LIQUID NITROGEN GENERATORS

MVS ENGINEERING PVT. LTD.

CRYOMECH
WORLD LEADERS IN CRYOREFRIGERATION FOR MORE THAN 50 YEARS
How does it work?

- MVS Liquid Nitrogen Plants (LNPs) are designed to reliably produce liquid nitrogen (LN$_2$) directly from air.
- MVS Engineering is partner of *CarboTech AC, Gmbh (Germany)* for PSA Nitrogen technology and *Air Liquide MEDAL (USA)* for Membrane Nitrogen technology. These units produce gaseous Nitrogen from Air.
- MVS Nitrogen Generator is integrated with the Cryorefrigerator from world leaders - *Cryomech (USA)* to convert gas to liquid Nitrogen.
- MVS supplies the fully integrated Liquid Nitrogen plant and customer only needs to connect power.

A Liquid Nitrogen plant comprises of components described below

- **Air Compressor** - Required for providing air to the Nitrogen Generator. Compressed air can be supplied by customer, or MVS provides Air compressor as part of integrated package.
- **Nitrogen Generator** - The Nitrogen Generator works on principle of Nitrogen separation from air. We provide both PSA and Membrane Nitrogen separation technologies as per user preference.
- **Cryorefrigerator** - The Cryorefrigerator consists of a cold head, Helium compressor and a pair of stainless steel flexible helium lines. The cold head is mounted on the top of the Dewar. The cold head extends down into the neck of the Dewar for the purpose of cooling the nitrogen gas entering the Dewar to 77K (-196°C). The Nitrogen gas liquefies on contact with the cold head heat exchanger. The liquefied Nitrogen drips off the heat exchanger down into the Dewar.
- **Dewar Assembly** - The gaseous Nitrogen produced from the Nitrogen Generator is taken to a Dewar assembly. The Dewar assembly has been designed for storage and extraction of LN2. The Dewar is a stainless steel, vacuum jacketed container built for the purpose of storing liquid nitrogen with minimal boil off (losses).
- **Level Indicator/ Switch** - The operation of the LNP is automatically controlled by the level indicator/ Switch mounted on the Dewar. The level indicator/ switch is preset to turn off the cryorefrigerator when the Dewar is full, and places the LNP in standby mode.

**Exclusive Representation in India:**

[Cryomech logo]
Model Selection

Nitrogen purity is 99% to 99.999% and units are supplied in sizes from 10 to 240 liters/day.

<table>
<thead>
<tr>
<th>Model</th>
<th>LN₂ Production (Per Day)</th>
<th>Foot Print Size (In mtrs.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>LNP 10</td>
<td>10 litres/day</td>
<td>1.8 x 1.8 x 1.5</td>
</tr>
<tr>
<td>LNP 20</td>
<td>20 litres/day</td>
<td>1.8 x 1.8 x 1.5</td>
</tr>
<tr>
<td>LNP 40</td>
<td>40 litres/day</td>
<td>2 x 2 x 1.6</td>
</tr>
<tr>
<td>LNP 60</td>
<td>60 litres/day</td>
<td>2 x 2 x 1.6</td>
</tr>
<tr>
<td>LNP 120</td>
<td>120 litres/day</td>
<td>2.8 x 2 x 1.7</td>
</tr>
<tr>
<td>LNP 240</td>
<td>240 litres/day</td>
<td>3.7 x 2.5 x 1.8</td>
</tr>
</tbody>
</table>

Liquid Nitrogen generator benefits for the customer

- Autonomy, reliability and availability of liquid Nitrogen
- Easy to operate
- Negligible maintenance
- Customer needs to provide only power connection
- Round-the-clock liquid Nitrogen availability
- No more waiting for liquid container delivery from vendor
MVS Engineering is a well established Engineering company started in 1977, with in-depth knowledge and unparalleled experience in the Air & Gas industry.

We are India's largest manufacturer and supplier of Nitrogen & Oxygen Gas generators & are leading supplier of various types of Hydrogen Gas Generators including Water Electrolysis, Ammonia Cracking and Hydrocarbon cracking methods such as Methanol and Natural gas.

The “MVS” Advantage
- State-of-the-art design and engineering
- System customization as per your requirement
- On-site installation services
- Start up supervision and support
- Training of customer operations team
- Pan-India and Global service support by 40+ engineers
- 24x7 telephonic customer helpline

MVS Engineering Products Range
We supply many other Air & Gas solutions:
- Nitrogen Gas Generators
- Oxygen Gas Generators
- Hydrogen Gas Generators (Water Electrolysis)
- Hydrogen Gas Generators (Methanol/ Natural Gas reforming)
- Hydrogen Gas Generators (Ammonia Cracking)
- Exo-Gas Generators
- Inert Gas Generators
- Gas purifiers (Nitrogen, Hydrogen, Argon)
- Air & Gas Dryers
- Liquid Drying systems

Cryomech (USA) are world leaders in Cryorefrigeration technology and MVS Engineering represents the complete product range of Cryomech in India.

For more details, you may visit: www.cryomech.com