

PSA NITROGEN GENERATORS

MOLECULAR SIEVE TECHNOLOGY



Technology License from



JYH

Big Engineering & Consultants

JYH BIG ENGINEERING & CONSULTANTS

(An ISO 9001:2015, ISO 14001:2015, ISO 45001-2018 Certified Company)

Plot No. A- 190, Flat No. - 499,
Ashtavinayak Co-operative Housing Society,
Sector 4, Ghansoli, Navi Mumbai 400701, Maharashtra India
Contact : + 91 9082834712, 9004176561

E-mail : info@jyhairseparation.com
ykjyhb@gmail.com
Website : www.jyhairseparation.com



JYH BIG ENGINEERING & CONSULTANTS is founded by Mr. Ved Prakash in 2016 with 30 years rich experience in the respective field of air & gas separation technology. He entered in this field with a desire to manufacture quality and energy efficient technically advanced products to meet the various industrial processes requiring Nitrogen, Oxygen, Hydrogen gases and compressed dry air.



GAS GENERATORS

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

AIR & GAS HEATERS

- Direct / Indirect gas and heater systems

AIR & GAS DRYERS

- Compressed Air Dryers
- Solvent / Liquid Dryers

GAS PURIFICATION UNITS

- Nitrogen Purifiers
- Hydrogen Purifiers
- Argon Gas Purifiers

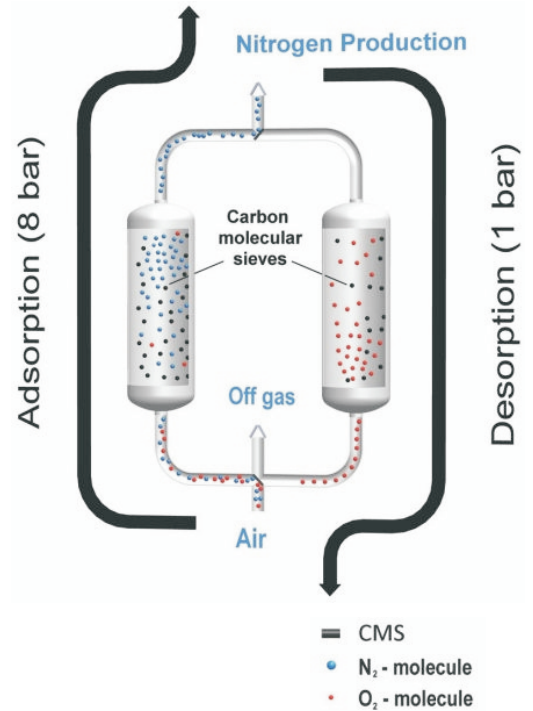
HOW IS NITROGEN PRODUCED ?

Nitrogen is produced from atmospheric air by using carbon molecular sieves which has ability to preferentially remove oxygen from air. We use **CarboTech AC GmbH of Germany** make CMS in our Nitrogen generators.

Nitrogen Generator consists of 2-Beds filled with Carbon Molecular Sieves & Activated Alumina. When compressed air is passed through the bed, Nitrogen comes out as product gas from one bed while other bed 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 by a simple PSA modules. Nitrogen purity above 99.99 % can be produced by adding purification units further. Followings are various models to produce different nitrogen purities.



JS Models

This is the simplest model which produces commercial grade Nitrogen purity up to 99.99% economically. Higher purity up to 99.999% can be achieved by adding more molecular sieves. Higher purity is required higher initial investment and higher Electrical power so running cost increase accordingly. We recommended this model for Nitrogen purity up to 99.99%. This model is commonly used for purging / Blanketing purpose only.

DX -Oxo Model

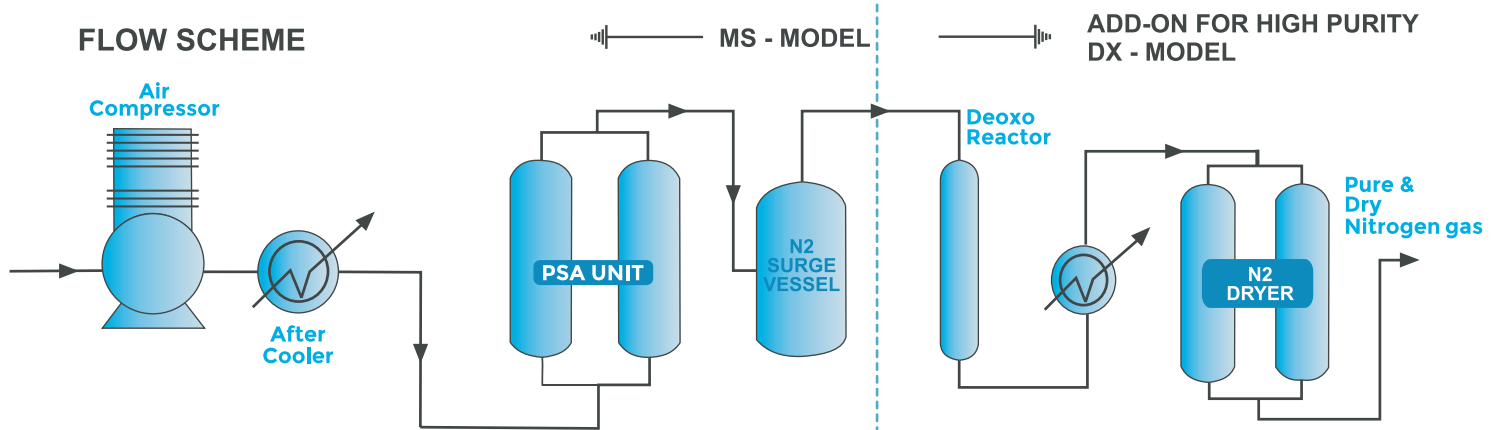
This is upgraded model adding Nitrogen purifier and used in metallurgical Industries in Heat Treatment Furnaces. Here Oxygen contents less than 1-ppm with Hydrogen contents from 0.2 to 0.5%. By adding Palladium Catalyst Purifier with Simple "JS Model" it becomes De-Oxo Model. This model finds applications in Chemical/ Electronic/ Printing Industries for high purity Nitrogen gas with desired Hydrogen contents.

Copper DX Model

There are few certain applications where nitrogen gas required oxygen & Hydrogen free. By adding of Copper catalyst Nitrogen purifier with "JS Model" becomes "Copper Dx"-Model. This finds applications in Fiber optical cable / Synthetic Fiber & Electronic Industries. The Nitrogen production cost is higher. Nitrogen gas purity 99.9999% with very dry.

MODELS :

Gas Compositions	JS	JS-H	De-oxo	Cu-De-oxo
N2 flow Capacity	1 – 4500 Nm3/hr	1 – 2500 Nm3/hr	1 – 4500 Nm3/hr	1 – 2500 Nm3/hr
Oxygen	0.1 - 5 %	10ppm – 500ppm	1 - 3 ppm	1 ppm
Nitrogen	99.9 – 95 %	99.999 - 99.95 %	Balance	99.9999%
Hydrogen	NIL	NIL	0.2 – 0.5 %	NIL
Dew Point	(-) 40 to (-) 80°C	(-) 40 to (-) 80°C	(-) 40 to (-) 80°C	(-) 40 to (-) 80°C
Applications	In all Chemical, Pharmaceuticals, Furnaces, Food Packaging industries as inert gas and in coal mines for fire control.	In all Chemical, Pharmaceuticals, Heat Treatment, Electrical & Electronics industries as inert gas.	In all metallurgical industry as inert gas	In all Electronics & Synthetic fiber and laboratories where Ultra -High Pure Nitrogen is required.
Price	1.50 to 60 Lakhs	3.00 to 1.50 Cr	5.00 to 2.00 Cr	10 Lakhs to 3.00 Cr



FEATURES

- Start-up time is only 15 minutes.
- Nitrogen Gas supply always under your control.
- Skid mounted units for easy site installation.
- Cost of Nitrogen only Rs. 4 /-) per cubic meter .
- 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 - 5000 M ³ /hr	95 - 99.9999%

NITROGEN CAPACITY

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

NITROGEN PRESSURE

Standard Nitrogen Generator produces Nitrogen at 5 - 6 bar g pressure. This pressure comes automatically as feed air pressure to the PSA unit 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 Rs. 20/- per cubic meter whereas cylinder Hydrogen gas costs Rs. 45/ per cubic meter.

NITROGEN STORAGE TANK

To meet your varying Nitrogen demands, we provide an Intermediate Nitrogen storage tank after the Gas generator. This tank always receives Nitrogen from the Gas generator and supplies to your process as per demand. Normally Nitrogen Storage tank of 1/2-hour capacity is adequate. In case one needs higher storage capacity then we add a Nitrogen Booster Compressor and store the 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 CYLINDER

- Cylinder Nitrogen costs Rs. 20/ per cubic meter.
- Transfer and handling of Gas cylinders is very cumbersome and has high pressure risks.
- 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. Rs. 4/- per cubic meter only.
- In-house Nitrogen generation whenever needed and in any quantity round the clock.
- Continuous and reliable Nitrogen supply available. Your plant never suffers due to want of Nitrogen gas.
- Nitrogen purity is very steady and reliable.

FREQUENTLY ASKED QUESTIONS

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.



JYH

Big Engineering & Consultants

JYH BIG ENGINEERING & CONSULTANTS

(An ISO 9001:2015, ISO 14001:2015, ISO 45001-2018 Certified Company)

Plot No. A- 190, Flat No. - 499, Ashtavinayak Co-operative Housing Society, Sector 4, Ghansoli, Navi Mumbai 400701, Maharashtra India
Contact : + 91 9082834712, 9004176561
E-mail : info@jyhairseparation.com, ykjhbig@gmail.com
Website : www.jyhairseparation.com