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Tire & Pressure Build-up

You check a tire at 8 AM and the ambient temperature in the shop is 70°F. The pressure measured using a calibrated gauge is exactly 100 psi. The fleet specified air pressure is also 100 psi so all is good and the mechanics are happy as the vehicle leaves the yard. Within two minutes it's moving down the interstate at 65 mph with a fully loaded trailer. Within five minutes of leaving the yard, the driver jumps out of his cab and checks the tire which now measures 107 psi. He gets back on the road and drives an additional twenty minutes and checks that same tire again. The tire pressure now measures 115 psi. Thirty minutes later the tire pressure is still 115 psi while the outside temperature has not risen from the 70° F. It is now time for a brief five-minute coffee break. The driver checks the tire pressure after finishing his coffee and finds 118 psi. The sun is shining brightly on that specific tire causing the rise in tire pressure.

The driver now gets back on the highway and runs for another hour before checking the tire pressure again and it's still 118 psi. The tire has reached a steady state condition and will stay at the temperature assuming all operating conditions remain the same including the outside temperature. But of course that is not going to happen. The road surface will have an impact on the tire pressure as well; for instance the difference between concrete and asphalt. The surface temperature of asphalt is usually hotter than concrete and may increase the tire pressure another one or two psi. The tire pressure may reach 120 psi due to this. Vehicle speed can increase the tire pressure even further. Running at 75 mph versus 65

mph will generate even more heat and the tire pressure may reach 125 psi.

Should you be concerned that the tire is 25% "overinflated" at 125 psi? The answer is simple. NO! Tires are designed to take all these load, speed, and temperature variables into account when a commercial radial truck tire is designed, developed, and tested. Welcome to the real world. This is why all tire companies clearly state in their literature to never check a hot tire for pressure because you will think that the tire is overinflated when the air pressure is exactly where it should be. Don't take air out of a hot tire! A truck tire can take four to six hours to revert back to its original pressure. You simply do not know where in the cycle you are checking the tire pressure. The recommendation is to check your tire pressures first thing in the morning after the tire has cooled down overnight.

However, cold weather can create a different challenge. As an example, a tire that has cooled down after running all day and measures 100 psi at 70°F will lose pressure if it sits out overnight and the temperature drops to 20°F. When the tire is checked in the morning, you will find only 90 psi in the tire because when the temperature drops, so does the tire pressure. Every loss of 10°F equals a loss of two psi. You may think that the tire is underinflated but it is NOT. As soon as it warms back up to 70°F, the tire pressure will be back to the specified 100 psi.

We always say that heat is a tire's worst enemy. It is when a tire running underinflated generates excessive internal heat due to the increased sidewall flexing and longer tire footprint (more rubber on the road). An underinflated tire is always much more serious than a tire being a few psi over inflated. Excessive heat will eventually lead to tire failure.

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