

Technical Notes — April '08'



Vic Natiello

Technical Committee —Chair



Should you switch to using Nitrogen to fill your Corvette tires? Nowadays, the ability of entrepreneurs to get their message out to the vast majority of the public is greater than ever. Not only have “specialized” magazines exploded in the last few decades, but also the Internet has provided a forum for everyday folks to see almost every new gimmick that comes on the market. One of the newest ideas to hit the automotive market is the gas that fills your tires. For years, manufacturers and tire dealers pumped air into tires to inflate them. However, there are special applications where the use of air, while not necessarily detrimental to tire operation, is not optimum. Two come to mind immediately, racing tires and aircraft tires. In those fields, nitrogen has replaced air as the gas of choice. So, should you avail yourself of this concept to improve the performance of your Corvette or increase the life of the tires on your “baby?”

First, let’s look at why these two specialized fields use nitrogen in their tires. Racing tires are set to maximize tire effectiveness during track conditions. Thus, track tire compounds are usually optimized for higher sustained tire temperatures and compounds are generally much softer than street tires. For our discussion, the salient point is that tire temperatures for racing applications vary quite a bit from a “street driver.” As an example, autocross tires generally stabilize in a range of 100 to 180°F, whereas road race tires reside in the 140 to 220°F range. I doubt the average FCCC member is approaching these stabilized temperatures of the latter unless they are “opening it up” across Death Valley.

Aircraft tires pose a different set of conditions to consider. First is anticipated duration of use. These tires are only meant for short time uses at maximum performance, generally less than thirty seconds. Second, while in use at anticipated performance, aircraft tires have significantly higher deflection than automotive tires (32% versus 11%) and significantly higher maximum temperature ratings, as much as 200°F above ambient temperatures. Finally, aircraft tires have an temperature operating range quite a bit broader than their automotive counterparts. A typical range is 200°F above ambient in hard braking to as low as 75°F below zero at altitude.

As usual, I will address this issue as it concerns most members: Either, will I save money? Or, will I get something of value for my money? Obviously, if you take your car to the track and wish to optimize performance, nitrogen filling may be of value regardless of the cost. But, is it worth it to drive to St. Augustine or Daytona from Flagler County, just to get your tires filled with nitrogen each time you drop below the desired cold inflation pressure recommended by the tire manufacturer? Once source in Tampa, FL estimated the cost of filling tires with nitrogen at between \$2 and \$10 per tire. To purge and refill an existing set of four air-filled tires was \$39. Consider this, it only cost two quarters to fill an entire set of tires at any station in Palm Coast and just pennies for electricity, if you come to my house where I have an air compressor.

Moreover, what are the claims of these nitrogen advocates and how much does it matter to your vehicle. First, they claim Nitrogen is far more stable than air. But, do you adjust your tire pressures in increments of as little as one-quarter of a pound per square inch as NASCAR pit crews? Do you do it every 125 miles or so when the tire temperature is in excess of 200°F? Could the stability of nitrogen versus air really be a factor in your everyday driving?

Second, Nitrogen proponents claim that because of molecule size, nitrogen leaks less than air. But, how much is the real question. Consider this study by Consumer Reports. Their test started on September 20, 2006 and the final measurements were taken on September 20, 2007. The results show nitrogen does reduce pressure loss over time, but the reduction is only a 1.3 psi difference from air-filled tires. The average loss of air-filled tires was just 3.5 psi from the initial 30-psi pressure setting. Nitrogen-filled tires lost an average of 2.2 psi from the initial 30-psi setting. But, do you really let your Corvette sit one year without checking tire pressure?

(Continued on Page # 9)

Technical Notes — April '08' (Continued from Page #8)



One other issue not addressed in the first few paragraphs is oxidation of the tire and wheel caused by the air mix which is 20% O₂. Claims of nitrogen being more friendly to the rubber and wheels is questionable, since most tires wear out the tread on the outside long before the inner rubber would go bad from exposure to oxygen. The same factors are true for wheels, many of which are made from alloys, not straight steel. You're far more likely to damage a wheel from hitting a curb than see a wheel go bad from oxidation.

In fact, many independent sources such as Consumer Reports, Bankrate.com, etc. have researched this issue of nitrogen filling passenger car tires and have come to the same conclusion as this author. Don't waste your time or money. As a FCCC driver, I expect your Corvette hardly ever sees the street, much less races around the Daytona Speedway. Nor do you go a half-mile south of the Speedway to the Daytona Beach runway, pounce on it at a 300 feet per minute fall and then brake your car to a screeching stop. I also expect that for all the time cleaning your car, you must spend just a few minutes each month to insure the tire pressure is at manufacturer's cold inflations specifications.

For enthusiasts, the best money you can spend is on an accurate, repeatable tire gage. You then need to do what any sports car enthusiast would do, check your tire pressure at least monthly. And here's an excellent article on how to correctly set the tire pressure in your car. It accounts for variations of garage temperature, sunlight, driving and most all effects on your tires. <http://www.tirerack.com/tires/tiretech/techpage.jsp?techid=73>

On a personal note, you may consider the following. I routinely set my tire pressure just slightly above manufacturer's specs. Here are the pros: Lower rolling resistance for better fuel economy; a more even tire wear on the edges; and the ability to maintain tire pressure minimum specs if you "forget" to check your tire pressure at a reasonable interval. Here are the cons: A bit lower traction at maximum performance cornering and a bit less traction in wet weather. For me, the pros outweigh the cons especially since I do not use maximum performance cornering while driving around Flagler County and I am always extremely cautious driving in the rain. Now, "slightly above" is a subjective judgment; I happen to use 2 psi and not any more. However, for obvious reasons, in this article I can only officially recommend setting the cold inflation tire pressure at **exactly** the manufacturer's specification. Inherent with that procedure, of course, is that you must religiously check the tire pressure at the recommended interval.