

Tire Curing with High-Purity, High-Pressure Nitrogen

A Better Process, A Better Tire



As a tire manufacturer, you're faced with many challenges, like increasing productivity while lowering costs. Air Products can help you improve your tire curing process by providing high-purity nitrogen as a flexible and inert pressure agent. We can help determine your projected nitrogen consumption and the optimal supply mode to meet your needs.

Conventional Curing Methods

Conventional methods used to vulcanize rubber during the tire curing process have several disadvantages. For example, the very high temperatures associated with high-pressure steam systems can cause problems with the proper curing of tires. Alternatively, hot water systems can achieve the desired high pressure without excessively high temperatures; however, these systems require longer curing cycles and can be costly to maintain and operate. Steam and inert gas from exothermic generators have also been used to cure tires. It may be difficult to maintain a controlled carbon dioxide and oxygen content in the gas from exothermic generators. This may cause problems with tire curing bladder life. Exothermic generators can also result in high energy costs.

Advantages of High-Purity Nitrogen–Steam Systems

Contrary to conventional methods, high-purity nitrogen–steam systems can improve tire quality and allow optimization of the cure cycle by increasing pressure without extreme temperatures. With these systems, steam provides the heat and nitrogen provides the pressure for the curing process.

Typical nitrogen–steam curing processes use low-pressure nitrogen or steam to inflate the bladder and shape the tire after it's placed in the mold. Subsequently, high-pressure steam flows into the tire bladder and around the outside of the mold to provide the necessary heat for vulcanization. The steam in the bladder is then followed by high-pressure nitrogen to raise the bladder pressure for the remainder of the curing time. Finally, the pressure on the tire bladder is released, and the tire is removed from the mold.

By using high-purity nitrogen, you can maintain a low oxygen content in the tire bladder, which can extend the bladder's life and lower your costs.

Advantages of High-Purity Nitrogen

Using high-purity nitrogen in your curing process can offer attractive economics and several technical and operational benefits over conventional methods, including:

- Longer bladder life due to oxygen level less than 10 ppm
- Lower operating and maintenance costs
- Reduced cycle time and higher production rates
- Improved flexibility based on individually controlled curing temperature and pressure
- Clean and environmentally friendly operation

For more information, please contact us at:

Americas

Air Products
7201 Hamilton Boulevard
Allentown, PA 18195-1501 U.S.A.
T 800-654-4567 or 610-706-4730, press 3
F 800-272-4449 or 610-706-6890
info@airproducts.com

Count on Air Products

As a leading global industrial gas supplier, Air Products has decades of experience with nitrogen–steam curing processes and over 75 years of experience in gas supply. We've helped many tire manufacturers around the world reap the benefits of using high-purity nitrogen as a pressure agent.

Whether you need small or large volumes of nitrogen, we've got you covered. We can provide nitrogen by truck delivery or through our proprietary PRISM® on-site generation system at your facility for a reliable, cost-effective gas supply that best meets your needs. Air Products can help you evaluate your current operation. Then we can customize and install a high-purity, high-pressure nitrogen delivery system so you can realize the benefits of a nitrogen–steam system in your curing process.



Asia

Air Products
Floor 2, Building #88
Lane 887, Zu Chongzhi Road
Zhangjiang Hi-tech Park
Shanghai 201203, P.R.C.
T +021-3896 2000
F +021-5080 5585
Sales hotline: 400-888-7662
infochn@airproducts.com

Europe

Air Products PLC
Hersham Place Technology Park
Molesey Road
Walton-on-Thames
Surrey KT12 4RZ
UK
T +44(0)800 389 0202
apukinfo@airproducts.com



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airproducts.com