TIRE REVIEW ...Online...

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Get Pumped Up

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While not dismissing the other benefits of using nitrogen instead of air, Sperberg focused on the negative impact of moisture introduced into a tire via undrained compressor tanks.

"This moisture-laden air (oxygen catalyzed by water) works its way into and through the tire cord body, causing heat, expansion, and loss of strength and elasticity," he said.

"Such air also attacks the wheel, ultimately penetrating the paint and oxidizing the iron below it to form iron oxide or rust. Even aluminum is not immune from rusting, forming aluminum hydroxide that produces an extremely fine dust," said Sperberg.

Although the good doctor's ideas were deemed "interesting" 40 years ago, they didn't make it to the top of the pile. Sperberg kept pushing, issuing studies in the 1980s and 1990s that kept the matter alive, but with nominal success.

But more recent developments – primarily soaring fuel prices and tire safety concerns – did what Sperberg's raw science could not. Nitrogen inflation is now the HOT topic in the tire industry.

Carrying promises of longer tire life, better fuel mileage, improved road handling, better inflation pressure maintenance, elimination of oxidation and rust, and improved truck tire retreadability – not to mention increased revenue – nitrogen generating/dispensing equipment have become a HOT products in the industry.

How hot? Over the last six months, a fast-growing number of dealers – and even one price club – have started offering nitrogen as a replacement for air in consumer tires. From coast to coast, TV news crews have highlighted consumers, eager to get every mile out of a $2 gallon of gas, plunking down as much as $10 a tire to replace the air in their tires with pure nitrogen.

There are reports of everyday passenger car drivers realizing two to three miles-per-gallon gains in fuel efficiency and truckers enjoying gains of 2%. Some nitrogen generator suppliers claim fuel efficiency gains of up to 4%.

Working with that 4% number, a vehicle rated at 20 mpg will save roughly 2.5 gallons of fuel a week based on a commute of 40 miles a day. At $1.90 a gallon for gasoline, that adds up to a fuel savings of 120 gallons a year or about $228 that can be added back to the family budget.

With supposed returns like that, it is little wonder that these claims have captured the attention of growing numbers of tire dealers and other tire retailers. In early June, Branick Industries got an order for 390 nitrogen inflation systems – from Costco Wholesale Corp.

Yes, the once forsaken gas is an in-demand item, and "early adopters" seem to be cashing in. The real problem appears to be sorting through the science and the hype.

Nitrogen Science 101

To understand the basis for the sudden interest in nitrogen, a little background is in order.

A dry, inert gas, nitrogen's main benefit is its molecular structure; nitrogen molecules are considerably larger than oxygen molecules, so they don't permeate a tire nearly as quickly. Oxygen can pass through an innerliner, belt package and sidewall/tread three to four times faster than nitrogen. This factor helps maintain proper inflation pressure longer, which means tires run cooler, thereby increasing safety and reducing operating cost. That's the basic science behind nitrogen and the many marketing claims being made.

As Sperberg pointed out, replacing moisture-friendly oxygen with naturally dry nitrogen means oxidation of tire and wheel components is virtually eliminated. And, without water vapor and oxygen to heat things up, nitrogen-inflated tires supposedly run cooler, last longer and deliver a host of other benefits.

Science and Statistics

Even though the idea of nitrogen inflation has been around for a while, it seems that suppliers and tiremakers are just starting to get their arms around its varied benefits. Some of what nitrogen provides is based on science. Some is based on statistics. And the rest is, well, somewhat interpretive.

Dave Connaughton, a strategic account manager at Parker Hannifin, says there is no doubt that "the effects of underinflation cost this country two million gallons of gasoline a day. In fact, 90% of the tire failures on the road today are caused by underinflation," he says.

Air Products, which makes Ultra-Fill nitrogen generators, contends that "an improvement of just 5% in tire life means at least 10 million fewer tires to dispose of in landfills per year."

Speaking of tire life, Nick Verini, president of Nitronics, adds, "a tire that is underinflated by 10% will lose approximately 7% of its service life."

"With nitrogen, proper inflation pressure is maintained for a much longer period of time," says Air Products. "Further, the nearly forgotten spare tire, inflated with nitrogen, will better retain its pressure for an emergency situation."

However, that doesn't mean the end of routine inflation pressure checks. Nitrogen generator manufacturers and tiremakers alike continue to stress the importance of ongoing inflation checks. Nitrogen eventually leaks out, too, but that isn't talked about very much.

Then, there are the extrapolated secondary benefits. “Properly inflated tires, those filled with nitrogen, will not only help save fuel but will corner better on wet or icy roads,” Air Products claims.
“A properly inflated tire, regardless of the gas inside of it, maintains the correct footprint on the road, which minimizes squirm and rapid tire wear,” and “drivers get better fuel mileage because a properly inflated tire has less rolling resistance than an underinflated one – which also decreases auto emissions,” says another supplier.
Another major point being made by nitrogen generator makers harkens back to Sperberg’s “chemical degradation.” According to at least one study, if the rate at which air permeates through the tire composite is slowed, so too is the rate of chemical aging.
“We can say conservatively that daily drivers will realize, roughly, a 5% gain in tread life,” says Mike Keim, manager of Ingersoll Rand’s solutions department. “Over a lifetime of driving, that might add up to one or two fewer sets of tires purchased.” Extrapolating further, it means less oil is used in tire manufacturing and fewer tires are delivered to landfills.
Regardless of the claims, nitrogen is climbing the charts. “We believe that, within three to six months, there will be a nationwide change in the way nitrogen inflation is being provided and used,” says Connaughton. “It’s the standard in other parts of the world – why not here?”

Surprising Start
Oddly, the nitrogen movement really caught fire among passenger car drivers, not major trucking firms, a fact that has puzzled the makers of nitrogen generators. “We thought truckers would start this revolution,” Connaughton says, “not consumers.”
In the trucking industry, which struggles with tires that can lose 2 psi per month, even nitrogen’s most basic benefit should be big news. Despite years of pitching, however, nitrogen has made minimal inroads with over-the-road fleets. Today’s soaring diesel prices, and nitrogen’s other benefits, may be turning the tide.
Filling a truck tire with nitrogen will extend tire life by up to 25%, according to Parker Hannifin. A truck tire that lasts 270,000 original miles will last 337,500 miles if filled with nitrogen, says the company.
“That's a savings of $120 per tire. A fleet with 50 trucks and 900 wheel positions would save more than $100,000 in tire costs by inflating with nitrogen,” the company says.
There is the matter of inflation pressure checks. Do truck tires filled with nitrogen still require daily/weekly inflation checks? Some say no and have computed the savings in time and labor to be as much as $31,000 per year.
Others insist yes, pointing to the negative impact of even minimal pressure leakage. The subject will, no doubt, remain open for discussion.
From a safety and tire-life standpoint, most of the benefit talk focuses on heat. Science says that a tire filled with naturally dry nitrogen will run cooler than a tire filled with moisture-laden compressed air. “Make that 20% cooler,” says Gil Schoener, president of Branick Industries Inc. in Fargo, N.D.
For the consumer contemplating a long summer vacation drive, properly inflated and cooler running tires would reduce the chance of a tire failure, a point some dealers have made in promoting nitrogen inflation.
For line-haul fleet owners, who hunt down cost-per-mile savings like heat-seeking missiles, such science should add up to monumental savings – numbers that are simply too large to ignore. What could be better than a longer-lasting truck tire that provides a more retreadable casing?
Branick’s Schoener says a truck casing that begins its service life on nitrogen will often have four or more retread lives. “We have seen on the road tire failures reduced by as much as 80%,” he says.
“If trailers go out and don't come back for six months or more, being able to keep consistent inflation pressures may greatly length tread life,” adds Bridgestone/Firestone North American Tire, which, along with Michelin, Goodyear and others, now embrace nitrogen.
“Some tests have shown increases of up to 26% longer tread life,” says the tiremaker. “Less chemical rubber aging and tire cord rust could also yield a higher proportion of retreadable casings, including casings that can survive more retread cycles.”

Getting Nitro ROI
A number of companies – Parker Hannifin, Ingersoll Rand, Branick, Nitronics, Rema Tip Top and Air Products, to name a few – are producing and/or marketing nitrogen generators. They say they are filling orders as fast as they can, and, in many cases, are already backordered.
Nitrogen generators, as the name implies, produce nearly pure nitrogen. Using a membrane and filters, they also remove oxygen and pollutants, such as water and oil vapor, from inside a tire.
Nitrogen generators cost around $5,000, plus options, which can include a holding tank and maintenance fees for filter replacements every one or two years and a carbon element every two to three years. The heart of the generator, the membrane, lasts from 15 to 20 years, so that’s not really a cost factor.
How does a dealer justify the purchase of a nitrogen generator and amortize the expense? Nitronics’ Verini says ROI comes down to promoting the benefits of nitrogen, advertising its availability and charging a fair price – dealers report a range of $3 to $15 per tire – for a fill up. Verini says dealers shouldn’t necessarily expect to get rich off of nitrogen, but offering it demonstrates “that you are providing the best possible service to your customers.”
From Rema Tip Top/North America headquarters in Northvale, N.J., Customer Service Representative for TRM North America John Salzbach offered his take on how nitrogen inflation will affect tire dealers.
“First, everyone in the nitrogen inflation business must educate every tire dealer about the merits of nitrogen,” he says. “And, we must show dealers how they can develop their tire business by charging for or giving away nitrogen.”
“We see nitrogen inflation as a way for a tire dealer to build loyalty and groom customers for repeat business,” Salzbach says. “The forward-thinking dealer who is selling nitrogen inflation is also offering a host of benefits and will get the first crack at drawing in new customers and/or keeping the ones he has.
“Price competition is tough in the retail tire business,” Salzbach continues. “The dealer who sells a full complement of name-brand tires with prices close to those of his competitor needs an edge, and we think nitrogen provides that edge.”

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One dealer seeking that edge is Buffalo-based Dunn Tire, which added nitrogen inflation to a pair of its 26 stores, with two more stores to follow. Following an introductory price of $2.50 a tire, Dunn will charge $5 a tire/$20 a car for nitrogen tire inflation.

Why the decision to go with nitrogen? “Because we want customers to know that Dunn Tire is the technology leader in our market area,” says Mike O’Neill, director of operations. “Those who have their tires filled with nitrogen are going to appreciate a gain in fuel efficiency, increase the life of their tires and reduce the oxidation of their expensive alloy wheels.

“We purchased two Branick and two Parker Hannifin units,” says O’Neill. “For the next 90 to 120 days, we’re going to test market nitrogen inflation with the expectation that it works out for us and our customers.”

From Canton, Ohio, Goodyear dealer Pat Stuhldreher has signed on with Branick and is flying a sign outside his location advertising nitrogen inflation.

“We have a huge traffic count here thanks to an adjacent shopping mall,” he says. “We are bringing street traffic into our dealership who otherwise would not have bothered.”

Stuhldreher doesn't charge the purchaser of four new tires for a nitrogen fill. “I give it away to a new tire buyer, and I charge $4.95 a tire for those who want to switch from straight air to nitrogen with their existing tires.

“That puts me on the leading edge of technology in my market, one which is very competitive,” he says. “If I get a real skeptic, I'll put nitrogen in his tires for free.

“I think nitrogen is here to stay because of the benefits it provides,” says Stuhldreher.

Not surprisingly, some dealers were less than anxious to talk about their nitrogen efforts. “Why should I tell you what I'm doing?” asks one dealer. “I'd be giving up my competitive advantage.” He wasn't the only dealer who clammed up.

Reality Check

But some dealers have been quite talkative … in their promotion of offering nitrogen inflation. One sales ploy used by eager early adopters has been a take off on the old “race on Sunday, sell on Monday” tack. If it’s good enough for NASCAR, it’s got to be better for your car, they say. And there is some validity to that.

The key reason pro race teams use nitrogen is convenience. In tank form, nitrogen is portable and can easily be moved from garages to pit areas. Because it’s moisture free, nitrogen is easy on expensive air tools. And, because it is non-flammable, unlike pure oxygen, nitrogen is safe to use. In terms of race performance, cooler-running tires help stretch out pit stops and provide a more consistent footprint.

Just how much a daily commuter will benefit from a cooler-running and subsequently longer-lasting tire is up for grabs, though. “It is a fact that, with nitrogen, drivers will run on cooler, longer lasting tires,” says Keim. “But the gain won't be as dramatic as it is for racecar drivers because rush-hour heat won't add up to race-day heat.”

Although the claims being made for nitrogen are effectively true, the real reward for a passenger tire user will vary a bit, say some. It's a bit like people who take vitamin pills – some notice a definite difference, while others don't notice anything, even though the vitamins are working their magic.

Judge for yourself what the producers of nitrogen generators are saying about nitrogen inflation. Basically, you're selling technology, and much of what they say is based on science.

Tiremakers, once soft on nitrogen, have taken notice. Michelin (as of late 2003) okays the use of nitrogen in its passenger tire line. Strong support also comes from Bridgestone/Firestone for its commercial tires, and most recently in a June technical bulletin from Goodyear approving the process. It's difficult not to get the sense that a major shift in thinking is taking place. Is it time for you to take the plunge?