

PSA NITROGEN GENERATORS

MOLECULAR SIEVES TECHNOLOGY

Technology License from



MVS
A Trusted name Since 1977





PSA Nitrogen Generators



MVS Engineering
is an ISO 9001 certified company.

About Us

Since its inception in 1977, **MVS Engineering** has been at the forefront of technology and has supplied over 10000 units worldwide. We are a turnkey supplier of Air and Gas equipments and have been a market leader in developing and executing on-site systems for continuous uninterrupted supply of high purity gases and dry air.

Our products are offered in Technical collaboration with world leading companies such as **CarboTech** (Germany), **Proton OnSite** & **Air Liquide**, from USA.

So, our customers not only benefit from world leading technologies, but also very price competitive solutions due to low manufacturing cost in India.

Reputed companies all over India and around 60 countries worldwide are proudly using MVS equipments.

Gas Generators

- Nitrogen - PSA and Membrane
- Oxygen - PSA, VPSA & Medical
- Hydrogen Gas
- Ammonia Crackers
- Inert Gas Generators
- Exo Gas Generators

Air / Gas Heaters

Electric Heaters & Gas Fired Heaters

Air & Gas Dryers

- Compressed Air Dryers
- Solvent / Liquid Dryers

Gas Purification Units

- Nitrogen Purifiers
- Hydrogen Purifiers
- Argon Gas Purifiers



IN TECHNICAL COLLABORATION WITH CARBOTECH, Germany

CarboTech is Germany's leading company in PSA-Nitrogen technology. With its roots in Germany's institutional mining research and coal industry. The company follows the tradition of all those who have extracted knowledge from Science and Technology to use it for the benefit of people and environments in an economically sound manner.

MVS Engineering is CarboTech's technological partner and licensee for PSA Nitrogen Technology and we source Carbon Molecular Sieves - CMS (A Core of PSA Nitrogen plants) from them.



How is Nitrogen Produced ?

The Nitrogen generator produces Nitrogen from air using Molecular Sieves Separation technology. It uses Carbon Molecular Sieves which has ability to preferentially remove oxygen from air. The process and supply of Molecular Sieves is licensed to us by **CarboTech (Germany)**.

Nitrogen Generator consists of 2-vessels filled with Carbon Molecular Sieves, When compressed air is passed, oxygen is removed while Nitrogen comes out as product gas from one vessel while other vessel is simultaneously regenerated by de-pressurization to atmospheric pressure. This process is called “**PRESSURE SWING ADSORPTION**” (PSA).



Nitrogen Purity

Nitrogen gas of purity 95% to 99.9999% can be produced from our N2 Generators. A simple PSA unit produces Nitrogen purity upto 99.9% and by adding a purification unit, high purity nitrogen is produced. Following are Models to produce different Nitrogen purities.



Carbon Molecular Sieves

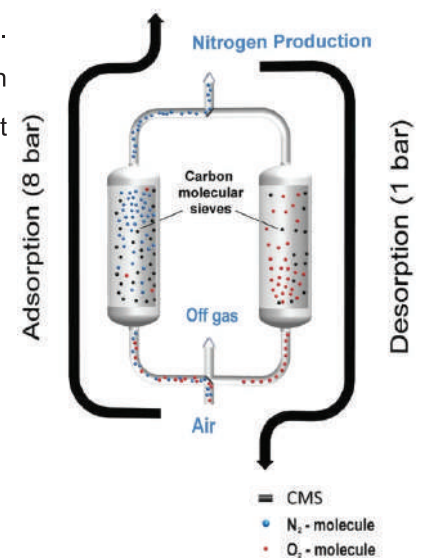
MS MODEL

This is the simplest model. It produces commercial grade Nitrogen purity up to 99.99% economically. By using more Molecular Sieves quantity, higher 99.999% purity Nitrogen can be produced. Higher the purity, higher would be the investment and higher is the running cost. This model is economical and is recommended for purity up to 99.99%. **This model is commonly used for purging/blanketing Nitrogen gas requirements.**

DX MODEL

This model is generally used in **Metallurgical industries** to produce very pure, and oxygen free Nitrogen gas for Heat Treatment Furnaces. Here Oxygen is less than 1-ppm and Hydrogen is around 0.5 to 1% which is desirable as reducing constituent in most Heat Treatment applications.

By adding a **Palladium catalyst Deoxo Purification Unit** in “Model-MS” Generator, it becomes “DX-Model”. This model is also used in **Chemical, Electronic industries for high purity Nitrogen gas requirements.**

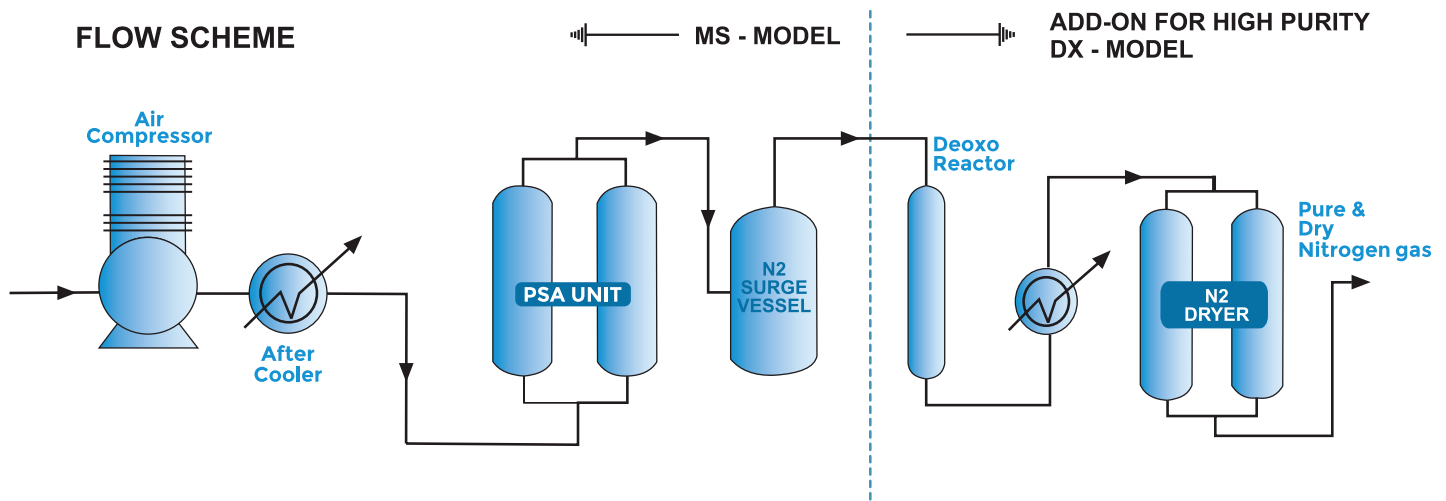


COPPER-DX MODEL

In some applications where one needs very pure gas free from Oxygen and Hydrogen, a Nitrogen Purification Module based on **Copper Deoxo Catalyst** is added. By adding this Catalyst Module to “MS-Model” Generator, it becomes Model “**Copper-DX**”. This finds application in **synthetic fiber, optical cables and Electronic industries**. Cost of production of Nitrogen from this model is Very high. **Nitrogen purity is 99.9999%** and also very dry Nitrogen gas.

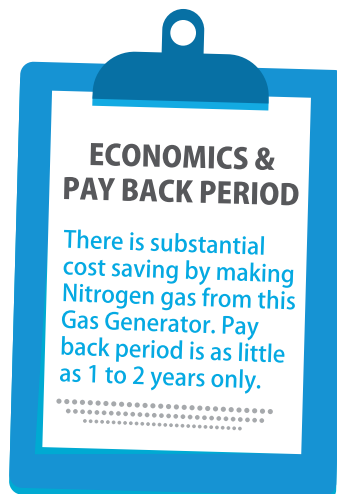
MODELS

Gas Composition	MS	MS-H	DX	COPPER-DX
Oxygen	0.1 to 5%	1-ppm to 500-ppm	1-ppm to 3-ppm (max)	1-ppm
Hydrogen	Nil	Nil	0.5% or more	Nil
Nitrogen	95 to 99.9%	99.95 to 99.9999%	Balance	99.9999%
Dew Point	(-) 40° to (-) 80° C	(-) 40° to (-) 80° C	(-) 40° to (-) 80° C	(-) 40° to (-) 80° C
Applications	As Inert gas in Chemical industries, Food/Packaging, Heat treatment Furnaces, Pharma industries, for fire control in coal mines etc.	As Inert gas in Chemical industries, Pharmaceutical industries, Electronics and Heat Treatment Furnaces.	As Inert gas in Chemical & Metallurgical Industries. In applications where Oxygen should be less than 1 ppm.	As Inert gas in Electronics, Synthetic Fiber, Hi-tech industries where one needs Ultra-high purity Nitrogen.
N2 Capacity	1 to 2000 M ³ /hr	1 to 2000 M ³ /hr	1 to 2000 M ³ /hr	1 to 500 M ³ /hr



FEATURES

- Start-up time is only **5 minutes**.
- Nitrogen Gas supply always under your control.
- Skid mounted units for easy site installation.
- Cost of Nitrogen only approx US\$ 0.05 (Rs. 3/-) per cubic meter
- Very high reliability to run unit unattended.
- Carbon Molecular Sieves life is around 10-years and in most cases it lasts whole life time of Gas Generator.



N ₂ Capacities	N ₂ Purity
1-2000 M ³ /hr	95-99.9999%

NITROGEN CAPACITY

Our Nitrogen Generators are tailor-made and are manufactured as per customer's specific requirements. However, standard units are also available in the capacity of 1, 2, 5, 10, 25, 50, 75, 100, 150, 200, 300, 500, 1000 & 2000 NM³/hr etc.

NITROGEN PRESSURE

Standard Nitrogen Generator produces Nitrogen at 5 barg pressure. This pressure comes automatically as feed air pressure is 7 barg. However, by using air of higher pressure upto 13 barg, Nitrogen can be produced at 11 barg pressure also. If Nitrogen is needed at still higher pressure, we add a Nitrogen booster compressor after the Gas Generator.



HYDROGEN REQUIREMENT

In high purity Nitrogen Generator, a Deoxo Unit is provided in which Oxygen is removed by reacting with Hydrogen. This Hydrogen can be supplied either from Hydrogen Cylinders or one can take a captive Hydrogen Generator based on Ammonia Cracking process. In smaller capacity Nitrogen Generators since Hydrogen requirement is very little, Hydrogen Cylinders are economical. But, in bigger capacity Nitrogen Generators, Ammonia Cracking Unit works out to be more economical. Cost of Hydrogen generation by Ammonia Cracking is around \$0.35 (Rs. 25/-) per cubic meter whereas cylinder Hydrogen gas costs \$0.75 (Rs. 53/-) per cubic meter.

NITROGEN STORAGE TANK

To meet your varying Nitrogen demands, we provide an Intermediate Nitrogen storage tank after Gas generator. This tank always receives Nitrogen from the Gas generator and supplies to your process as per demand. Normally Nitrogen Storage tank of 30 - min capacity is adequate. In case one needs large storage capacity then we add a Nitrogen Booster Compressor and store N₂ gas at high pressure to keep Storage Tank size smaller. A high Pressure Switch in Tank automatically stops the gas generator when pressure reaches the set value. When pressure in the tank falls, Gas generator restarts Nitrogen production automatically. The gas generator keeps switching on & off by pressure switch and you get nitrogen round the clock from the tank.

N₂ CYLINDERS v/s N₂ GENERATOR

NITROGEN CYLINDERS

- Cylinder Nitrogen cost is high- US\$ 0.35 (Rs. 20/-) per cubic meter.
- Transfer and handling of Gas cylinders is very cumbersome and has high pressure risks.
- There is Dependency on availability of Nitrogen Cylinders all the time.
- Nitrogen purity in cylinders is not reliable and varies from lot to lot.

NITROGEN GENERATORS

- Nitrogen Generator Gas production costs approx. US \$ 0.04 (Rs. 3/-) per cubic meter only.
- In-house Nitrogen generation all the time and in any quantity round the clock.
- Continuous and reliable Nitrogen supply available. Your process never suffers due to want of Nitrogen gas.
- Nitrogen purity is very steady and reliable.

What is the purity of Nitrogen gas ?

Several models are available to produce Nitrogen gas from 95% to 99.9999% purity. Oxygen level can be obtained as low as 1-ppm and Dew Point up to (-) 80°C.

Can we get Nitrogen generator of size exactly as per our Nitrogen demand ?

Yes, Nitrogen Generators are tailor made as per customer's specifications of Nitrogen Purity and Nitrogen capacity. However, standard sizes are available as mentioned on Page-5.

Is it easy to install ?

Yes. The Gas generator is supplied fully assembled on steel frames which are kept on floor. You simply connect power and the Gas generator becomes ready for start-up. We provide services of Engineer to supervise its installation and commissioning at site.

Does it make any noise ?

The noise level is less than 75 dbA at 1-meter distance. A very effective silencer is provided in exhaust line. The total Gas Generator Package is "very silent"

What happens to the Gas generator if the gas consumption is lower than Gas generator capacity ?

Gas generator is designed to run continuously all 24-hours. But, if gas is not being consumed or consumption is low, pressure gradually builds up in Nitrogen Storage Tank. An automatic pressure switch stops the Gas generator. When pressure in the Nitrogen tank falls due to continuous gas consumption, the pressure switch automatically restarts the Gas generator.

Does this Gas generator require an operator ?

Continuous supervision is not needed. Once started, it can be left unattended. Several instruments monitor and control the running of Gas generator automatically.

What is life of Molecular Sieves ?

Life of Molecular Sieves is around 10-years and in majority of the cases it lasts whole lifetime of the Gas generator. However, Molecular Sieves life is reduced by oil in air. Therefore, it is essential to use special pre-filters if lubricated air is used and filters should be replaced timely.

What is Maintenance Schedule ?

The "Maintenance Schedule" is given in our "Operation Manual". The maintenance is limited to only replacement of filter elements and preventive maintenance in Air Compressor.

What happens if Gas generator does not produce required purity ?

An On-line Oxygen Analyzer continuously monitors Nitrogen purity and shuts down the Gas generator automatically with alarm if purity drops below set limit.

What is Nitrogen generation cost and how am I benefited ?

The only expense in this Gas generator is of electricity for Air Compressor. Running cost is \$0.05 (Rs. 3/-) per cubic meter of Nitrogen produced. This is very low as compared to cylinder Nitrogen cost of \$0.35 (Rs. 20/-) per cubic meter. So, there is big cost saving when you install such Gas generator. Pay back period is only 1 to 2-years.

Service & Spares

For our equipment to be operate at it's high efficiency and for giving years of trouble-free service, we suggest that you get in touch with our service team to avail our expert engineering services and get genuine spare parts.



24x7 telephonic support



MVS service team is available 24x7 to assist our customers. We are reachable by phone, Email and web. Our typical response is within 8-hours and mostly of complaints are attended to in under 24 hours.

Routine Maintenance



Our machines are designed to give 10+ years of service and in most cases they actually run a lot longer than that. This is made possible by our customers maintaining the machine timely as we recommend.

Annual Maintenance Contract (AMC)



Customers looking for headache free operation of MVS systems can opt to give a annual maintenance contracts. We offer several options including labor - only, parts - only and comprehensive parts and labour contract.



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[On-Site Gas Generation Solutions for Nitrogen, Oxygen & Hydrogen](#)

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