

PRISM[®] Cryogenic Nitrogen Generation Systems



We serve customers across a broad range of industries, and this has enabled us to develop a standardized product family with engineered features, enabling us to meet individual requirements. Our global success has been built on providing our customers with economical on-site nitrogen gas supply based on fundamental cryogenic technology expertise and our commitment to continuous improvement.

Experience and understanding. These attributes allow Air Products to reliably deliver a cost-effective nitrogen generator solution to meet the needs of your application.

Dependable nitrogen supply solutions

Air Products' PRISM HPN and GN generators provide cryogenic purity gaseous nitrogen at flow rates from 300 Nm³/hr to more than 4000 Nm³/hr, providing a highly reliable gas supply at an overall cost savings compared to delivered liquid nitrogen. Our PRISM HPN generators are also capable of producing nitrogen gas with oxygen impurities at the parts per billion level. The on-site generator's modular design allows for easy installation and fast start-up with unattended operation. A programmable logic controller ensures dependable operation, and our advanced telemetry permits remote monitoring by the global Air Products on-site operations team. An integrated liquid nitrogen backup system helps ensure uninterrupted supply.

To generate nitrogen with maximum efficiency, the PRISM HPN generator incorporates a proprietary air separation process. The system's design reduces maintenance requirements, thus enhancing dependable gas supply. Air Products' HPN and GN generators are installed around the world, and our regional project execution teams ensure compliance with local design requirements and specifications.



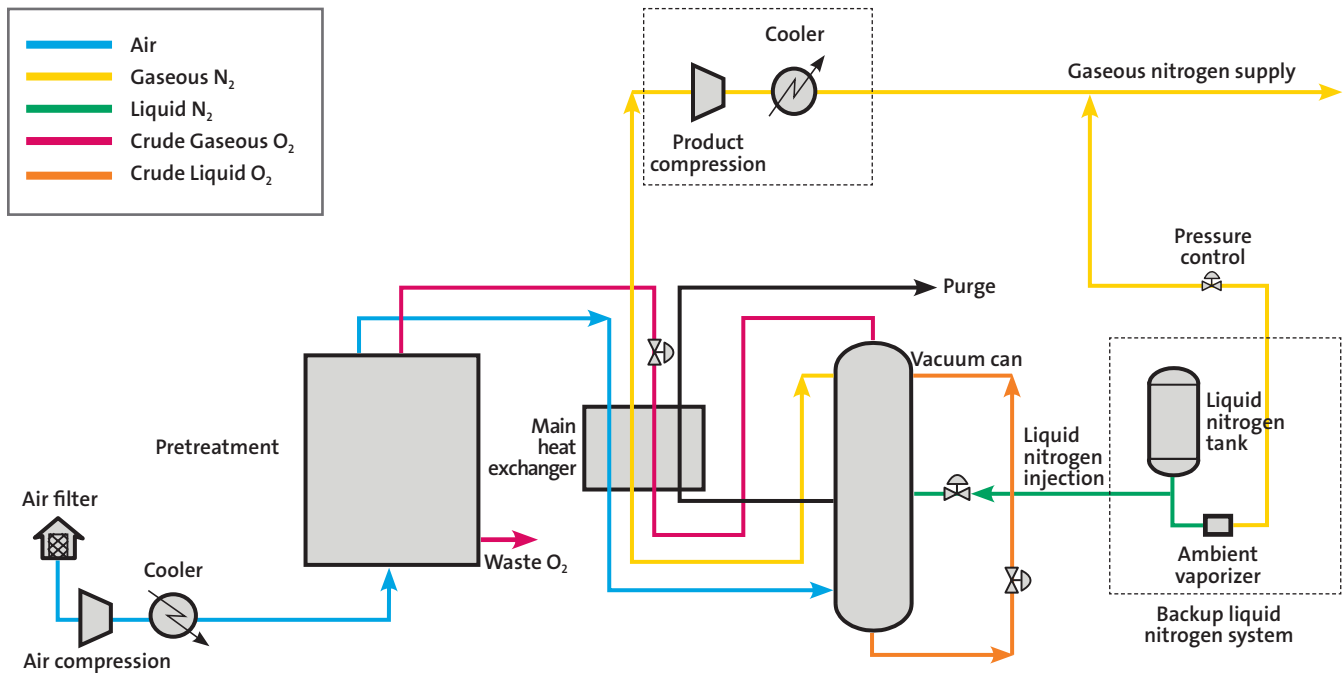
Process description

Atmospheric air is compressed in the main air compressor of the nitrogen generator system and cooled in the compressor aftercooler. The air then passes through a pretreatment system to remove water vapor, carbon dioxide, and hydrocarbons.

Inside the vacuum can, the air is cooled and partially liquefied by exchange against outgoing process streams in the main heat exchanger. The cold, partially liquefied air and gas mixture passes into the distillation column. Here the mixture is separated by distillation into nitrogen gas and oxygen-enriched liquid.

The column is vacuum insulated with a highly efficient heat exchanger. As such, the cryogenic nitrogen process in the design uses a much smaller amount of liquid nitrogen to provide the refrigeration balance required in the nitrogen generator. A standard option of Air Products' proprietary design, an efficient expander will provide such refrigeration capability. Alternatively, our design can also rely on a small amount of liquid nitrogen, normally from the storage tank, to balance the process heat gain.

Process description



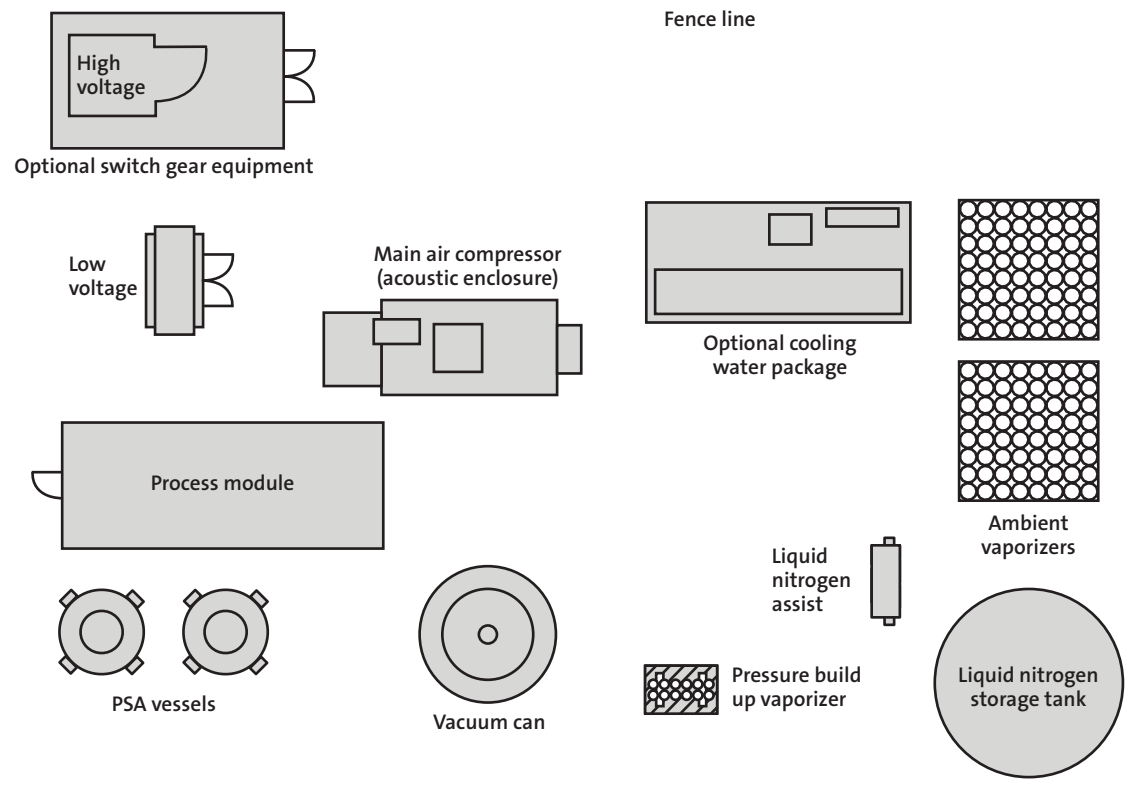
Generator performance

The PRISM HPN and GN generator product family offers a range of gaseous nitrogen requirements from 300 to more than 4,000 Nm³/hr. Product discharge pressures typically range from 3 to 9 barg with higher pressures available as needed by specific applications.

Nitrogen applications

Nitrogen is valued as a gas for its inert properties. Virtually any industry can benefit from its unique properties to improve yields, optimize performance, and make operations safer. Its inertness makes it suitable for many applications covering most aspects of manufacturing, processing, handling, and shipping. Our experienced applications teams across the globe can use their knowledge of your industry and application to provide you with a nitrogen supply and technology solution to meet your unique needs. Among the industries using nitrogen are chemicals, oil and gas production, electronics assembly, food and beverage, refineries, pharmaceuticals, glass, iron and steel production, metals processing, primary nonferrous, rubber and plastics, and semiconductors.

Typical plant layout



Features and benefits

Cost-effective gas supply

- Standard, pre-engineered product range
- Highly skidded, modular design for low cost installation
- Compact design requires minimal plot space
- Low-pressure design with product compression
- Fully automated controls for unattended operation

High reliability for dependable gas supply

- Single, integrally geared air compressor
- Integrated instrument air system
- Full local and remote operation with automatic call-out for 24/7 support

Flexibility

- Load following turndown provides power savings at reduced nitrogen consumption rate
- Customer and local code requirements can be supported within product design envelope

Worldwide

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.

**For more information,
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