

Supply Systems That Reduce Costs

The global economy continues to heighten the competitive pressure in the metals processing industry. While new technologies bring advances, they come at a cost. Productivity improvements, on the other hand, can provide valuable cost savings.

One area where improvements can be realized is in the supply of controlled atmospheres used in the heat treating, brazing and sintering operations, specifically nitrogen (N₂) supply systems. Selecting the optimum supply solution for your operation requires a careful evaluation of your overall process and N₂ atmosphere needs. Since Air Products offers an extensive range of supply solutions, we understand the options and can help you select the system that is best for you.

Table 1

Air Products' nitrogen product portfolio enables us to provide you with the best technology for your needs

	<i>Liquid</i>	<i>Membrane</i>	<i>PSA</i>	<i>HPN (LIN assist)</i>
<i>Flow (mscft)</i>	0–30	0.01–60	1–84	9.5–76
<i>Purity (% N₂)</i>	99.9995+	95–99.9	95–99.9995	99.9995+
<i>Standard Pressure (psig)</i>	40–250	60–180	85–100	40–140

Often we will perform a comprehensive analysis of your current and future N₂ requirements, including flow monitoring at your site as well as evaluation of your operating process. This precise definition of your flow and purity requirements enables us to determine the right supply option for your process to achieve your desired improvements. For instance, depending on your volume and purity requirements, many of our customers have been able to achieve 20%–40% costs savings by replacing truck-delivered nitrogen with an Air Products PRISM® Nitrogen Generation System.

Evaluating the Options

There are a number of key factors to focus on when determining what the best supply option for your application is. Here is a summary of some of those factors:

Flow Rate and Pattern – flow tests are often used to gain an understanding of your base hourly rate and utilization rate (hours/month) and the pattern of usage. This will aid in providing optimal unit nitrogen costs and in appropriately sizing the unit.

Nitrogen Purity or Oxygen Content – understanding the purity of nitrogen required by your operation (measured in % nitrogen or residual parts per million (ppm).) Most, but not all, atmospheres require 10 ppm purity.

Pressure Requirement – determining the pressure needed by your process is a combination of the gas pressure required by the process plus the pressure drops through your supply piping.

Power Cost – your cost for power (marginal power rate in \$/kWh) is important to consider because on-site generation systems typically require more power to operate than liquid storage supply, making it important to understand the complete cost analysis.

Footprint – the footprint, or space available at your facility, can also determine whether your on-site nitrogen generation system will be an indoor or outdoor installation.

Benefits of PRISM Nitrogen Generation Systems

If an on-site nitrogen generation system is right for your process, you can potentially realize numerous benefits including:

1. significant cost savings as compared to traditional truck-delivered nitrogen
2. highly reliable nitrogen supply due to remote 24/7 monitoring along with liquid nitrogen back-up storage
3. hassle-free operations with Air Products providing maintenance of the generator
4. predictable nitrogen pricing

Here's What Others Are Saying

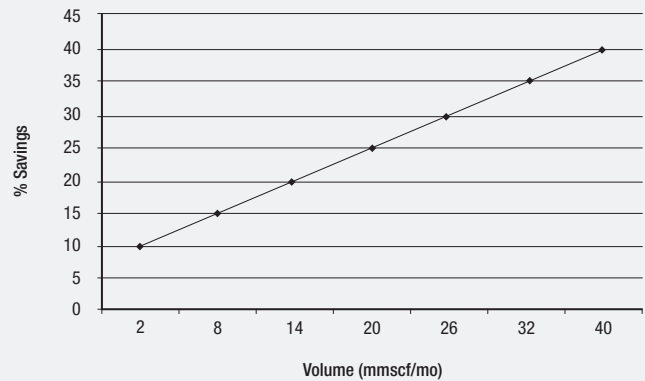
Air Products has supplied nitrogen to customers in over 30 countries, with customers in the metals industry using our gas atmospheres in galvanizing, annealing, brazing, carburizing, extruding, sintering, neutral hardening, shrouding and degassing applications.

A.O. Smith, one of the world's largest suppliers to the electric motor industry, recently installed Air Products' PRISM high-purity nitrogen (HPN) system at their Mt. Sterling, Kentucky facility. The HPN nitrogen is combined with hydrogen from a liquid storage and delivery system already supplied by Air Products. This blended and humidified end product provides the required atmosphere for A.O. Smith's motor lamination annealing process.

"We selected Air Products because its nitrogen-hydrogen offering produces a furnace atmosphere that leads to superior product quality and consistency," explained Jerry Shrout, A.O. Smith plant manager. "It's simply the most reliable and cost-effective solution for us."

Figure 1

Savings When Replacing Delivered Nitrogen With PRISM Nitrogen Generation System



Determining What Is Right For You

Can your application realize the benefits of a PRISM nitrogen generation system? The following chart will enable you to do a quick self assessment.

Figure 2

On-Site Nitrogen Amenability Self Assessment Chart

Category	Parameter 1	Parameter 2	Parameter 3	Parameter 4	Category Factor Score	CFS
Base Hourly Flow Rate (scfh) <i>parameter factor</i> <input type="text"/> Your Flow Rate	<4000 scfh 1	4,000–15,000 scfh 3	15,000–70,000 scfh 5	>70,000 scfh 5	Your parameter factor (x) x 4 (category factor) =	0
Purity (parts per million/ppm or % nitrogen) <i>parameter factor</i> <input type="text"/> Your Purity Requirement	<10 ppm (99.999% N ₂) 1	10–100 ppm (99.99% N ₂) 2	100–1000 ppm (99.9% N ₂) 4	1000–10,000 ppm (99.0% N ₂) 5	Your parameter factor (x) x 4 (category factor) =	0
Pressure <i>parameter factor</i> <input type="text"/> Your Pressure Requirement	100psig 5	100–130 psig 3	130–170 psig 1	170 psig 0	Your parameter factor (x) x 2 (category factor) =	0
Utilization Rate <i>parameter factor</i> <input type="text"/> Your Utilization Rate	<350 hrs/mth 0	350–520 hrs/mth 1	520–624 hrs/mth 3	624–730 hrs/mth 5	Your parameter factor (x) x 3 (category factor) =	0
Power Costs <i>parameter factor</i> <input type="text"/> Your Power Costs	<\$0.03 0	\$0.03–\$0.05 1	\$0.06–\$0.07 3	>\$0.07 5	Your parameter factor (x) x 3 (category factor) =	0

Assessing Your Total Factor Score (TFS)

Low Amenability	<34 TFS
Medium Amenability	34–51 TFS
High Amenability	52–80

Definitions

Low amenability—A TFS of 33 or less means your operation probably cannot benefit from on-site nitrogen generation at this time. However, this could change as your operation changes. For example, if you add more shifts and increase your base hourly flow rate requirements, your TFS and amenability to on-site supply may change. It's a good idea to keep on-site supply in the back of your mind as an option for a cost-effective alternative as your operation changes.

Medium amenability—If your TFS is 34–51, your operation may be amenable to on-site nitrogen supply. In this range, you may be able to save as much as 25% to 30% on your current nitrogen costs. Since your TFS falls in the medium category, it is worth discussing your results with an Air Products representative to verify your TFS, and thus your amenability to on-site nitrogen supply.

High amenability—If your TFS is 52–80, chances are your operation is highly amenable to on-site generation supply. In fact, with an Air Products on-site generator, you may be able to save as much as 40% on your nitrogen costs. Your current nitrogen cost also impacts your economic amenability to on-site supply.

While completing the assessment, if you have any questions or are unsure of your base hourly flow rates or minimum pressure requirements, feel free to contact us at 1-800-654-4567. One of our application engineers is willing to help you determine these values.

For More Information

Corporate Headquarters

Air Products and Chemicals, Inc.
7201 Hamilton Boulevard
Allentown, PA 18195-1501
Tel 800-654-4567
Fax 800-272-4449
E-mail gigmrktg@airproducts.com

tell me more
www.airproducts.com/equipment