

# PRISM<sup>®</sup> PSA Nitrogen Generation System

EXPERIENCE AND TECHNOLOGY. AIR PRODUCTS' PRISM PRESSURE SWING ADSORPTION (PSA) NITROGEN SYSTEM CAN DELIVER RELIABLE AND COST-EFFECTIVE GAS TO HELP YOU MEET YOUR NEEDS.



## dependable gas supply solutions

With a full selection of nitrogen generation technologies, Air Products can deliver the low-cost solution that is right for your application. Our PRISM PSAs are able to supply nitrogen flow rates up to 2,600 Nm<sup>3</sup>/hr (100,000 scfh), while our advanced process can make nitrogen with residual oxygen as low as 5 ppm (95% to 99.9995% nitrogen).

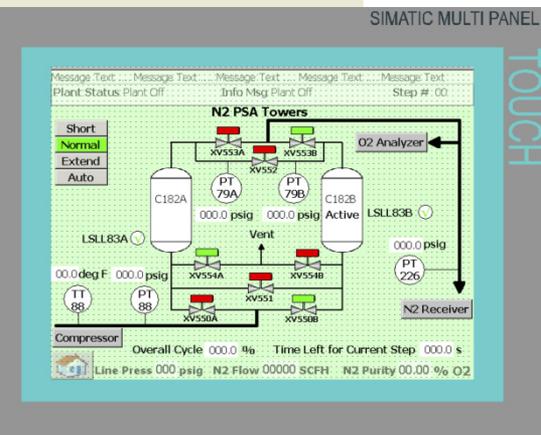
For medium to higher volume nitrogen users, on-site gas generation can provide long-term supply stability at an overall cost saving compared to delivered liquid product. Air Products' PRISM PSAs are currently being used around the world in a diverse range of applications, including metals treatment and processing, food processing and packaging, electronics packaging and test, chemicals, and pharmaceuticals. Our PSA plants can be provided under a multi-year sale of gas supply contract or purchased outright for you to own and operate.

Using a proprietary adsorption air separation process developed by Air Products, the PRISM PSA nitrogen generator's unique design reduces maintenance requirements, thus enhancing

reliable gas supply. The generator's system allows our operation team remote monitoring and operation. The nitrogen generator's modular design allows for easy installation and fast start-up anywhere in the world, where our regional project execution teams ensure compliance with local design requirements and specifications.

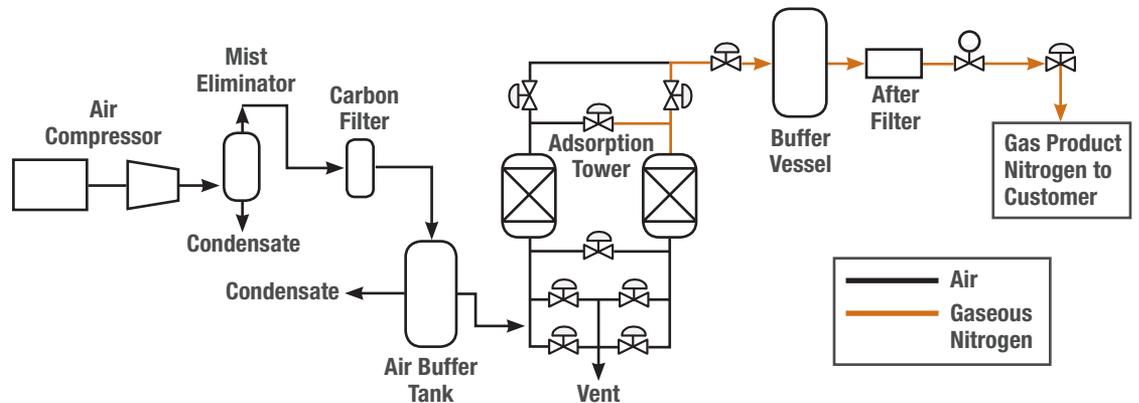
## the right supply for your application

Air Products' global success is built on providing our customers with economical on-site gas supply based on our proprietary technology expertise and a commitment to continuous improvement. PSA generator technology can provide nitrogen at the right purity level for your application. For instance, at any given nitrogen flow rate, a lower purity design (such as 400 Nm<sup>3</sup>/hr of 98% N<sub>2</sub>) will consume less energy and have lower capital cost than the higher purity system to deliver the same flow rate (400 Nm<sup>3</sup>/hr at 99.9% N<sub>2</sub>). Whether your nitrogen requirements are purity or flow rate, Air Products can provide you with the best solutions to meet your needs.



## PROCESS FLOW DIAGRAM

Air Products' Proprietary Adsorption System Delivers Cost-Effective and Reliable Supply



## process description

The PSA system comprises four major operations: air compressor; air pretreatment; adsorption/desorption; product delivery.

### Air Compressor

Atmospheric air is elevated to high pressure by a packaged air compressor.

### Air Pretreatment

The high-pressure feed air from the compressor passes through a mist eliminator to remove water droplets and very small amounts of entrained oil. The air then passes through the carbon filter to remove oil vapors prior to entering the buffer tank.

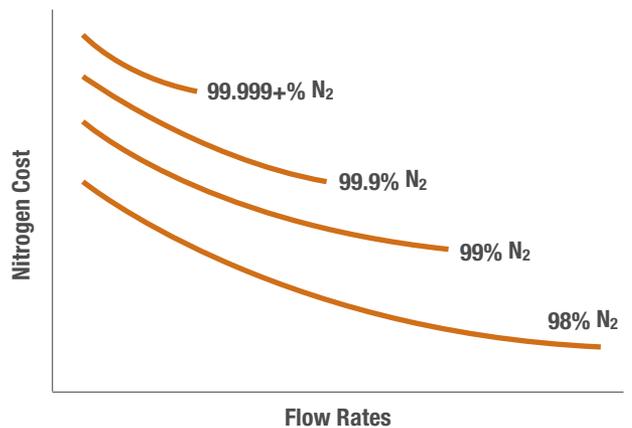
### Adsorption/Desorption

The "treated" air enters an adsorption tower where it is contacted with a carbon molecular sieve to remove oxygen. "Purified" nitrogen passes to product delivery operation.

When the oxygen capturing capacity of the onstream adsorption tower is diminished, the feed flow process valves switch to a second adsorption tower. The first adsorption tower is then depressurized rapidly and purged to

## AIR PRODUCTS SHOWS YOU HOW TO SAVE

To maximize savings, Air Products' experts analyze flow rates, operating costs and purity requirements for your application.



We will work with you to evaluate the PSA system alternatives and identify the one that is right for your specific requirement.

remove the adsorbed oxygen. When the second bed becomes saturated with oxygen, the feed flow process valves switch back to the first adsorption tower and the cycle begins again.



FEATURES AND BENEFITS	
Cost-Effective Gas Supply	Standard, pre-engineered product range
	Highly skidded, modular design for low-cost site installation
	Compact design requires minimal plot space
	Fully automated controls for unattended operation
High Reliability for Dependable Gas Supply	Full local and remote operation with automatic callout for 24/7 support (available also on customer-owned plants); remote monitoring by Air Products provides optimal performance at virtually all times
	Integrated instrument air system
	Design and equipment selection proven through more than 70 years' experience operating air separation plants
	Liquid backup under a sale of gas contract provides even higher onstream supply reliability and optimization of plant capital
Low Operating Cost	Turndown for power savings at reduced consumption rates
	Air Products' proprietary adsorption process to minimize power consumption
Flexibility	Customer and local code requirements can be supported within product design envelope
	Project execution strategies are optimized to local cost structure and infrastructure available at the jobsite
	Air Products can provide a plant we own and operate, one owned by the customer, and hybrid options in between

**Product Delivery**

The “purified” nitrogen enters a nitrogen receiver tank that provides gas to the adsorber vessels during product repressurization and nitrogen buffer capacity. The nitrogen purity is continuously monitored by an oxygen analyzer prior to delivery to the customer houseline. Should the oxygen level rise above the preset alarm point, the product delivery valves

isolate any off-specification product from the customer houseline. The system will automatically enter a “cleanup” mode, and product delivery will resume when the nitrogen purity is within specification. A flow control system prevents system overdraw.

Depending on your supply needs, we can also offer an integrated backup liquid nitrogen system to meet peak flow demands.

## REMOTE MONITORING FOR DEPENDABLE SUPPLY

Air Products' PRISM Nitrogen PSAs use our remote monitoring system, which facilitates communication between the gas generator and our global network of 24/7 operating service centers. This enables Air Products' technicians to track the mechanical operation and the flow and purity performance of the PSA, identify maintenance intervals, and adjust system controls for changes in your requirements. Air Products' remote monitoring service is included under our sale of gas contracts and is now available to sale of equipment customers who own the PSA plant.



| worldwide |

## GLOBAL EXPERTISE DELIVERED LOCALLY

With local expertise around the world, Air Products is focused on delivering reliable, cost-effective gas supply solutions based on understanding your needs. Visit your local country website or contact your local office below to see how we can help you.

Air Products' PRISM gas generators are available for the production of nitrogen, oxygen, and hydrogen. Check out our website at [www.airproducts.com/gasgeneration](http://www.airproducts.com/gasgeneration) to review our range of offerings.

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