Nitrogen Generators
Pressure Swing Adsorption (PSA)

Nitrogen On Demand
Largest Product Offering
Highest Efficiency
Highest Purity
Proven Dependability

www.igs-global.com
Nitrogen Generators — Highlights & System Features

HIGHLIGHTS

√ Proven designs with over 30 years experience, IGS is building one of the world’s largest portfolio of nitrogen generators with units from 0.6 Nm3/h / 22 SCFM to 3,200 Nm3/h / 2,030 SCFM.

√ Over 10,000 industrial systems installed worldwide.

√ IGS’s long history in manufacturing PSAs has enabled it to design systems for years of trouble free operation.

√ Cost advantage of a Generon IGS Nitrogen PSA Generator
  • Cost saving of 50% to 300% over Bulk Liquid, Dewars and Nitrogen Cylinders.
  • No safety or handling issues with bulky high pressure cylinders or dangers of cryogenic liquids
  • No complicated supply contracts with ever escalating charges

SYSTEM TYPES

IGS supplies three types of PSA Generators:

- Bank PSA Nitrogen Generators
- Compact PSA Nitrogen Generators
- Twin Tower Nitrogen Generators

Generon IGS’s technical specialist will accurately select and size your system to meet your specific requirements.

OPTIONS

- Refrigerated Dryer
- Oxygen Analyzer
- Product Flow Meter
- Air Receiver Tank
- Nitrogen Buffer Tank
- Bottle Filling Station
- Purities to 99.9999% with DeOxo System
- Feed Air Compressor
- Product Booster Compressor
- Enhanced PLC with Telemetry
- Dew Point Analyzer
- Classified or Unclassified Areas

KEY FEATURES

- Purities up to 99.9995%
- Automatic part load operation to 30% of design capacity
- Exhaust Muffler
- PLC Piping & Instrumentation
- Safety Valve
- Nitrogen Pressure and Flow Regulator
- Control System
- Skid Mounted
- Hour Meter
- Air Filters
- Adsorber Vessels
- Fully automated unattended operation
- Pneumatic Valves
- Pressure Switch for automated Idle-Mode
Nitrogen Generators—Standard Systems

Nitrogen NITROSWING® Bank PSA Series

This patented design was specifically designed to meet our client’s requirements for a highly compact, expandable and durable PSA product. Able to produce Nitrogen Purities of up to 99.995%, this patented design allows for a client to purchase a unit to meet the demands of today and expand the unit as their demand increases by the addition of “PSA Modules” without having to purchase a new unit.

Input Pressures: up to 145 PSIG (10 barg)
Output Pressures: up to 110 PSIG (7.5 barg)
Flows: up to 4300 SCFH (112 Nm3/hr) @ 99.9%

Nitrogen Compact PSA Series

Continuing to be the leader in innovative designs, Generon IGS has developed the Compact PSA Systems. This design allows for the nitrogen and air buffer tanks to be on the same skid, saving space and installation time. 99.9995%

Input Pressures: up to 145 PSIG (10 barg)
Output Pressures: up to 110 PSIG (7.5 barg)
Flows: up to 1744 SCFH (46 Nm3/hr) @ 99.9%

Nitrogen Twin Tower PSA

Using the most efficient Carbon Molecular Sieve on the market to date, our Twin Tower PSA System provides maximum output flow with a smaller footprint than most common PSAs on the market. 99.9995%

Input Pressures: up to 150 PSIG (10.3 barg)
Output Pressures: up to 120 PSIG (8.3 barg)
Flows: up to 44166 SCFH (1160 Nm3/h)@ 99.9%
Nitrogen Generators—PSA System Components

Nitrogen NITROSWING® Bank PSA Series

Nitrogen Compact PSA Series

Nitrogen Twin Tower PSA
IGS has over 30 years experience in the design and manufacturing of Pressure Swing Adsorption (PSA) plants. We are at the forefront of this technology and have the flexibility to provide the right package to meet all customer requirements. IGS’ Nitrogen Generator Systems use the basic principle of passing air over adsorbent material which bonds with oxygen to leave a rich stream of nitrogen.

The adsorption separation is accomplished in the following process steps:

1. **FEED AIR COMPRESSION AND CONDITIONING**
   The ambient (inlet) air is compressed by an air compressor, subsequently dried by an air dryer and filtered before entering the process vessels.

2. **PRESSURIZATION AND ADSORPTION**
   The pre-treated air is passed into a vessel filled with Carbon Molecular Sieve (CMS) where the oxygen is adsorbed preferentially in the CMS pores so that nitrogen with an adjustable purity (down to a residual O2 content of 50 ppm) remains in the gas stream. Before the adsorption capacity of the CMS is fully utilized, the nitrogen separation process is interrupted, and the switching of the adsorber vessels is initiated.

3. **DESORPTION**
   The saturated CMS is regenerated (i.e., the adsorbed gases are released) by means of pressure reduction below that of the adsorption step. This is achieved by a simple pressure release system. The resultant waste stream is vented into atmosphere. The regenerated adsorbent can now be used again for the generation of nitrogen.

4. **NITROGEN RECEIVER**
   Adsorption and desorption take place alternately at equal time intervals. This means that the continuous generation of nitrogen can be achieved with two adsorbers, one being switched at adsorption and the other at regeneration. Constant product flow and purity is ensured by a connected product buffer vessel that stores the nitrogen at purities up to 99.9995% and pressures up to 7.5 bar (g) / 110 PSIG.

5. **NITROGEN PRODUCT**
   The result is a constant stream of on-site produced high purity nitrogen at cost significantly below that of liquid or bottled gases.
Nitrogen Generators — Which Technology to use?

Generon® IGS is in a unique position, where we offer both Nitrogen PSA Systems and Nitrogen Membrane Systems. Our sales and engineering team will be with you to help you decide which technology is right for your application. Generon IGS has been designing and manufacturing both PSA and Membrane systems for over 40 years.

<table>
<thead>
<tr>
<th>System Type</th>
<th>Purity</th>
<th>Pressure</th>
<th>Ease of Operation</th>
<th>Ambient Temperature</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pressure Swing Adsorption (PSA)</td>
<td>PSAs are ideal for generating high purity nitrogen up to 99.999%</td>
<td>Product delivery pressures up to 115 PSIG (7.93 barg)</td>
<td>PSA systems though reliable, have significantly more components to maintain. Refrigerated air dryer required and 8 switching valves.</td>
<td>PSA performance declines rapidly above 95°F TO 104°F (35°C to 40°C) depending on product purity.</td>
</tr>
<tr>
<td>Hollow Fiber Membrane</td>
<td>Membrane Systems are ideal for generating nitrogen between 95% and 99%</td>
<td>Pressures available up to 500 PSIG (34.47 barg)</td>
<td>Membrane systems are relatively simple with no moving parts to maintain.</td>
<td>Membrane Systems perform well up to 165°F (73°C)</td>
</tr>
</tbody>
</table>

So Why Choose Generon® IGS for your Nitrogen Generator Supplier?

COST SAVINGS
You can save up to 300% of Nitrogen costs by generating your own nitrogen on-site.
By generating your own nitrogen on site, you can dramatically reduce your nitrogen consumption costs.
Save on:
- Delivery Costs
- Bulk Liquid Evaporation Loss
- Monthly Cylinder / Tank Rental Fees
- Handling and Purchasing Costs
- Site Liability Insurance

RELIABILITY / EXPERIENCE
The key to making the investment in nitrogen Generation equipment is purchasing from a dependable company. Generon® IGS has thousands of systems that have been installed worldwide.

Generon® IGS has over 40 years of experience of designing and manufacturing Pressure Swing Adsorption (PSA) systems. Our systems have been designed for on-shore and offshore applications.
Other Generon® Products

Primary Compression Packages
All custom designed to your specifications

Twin Tower Desiccant Air Dryers
Custom designed to your specifications in the Oil & Gas and Petrochemical Industries.

Nitrogen Membrane Generators
Available in flows up to 4,000 SCFM

Post Compression Packages
Custom designed systems available up to 5,000 PSIG

Process Gas Separation Systems
Membrane and PSA systems available, H2, CH4, CO2, He, SF6

Booster Compressors
Custom systems available to meet your specifications with Zone II rating, Class I, Div II
Clients

General Mills
POET Engineering
Airgas
La Fabril
Valley National Gases
Acamp
Omega Nutrition
Dometic USA
Elab
Metal Tech
Seadrill Offshore
Agilent Technologies
Scott Gross Welding
Celta
Advanced Composites
ITASA
Mohawk
BJ Services

General Electric
Spectrum Controls
Delphi
Ecka Granules
Proton Energy
Northwest Equipment
Mahle
DJIA
Ansen Corporation
Conelec of Florida
Cenovus Energy
PCC Airfoil
Innomag
Spectrum Controls
Delphi
Ecka Granules
One Source Toxicology
Precision Air Drilling

3M
Ornex
City of Springfield
Micross
Sugar Foods
Criteria Labs
Matheson Trigas
Lacamas Labs
ADM
King Nut
Welsco
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Pioneering Gas Solutions from Concept to Completion