

Nitrogen & Oxygen Generators



*Nitrogen & oxygen on-site production :
a solution for all industrial applications*

NOXERIOR
Next Generation Gas Solutions

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GRUPE

NOVAIR

NOVAIR

EXPERT MANUFACTURER OF OXYGEN & NITROGEN PSA GENERATORS



Founded in 1977 in France, NOVAIR is specialized in the design and manufacturing of **air & gas separation, treatment and compression solutions**. The company is focused on on-site generation of nitrogen and oxygen through customized systems designed to help industries reduce their operating costs and increase their autonomy.

NOVAIR headquarters are located in France, near Paris. The group includes an R&D and production site Italian subsidiary - NOXERIOR - and is operating in over 100 countries through a wide network of certified local distributors.

Superior quality

is at the heart of our philosophy. A major technical expertise in on-site PSA systems and a strong experience result in the most reliable and safe solutions on market.

Innovation

is our constant priority. Through a large investment in R&D and a close dialog with our clients, we are continuously improving our solutions and optimizing equipment performances and design.

Tailor made technology

is our motto. We respond to the constraints and requirements of a wide variety of industries and design and manufacture custom made solutions for each of our clients.

With a long experience of large industrial projects and a strong competency in **complex engineering projects for EPC companies**, NOVAIR & NOXERIOR are able to take up the most ambitious challenges, in accordance with the most demanding engineering standards.

On-site oxygen and nitrogen plants: increase your safety & autonomy, decrease your expenses

Forget high pressure cylinders deliveries or liquefied gas supply: Novair offers you solutions to become your own supplier of oxygen and nitrogen, from an unlimited, universal and free raw material: air.

- **Reduced operating costs:** you produce the nitrogen/oxygen you need and get rid of any external supply contract with all the transportation or rental costs involved. Most of our clients recover their investment within 2 years.
- **Increased safety:** no more heavy cylinders to handle, no high pressure or cryogenic storage of combusive gas.
- **No more supply chain failure:** your generator provides an unlimited supply of nitrogen or oxygen on site.
- **No more logistic constraints:** save time avoiding recurrent logistic procedures - orders, delivery bills, invoices, inventory management.
- **Reduced environmental impact:** no more comings and goings of polluting trucks



EPC project

Novair engineering and after sales service: an expert support at each step of your project

From feasibility pre-study to remote monitoring of installed plants, we are here to design, manufacture and service customized solutions and provide continuous support to our customers.



Certified quality management system

NOVAIR has set up a quality system that meets the requirements of ISO 9001 and is annually certified by an independent notified body for corporations quality management. A guarantee of the reliability of our installations and services.



Advanced air separation technologies for nitrogen & oxygen production

PSA Technology

NOVAIR nitrogen / oxygen generators are based on a PSA process (Pressure Swing Adsorption). It consists in an air gases separation thanks to a molecular sieve capable to adsorb the nitrogen / oxygen under pressure.

The nitrogen/oxygen generator is composed of two separation columns (adsorbers) filled with molecular sieve, called zeolite or CMS. When the compressed air pressurises a column, the nitrogen (or oxygen) is gradually being retained by the molecular sieve while the oxygen (or nitrogen) is going directly to the output of the generator.

DS-PSA Oxygen Technology

Result of years of R&D effort and investment, the DS-PSA technology is taking PSA to the next level.

This exclusive know-how from NOVAIR is based on a double stage PSA process : with 2 molecular separation stages, DS-PSA removes nitrogen, argon, and any trace of pollutants remaining after the first stage, making it possible to reach up to 99,5% oxygen concentration, with an exceptional stability.

Modular PSA Technology

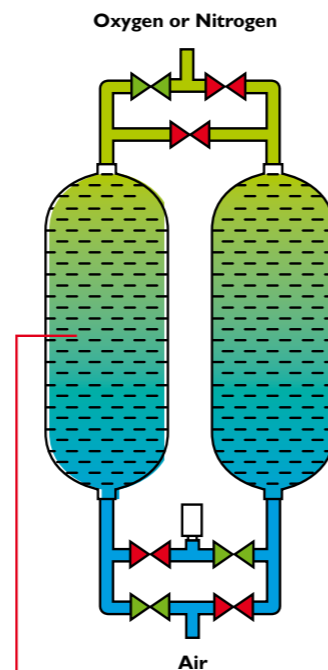
Unlike twin-tower standard systems, modular PSA generators feature multiple modules of molecular sieve, each implementing an optimized patented PSA process. Production capacity can be easily adjusted directly on site without any skilled personnel by simply adding or removing modules.

Membrane Technology

NOVAIR generators separate different components of the air by means of hollow fibers over lengths adapted to each need.

V-PSA Technology

NOVAIR V-PSA generators extract the available oxygen in the ambient air from the other gases by applying the Vacuum Pressure Swing Adsorption (V-PSA) technology.



The PSA technology

For industries : engineering, installation & after-sales service

NOVAIR is also a complete service panel to support industries in the research of dedicated solutions.

Nitrogen & oxygen plants NOVAIR are customized after a careful analysis of the needs of each client :

- Pre-feasibility study
- Planning
- Computer assisted design and sizing
- Programming of automated solutions
- Manufacturing and skid mounting
- Project management
- Standardized documentation
- On-site installation, tests
- Maintenance
- Remote monitoring

We promote a complete training on the operation and maintenance of NOVAIR solutions in our factory near Paris, or at the installation



Thousands of references worldwide



NOVAIR

OXYPLUS
TECHNOLOGIES

NOXERIOR
Next Generation Gas Solutions

All technologies for on-site nitrogen or oxygen production



Oxygen
95%
+/-2%

Nitrogen
up to 10ppm
oxygen
residual

Modular PSA Generators

Oxygen / Nitrogen



Oxygen
95%
+/-2%

Nitrogen
up to 10ppm
oxygen
residual

Twin Tower Generators

Oxygen / Nitrogen



Nitrogen
up to 0.5%
oxygen
residual

Membrane Generators

Nitrogen



Oxygen
96 to 99.5%
+/-0.2%

DS-PSA Generator

Oxygen

V-PSA Generators

For industries needing particularly high flows (ie : glasswork, fish farming), NOVAIR introduces a new range of V-PSA solutions. Using a Vacuum Pressure Swing Adsorption (V-PSA) technology, these generators deliver up to 140 Nm³/h at the lowest operation costs.



Molecular sieve protection system

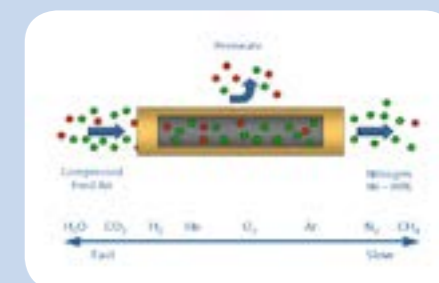
To guarantee that the molecular sieve is not damaged by any oil/water mixture coming from the air compressor, all NOVAIR PSA generators feature a special protection system which stops the oxygen / nitrogen production process before the molecular sieve could be damaged.



Membrane

The membrane generator separates different components of the air by means of hollow fibers over lengths adapted to each need.

NOVAIR generators incorporate high efficiency membranes and offer a wide range of membrane module sizes according to any required pressure vessel design standard.

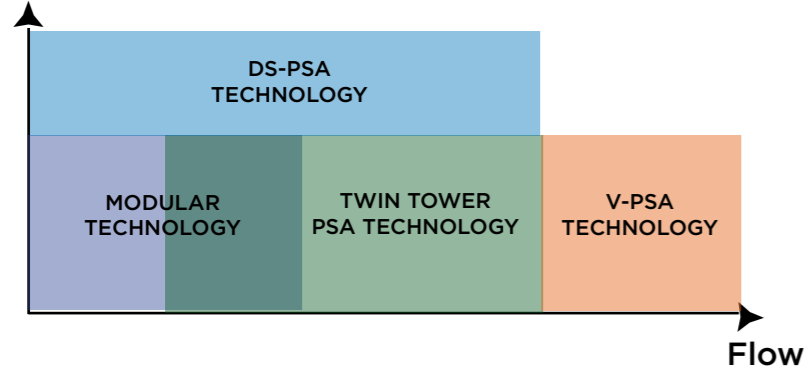


The largest range on market

Modular PSA Generators

With over 40 years of experience, NOVAIR has developed a deep knowledge of all on-site air separation technologies for the production of nitrogen or oxygen, and offers the widest choice of on-site generators on market.

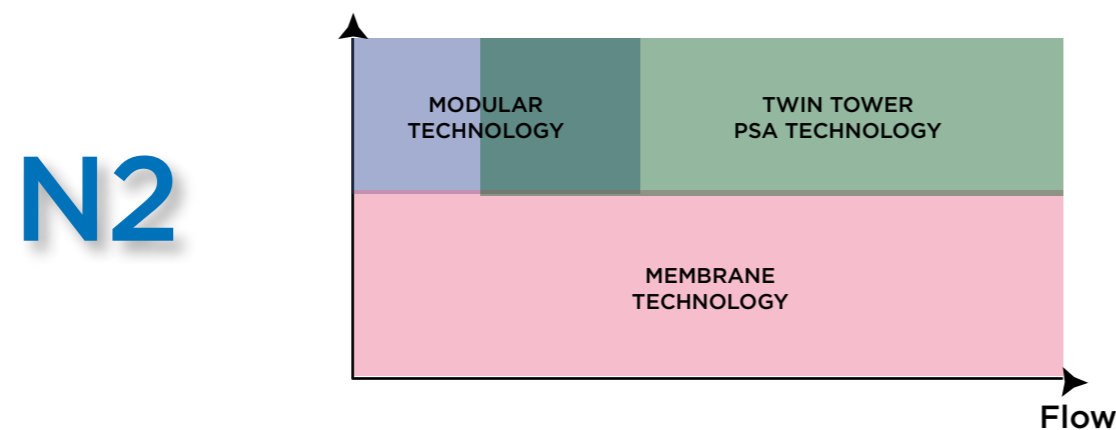
Oxygen Purity



O₂



Nitrogen Purity



N₂

On-site production : BENEFITS

- Nitrogen/Oxygen available 24/7: continuous production
- Guaranteed purity: continuous analysis
- Full safety
- Proven savings
- No more logistic constraints
- No more supply chain failure : instant production on-demand
- Eco-friendly solution: zero delivery & zero emission of pollutants



NOVAIR introduces NITROSWING, a modular concept with easy capacity extension by addition of modules or Dual Bank

- Patented PSA process
- High efficiency
- Compact & flexible



NITROSWING

NITROSWING® is a range of modular PSA generators, designed after years of R&D within NOXERIOR from NOVAIR group. NITROSWING® offers the highest standards in terms of efficiency, flexibility and reliability :

- Unprecedented energetic efficiency
- High purity stability
- Instant optimal working conditions
- Easy instruments upgrade

The generators can produce nitrogen with a residual oxygen content ranging from 5ppm to 3.0 vol%.



Each NITROSWING® Modular PSA nitrogen generator can easily be upgraded at any time by simply adding modules to the generator.

A "Dual Bank" can also be added, consisting in a second PSA nitrogen generator (without any PLC and power supply). The Dual Bank gets its power and control signals from the NITROSWING® PSA nitrogen generator through a single cable connection (master/slave principle).

Nitrogen Outputs : from 5 to 150 Nm³/h

Gas Purity : from 3 vol.% to 5ppm oxygen residual

Nitrogen outlet pressure : from 6 to 11 barg / 101 to 159 PSIG

Twin Tower generators

NITROPLUS is a high efficiency nitrogen generator based on the PSA technology: the perfect response to applications that need high purity nitrogen and want to gain autonomy while reducing their operating costs.

- Turnkey solution
- Fully automatic process
- Robust construction on skid
- Available in multi twin tower concept for larger plants



Nitrogen Outputs : from 150 to 1.200 Nm³/h

Gas Purity : from 3% to 5 ppm oxygen residual

Nitrogen outlet pressure : from 6 to 8 barg / 87 to 116 PSIG - higher pressure available upon request

NITROPLUS

NOVAIR introduces a nitrogen generator designed to produce nitrogen at a concentration of up to 99,999% with an exceptional stability.

This on-site production system is based on the P.S.A. technology (Pressure Swing Adsorption), a static separation of air gases using a specific molecular sieve that adsorbs oxygen under pressure.

NOVAIR can supply the nitrogen PSA generator only, or the complete nitrogen plant, from the feed air unit to the nitrogen receiver. We also offer different plug & play mounting options, for indoor or outdoor locations.

Operating conditions

Version	Standard	With upgrade
Ambient temperature	Up to 25°C	Up to 50°C
Altitude	< / =1000m	> 2000m
Humidity	50% @ 40°C (80% MAX ≤31°C)	
Power supply	230-110V / 50-60Hz	

For the marine industry, in search of a reliable and fully automatic supply of nitrogen, NOXERIOR of NOVAIR group has designed NITROMEM, the new generation membrane generator.

- Continuous process
- Guaranteed stable nitrogen purity
- Ultra-fast reaction time
- LLOYDS REGISTER approved



Nitrogen Outputs : 350 to 6.000 Nm³/h

Gas Purity: from 5,0 to 0,1 vol.% O₂ residual

Nitrogen outlet pressure : from 6 to 11 barg / 87 to 159 PSIG

Membrane Generators

NITROMEM

NITROMEM offers a reliable and fully automatic nitrogen supply with the smallest space requirements.

■ Extremely Compact

Reduced footprint, all tie-in connections on one side, easy to install and maintain. Ideal for marine / naval or offshore installations.

There are no other membrane nitrogen system on the market with such limited space requirements.

■ High Reliability

First-class components, stainless steel process piping and valve bodies, heavy-duty PLC. It should work. Always.

■ Easy System Adjustment

Only two cabinet sizes for the entire NITROMEM product line, which allows a future capacity increase for all models (except for the NM-36 and NM-72). In case your nitrogen supply conditions will change, simply adjust your NITROMEM system by varying the number of membrane modules. Just by yourself, no other modifications to the generator required.

■ Easy Fleet Management

Identical components for the entire model range = limited spare part management, easy maintenance.

Applications

Modular PSA Generators



ELECTRONICS



LABORATORIES



WINE SPARGING



OIL & GAS /
CHEMICALS



FOOD & BEVERAGE



INJECTION /
MOLDING

A wide variety of industries use nitrogen for its inert property. For each of them, there is a NOVAIR nitrogen generator available. Here are some of the industries we can serve:

Examples of a NOVAIR nitrogen turnkey solutions

NITROSWING LASERPACK



LASER CUTTING



An integrated solution including :

- Nitrogen produced on-site according to your needs
- High pressure nitrogen for consumption peaks

NITROMEM



MARINE

A membrane nitrogen generator specifically designed for the marine application, including all necessary features according to the latest IMO Regulations and provided with Type Approval Certificate (LR)



For industries looking for a flexible and autonomous supply of oxygen, NOVAIR introduces OXYSWING®, modular oxygen generator delivering a continuous flow of oxygen 95% produced on-site.

- Oxygen up to 95% purity
- Patented PSA modular process
- Evolutive capacity



Oxygen Outputs : from 2.5 to 44.4 Nm³/h

Gas Purity: up to 95% oxygen purity

Oxygen pressure : 6 barg / 87 PSIG

OXYSWING

OXYSWING® modular PSA generators implement a unique Pressure Swing Adsorption technology. Unlike twin-tower standard systems, OXYSWING® generators feature multiple modules of molecular sieve, each implementing an optimized patented PSA process.

- Unlimited flexibility: production capacity can be easily adjusted directly on site by simple module additions without any skilled personnel
- Compact dimensions for installations even in small or low ceiling spaces of your production facilities
- Easy fleet management: all OXYSWING® models feature the same components, allowing a limited spare parts management and easy maintenance
- Non-corrosive materials such as aluminum and stainless steel, for all process components



For larger capacities, OXYSWING® generators can be completed with a Dual Bank, which consists in a second PSA oxygen generator without any PLC and power supply. The Dual Bank gets its power and control signals from the OXYSWING® PSA oxygen generator through a single cable connection (master/slave principle).

One OXYSWING® PSA oxygen generator can control up to three Dual Banks in parallel.

Twin Tower generators

OXPURE is a PSA oxygen generator offering an ideal alternative to traditional gas supply (cylinders or liquefied gas).

- Turnkey solution
- Fully automatic process
- Robust construction on skid
- Available in multi twin tower concept for larger plants



Oxygen Outputs : from 60 to 200 Nm³/h
Gas Purity: from 90 to to 95% oxygen purity
Oxygen pressure : 6 barg / 87 PSIG

OXPURE

OXPURE is a PSA oxygen generator designed to produce oxygen at a concentration from 90% to 95%, with an exceptional stability.

With a large range of capacities and various output oxygen purities, OXPURE responds to the needs of all types of industries, with the most cost effective solutions.

OXPURE generator is designed to produce oxygen at a concentration up to 95% . This system is based on the P.S.A technology (Pressure Swing Adsorption) : a static separation of air gases using a specific molecular sieve that adsorbs nitrogen under pressure.

NOVAIR can supply the oxygen PSA generator only, or the complete oxygen plant, from the feed air unit to the oxygen receiver. We also offer different plug & play mounting options, for indoor or outdoor locations.

NOVAIR introduces OXPURE DS-PSA, an oxygen generator capable to produce high purity oxygen on site, with an exceptional stability.

- Oxygen up to 99.5%
- Ultra stable concentration $\pm 0.2\%$
- Adjustable purity on site



Oxygen Outputs : 4.5 to 45 Nm³/h
Gas Purity: from 96 to to 99.5% oxygen purity
Oxygen pressure : 6 or 10 barg / 87 or 145 PSIG

DS-PSA Generator

OXPURE DS-PSA

OXPURE DS-PSA is a new generation oxygen generator applying an unique and patented technology. Based on a two-stage molecular separation process, the DS-PSA removes nitrogen, argon and traces of pollutants remaining after the first stage. This technology allows to obtain an ultra high purity oxygen (up to 99.5%).

Thanks to its OCS® patented system, OXPURE DS-PSA produces an oxygen with an exceptional stability ($\pm 0.2\%$). The system adjusts the outlet pressure when required flow increases, without affecting the concentration.

Ultimate performances :

- Automatic mode with self-adjustment of production parameters depending on the facility consumption
- Energy saving working mode
- Adjustable concentration on-site by end-user
- Advanced control panel Visio HD



For applications needing particularly high oxygen flows, NOVAIR introduces a new range of V-PSA solutions, offering the lowest operation costs on market.

- Low operating pressures
- Lowest operation costs
- Fully automatic and unattended operation



Oxygen Outputs : from 73 to 140 Nm³/h

Gas Purity: from 90 to to 95% oxygen purity

Oxygen pressure : 0.7 barg

V-PSA

NOVAIR V-PSA generators extract the available oxygen in the ambient air from the other gases by applying the Vacuum Pressure Swing Adsorption (V-PSA) technology.

Key features:

- Complete turnkey system
- Adsorber Vessels according to 2014/68/UE (ASME VIII Div. 2 as option)
- Pneumatic Valves
- Control System with Siemens SIMATIC® PLC and Siemens Graphical Touch Panel HMI
- Data Logging
- Standard Profinet Industrial Ethernet Interface
- Instrumentation for complete smart monitoring

The V-PSA process

During the V-PSA process, ambient air is led to a molecular sieve bed by means of a blower. This allows the oxygen to pass through as a product gas and adsorbing the other gases. The sieve releases the adsorbed gases to the atmosphere, when the outlet valve opens and the bed is depressurized down to a small vacuum with the aid of a vacuum pump.

Afterwards, the bed is purged with oxygen before fresh compressed air will enter for a new production cycle. In order to guarantee a constant product flow, NOVAIR V-PSA oxygen generators use two molecular sieve beds, which alternatively switch between the adsorption and the regeneration phase.

Under normal operating conditions and with correct maintenance the molecular sieve beds will have an almost indefinite lifetime.

With oxygen purities ranging from 90% to 99,5%, NOVAIR oxygen generators respond to the needs of many different industries. Among them:

Examples of a NOVAIR oxygen turnkey solutions

MODULO2 COMPACT OXYGEN PLANT



BIOGAS



Produce your oxygen on site with a turnkey solution including in a compact cabinet : a Modulo2 oxygen generator & an oxygen receiver.



WASTE WATER TREATMENT



From the generator to the oxygen booster, a Plug&Play solution including a complete oxygen plant.



FISH FARMING



WINE MAKING



METAL INDUSTRY



PETROCHEMICALS



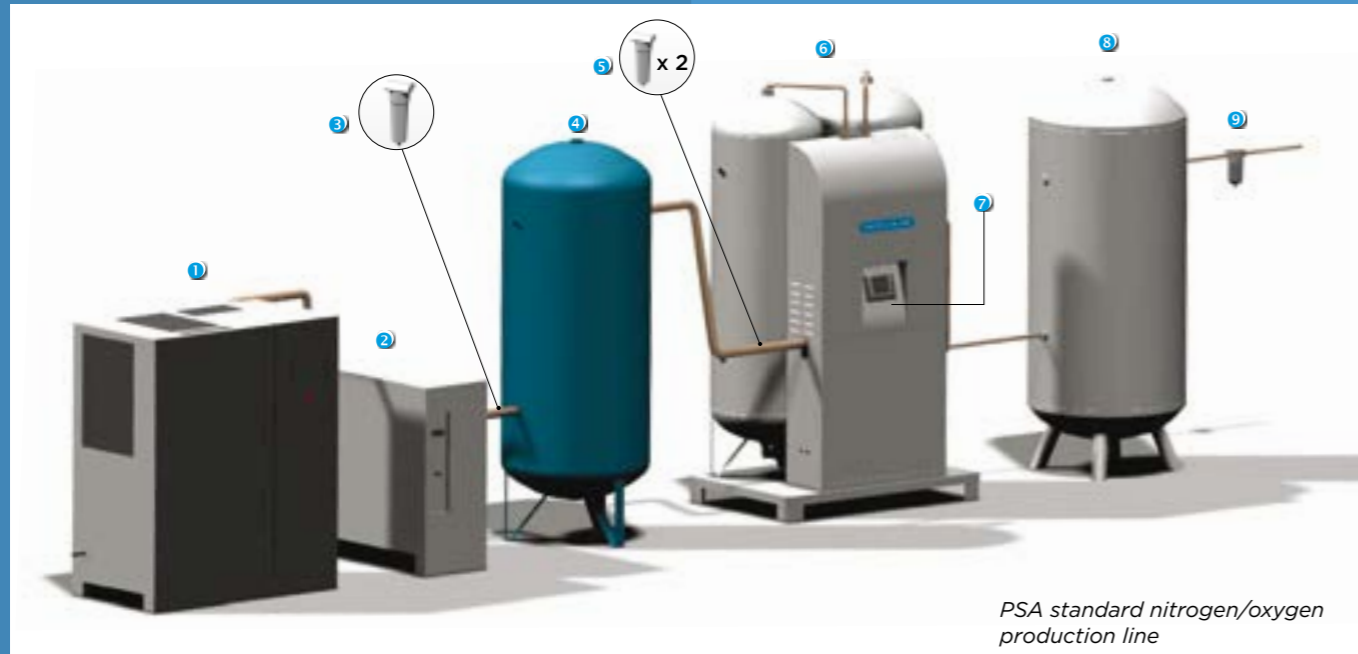
VETERINARY



GLASS MANUFACTURING



HEALTHCARE



① Rotary screw compressor

- Produce the compressed air which feeds the oxygen or nitrogen generator
- Designed for a 24h/24 duty profile
- Load / Unload regulation for high efficiency operation

Non lubricated air compressors available upon request

② Air treatment line

- Refrigeration dryer which ensures quality, dry compressed air as per ISO 8573-1
- Air filter providing clean compressed air with minimal pressure drop
- Condensate drain protecting filters and ensuring minimal air loss
- +3°C pressure dew point

③ Coalescing micronic filter (1 µm)

④ Air receiver

- Compliant with European Pressure Equipment Directive (PED) EC 97/23
- Long service life

⑤ Filters

- One coalescing micronic filter (1 µm)
- One submicronic filter (0,01 µm)

⑥ Oxygen or Nitrogen generator

- Air separation pressure swing adsorption process
- Air filter providing clean oil-free compressed air with minimal pressure drop

⑦ PLC based control panel

- High definition touch screen panel to control and monitor the complete installation
- Includes a logic controller
- Digital screen displaying oxygen purity, hour meter, active default list
- Available in several languages

⑧ Oxygen or Nitrogen receiver

- Compliant with European Pressure Equipment Directive (PED) EC 97/23
- Certified for oxygen and nitrogen use

⑨ Sterile filter (on oxygen production systems)

- Stainless steel housing
- Absolute filtration rating < 0.01 µm
- Bacterial retention greater than 107 CFU/cm²

Plug and play solutions

NOVAIR offers skid mounted & containerized systems (20 or 40 feet) including all components premounted for a quick and easy installation on-site



Integration in container



Cylinder filling systems

Novair HP filling systems allow customers to gain a full autonomy by filling on-site their own high pressure cylinders of oxygen or nitrogen. The gas produced by PSA generators can be pressurized up to 200 bar for back-up storage or to fill mobile cylinders.



Medium & High Pressure Nitrogen Boosters

Medium Pressure Boosters

Flow : 20 to 141 m³/h

Max. working pressure : 25 to 35 bar



High Pressure Boosters

Flow : 21 to 84 m³/h depending on inlet pressure

Max. working pressure :

350 barg



Options available

- Gas analyzers
- Electronic flow meter
- Remote monitoring
- Gas booster
- Cylinders
- Containerized plants