

PRISM[®] Cryogenic Oxygen Generators

Reliable on-site supply



Features/benefits

Cost-effective

- Standard pre-engineered plant range
- Shorter lead times
- Reduced space required
- Economies of scale due to significant operating experience

High reliability

- Integrated instrument air system

Low operating costs

- Proprietary column packing
- Efficient adsorber system

Liquid argon production

- Argon supply for customer process

Flexibility

- The system configuration can be varied to make products required for the application.

Fully automatic controls

- Allows for remote operation
- Minimal site manning

Superior performance

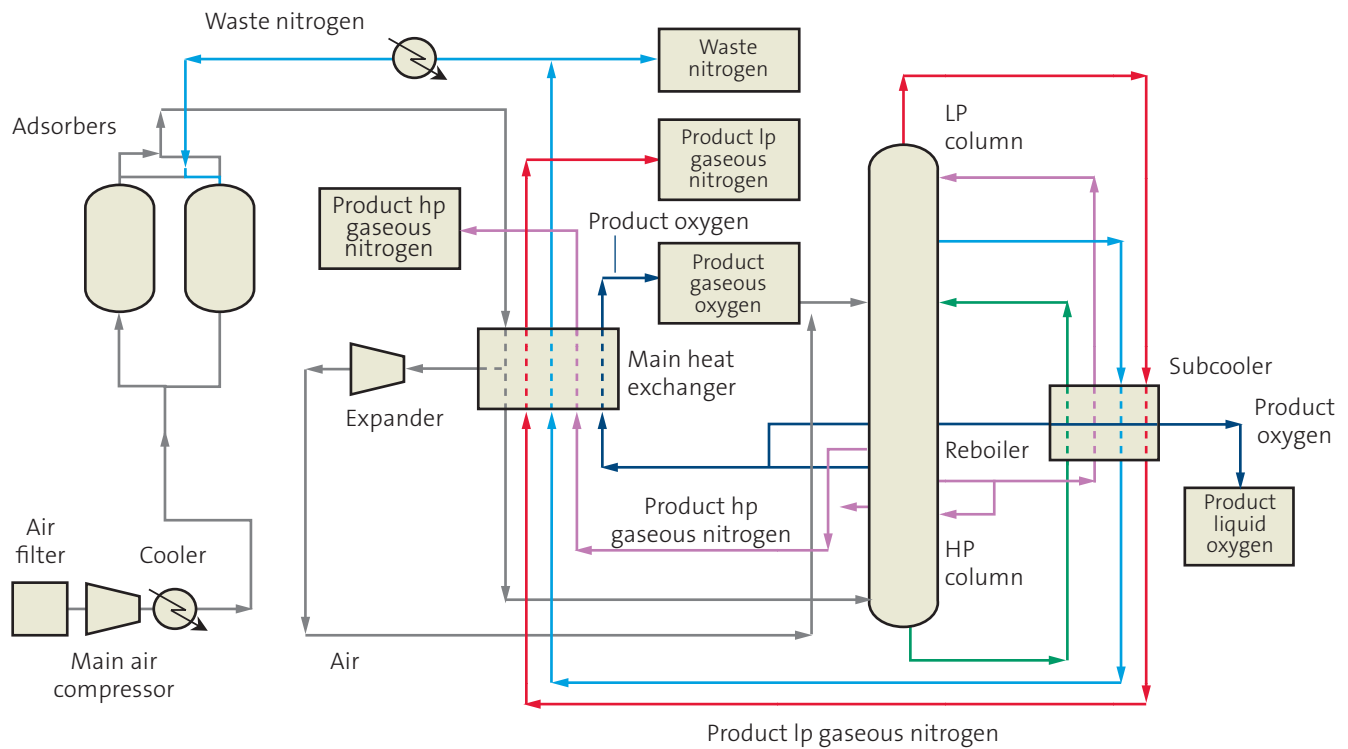
For applications with medium to high volume requirements, on-site gas generation is often preferred because of its cost-effectiveness and reliability. Air Products' Cryogenic Oxygen Generators can produce high purity oxygen at the flow rate you need. These generators can also be designed to make nitrogen and argon if required.

Our design, engineering, and expertise with on-site gas generation has developed over more than 80 years in plants located around the world. Today, Air Products' Cryogenic Oxygen Generators are reliable, efficient, and are designed for unmanned operation.

The PRISM family of Cryogenic Oxygen Generators span a full range of requirements up to more than 500 MTD of oxygen at 99.5% purity, gases nitrogen production of up to 480 MTD at 5 ppm of oxygen in nitrogen, and liquid argon supply of up to 26 MTD at 1.5 ppm oxygen in argon. Required product pressure can be achieved either directly from the plant or with the use of product compression. Product purities are dependent on the operation mode and feed air specification.

Product	Purity
Gaseous oxygen	99.5%
Gaseous argon	5 ppm (oxygen)
Liquid argon	1.5 ppm

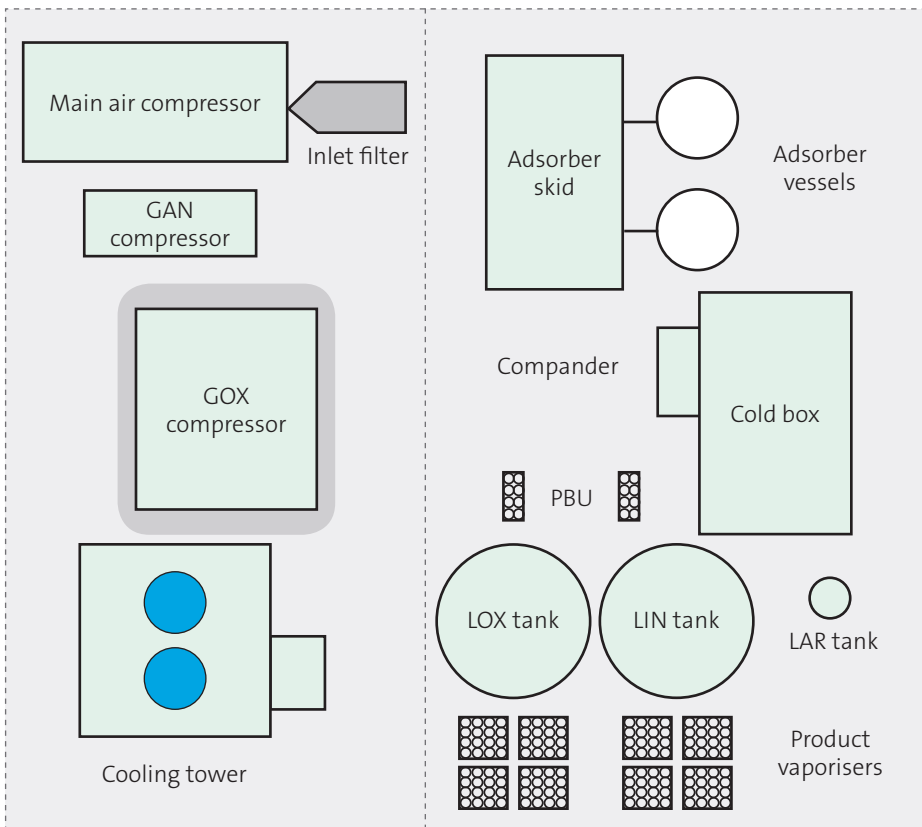
Figure 1: Proprietary Design Delivers Cost-Effective Supply



Process description

1. Filtered air is compressed by the main air compressor (MAC) and then cooled.
2. The air passes through a 2-bed adsorption system which removes moisture, carbon dioxide and heavier hydrocarbons. The two beds alternate between service and regeneration.
3. The clear air is then divided into two streams. The first air stream is cooled in the main heat exchanger (MHE) before flowing to the bottom of the high pressure (HP) column. The second air stream is compressed and cooled in the booster before passing through the MHE and entering the distillation column.
4. The cold air in the HP column separates into gaseous nitrogen at the column top and oxygen-enriched liquid at the column bottom.
5. Gaseous nitrogen then moves to the reboiler/condenser and either returns to the HP column as reflux, is subcooled in the MHE and sent to the low pressure (LP) column as liquid nitrogen (LIN) reflux, or stored as LIN.
6. The oxygen enriched liquid moves to the top of the crude argon column for condensing purposes, and then is fed to the LP column for further distillation.
7. Final oxygen distillation occurs in the LP column with continuous purging from the reboiler separator to prevent hydrocarbon and carbon dioxide buildup.
8. Argon purification occurs in the argon column. First nearly all of the oxygen is withdrawn, with a second step to remove the nitrogen.

Figure 2: Typical Plant Layout



Applications around the world

On-site gas generation is an excellent choice for a broad range of industries that can benefit from oxygen's ability to increase production rates, reduce emissions, and enhance product quality. Around the world, glass, metals, steel production, and chemicals are utilizing our on-site gas generation solutions to cost-efficiently meet their industrial gas requirements.

Our commitment to you

We believe that nothing is more important than safety, health and the environment. As an industry safety leader, we put our eight decades of expertise into every plan we design, build, sell and operate.

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.

Certified under ISO 9001, Air Products designs all pressure vessels to ASME VIII standards with regional variations such as European PED when needed. Free field noise levels (with no other noise sources considered) are 85 dB (A) at one meter of the plot boundary. Lower noise levels can also be achieved. ASME B31.3 is our standard piping, while electrics are IEC, CE marked and NEMA where required.

Gain from our experience

We understand all aspects of on-site gas generation. Put that expertise to work for you and realize the benefits of cryo oxygen generation for your application. Visit us at www.airproducts.com/gasgeneration or contact your local office below to see how we can help you.

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

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