FIRST COMPRESSOR MANUFACTURER IN THE WORLD ACCREDITED ISO 50001 ENERGY MANAGEMENT

COMPRESSED NITROGEN GAS GENERATORS

METALPLAN AIRPOWER

METALPLAN IS NUMBER ONE IN ENERGY EFFICIENCY

As the absolute leader in screw compressors up to 25 hp in Brazil, Metalplan is the world's first* compressor manufacturer accredited in ISO 50001 - Energy Management, demonstrating its commitment to energy efficiency, the foundation for sustainability and competitiveness of companies.

Founded in 1986, Metalplan has a production area of 6.000 m², developing innovative equipment with a high level of nationalization, exporting to over 20 countries.

Its network of authorized distributors and service centers includes over 300 highly specialized companies with extensive geographic coverage, capable of servicing over 100.000 operating equipment.

In recent years, Metalplan has been expanding its horizons to disruptive technologies in gases and renewable energies, such as on-site generation and compression of nitrogen, oxygen, biogas, biomethane, CO_2 and CNG.

*in the compressed air, gases, and industrial refrigeration segment

1980

- 1986 FOUNDATION
- 1987 AIR TANKS AFTERCOOLERS FILTERS

1990

- 1992 OWN HEADQUARTERS
- 1993 ELECTRONIC DRAINS
- 1994 COMPRESSED AIR DRYERS

2000

- 2002 ISO 9001 QUALITY MANAGEMENT
- 2003 CHILLERS
- 2004 AIR AND GAS ULTRA-COOLERS
- 2006 ROTARY SCREW COMPRESSORS

2010

- 2011 ALUMINUM PIPES/FITTINGS
- 2012 ISO 50001 ENERGY MANAGEMENT
- 2014 PSA NITROGEN GENERATORS
- 2015 WATER/OIL SEPARATORS
- 2019 MEDICAL COMPRESSED AIR MODULES

2020

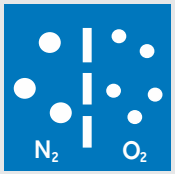
- 2021 PSA OXYGEN GENERATORS
- 2022 BIOGAS/BIOMETHANE, CO_2 AND CNG
- 2024 USA SUBSIDIARY

2030

*The largest global manufacturer of automotive air conditioning, Japanese company **Denso**, replaced the outsourced nitrogen tank at the Manaus plant with an integrated on-site nitrogen gas generation system from Metalplan. This system comprises **TotalPack Flex DD** screw compressors, **Energy Plus** refrigeration dryers, **Hyperfilter** coalescing filters, **SVA** reservoirs, **ModuCarb** towers, and **NitroMax** PSA generators.*
Denso's total production of nitrogen gas reaches 175 m³/h (5.6 tpd) with a purity of 99.999%, providing significant cost reduction and complete operational autonomy.

DENSO
Crafting the Core

PSA
Molecular separation from compressed air



Flow rate up to **2000** m³/h

PURITY UP TO 99,999%

ON-SITE NITROGEN GENERATION PLANT

On-site nitrogen generation, using **Pressure Swing Adsorption (PSA)** technology, is the most economical and efficient method for producing this important gas directly at the customer's facility, without the inconvenience of supply contracts.
On-site nitrogen generation costs less because it eliminates the logistics required for cylinder and tank control, such as issuing invoices, dispatching, transportation, receiving, handling, and payment control.
Each NitroMax nitrogen generator is customized to meet the specific needs of the user in terms of purity, pressure, flow rate, layout, safety, and embedded electronics.

MOLECULAR SIEVE

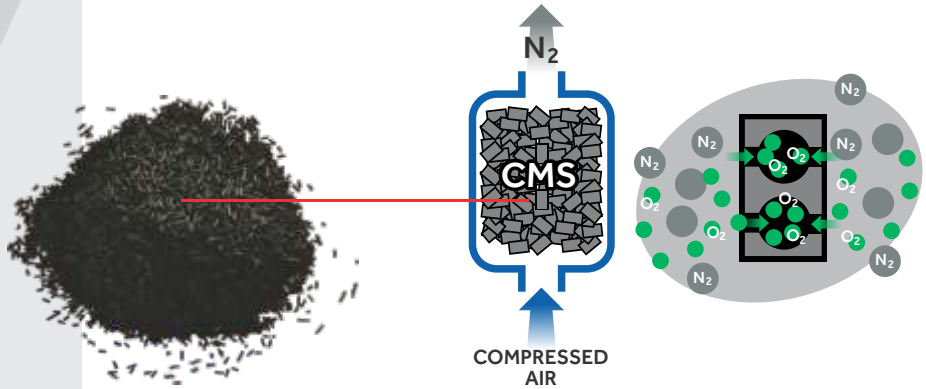
Carbon Molecular Sieve - CMS

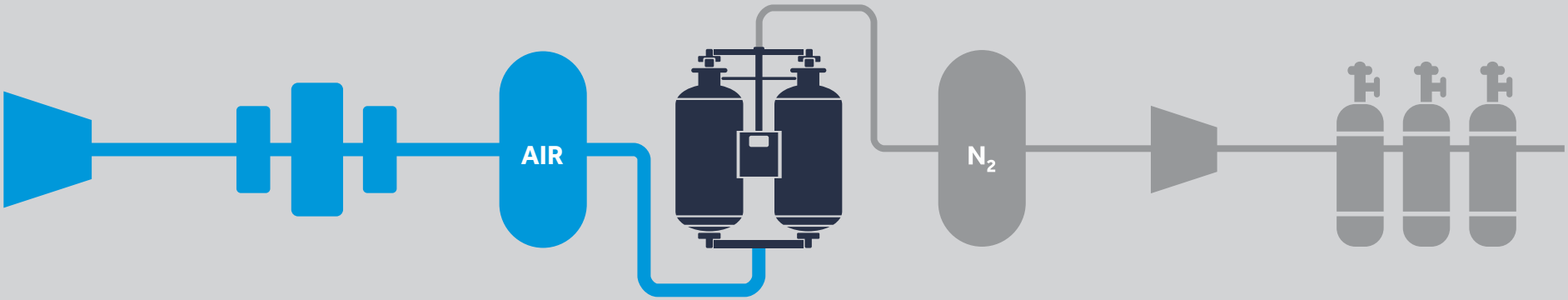
The carbon molecular sieve has nanopores with a diameter of 3.0 Å*, capable of selectively separating nitrogen molecules (3.1 Å) and oxygen molecules (2.9 Å). Oxygen molecules penetrate and become trapped in the nanopores, while nitrogen molecules bypass the molecular sieve.

* Angstrom - unidade de comprimento, equivalente a 10^{-10} m

NITROGEN GENERATOR

NITROMAX





AIR COMPRESSOR

It is essential to ensure a reliable and efficient supply of compressed air for the nitrogen generation process.

COMPRESSED AIR TREATMENT

A compressed air dryer, either refrigeration-based or adsorption-based, along with pre- and post-coalescing and adsorbent filters, are basic components of the system to ensure the purity of the produced nitrogen.

AIR RECEIVER

The compressed air reservoir corrects pressure and flow fluctuations typical of nitrogen generation by the PSA method.

NITROGEN GENERATOR - PSA

The molecular sieve, using Pressure Swing Adsorption technology, delivers nitrogen at the flow rate, pressure, and purity required by the user.

NITROGEN STORAGE TANK

The produced nitrogen is stored to provide a stable and continuous low of gas downstream.

NITROGEN BOOSTER

When needed, nitrogen can be recompressed to pressures of up to 250 bar.

HIGH-PRESSURE STORAGE

Nitrogen is stored in high-pressure cylinders, which can be either stationary or transported to the locations where the gas will be consumed.

OPERATION

The basic principle of the on-site nitrogen generation plant involves capturing, compressing, and treating atmospheric air through compressors, filters, and dryers, leading it to a system of two vessels filled with molecular sieve (carbon molecular sieve). The molecular sieve is capable of separating oxygen molecules (smaller diameter) from nitrogen molecules (larger diameter).
The two vessels are necessary to ensure an uninterrupted separation process, where one vessel is responsible for selective adsorption, while the other vessel is in the regeneration stage.

The generated nitrogen is stored in a suitable reservoir and can be recompressed using a booster until it reaches the working pressure required by the user.
Since the molecular sieve is highly sensitive to water and oil, the compressed air must be dry and free of hydrocarbons.
This can be achieved by installing a compressed air dryer, either refrigeration-based or adsorption-based, with coalescing filters and an activated carbon module, according to the nitrogen purity desired.

N_2 PURITY VS APPLICATIONS

95% to 99%

- Fire/explosion prevention
- Pipeline inspection
- Pressure testing
- Tank inerting
- Chemical inerting
- Autoclaves
- Laser sintering
- Dry boxes

99% to 99,9%

- Food processing
- Inerting beer/champ dispenser
- Wine barrel inerting
- Oil bubbling
- Brazing
- Mold injection
- Cable heat treatment
- Aluminum bubbling

99,9% to 99,999%

- Laser cutting
- Heat treatment
- Welding of electronic circuits
- Pharmaceutical processes

MASTER CONTROL

TOUCH CONTROL

MASTERCONTROL

INTEGRATED TELEMETRY (OPTIONAL)

The MASTERCONTROL controls and monitors the main functions of the NitroMax nitrogen generation plant to ensure maximum reliability with low energy consumption.

PREVENTIVE MAINTENANCE ALERT

Countdown timer and text messages to communicate all preventive maintenance on the Nitrogen Generator

GENERAL DIAGNOSIS & SPECIAL FUNCTIONS

• History of alerts and failures from the last 50 events:
- Low nitrogen purity
- Low nitrogen flow rate
- Low nitrogen pressure
- High dew point of compressed air
- High/low compressed air pressure

- Calibration of temperature and pressure sensors
- Remote start/stop (via cable)
- Remote fault signal (via cable)
- Serial communication (Modbus)
- Unit conversion (°C / °F)
- Adjustment of operating cycles
- Adjustment of local date and time

TOUCHCONTROL /HUMAN-MACHINE INTERFACE

*The **CERTI** - Center of Reference for Innovative Technologies is so focused on innovation that it chose not just one, but two **NitroMax** nitrogen generators (99.99% purity), which have been in operation since 2014, to replace its cryogenic system and save R$ 800 thousand per year.*

certi

UNIVERSIDADE FEDERAL DE SANTA CATARINA

*In the leak testing section of the refrigeration compressors, **Bitzer** used gaseous nitrogen supplied by a cryogenic tank. In order to reduce production costs and have better control over the processes, a **NitroMax** nitrogen generator was acquired, which has been operating continuously since 2004.*

Bitzer

*"We, at **Café LaSanté**, were aware of the importance of nitrogen in the packaging and preservation of the quality of our gourmet coffee, but we lacked an efficient and economical way to supply this gas. The **NitroMax** from Metalplan met our needs in the best possible way, producing nitrogen at low cost and without interruptions, proving to be much more convenient than handling heavy nitrogen cylinders."*

Rodrigo Eleutério
Director

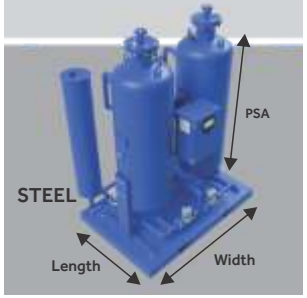
TECHNICAL DATA

Model	Nitrogen Production (Nm³/h @ 10 bar)												Compressed Air Consumption (Nm³/h @ 10.5 bar)											
	NITROGEN PURITY																							
	95%		99%		99,9%		99,95%		99,99%		99,995%		99,999%											
NM-007	3,2	6,1	1,7	4,3	1,0	3,5	0,9	3,4	0,6	2,8	0,5	2,4	0,3	2,2										
NM-009	4,6	8,7	2,3	6,1	1,4	5,0	1,2	4,8	0,8	4,0	0,7	3,4	0,5	3,1										
NM-014	6,5	12,3	3,3	8,6	2,0	7,0	1,8	6,7	1,2	5,6	1,0	4,8	0,7	4,4										
NM-018	9,1	17,4	4,7	12,1	2,9	10,0	2,5	9,5	1,6	7,9	1,3	6,7	1,0	6,3										
NM-028	12,9	24,6	6,6	17,2	4,0	14,1	3,5	13,5	2,3	11,2	1,9	9,5	1,4	8,9										
NM-036	18,3	34,7	9,3	24,3	5,7	19,9	5,0	19,0	3,3	15,8	2,7	13,5	1,9	12,5										
NM-072	36,6	69,5	18,7	48,5	11,4	39,8	9,9	38,1	6,6	31,6	5,4	26,9	3,9	25,1										
NM-108	54,9	104,2	28,0	72,8	17,1	59,7	14,9	57,1	9,9	47,4	8,1	40,3	5,8	37,6										
NM-144	73,1	138,9	37,4	97,0	22,8	79,6	19,9	76,2	13,1	63,2	10,8	53,8	7,7	50,1										
NM-180	91,4	173,7	46,7	121,3	28,5	99,5	24,9	95,2	16,4	78,9	13,5	67,2	9,7	62,7										
NM-216	109,7	208,4	56,1	145,6	34,2	119,4	29,8	114,3	19,7	94,7	16,1	80,7	11,6	75,2										
NM-252	128,0	243,2	65,4	169,8	39,9	139,3	34,8	133,3	23,0	110,5	18,8	94,1	13,5	87,7										
NM-288	146,3	277,9	74,7	194,1	45,5	159,2	39,8	152,3	26,3	126,3	21,5	107,6	15,4	100,3										
NM-324	164,5	312,6	84,1	218,4	51,2	179,1	44,7	171,4	29,6	142,1	24,2	121,0	17,4	112,8										
NM-360	182,8	347,4	93,4	242,6	56,9	199,0	49,7	190,4	32,8	157,9	26,9	134,5	19,3	125,4										
NM-500	257,0	488,3	131,3	341,1	80,0	279,9	69,9	267,7	46,2	221,9	37,8	189,0	27,1	176,2										
NM-720	378,8	719,7	193,5	502,7	117,9	412,4	103,0	394,5	68,0	327,1	55,7	278,6	40,0	259,7										
NM-1000	572,6	1088	292,6	759,9	178,3	623,4	155,7	596,4	102,9	494,5	84,2	421,1	60,5	392,6										
NM-1500	747,2	1420	381,8	991,7	232,7	813,5	203,1	778,3	134,2	645,3	109,9	549,6	78,9	512,3										
NM-2000	1008	1916	515,1	1338	313,9	1098	274,0	1050	181,1	870,7	148,3	741,5	106,5	691,2										

Model	IN/OUT (BSP)	Dimensions (mm)			Weight (kg)
		Width	Length	Height PSA/Backfill	
NM-007	1/4"	737	440	877 / NA	47
NM-009	1/4"	737	440	1000 / NA	52
NM-014	1/4"	737	440	1177 / NA	59
NM-018	1/4"	700	1150	1140 / 1353	121
NM-028	1/2"	700	1150	1490 / 1353	135
NM-036	1/2"	700	1200	1990 / 2100	155
NM-072	1/2"	700	1300	1990 / 2100	248
NM-108	3/4"	700	1490	1990 / 2100	355
NM-144	3/4"	700	1640	1990 / 2100	373
NM-180	1"	700	2000	1990 / 2100	436
NM-216	1"	700	2300	1990 / 2100	498
NM-252	1 1/4"	700	2500	1990 / 2100	656
NM-288	1 1/4"	700	2650	1990 / 2100	719
NM-324	1 1/2"	700	2800	1990 / 2100	781
NM-360	2"	700	3000	1990 / 2900	844
NM-500	2"	1800	3200	2500 / 2900	1050
NM-720	2"	1800	3200	2600 / 3600	1462
NM-1000	2"	2000	3200	2750 / 3600	2030
NM-1500	3"	2500	3500	2750 / 3950	3045
NM-2000	3"	2500	3500	3200 / 3950	3800

LAYOUT

ALUMINUM



STEEL

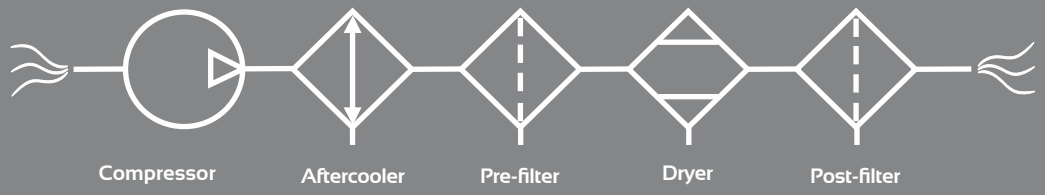
Standard ambient conditions: Temperature = 20°C / Pressure = 1 bar (abs) / Relative Humidity = 0% / Working Pressure = 7 bar (abs)
Electricity: 220V/1Φ/50-60 Hz 150W

Please request a complete table for other levels of nitrogen purity.

Also, please check out our OxiPlus oxygen generators line.

COMPRESSED AIR FUNDAMENTALS

ISO 8573 STANDARD INSTALLATION



CONTAMINANTS & QUALITY CLASSES

class	SOLID PARTICLES maximum number of particles per m³ (d = particle size) 0,1µm < d ≤ 0,5µm	0,5µm < d ≤ 1µm	1µm < d ≤ 5µm	class	WATER moisture dew point (°C)	class	OIL - total concentration (liquid/aerosol/vapor) (mg/m³)
0	CLASS ZERO - as specified by the user or equipment supplier and stricter than Class 1						
1	≤ 20.000	≤ 400	≤ 10	1	-70	1	≤ 0,01
2	≤ 400.000	≤ 6.000	≤ 100	2	-40	2	≤ 0,1
3	-	≤ 90.000	≤ 1.000	3	-20	3	≤ 1
4	-	-	≤ 10.000	4	+3	4	≤ 5
5	-	-	≤ 100.000	5	+7	5	-
	Mass concentration - C_p (mg/m³)			6	+10	6	-
6	$0 < C_p \leq 5$				Liquid Water C_w g/m³)		
7	$5 < C_p \leq 10$			7	$C_w \leq 0,5$	7	-
8	-			8	$0,5 < C_w \leq 5$	8	-
9	-			9	$5 < C_w \leq 10$	9	-
X	$C_p > 10$			X	$C_w > 10$	X	> 5

ISO 8573 COMPRESSED AIR FOR GENERAL USE

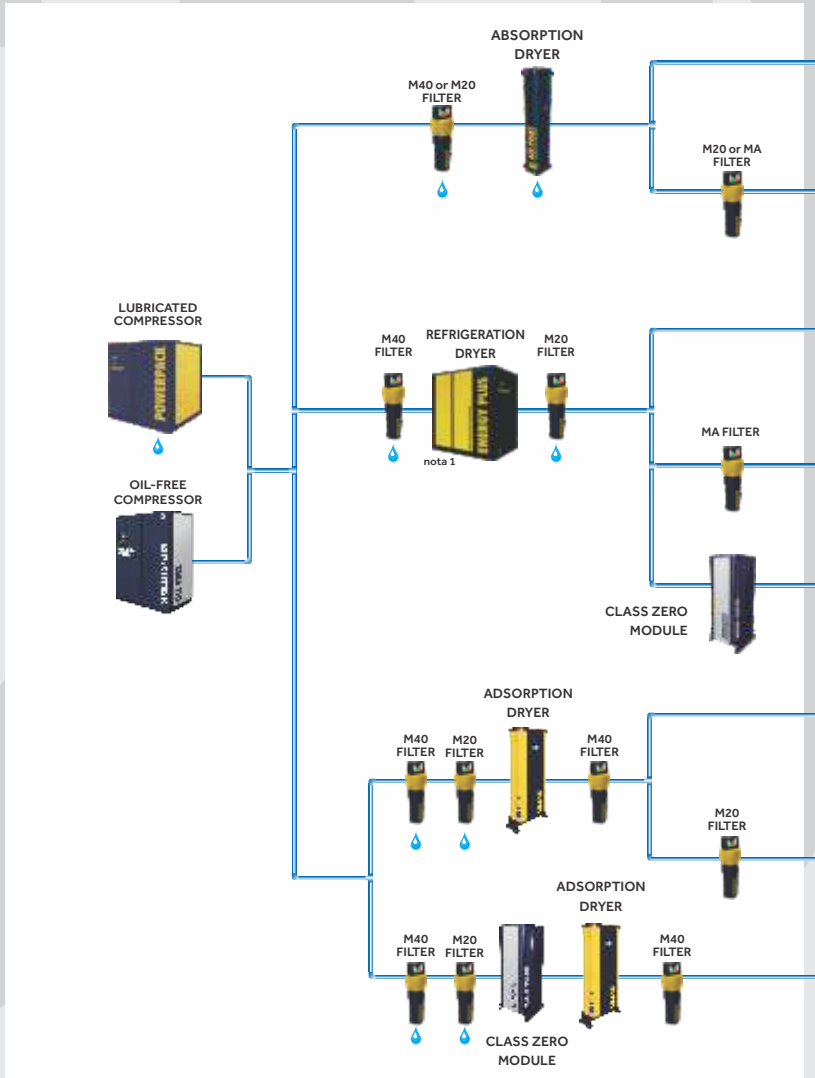
ISO 8573 is the international reference for compressed air systems, focusing on contamination levels.

The standard has various quality classes that serve multiple applications in industry and services, excluding human breathing and medicinal use.

Published in 1991, it was translated by Metalplan in 1992, positioning Brazil at the forefront of its utilization.

Its 3rd edition is from 2010, when Class Zero was introduced, with purity levels stricter than those found in Class One.

COMPRESSED AIR FUNDAMENTALS

ISO 8573 TYPICAL SYSTEMS	quality class	APPLICATIONS
	[1:6:1] [2]	Dry air, with dew point between 5°C and 15°C. Ideal for low flows and protection of valves, cylinders, pneumatic tools, automation, blasting, painting, etc.
	[1:6:1] [2] [1:6:0] [2]	Activated carbon filter eliminates odors, with residual oil of 0.003 mg/m³, suitable for dental clinics and similar applications, except for human breathing.
	[1:4:1]	This is the most used treatment system in the industry. Its level of protection meets various sectors such as automotive, plastic, textile, paper, mechanical, metallurgical, etc.
	[1:4:0]	Quality similar to the previous system, with odor elimination and lower residual oil (0.003 mg/m³), important in N2 and O2 generation and in the food, chemical, pharmaceutical industries, etc.
	[1:4:0]	Quality similar to the two previous systems, in terms of "water" and "solid particles". Meets Class Zero for the "oil" contaminant with total safety.
	[1:2:1] [1:1:1]	Prevents vapor absorption when air comes into direct contact with hygroscopic materials (cement, resins, powdered or freeze-dried foods and pharmaceuticals). Prevents freezing when air is subjected to negative temperatures. Applied in the generation of gases of very high purity.
	[1:2:1] [1:1:1]	Low dew point and maximum particle retention are essential in the manufacture of optical fibers, chips, critical instrumentation, steelmaking, nuclear reactors, etc.
	[1:2:0] [1:1:0]	Quality similar to the two previous systems, in terms of "water" and "solid particles". Meets Class Zero for the "oil" contaminant with total safety.

1 Energy Plus and Titan Plus dryers have integrated pre and post-filters

2 only if the compressed air inlet temperature is < 25°C

Install an AQUA + condensate treatment system.

COMPRESSED AIR CONSUMPTION IN NITROGEN GENERATION VIA PRESSURE SWING ADSORPTION (PSA)

A nitrogen generation system using PSA technology must be sized based on three main parameters:

1.Nitrogen production
2.Purity
3.Pressure

These parameters determine the size of the PSA system, including the volume of the adsorption towers and the air compressor flow rate, which is the essential input for the system.

The higher the desired nitrogen production or purity, the larger the amount of carbon molecular sieve (CMS) required to adsorb the oxygen from the air, which will then be vented out. This directly impacts the tower volume.

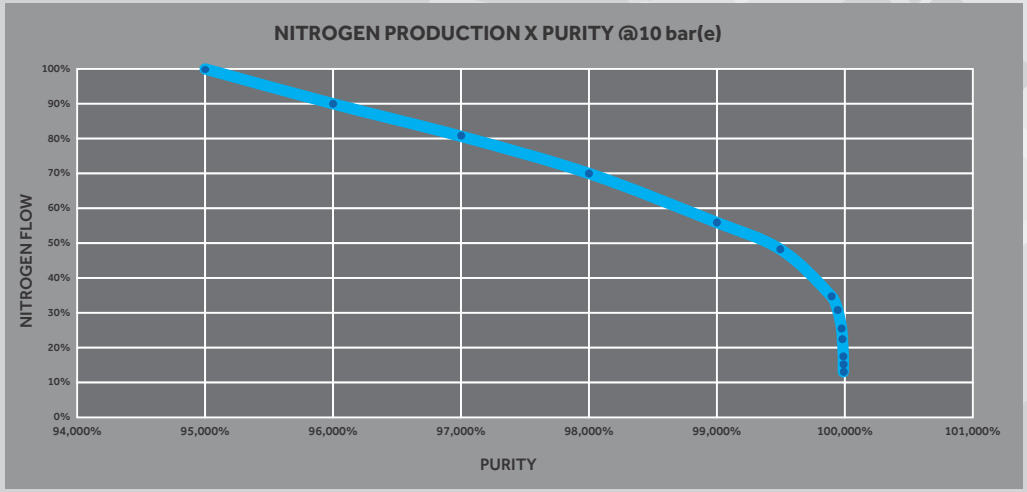
CMS adsorbs gases selectively over time: it first adsorbs oxygen, and after a period, it also adsorbs nitrogen. Therefore, before the CMS starts adsorbing nitrogen, a tower switch must occur. This switch time is specific to the adsorbent material and the gases involved.

At each tower switching cycle, all the compressed air stored in the system is released into the atmosphere, representing the main air consumption in a nitrogen generation system.
For this reason, it is crucial to specify nitrogen generation systems with great care to avoid under- or over-sizing.

If the system is undersized, it will fail to achieve the desired production and purity levels.

On the other hand, if the system is oversized, nitrogen purity will be higher, but this will come with an increase in compressed air consumption relative to the amount of nitrogen actually produced. This worsening of the Power-to-Nitrogen ratio is due to the towers and regeneration port being larger than necessary for a properly sized system.

To ensure proper system sizing, it is essential to analyze the user's nitrogen **consumption profile**. In cases where consumption is highly seasonal, it may be advisable to use two or more nitrogen generators in parallel, so that one or more units can be kept on standby when needed.



IMPRINTS OF OUR HISTORY

AFTER-SALE SERVICES

★★★★★

96% OF CUSTOMERS FULLY SATISFIED

In an Annual ISO 9001 Audited Survey, we achieved a 96% customer satisfaction rate for Technical Assistance. This percentage corresponds to the evaluations above 7 (seven), on a scale of 0 (zero) to 10 (ten).

This success is due to over 70 authorized workshops and 200 accredited technicians throughout American continent, supported by an exclusive partnership with National Service for Industrial Training for mechanic training, making our After-Sales Service the most acclaimed in the market.

SAM
Metalplan Authorized Service

Typical facade

COMPREHENSIVE INVENTORY OF ORIGINAL PARTS

MAXIMUM EFFICIENCY IN AFTER-SALES SERVICE

70 CERTIFIED WORKSHOPS

200 SPECIALIZED TECHNICIANS

OUR SOLUTIONS

COMPRESSED AIR

- COMPRESSORS
- DRYERS AND FILTERS
- RESERVOIRS
- 100% ALUMINUM PIPING

OXYGEN & NITROGEN

- OXYGEN GENERATORS PSA / VSA ON SITE
- NITROGEN GENERATORS PSA ON SITE

INDUSTRIAL REFRIGERATION

- WATER CHILLERS
- ULTRA AIR AND GAS COOLERS (-35°C)
- THERMOCHILLERS
- DRY COOLERS

BIOGAS & CNG

- COMPRESSORS FOR BIOGAS, BIOMETHANE AND CNG
- BOOSTERS
- CHILLERS
- DISPENSERS

e-line

ROTARY SCREW COMPRESSORS

4 to 25 hp

REFRIGERATION DRYERS

20 to 250 pcm

ABSORPTION DRYERS

6 to 32 pcm

COALESCING FILTERS

25 to 300 pcm

AUTOMATIC DRAIN VALVES

electronic & magnetic

METALPLAN

www.metalplan.com.br
metalplan@metalplan.com.br
55 11 4448-6900

FIRST COMPRESSOR MANUFACTURER IN THE WORLD ACCREDITED ISO 50001 ENERGY MANAGEMENT