

PRISM[®] Cryogenic Nitrogen Generators — HN Series

Reliable, on-site supply



Custom tailored high-purity nitrogen supply.

Our proprietary technology, pre-fabricated modules, and understanding of your needs combine to give you safe, reliable and cost-effective high-purity nitrogen supply.

Proven, flexible solutions

At work around the world, Air Products has a full selection of nitrogen generation technologies to deliver the low-cost solution that is right for your application. Our PRISM[®] HN Nitrogen Generators use proprietary cryogenic separation technology to produce high-purity gaseous nitrogen. Liquid nitrogen can also be produced, stored, and vaporized as needed for your application's peak shaving or backup requirements.

The PRISM HN Nitrogen Generators are supplied as a set of pre-engineered modules that are simple and economical to install, operate and maintain. We utilize a novel design approach to allow for further optimization of the plant to accurately suit your needs. Options include:

- High-efficiency operation using low pressure plant operation
- High liquid production with high pressure operation
- Ultra-high liquid production (typically 50% of total production with special design)
- Ultra-high purity to 1 ppb oxygen for electronics wafer tabs and CDA (Clean Dry Air)
- Closed loop cooling water, open tower cooling or air cooled option
- Control by integrated PLC (Programmable Logic Controller) or directly by client DCS
- Air supply by integrated compressor with typical turndown to approximately 75% of maximum
- Air supply from client's compressed air system, with typical turndown to approximately 50% of maximum or better
- Higher pressure can be supplied by product compression

Performance

A full range of gaseous nitrogen production up to 11,000 Nm³/hr with simultaneous liquid nitrogen output of up to 20% of gaseous nitrogen flow is attainable with PRISM HN Nitrogen Generator systems. The diagram outlines the general performance capabilities of the various plants. Liquid production rates vary with pressure and can be up to 10 bar without product compression. Standard nitrogen purity is <10 ppm O₂ in nitrogen but high purities of up to <1 ppb O₂ in nitrogen can be achieved.

Customizing a solution for you

At Air Products, we don't have a "one size fits all" approach. Our PRISM HN Nitrogen plant design platform is flexible, so the final system meets your specific requirements with the scope of supply tailored based on your interests.

Features/benefits

Low capital cost

- Standard pre-engineered plant range
- Single distillation column with Air Products proprietary structured packing
- Skidded for low installation costs and reduced space requirements.

High reliability

- Single, integrally geared turbo air compressor
- Produces liquid nitrogen for back-up and peak shaving, no trucked in back-up required
- Efficient adsorber system eliminates the need for any mechanical chiller unit
- Small plants have proprietary compliant foil bearings, so eliminating the need for a lube-oil system
- Integrated instrument air system

Low operating costs

- Proprietary column packing results in low air/nitrogen ratio
- Low pressure option with product compression gives low power consumption
- Fully automatic controls for unmanned operation resulting in low manning costs
- Remote operation can be provided.

Flexibility

- Customer has options to best fit their requirements.
- Variable liquid production to suit fluctuating demand
- Multiple design and operating options
- Can be customized to meet client specifications

Figure 1: Liquid Nitrogen vs. Gaseous Nitrogen Performance

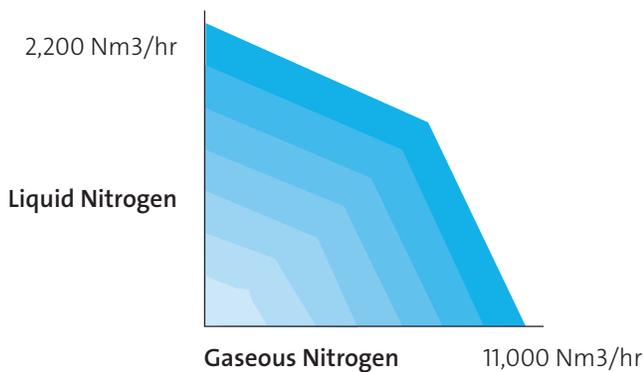


Figure 2: Typical Plant Layout

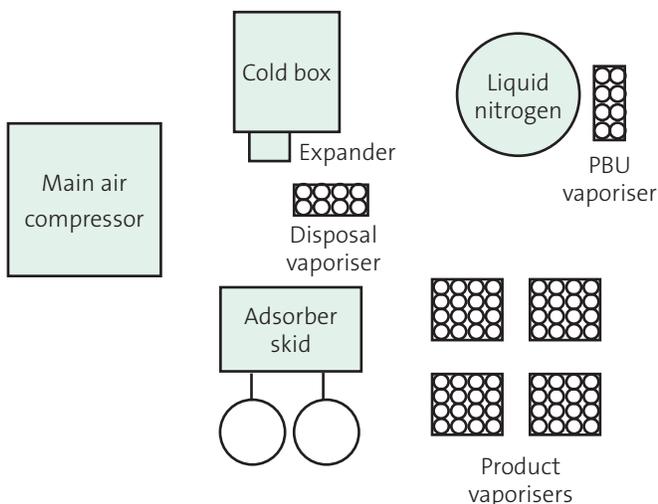
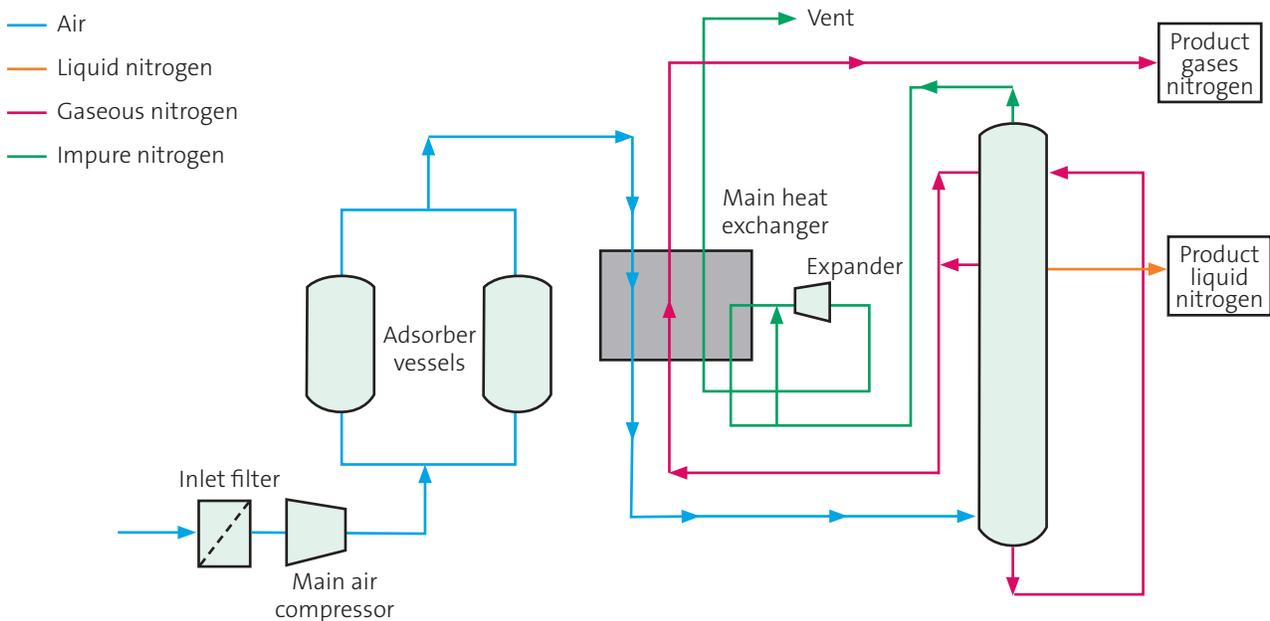


Figure 3: Process Flow Diagram



Flexibility

The Prism HN Nitrogen Generator's flexibility makes it ideal for applications across many industries because it can achieve a comprehensive range of flows, pressures and purities.

Oil, gas and petrochemical users benefit from the generator's ability to produce both gaseous and liquid nitrogen, our plant reliability, and our ability to build a system to meet your specifications.

For electronics customers, purity (typically ppb levels of oxygen in nitrogen) is paramount. Our generators deliver with high efficiency, low noise and a compact layout plus our short delivery and installation times.

Metallurgical, glass, pharmaceutical, food processing and power generation industries utilize this PRISM HN Nitrogen Generator system's flexible technology platform to safely, reliably and efficiently meet their nitrogen requirements.

Process description

1. Filtered atmospheric air is compressed in the main air compressor, then cooled.
2. A dual bed adsorption system removes vapor, carbon dioxide, and heavier hydrocarbons with the two beds alternating between adsorption and regeneration.
3. Dry air enters the cold box, is partially liquified then passes into the distillation column with pure nitrogen moving to the top of the column and crude liquid oxygen collecting at the column base.
4. High purity nitrogen leaves the top of the column where it is condensed, returned to the high pressure column, or stored as liquid product.
5. Oxygen rich liquid at the column base is used to provide refrigeration, and is continuously purged to prevent buildup of hydrocarbons and carbon dioxide.
6. Overall refrigeration for the process comes through capturing the energy of the expansion of the waste gas which is also utilized to regenerate the adsorbers.
7. Pure gaseous nitrogen from the top of the high pressure column is brought to near ambient temperatures before combining with any makeup gas from the stored reserves to meet the applications' gas requirements.



We welcome the opportunity to have a discussion with you. Please contact us at any of these locations:

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Our commitment to the details

Nothing is more important to us than safety, health and the environment. Air Products is proud to be a safety leader in the industrial gas industry and we apply our eight decades of operation experience to every plant we design and build.

Additionally, on-site gas generation helps sustainability-minded customers reduce their carbon footprint. It reduces the transportation of delivered products and makes the molecule directly as a gas thereby avoiding the energy needed for liquefaction. And our technology and engineering teams are constantly working to provide even higher levels of energy efficiency in our on-site gas generators.

Our quality standards are also high. We are certified under ISO 9001; utilize ASME B31.3 as our piping standard; design all pressure vessels to ASME VIII (with regional accommodations as needed); IED and CE plated standard electrical components and NEMA were needed; and noise level protocols of 85 dB (a) at 1 meter of the plot boundary ("free field" area without consideration of other sources) with lower levels achieved when required.

Worldwide expertise at your doorstep

With local expertise around the world, Air Products can deliver reliable, cost-effective gas supply solutions by working with you to understand your needs. You can explore your gas supply options at: www.airproducts.com/gasgeneration or contact your local office to see how we can help you.



tell me more
airproducts.com/gasgeneration