PERFORMANCE

Technical Specifications - Nitrogen Generators

MODEL	95% Flow N_2 (Nm^3/h)	99% Flow N_2 (Nm^3/h)	99,9% Flow N_2 (Nm^3/h)	99,999% Flow N_2 (Nm^3/h)
HIL-N2-1	0,916	0,550	0,345	0,083
HIL-N2-2	1,991	1,195	0,750	0,181
HIL-N2-3	4,14	2,48	1,56	0,38
HIL-N2-4	7,03	4,22	2,65	0,64
HIL-N2-5	13,61	7,17	5,13	1,23
HIL-N2-6	18,84	11,32	7,10	1,71
HIL-N2-7	40,39	24,25	15,22	3,66
HIL-N2-8	60,27	36,19	22,72	5,47
HIL-N2-9	80,78	48,50	30,45	7,33
HIL-N2-10	109,81	65,94	41,39	9,96
HIL-N2-11	125,02	75,07	47,13	11,34
HIL-N2-12	164,58	98,82	62,04	14,93
HIL-N2-13	227,50	136,60	85,76	20,64
HIL-N2-14	347,42	208,61	130,96	31,52
HIL-N2-10LP	430,35	258,40	-	-
HIL-N2-10HP	-	-	162,22	39,05
HIL-N2-20LP	492,13	295,50	-	-
HIL-N2-20HP	-	-	185,51	44,65
HIL-N2-30LP	806,38	484,19	-	-
HIL-N2-30HP	-	-	303,97	73,16
HIL-N2-40LP	1263,96	758,94	-	-
HIL-N2-40HP	-	-	476,45	114,68

NITROGEN PRODUCTION WITH COMPRESSED AIR INPUT AT 10 barg

PURITY
Purity values are measured in oxygen content.
Other purities are available on request.
For choosing the appropriate purity for the process please refer to the applications purity list or contact Hi-line Industries.

COMPRESSED AIR
Required inlet compressed air quality is 1:3:1 as in ISO DIN 8573-1.

DEWPOINT
Dewpoint: a refrigerated air dryer (3° dewpoint) is required.
The produced nitrogen flow will have a dewpoint of -40°c.

Other capacities available on request.
Models and specifications are subject to change without notice.

Technical Specifications - Oxygen Generators

MODEL	70% Flow O_2 (Nm^3/h)	85% Flow O_2 (Nm^3/h)	90% Flow O_2 (Nm^3/h)	93% Flow O_2 (Nm^3/h)	95% Flow O_2 (Nm^3/h)
HIL-02-1	-	0,167	0,153	0,142	0,125
HIL-02-2	-	0,345	0,317	0,294	0,258
HIL-02-3	-	0,835	0,767	0,710	0,624
HIL-02-4	-	1,18	1,09	1,01	0,884
HIL-02-5	-	3,68	3,35	3,05	2,68
HIL-02-6	-	6,04	5,35	4,51	3,77
HIL-02-7	9,93	8,41	7,35	5,98	4,86
HIL-02-8	13,80	11,69	10,22	8,31	6,75
HIL-02-9	17,67	14,96	13,08	10,64	8,65
HIL-02-10	23,56	19,95	17,44	14,19	11,53
HIL-02-11	37,26	31,55	27,58	22,44	18,23
HIL-02-12	46,57	39,44	34,48	28,05	22,79
HIL-02-13	60,84	51,53	45,04	36,64	29,77
HIL-02-14	79,13	67,02	58,58	47,66	38,72
HIL-02-15	120,18	101,79	88,97	72,38	58,81

OXYGEN PRODUCTION WITH COMPRESSED AIR INPUT AT 6,5 barg

PURITY
Purity values are measured in oxygen content (Variation + 3%).
Other purities are available on request.
For choosing the appropriate purity for the process please refer to the applications purity list or contact Hi-line Industries.

COMPRESSED AIR
Required inlet compressed air quality is 1:3:1 as in ISO DIN 8573-1.

DEWPOINT
Dewpoint: a refrigerated air dryer (3° dewpoint) is required.
The produced oxygen flow will have a dewpoint of -35°c.

Other capacities available on request.
Models and specifications are subject to change without notice.

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VERSION 1 02/2016

HI-LINE INDUSTRIES

N_2&O_2
Nitrogen and Oxygen Generators

HIGH PURITY
LOW ENERGY
PRESSURE SWING GENERATORS
02 ANALYERS & ENERGY CONTROL AS STANDARD

Are you buying Nitrogen or Oxygen?

It's amazing how many companies are spending £100's of thousands of pounds on the planets most abundant gasses!

In rounded figures 79% of our atmosphere is Nitrogen and 21% is Oxygen, yet many businesses are paying for bottled gas or bulk N2/O2 tanks. Paying top prices for something that is free will not make any sense to anyone?

Imagine the savings each year if you never again paid to have your N2 or O2 delivered to site.

Free Nitrogen & Oxygen?

The speciality gas companies who are currently selling you N2/O2 deploy the same technology as we are able to offer our customers. This safe and simple proven process has been around for decades. It enables you to make N2 and O2 on demand. Whilst nothing is for free, the savings on making your own N2/O2 are staggering. Not only are you buying something that occurs naturally, but the likely hood is that you are paying for delivery, storage and for the hire of bottles or receivers, documentation and health & safety procedures and insurance on these products.

The most ironic thing in this purchase is that most often we find that customers are sold the wrong product! Most of the large gas producing companies offer only N2 at UHP (Ultra High Purity) 99.99999% N2. There is no option. However the applications may only require a purity of only 98% or 95%.

The cost to generate N2 at 99.9999% is significally more than at 98% so on this occasion 'one size' doesn't fit all.

Often when we design a N2 system the cost of a 98% generator against 99.99999% generator of the same flow is 10 times cheaper.

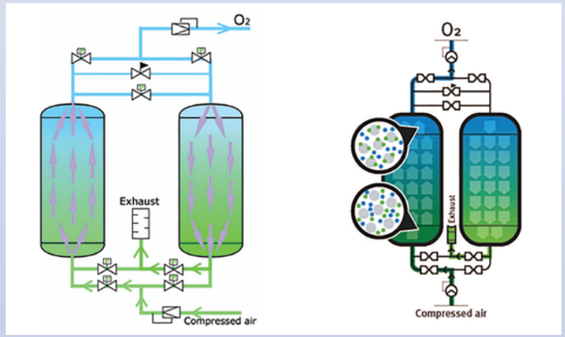
Simple PSA Technology

The technology employed at Hi-line for N2/O2 generation is simple PSA - Pressure Swing Adsorption Technology. Twin Tower CMS beds that adsorb and regenerate to remove either N2 or O2 dependant on requirement. As manufacturers (at our Midlands factory) we are able to design a bespoke system for you that ensures you the lowest possible running costs, smallest footprint and the exact purity of N2 or O2 at all times.

Hi-line Nitrogen Generator

Principle of Operation

- Hi-line N2 Generators have two vertical pressure vessels filled with carbon molecular sieve (CMS). Operation is continuous – one vessel producing N2, the other is regenerating.
- Dry compressed air enters the vessel via the main inlet valve at the base of the unit. The inlet pressure is built to reach working pressure, normally between 5.5 to 8 barg.
  Oxygen molecules adhere to the carbon molecular sieve under pressure, during this, the adsorption phase. The nitrogen passes through to the CMS and to the outlet of the Generator and on to a storage vessel.
- Whilst one Vessel is in the adsorption phase, the other is at zero pressure and is purging the entrapping Oxygen back to atmosphere via an Exhaust muffler, this is the regenerating phase.
- A small quantity of the produced gas is used for this regeneration.
  The cycle is therefore continuous producing high quality Nitrogen 24 hours/day
- Used correctly, the carbon molecular sieve is fully regenerative and has a life span over 40.000 operation hours.



The entire PSA System can be subdivided into the following:

- Compressed air system (Air compressor, Air Dryer, Air Receiver & Filters)
- PSA skid
- Nitrogen receiver
- Nitrogen boosting & filling station (optional)

Optional supplies

- Panel Display with electro galvanized sensor
- Touch Screen with zirconium sensor
- GSM modem for touch screen

Hi-line Industries Methodology

At Hi-line we appreciate every customer and application is different. Although we have a standard range of generators for N2/O2 detailed on the back of this brochure, each generator is bespoke. Before a generator is manufactured for you we will have already carried out a free of charge survey of your N2/O2 usage and surveyed your site.

Technical Selection Process

1. Collection of data related to the current production of compressed air and N2/O2 consumed and at what rate/purity.

2. The most efficient solution for each project is analysed and studied by one of the Hi-line specialist design engineers in close co-operation with the customer.

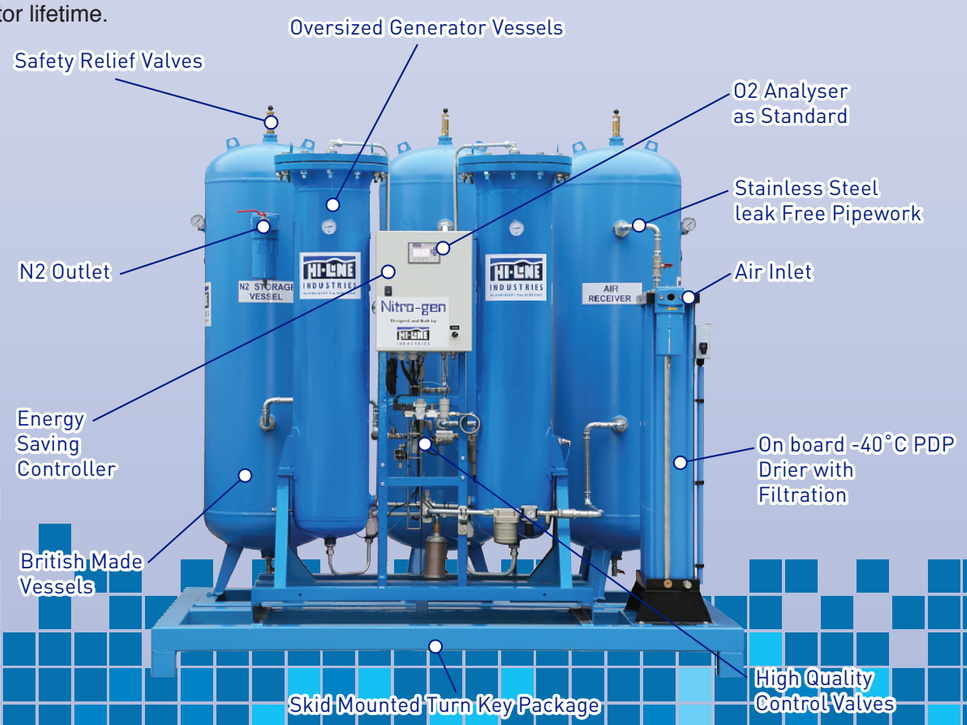
   Points to consider:

   I. Characteristics of Consumption
   II. Consumptions and purity levels
   III. Most efficient practice of generation
   IV. Energy costs v current cost of gas
   V. Site, installation, energy

3. Present proposal to projects team.
   Looking at total cost of ownership. Savings to be made, financials to help the customer consider and validate the proposal against existing costs.

4. Support the solutions implementation.

5. Provide full technical and service support for generator lifetime.



Advantages of on-site production of N2/O2

Advantages

- Independence of external suppliers of gas and fluctuations in market price of nitrogen;
- Elimination of logistics operations associated with the bottles or with the liquid Nitrogen and with the management of suppliers;
- Modular equipment, flexible and with very low maintenance costs;
- The only relevant energy source used by the Generator is the air compressor, raw material is free!
- The Hi-line Industries Nitrogen generation units are designed to enable a rapid playback time, resulting in significant savings in costs related to the consumption of nitrogen.

Case Study

A famous food packaging company were spending £120k+ per annum on N2 for MAP (Modified Atmosphere Packaging) this was without delivery charges, (a tanker four times per week). Hi-line was able to supply a N2 generator skid which was a one off fee of £55k. Now they produce their own N2 for only the cost of air compressor energy, a huge saving year on year.

Call now for a free site survey to discuss potential savings at your plant/factory.