System Operation

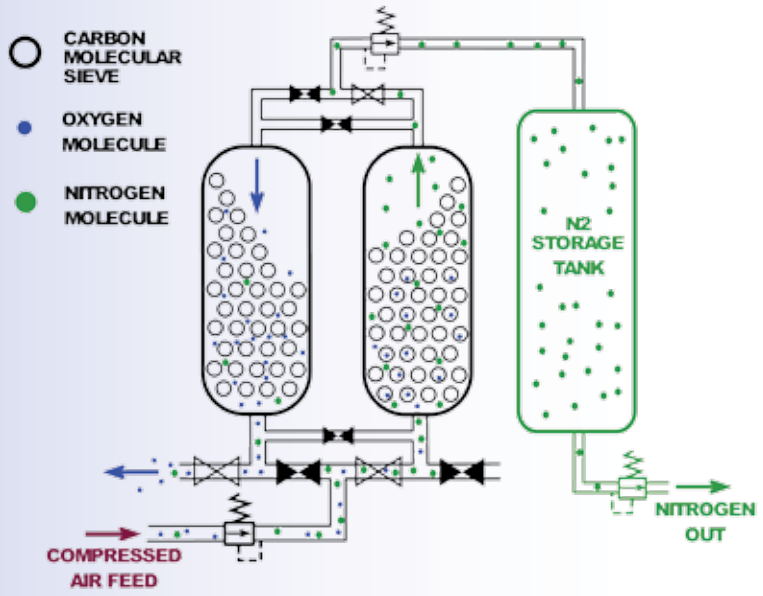
The earth's atmosphere is comprised of approximately 78% nitrogen and 21% oxygen. Once atmospheric air is compressed, its pressure is increased while proportions of nitrogen and oxygen remain unchanged. Once the air is compressed it must be filtered and dried prior to its introduction to the GN2 system.

Step 1.
Inlet valves direct the compressed air flow into one of the two adsorption chambers (Right) where the CMS (Carbon Molecular Sieve) adsorbs the oxygen content while allowing the nitrogen to pass creating a high purity nitrogen stream that then exits the adsorption chamber and is stored in the nitrogen storage/buffer tank. The other adsorption chamber (Left) is depressurized to atmosphere through the exhaust valve enabling the CMS to release and expel any previously adsorbed oxygen to atmosphere.

Step 2.
Just prior to the end of the (Right) absorption cycle the exhaust valve on (Left) is closed and balance valves are opened to equalize pressure in the two adsorption tanks.

Step 3
The inlet valves are then inverted bringing the regenerated (Left) tower online to adsorb oxygen leaving a high purity nitrogen gas stream. The other adsorption chamber (Right) which was previously online adsorbing oxygen is depressurized so the CMS will release and exhaust any previously adsorbed oxygen to atmosphere.

Step 4
This cyclic action continues allowing the GN2 to produce a steady stream of high purity nitrogen gas. This process is commonly known as Pressure Swing Adsorption (PSA).



Flow diagram represents status for operational steps 1 & 2 only.

(CMS) Carbon Molecular Sieve

The adsorption component CMS is a non-polarity based adsorbent that uses a unique pore structure to preferentially adsorb oxygen molecules over nitrogen molecules. By adsorbing the oxygen from the process stream (Compressed Air) what remains can be virtually pure nitrogen. Because the product is a non-polarity based adsorbent, it's hypothetical life is indefinite but realistically it has an industrial service life in excess of 10 years with proper maintenance.

Carbon molecular sieve is also widely applied in petrochemical industry, heat treatment industry, and electronic manufacturing as well as the food preservation.