APSA™
on-site nitrogen gas generation from the industry pioneer

www.us.airliquide.com
How to get started

Call the Air Liquide office nearest you (on the back of this brochure) to initiate an evaluation of your nitrogen requirement.

For your customized APSA solution

We will identify the optimal nitrogen supply solution for your facility by:
- Determining accurate nitrogen usage patterns
- Evaluating opportunities to optimize nitrogen consumption
- Considering growth potential and the impact on future nitrogen requirements
- Identifying potential cost savings

Upon completion of the evaluation, Air Liquide specialists will work with you to select a properly sized APSA supply system. Our proposal will outline:
- Recommended technical solution
- Commercial aspects of the offer
- Potential savings

A Typical APSA Installation

AIR LIQUIDE SCOPE of SUPPLY
1. Air Pretreatment
2. Compression
3. Air Separation Column
4. Liquid Nitrogen Tank
5. Vaporizers
   * Air Liquide can provide assistance with vendors and contractors for customer supplied items.

CUSTOMER SCOPE of SUPPLY
6. Concrete Foundation
7. Fence/Grass Bollards
8. Power Supply/Electrical
9. Nitrogen Piping to Point of Use
   * Telephone Lines/Ethernet Connection (not shown)
   * Condensate Disposal (not shown)
Air Liquide’s industry leading APSA’s are installed worldwide for an extensive range of customer industries and applications.

APSA technology

APSA Advanced Product Supply Approach

• **Air Compression:** Air is compressed in a rotary screw compressor. This compressor provides the efficient turndown that is a characteristic of an APSA.

• **Air Purification:** Impurities, such as CO<sub>2</sub> and water, are removed in molecular sieve beds and filters.

• **Heat Exchange:** A heat exchanger simultaneously cools the air to the distillation column while it warms the products from the distillation column. In this way, the column is kept cold without the use of a rotating equipment.

• **Distillation:** The liquefied air is separated into its components in a distillation column.

• **Liquid Storage:** Liquid nitrogen provides a supply of refrigeration to make up for heat losses from the distillation column. This liquid nitrogen also provides a backup supply of nitrogen.

APSA Nitrogen Specifications

<table>
<thead>
<tr>
<th>Specification</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flowrates</td>
<td>7,500 to over 150,000 scfh</td>
</tr>
<tr>
<td>Purity</td>
<td>99.999% with &lt; 3 ppm oxygen*</td>
</tr>
<tr>
<td>Pressure</td>
<td>Up to 500 psig*</td>
</tr>
</tbody>
</table>

* Higher purity and pressure options available

Your Industry
Chemicals
Electronics
Food Packing
Materials
Metals
Refining
Rubber and Plastic

Your Need
Nitrogen

Your Solution

APSA
Low Cost
High Quality
Reliable
Efficient
Flexible
Air Liquide’s APSA offers a low cost, reliable, flexible and efficient means to deliver consistent high quality gaseous nitrogen with cryogenic purity.

**Low Cost**

- Eliminate cost associated with production and distribution of bulk liquid
- Avoid additional costs of using hydrogen for purification
- Optimize nitrogen consumption with Air Liquide’s i-Datal™ service
- Reduce power consumption when nitrogen demand is below design flow rate

**High Quality**

- Produce cryogenic purity nitrogen (99.999%) consistently
- Continuously analyze the product stream for residual oxygen
- Ensure dew point lower than -100°F using cryogenic process
- Stay on schedule during start-up through the use of standard sized modular units

**Reliable**

- Typically operate in excess of 98% of the time.
- Leverage Air Liquide’s extensive APSA experience with standardized equipment and field service expertise
- Continuously monitor remotely with Teleflo™ to ensure immediate response to production demands

**Sample i-DATAL Web page**

<table>
<thead>
<tr>
<th>APSA System</th>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>LI167</td>
<td>Liquid N2 backup tank level</td>
<td>85.00 InH20</td>
</tr>
<tr>
<td>APSA_PWR</td>
<td>APSA Main power</td>
<td>ON</td>
</tr>
<tr>
<td>APSA_STATUS</td>
<td>APSA System status</td>
<td>OK</td>
</tr>
<tr>
<td>AI116</td>
<td>APSA Product 02 content</td>
<td>0.510 ppm</td>
</tr>
<tr>
<td>FI971</td>
<td>Customer Total flow</td>
<td>23079.00 SCFH</td>
</tr>
<tr>
<td>MoPwrONTm</td>
<td>APSA Monthly ON Time</td>
<td>822.49 Hrs</td>
</tr>
<tr>
<td>MoPwrOFFTm</td>
<td>APSA Monthly OFF Time</td>
<td>0.0 Hrs</td>
</tr>
</tbody>
</table>

**Consumption Data**

<table>
<thead>
<tr>
<th>Name</th>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>HrsCons</td>
<td>N2 Consumption this hour</td>
<td>1191.16 SCF</td>
</tr>
<tr>
<td>DayCons</td>
<td>N2 Consumption this day</td>
<td>208664.81 SCF</td>
</tr>
<tr>
<td>MonCons</td>
<td>N2 Consumption this month</td>
<td>5737662.00 SCF</td>
</tr>
<tr>
<td>MoLinPwrOut</td>
<td>N2 Consumption during power out</td>
<td>8847.20 SCF</td>
</tr>
</tbody>
</table>
Air Liquide’s APSA product line offers a full range of on-site generators that provide optimally sized, customized solutions for your specific nitrogen requirements.

**Flexible**
- Vary nitrogen flow rate and power consumption based on demand
- Meet customer needs with full range of standardized modular APSA sizes
- Customize solutions with high pressure or high purity options

**Efficient**
- Minimize power consumption with load following capabilities (see graph below)
- Leverage low specific power
- Remote start and stop capability

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**Sample APSA Power Curve (Nitrogen Flow vs. Power)**

As the use of nitrogen decreases, your power consumption and cost also decrease.
founded in 1902 and now present in 72 countries with nearly 37,000 employees, Air Liquide is a world leader in industrial and medical gases and related services. The Group offers innovative solutions based on constantly enhanced technologies to help manufacture many indispensable everyday products and preserve life.

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