Tire$aver™

Nitrogen Tire Inflation Systems

Extend Tire Life • Enhance Safety • Improve Fuel Efficiency • Prevent Under Inflation

Bulletin TSN2-G

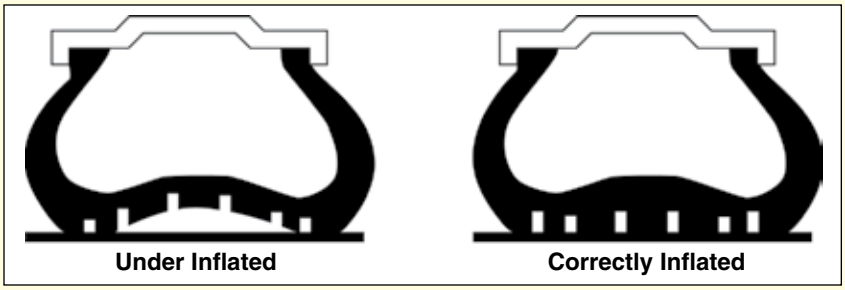
anything Parker Possible™

Parker Tire$aver Nitrogen Generator

Why Use Nitrogen?

Nitrogen is a dry, inert gas used to inflate airplane tires, off-road truck tires, military vehicle tires, and race car tires for improved performance. Oxygen in compressed air permeates through the wall of the tire, thus reducing the tire's inflation pressure. During its journey through the tire wall, oxygen oxidizes the rubber compounds in the tire, causing under-inflation and deterioration of the rubber. Dry nitrogen will maintain proper inflation pressure and will prevent auto-ignition, will not corrode rims, and will help the tire to run cooler. The result is increased safety and reduced operating cost.

Correct Inflation vs. Under Inflation



Under Inflated | Correctly Inflated

Correct inflation is highly significant when considering tire life and performance. It is not always possible to look at a tire and detect under-inflation. However, under-inflation can cause many tire related problems. As inflation pressure largely determines a tire's load capacity, under-inflation results in an overloaded tire. An under- inflated tire operates at high deflection resulting in decreased fuel economy, sluggish handling and may result in excessive mechanical flexing and heat build up leading to catastrophic tire failure.

Improved Tire Life

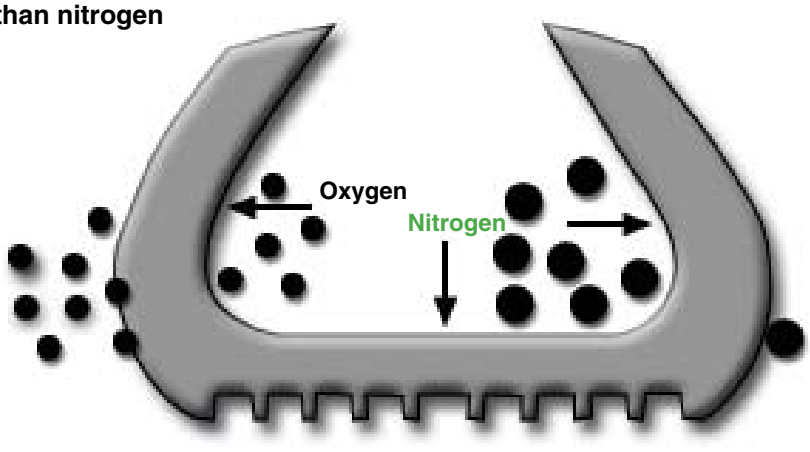
Nitrogen will help to extend tire life by reducing premature failure of the tire.

The causes of premature tire failure which are affected by oxygen include:

- Rubber deterioration by oxidation
- Rim corrosion
- Under-inflation
- Overheating
- Pressure increase due to heat build up
- Uneven wear due to improper inflation

Experts in the tire industry indicate that oxidative aging is one of the primary causes of limited tire life. Oxidative aging is caused by the diffusion of air from the pressurized air cavity of the tire to the outside atmosphere. Tests have shown that if tires are inflated with nitrogen, there is a significant reduction in tire failure.

Oxygen diffuses through the tire much faster than nitrogen



Cross section view of a tire

Reduced Operating Cost

Tires are one of the primary costs of operating a fleet of vehicles. Tire costs include procurement, maintenance and the cost of blowouts.

A typical truck tire with two retreads costs $480.00 and lasts approximately 270,000 miles. Inflating tires with nitrogen will help to prevent premature casing failure and allow tires to be retread multiple times, with confidence and reliability. Inflating tires with nitrogen to eliminate oxidative aging might extend tire life by up to 25%. Increasing tire life to 337,500 miles would save $120 per tire. A fleet with 50 trucks and 900 wheel positions would save over $100,000 in tire cost by inflating with nitrogen.

The primary cost of maintaining tires is the cost of labor to check tire pressures and top off tires with compressed air on a periodic basis. Tire pressure must be checked and the tires topped off due to the diffusion of air through the tire. Tires filled with nitrogen will not experience this diffusion and resulting loss of pressure. Tires filled with nitrogen maintain pressure for a much longer period of time than tires filled with air. If a truck fleet conducts preventative maintenance on 5 trucks per day and presently spends 30 minutes per truck topping off tires, they could realize savings of $31,250 per year based on a labor rate of $50 per hour and 250 work days per year, by inflating tires with nitrogen.

The cost of a service call to repair a blowout can be $500 or more. Consider the hidden costs of a blowout:

- Penalties for delayed product delivery
- Spoilage of product
- Driver idle time
- Cost of lost production or lost revenue from having the truck out of service
- Extra travel time for a mechanic
- Extra repair time due to field conditions
- Damage of associated parts
- Refunds of shipping costs
- Loss of goodwill
- Overhead costs

Reaction from Fleet Owners:

"I don't have to waste time during routine maintenance topping off tires, just a quick check does it. It's a real timesaver."

- Long Haul Fleet Owner

"Nitrogen eliminated an uneven wear problem we had with our vehicles."

- Chief of Police

"As a result of filling tires with nitrogen, we save about one half hour per PM for each truck."

- Long Haul Fleet Owner

Enhanced Safety for Vehicles

The most significant benefit of filling tires with nitrogen on automobiles is enhanced safety. Underinflation of tires due to the diffusion of air through the tire was identified as a significant cause of recent tire failures. In fact, the TREAD Act recently passed by the US Congress requires the National Highway and Transportation Safety Agency (NHTSA) to develop an on board warning of low tire pressure in all automobiles.

A recent article from the Wall Street Journal states:

"One thing government and tire-industry officials agree on is the importance of keeping tires properly inflated. The risks of underinflation, which stresses tires by causing their sidewalls to flex more and the air temperature inside to rise, were highlighted during congressional hearings two years ago into the Firestone tire problems. Underinflation was identified as a factor in the failure of Firestone tires."

-- Wall Street Journal, September 25, 2002.

The Parker Nitrogen Tire Inflation System

- Produces high purity (95-98%) nitrogen from compressed air
- Requires simple wall mount installation (floor standing model also available)
- Allows inflation of up to 32 truck tires per hour
- Requires no storage of nitrogen
- Operates in the low pressure range up to 150 psig
- Inflates tires at the same rate as compressed air
- Includes two stages of high efficiency prefiltration and oil removal filtration
- Extends tire life by up to 25%
- Improves fuel efficiency by up to 3.3%
- Provides more consistent tire pressure
- Prevents auto-ignition of tires
- Eliminates rim corrosion
- Results in tires operating at lower temperature

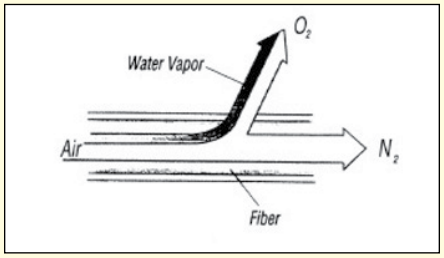
Features and Benefits

- Auto shut down = less wear and tear on compressor, less energy use
- Complete prefiltration package offering maximum reliability and longest operating life
- Receiver tank optional
- Broad operating temperature range. Nitrogen can be generated automatically, without electricity (and troublesome heaters), in a cold garage bay
- Optional wall mount system, frees up floor space
- No electricity, easy installation
- Membrane does not degrade over time providing consistent high performance throughout life of membrane
- No moving parts, reliable operation
- Simple anuual maintenance
- High capacity floor standing model are ideal for high volume dealerships

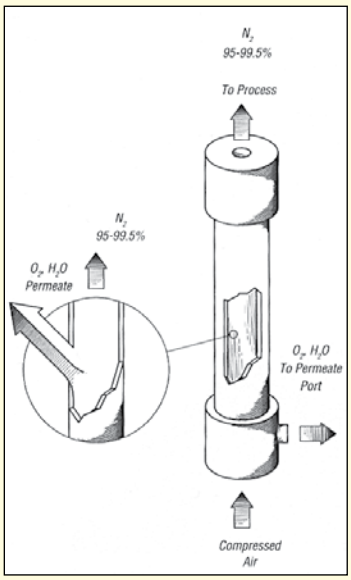
How does the TireSaver system work?

The benefits of inflating tires with nitrogen as opposed to compressed air have been well known to the tire and transportation industries for many years. In general, tires filled with nitrogen improve tire life, reduce operating costs and improve safety. Until recently, there has not been a convenient, reliable, economic means of providing nitrogen to inflate tires. In the past, nitrogen would be provided in large liquid tankers transferring the nitrogen to large storage vessels or as a gas in high pressure cylinders at 2500 psig.

In recent years membrane technology has been developed to purify air into a stream of high purity nitrogen. This technology is being used to generate nitrogen gas at the point of use for a wide variety of applications including general manufacturing, food processing and packaging, chemical blanketing, and chemical analysis. This same technology is now available for inflating tires with nitrogen.



Hollow fiber membrane technology is used to generate nitrogen on site



The Parker Nitrogen Tire Inflation Systems

Model TS021, TS051, TS076, TS123
(Floor/Wall Mount)

Model TS18, TS24F
(Floor Standing)
(Receiving Tank and Prefilters Not Shown but Included)

What Industry Leaders Say:

Michelin Supports the use of nitrogen based on its ability to better retain pressure over a period of time.
- Michelin Technical Bulletin, November 2003

Goodyear says 15% under-inflation = 8% less tread mileage and 2.5% decrease in fuel economy.
- Goodyear Radial Truck Tire and Retread Service Manual, Pg. 40

Pirelli says 20% under-inflation = 15% shorter tire life.

United States Department of Energy says the United States loses over 2 million gallons of fuel each day due to under-inflation.

TMC (Technology & Maintenance Council of the American Trucking Association) says that about 90% of tire failures causing tire road debris is caused by under-inflation.
- TMC Tire Air Pressure Study, May 2002

Bridgestone says air inflated tires lost an average of 2.7 psi per month and nitrogen inflated tires lost an average of 0.7 psi per month.
- Guy Walenga, Clemson Tire Conference, March, 2004

Principal Specifications and Ordering Information

Principal Specifications

Model	TS02	TS051	TS076	TS123	TS18F	TS24F
Nitrogen Purity	95%	95%	95%	95%	95%	95%
Nitrogen Capacity	2.1 SCFM	5.1 SCFM	7.6 SCFM	12.3 SCFM	17.5 SCFM	34 SCFM
Inlet pressure	145 psig	145 psig	145 psig	145 psig	145 psig	145 psig
Ambient temperature	68°F	68°F	68°F	68°F	68°F	68°F
Tire Inflation Capacity Auto Tire* (195/65R15 size)	36 tires/hour	87 tires/hour	130 tires/hour	200 tires/hour	N/A	N/A
Truck Tire* (295/75R22.5 size)	N/A	10 tires per hour	15 tires/hour	24 tires/hour	36 tires/hour	68 tires/hour
Nitrogen Dewpoint	-50°F	-50°F	-50°F	-50°F	-50°F	-50°F
Ambient Operating Temperature	33°F - 110°F	33°F - 110°F	33°F - 110°F	33°F - 110°F	33°F - 110°F	33°F - 110°F
Compressed Air Pressure Required	100 - 145 psig	145 - 189 psig	145 - 189 psig	145 - 189 psig	145 - 189 psig	145 - 189 psig
Maximum Compressed Air Pressure	145 psig (10 bar)	189 psig (13 bar)	189 psig (13 bar)	189 psig (13 bar)	189 psig (13 bar)	189 psig (13 bar)
Compressed Air Temperature Range	50°F - 104°F	50°F - 104°F	50°F - 104°F	50°F - 104°F	50°F - 104°F	50°F - 104°F
Compressed Air Consumption	5.5 SCFM	13 SCFM	20 SCFM	31 SCFM	46 SCFM	88 SCFM
Compressor HP	5 HP	5 HP	7.5 HP	10 HP Screw 15 HP Recip.	15 HP Screw 20 HP Recip.	20 HP Screw 20 HP Recip.
Compressed Air Pre-filtration Activated Carbon Filter	Two Stages	Four Stages Including Carbon Filtration →				
Wall Mount Generator Dimensions	52”hx17”wx12”d	52”hx17”wx12”d	52”hx17”wx12”d	52”hx17”wx12”d	—	—
Floor Mount Generator Dimensions	64”hx25”wx31”d	64”hx25”wx31”d	64”hx25”wx31”d	64”hx25”wx31”d	69”hx24”wx20”d	69”hx24”wx20”d
Wall Mt. Generator Wt.	200 lb.	200 lb.	200 lb.	200 lb.	—	—
Floor Mt. Generator Wt	400 lb.	400 lb.	400 lb.	400 lb.	400 lb.	422 lb.
Inlet/Outlet Connection	1/2” NPT/1/2” NPT	→				3/4” NPT/1/2” NPT
Noise Level	<45dBA	<45dBA	<45dBA	<45dBA	<45dBA	<45dBA
Required Maintenance	Annual Filter Element Change	Annual Filter Element Change	Annual Filter Element Change	Annual Filter Element Change	Annual Filter Element Change	Annual Filter Element Change
	–	Annual Carbon Change	Annual Carbon Change	Annual Carbon Change	Annual Carbon Change	Annual Carbon Change
Application	Motorcycle and Auto Tires	Auto Tires & Light Truck	Truck Tires	Truck Tires	Truck Tires	Truck Tires

Ordering Information

Nitrogen Generator	TS021	TS051	TS076	TS123	TS18	TS24F
Maintenance Kit	MK-TS021	MK-TS123	MK-TS123	MK-TS123	MK-L9001	MK-TS24F

Options

60 Gallon ASME Tank	Included with floor mount

* Nominal value based on a single inflation from 0 psig with valve stem removed. Actual results depend on operating pressure, inflation pressure, hose length, and other factors.

Parker Mobile TireSaver™ Nitrogen Inflation System for Use on Service Trucks

Generate Nitrogen On Demand

- Service breakdowns and blowouts
- Provide value added service
- Convert fleets to nitrogen at the fleet yard
- Achieve consistent tire pressure
- Prevent under inflation
- Tires run cooler
- Reduce blowouts
- Extend tire life
- Reduce tire maintenance
- Improve retread casing quality
- Improve efficiency

Model MTS06

High capacity output for rapid inflation

Designed for extreme conditions, -30°F to 120°F

Complete system for quick, easy installation

Service truck with a Parker TireSaver Nitrogen Inflation System on the bed

Rugged weather proof system

Small, compact unit takes up minimal space

No operator attention required

Reaction from Fleet Owners:

"I don't have to waste time during routine maintenance topping off tires, just a quick check does it. It's a real timesaver." - Long Haul Fleet Owner

"As a result of filling tires with nitrogen, we save about one half hour per PM for each truck"- Long Haul Fleet Owner

"With reduced blowouts, I have saved significant costs in fewer damaged custom automobiles and axles, brakesystems and tie down rollers on my trucks"
- Auto Transport Fleet Owner

"We reduced blow outs from 15 per month to just 2 by using nitrogen" - Small Auto Transport Fleet

"Nitrogen eliminated an uneven wear problem we had with our vehicles" - Chief of Police

Principal Specifications

Model	MTS06	MTS12
Nitrogen Purity	95%	95%
Nitrogen Capacity	6 SCFM	12 SCFM
Nitrogen Output Dewpoint	<40°F pressure dewpoint	<40°F pressure dewpoint
Delivery Output Pressure	10 psi minus inlet pressure	20 psi minus inlet pressure
Min/Max Inlet Air Pressure Air Temperature	145 psig/175 psig 40°F/250°F	145 psig/175 psigMin/Max Inlet 40°F/250°F
Inlet Air Requirement	16 scfm	32 scfm
Min/Max Ambient Temperature Range	-30°F/120°F**	-30°F/120°F**
Electrical Requirements	Voltage 12 VDC Current Draw 6.5 Amps	Voltage 12 VDC Current Draw 13 Amps
Inlet/Outlet Connection	1/2" FNPT/1/2" FNPT	1/2" FNPT/1/2" FNPT
Dimensions	42.5"hx28.7"wx11.5"d	42.5"hx28.7"wx11.5"d
Net Weight	200 lb.	220 lb.
Tire Inflation Capacity	12 tires/hour (295/75R22.5 size) 90 tires per hour (195/65R15 size)	24 tires/hour (295/75R22.5 size) 180 tires per hour (195/65R15 size)
Gas Compressor HP	10	20
PTO Compressor HP	5	7.5

Ordering Information

Nitrogen Generator	MTS06	MTS12
Maintenance Kit*	MK-MTS	MK-MTS

Bring Nitrogen to Your Fleet

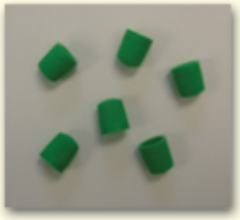
Nitrogen is a dry, inert gas used to inflate airplane tires, off-road truck tires, military vehicle tires and race car tires. When tires are inflated with compressed air, oxygen in the air permeates through the wall of the tire reducing the tire's inflation pressure and causing premature aging. Dry nitrogen will permeate more slowly through the tire. Inflating your fleet tires with nitrogen will improve safety and performance while reducing operating costs.

*Maintenance Kit includes filter elements and carbon bed for annual change.

**120°F Max Temp, intermittent use only. 110°F Max. Temp. for continuous use.

Retail Tire Dealer Accessories

Retail Tire Dealer Components Included in TS-SRTD



#B04-0155: Green Tire Valve Caps for Autos
400 pcs

#TS-BR: Banner for Retail Tire Dealers
1 pcs
Dimensions: 24" x 48"

#Tricar: Trifold Product Brochure for Retail Tire Fleet Dealers
200 pcs
Dimensions: 3.75" x 8.5"

#TS-carlabel: Static Cling Windshield Labels for Autos
250 pcs
Dimensions: 2.25" x 1.5"

#TS-ButtonCar: "Ask Me About Nitrogen" Buttons
5 pcs
Diameter: 2.25"

#TS-Displaycar: Countertop Display for Retail Tire Dealers
1 pcs with 200 #Tricar
Dimensions: 9.5" x 15.5"

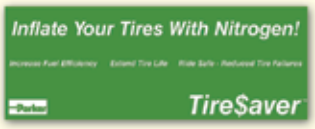
#TS-Postcar: Retail Tire Dealer Poster
1 pcs
Dimensions: 24" x 30"

For Assistance Call 1-800-343-4048 or, go to www.parkertiresaver.com

Commercial Tire Dealer Accessories

Commercial Tire Dealer Components Included in TS-SCTD

#A05-0056: Green Tire Valve O-Rings for Trucks
400 pcs



#TS-UB8: Banner for Commercial Tire Dealers
1 pcs
Dimensions: 24” x 96”

#Trifleet: Trifold Product Brochure for Commercial Tire Fleet Dealers
200 pcs
Dimensions: 3.75" x 8.5"

#TS-Trklabel: Adhesive Backed Label for Trucks
200 pcs
Dimensions: 2.75" x 3.75"

#TS-ButtonTruck: "Ask Me About Nitrogen" Buttons
5 pcs
Diameter: 2.25"

#TS-Displaytrk: Countertop Display for Commercial Tire Dealers
1 pcs with 200 #Trifleet
Dimensions: 9.5" x 15.5"

#TS-Posttrk: Commercial Tire Dealer/Fleet Poster
1 pcs
Dimensions: 24" x 30"

For Assistance Call 1-800-343-4048 or, go to www.parkertiresaver.com

Commercial airlines have used nitrogen tire inflation for years for consistent inflation pressure and minimized oxidation of rubber compounds

Race cars and motorcycles use nitrogen in tires for improved, consistent handling and reduced operating temperatures

Off-road construction vehicles use nitrogen tire inflation to achieve consistent tire pressure and to prevent auto ignition

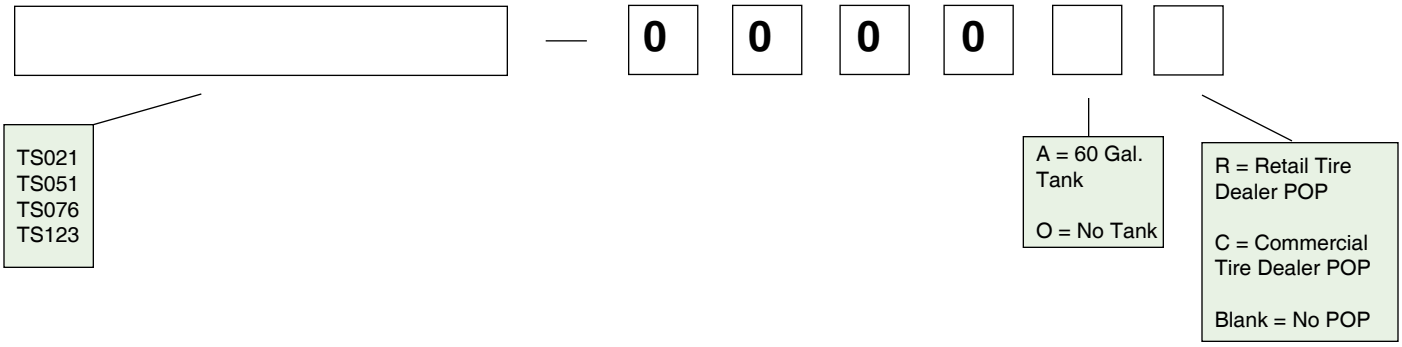
Truck fleets can use nitrogen tire inflation to improve fuel efficiency, extend tire life and reduce the frequency of blowouts

Automobiles use nitrogen tire inflation to improve safety and extend tire life

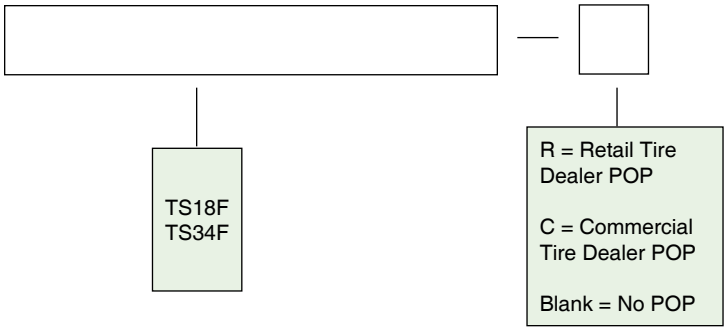
Parker Hannifin is the global leader in supply of nitrogen generator technology for inflation of tires. Parker's success includes:

- 350 Automobile service garages in Germany
- Volvo Netherlands uses nitrogen for tire inflation
- The largest taxi company in the world uses the Parker Nitrogen Generator for tire inflation
- Leading garage equipment manufacturers worldwide use Parker membranes
- More than 4000 units in service worldwide
- Nitrogen and Parker nitrogen generators have been used successfully for years to inflate tires used on automobiles, trucks, race cars, military vehicles, airplanes and off road construction vehicles.

How to Order Models TS021, TS051, TS076, TS123



How to Order Models TS18F, TS34F



Notes: