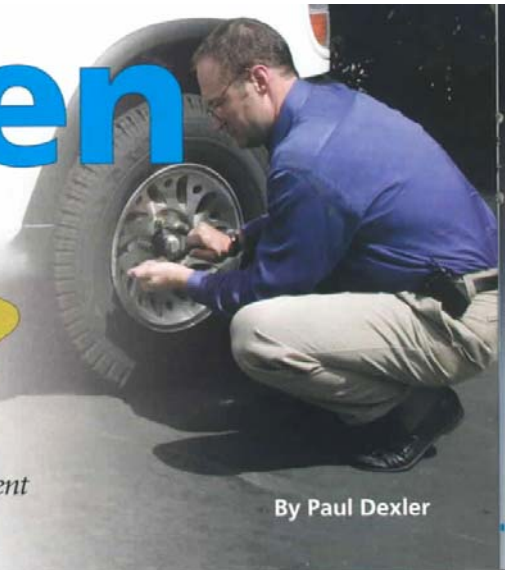


September/October 2006

# Is Nitrogen a Better Tire Fill?

*The air in tires is 78-percent nitrogen. There appear to be many advantages to filling tires with 99-percent pure nitrogen. Equipment is available for centrally managed fleets to do the job.*



By Paul Dexler

**T**raditionally, tires have been filled with compressed air. It's cheap, easy, and available, but has had problems that now can be resolved.

If air pressure in tires is not kept at the correct level, at best, they wear out too soon. At worst, they could cause a serious accident. The most important factor in tire performance and life is correct air pressure. Research indicates that nearly 83 percent of tire problems start with low tire pressure.

The air in a tire leaks. Even with perfect valves and unblemished casings, air leaks permeate the rubber itself and the interface between the tire and the rim. As a tire heats during driving, the air inside expands, then contracts when the tire cools down. This means that tire pressures must be checked prior to driving more than a mile or so, since recommended tire pressures always refer to the cold state.

## Air is 78-Percent Nitrogen

The air that we breathe is about 78-percent nitrogen, 21-percent oxygen, and 1-percent other gases. Nitrogen is inert, non-combustible, and noncorrosive. Oxygen, on the other hand, is corrosive and immensely destructive to rubber and other tire materials. As soon as a tire is manufactured and exposed to air, the effects of oxidation begin to deteriorate the rubber.

Over time it loses elasticity and strength, just like an old rubber band. Likewise, the oxygen in inflated tires permeates the tire structure and ultimately the tread. This is why tire manufacturers recommend replacing tires that are six years old, even if the tread is still good.

One way to solve the problems of air-inflated tires is to inflate them with an inert gas, such as nitrogen.

In the past, the equipment needed to produce nitrogen was large and expensive. The only alternative was to use externally filled high-pressure nitrogen bottles, which were also expensive and a safety hazard.

The NitroFill company, which produces nitrogen tire inflation equipment, has developed a solution to these problems. Instead of using stored nitrogen, NitroFill takes advantage of technology that allows nitrogen to be separated from the air. The process is done under low pressure and results in highly purified nitrogen.

The purity of nitrogen available from nitrogen generators generally ranges from 95 percent (low purity) to 99.9 percent (high purity). NitroFill generators can produce nitrogen in excess of 99.9 percent purity and provide the procedures to guarantee a minimum of 95-percent purity in a serviced tire, the minimum purity that must be maintained in the tire to enjoy the benefits that nitrogen provides.

## The Benefits of Nitrogen

The use of nitrogen to inflate tires:

- Slows pressure loss from permeation.
- Stabilizes pressure and virtually eliminates pressure fluctuations due to temperature change.
- Reduces tire oxidation.
- Eliminates interior wheel corrosion.
- Reduces running temperatures.
- Decreases false alarms and activation of tire pressure-monitoring systems.

Nitrogen use in tires is not new. It has been used on earth-moving equipment and aircraft tires and in racecars. Air is not used in those applications because it is one-fifth oxygen, and oxygen fuels fires. Aircraft and racecar tires can become so hot they actually catch fire. Nitrogen does not support combustion.

A heavy truck fleet running the system in Class 8 tractors reports that tires run cooler; and it found a 2-percent fuel economy improvement.

The air inside a tire eats away at the rubber casing, and the moisture in the air can contribute to wheel corrosion. Nitrogen has no moisture, therefore, no wheel corrosion. An inert gas, it doesn't permeate the molecular structure of the tire casing. A nitrogen-filled tire holds its pressure longer and runs cooler, both of which contribute to longer tire life. **GT**