

## Automatic Tire Inflation Systems

*Automatic tire inflation systems can save tire maintenance costs and improve fuel economy by nearly 1%, saving 100 gallons of fuel and eliminating one metric ton of greenhouse gas emissions per year. Properly inflated tires also wear longer and have fewer punctures.*

### What is the challenge?

When not properly inflated, tires flex more under load, producing heat and increasing rolling resistance, which wastes fuel. Truck tires inflated ten pounds per square inch (psi) below recommended air pressure levels can reduce truck fuel economy from 0.5 percent to one percent. Heat and stress from improper inflation soften and deflect tire components, causing faster and more uneven wear, which shortens the life of the tire. Under inflated tires have more frequent punctures, increasing the risk of tire failures that could lead to costly road service and loss of revenue.

Despite these costs, a recent survey of combination trucks found that less than half the tires surveyed were within five percent of the recommended inflation pressure. Fleets may find it difficult to keep tires properly inflated since truck tires can lose up to 2 psi each month, even if the rim seal and valve stems are tight. This is because air molecules can permeate through tires. Temperature and load also affect tire pressure. For these reasons, tire manufacturers recommend checking tire pressure each week and establishing a tire maintenance program.

Even a good tire maintenance program may fall short of its aims. In part, this is because trailer tires have more impact on truck fuel economy than tractor tires, yet trailers are interchangeable and thus harder to monitor. Since the bulk of the load is carried in the trailer, a 10-psi under inflation in a trailer tire may have nearly twice the impact on truck fuel economy as the same amount of under inflation in a drive tire. Despite the importance of keeping trailer tires properly inflated, a fleet may not be able to inspect its trailers regularly. A trailer may be gone from the service yard for extended periods of time while on the road, at a customer's facility or at drop-off location waiting for a back haul. A fleet may not even own the trailers it hauls, but pick them up from a shipper or third party. These circumstances can place much of the responsibility for checking tire pressure onto drivers. However, one industry survey indicates only eight percent of truck drivers check tire pressure with a tire gauge before each trip.

### What is the solution?

Automatic tire inflation (ATI) systems monitor and continually adjust the level of pressurized air in tires, maintaining proper tire inflation automatically, even while the truck is moving. One ATI system uses the vehicle's own air-brake compressor to supply air to all the tires. Another system uses self-contained compressors mounted on each hub that are powered by the rolling motion of the wheels. Once an ATI system is installed, it should not require any special attention from the driver.

### The results are in . . .

ATI systems can extend tire life by eight percent or more. The systems eliminate the need to check tire pressure manually, saving time and labor while ensuring consistent and proper tire inflation. Installing an ATI system on a truck's drive axles and trailer costs up to \$900, but can save over \$200 annually in tire maintenance costs. For a typical long-haul combination truck, annual fuel savings could reach 100 gallons, saving \$170 in fuel costs and eliminating one metric ton of greenhouse gas emissions. The cost of installing an ATI system in a line-haul truck is generally recouped in just over two years through fuel and maintenance cost savings. Truck fleets may realize additional savings from reducing the risk of expensive tire failure caused by under inflation.

### Next steps

Line-haul carriers that find it too difficult or expensive to monitor tire pressure on a regular basis should consider installing automatic tire pressure inflation systems on drive and trailer tires. ATIs can be readily retrofitted onto existing trucks and trailers. Interested fleets can check with ATI manufacturers and truck and tire dealers for more information. Fleets may also contact tire manufacturers or their state or national trucking associations for more information about the benefits of proper tire inflation.