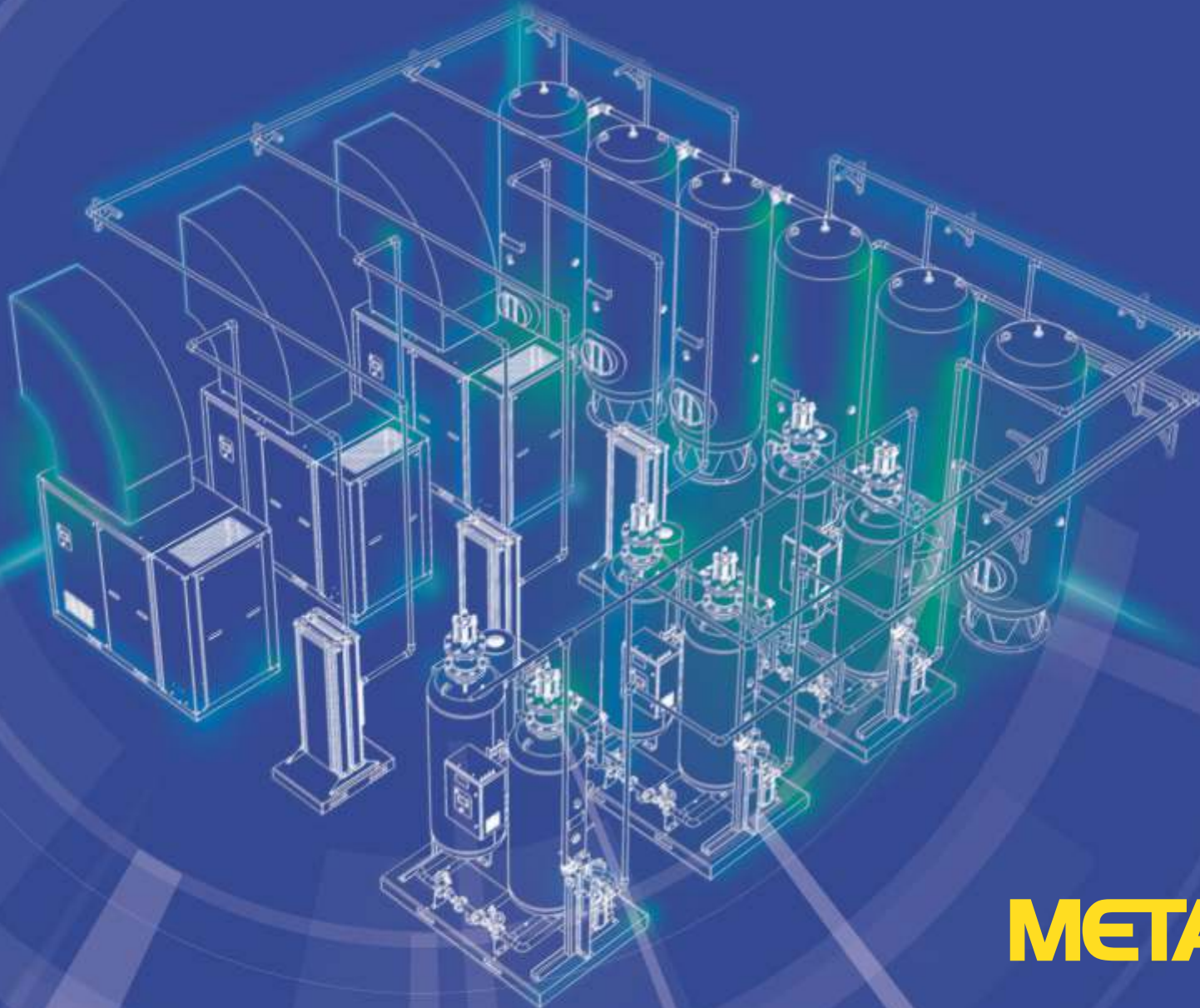


FIRST COMPRESSOR
MANUFACTURER IN THE
WORLD ACCREDITED

ISO 50001
ENERGY MANAGEMENT

premium line



METALPLAN

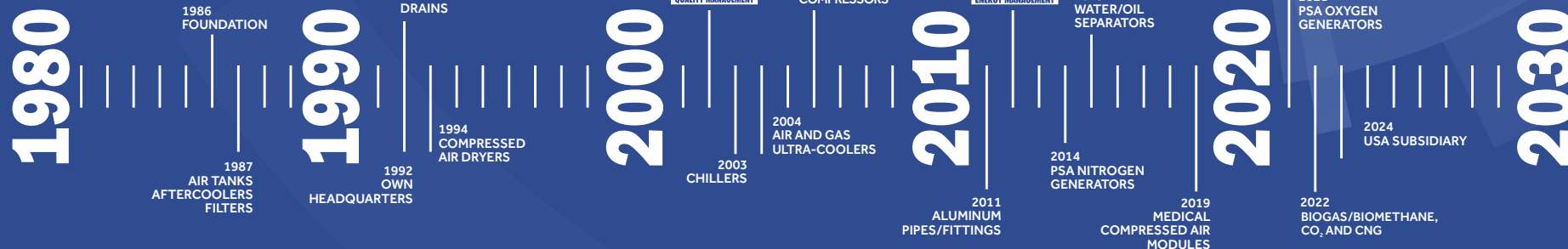
METALPLAN IS NUMBER ONE IN ENERGY EFFICIENCY

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, CO₂ and CNG.



FIRST COMPRESSOR
MANUFACTURER IN THE
WORLD ACCREDITED

ISO 50001
ENERGY MANAGEMENT



ISO 8573 STANDARD INSTALLATION



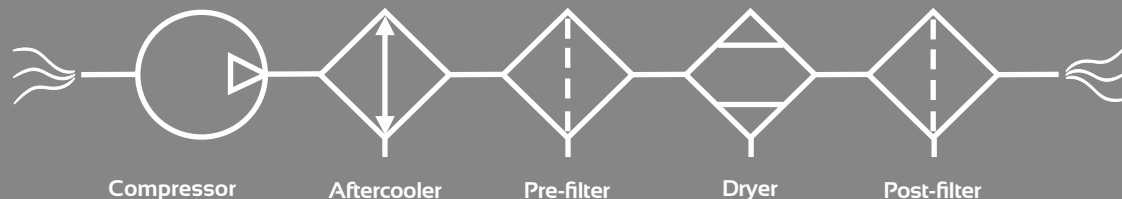
ISO 8573 COMPRESSED AIR FOR GENERAL USE

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.



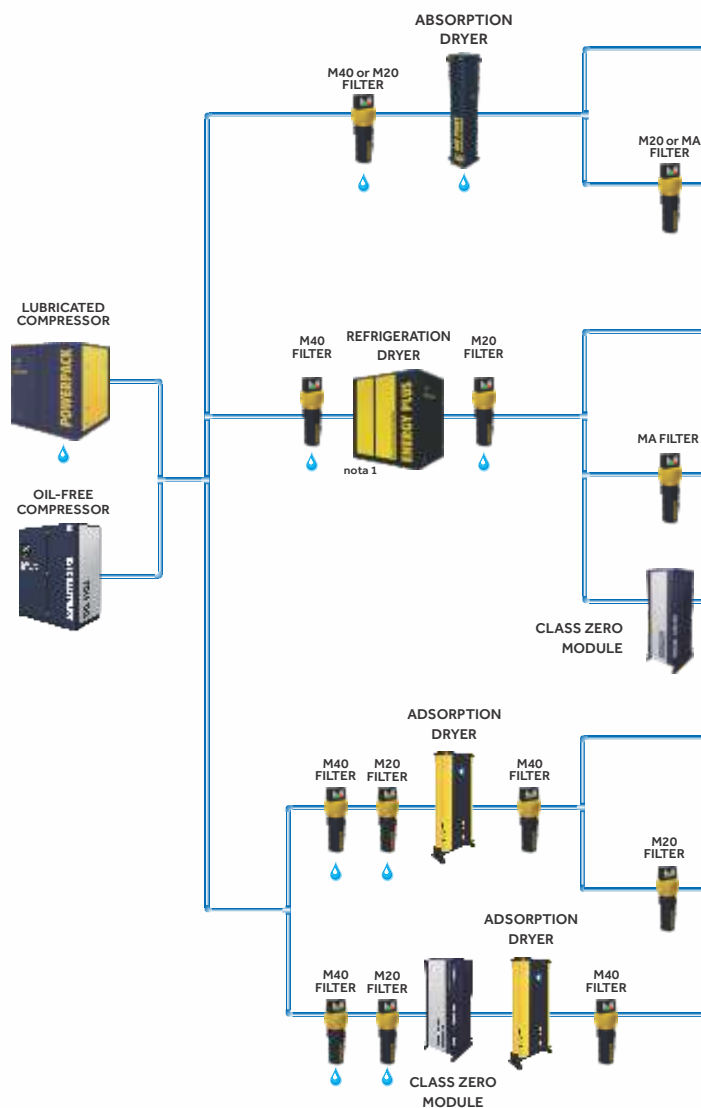
CONTAMINANTS & QUALITY CLASSES

class	SOLID PARTICLES maximum number of particles per m ³ (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/m ³)
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/m ³)			6	+10	6	-
6	0 < C _p ≤ 5				Liquid Water C _w (g/m ³)		
7	5 < C _p ≤ 10			7	C _w ≤ 0,5	7	-
8	-			8	0,5 < C _w ≤ 5	8	-
9	-			9	5 < C _w ≤ 10	9	-
X	C _p > 10			X	C _w > 10	X	> 5

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.

DECIPHERING CLASS ZERO

When drafting Class Zero, ISO 8573 **failed to adopt the necessary clarity**. See the original text:

"Class 0: as specified by the equipment user or supplier and **more stringent than Class 1**"*

The standard requires that the contamination levels of Class Zero be **lower** – "more stringent" – than the levels of Class One, meaning, **the maximum levels of Class Zero must be below the lowest levels of Class One**. However, the standard does not establish the limit between these levels. When referring to the oil contaminant, we know that the most sophisticated instruments can detect up to 0.003 mg of oil in each m³ of compressed air. Therefore, this is the value that should be adopted as the minimum level of Class One and the maximum of Class Zero.

CHOOSE THE MOST SUITABLE CLASS FOR YOUR APPLICATION

When specifying the quality of compressed air, never go beyond the user's needs, avoiding high costs and inconveniences.

An example is the increasing demand for "100% oil-free/Class Zero" compressed air, even when there is no basis for it. There are specifications that opt for excessive caution, without considering that it is easy to eliminate the risk of contamination with very affordable devices.

It is up to the user, with the support of experts, to define the necessary and sufficient technical requirements for their application.

For situations where even the slightest presence of oil is not tolerable, a synthetic, non-toxic, colorless, and odorless lubricant can be used, of the food-grade type, approved and recommended by : National Health Surveillance Agency



OIL RESIDUE - ISO 8573



CASE STUDY

COMPRESSOR POWER	100 hp
TOTAL FLOW OF COMPRESSED AIR	7.7 million m ³ /year
TOTAL MASS OF COMPRESSED AIR	10 thousand tons/year
OIL RESIDUE IN CLASS ONE	86 grams/year
OIL RESIDUE IN CLASS ZERO	26 grams/year

OIL-FREE COMPRESSED AIR: DEBUNKING MYTHS

Air compressors draw in ambient air and all contamination around them: water vapor, oil vapor, and solid particles.

"Oil vapor" is the generic term for the combination of oil vapors, hydrocarbon vapors, and volatile organic compound (VOC) vapors present in the ambient air¹.

The concentration of oil vapors in the atmosphere is typically between 0.05 mg/m³ and 5 mg/m³ but can reach even higher levels in dense industrial or urban areas.

According to the UN, the ambient air in certain regions may contain a level 100 thousand times higher than Class Zero² of ISO 8573 Standard allows.

Conclusion: regardless of the type of compressor – **lubricated or oil-free** – the presence of oil in compressed air is inevitable, requiring appropriate treatment immediately after compression. Effectively, when using an oil-free compressor, achieving Class Zero is easier, while a lubricated compressor will require more safety devices.



THE AMBIENT AIR CAN CONTAIN UP TO 100 THOUSAND TIMES MORE OIL VAPORS THAN CLASS ZERO PERMITS



SOURCE	OIL CONCENTRATION – C	ISO 8573
CAGI – Compressed Air and Gas Institute (USA)	0.05 mg/m ³ ≤ C ≤ 0.5 mg/m ³	Classes 2 and 3
OSHA – Occupational Safety and Health Administration (USA)	C ≤ 5 mg/m ³	Class 4
MTb – Ministry of Labor (Brazil)	C ≤ 5 mg/m ³	Class 4
UN – United Nations Industrial Development Organization	C ≤ 300 mg/m ³	Class X

GLOSSARY

¹ **Hydrocarbon:** organic compound formed by hydrogen and carbon atoms.

Oil: mixture of hydrocarbons formed by six or more carbon atoms (C6+).

Volatile Organic Compound: carbon compounds with a high vaporization rate (benzene, ethanol, acetone, formaldehyde, etc.)

² **Class Zero:** oil residue ≤ 0.003 mg/m³

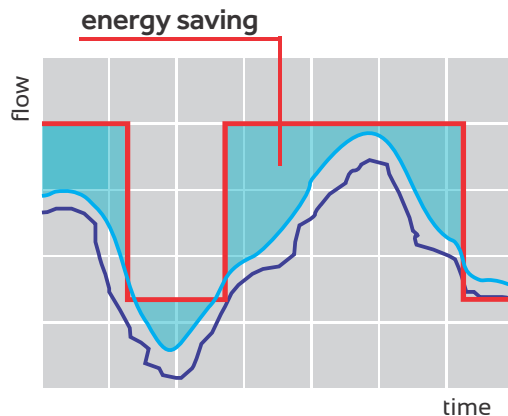
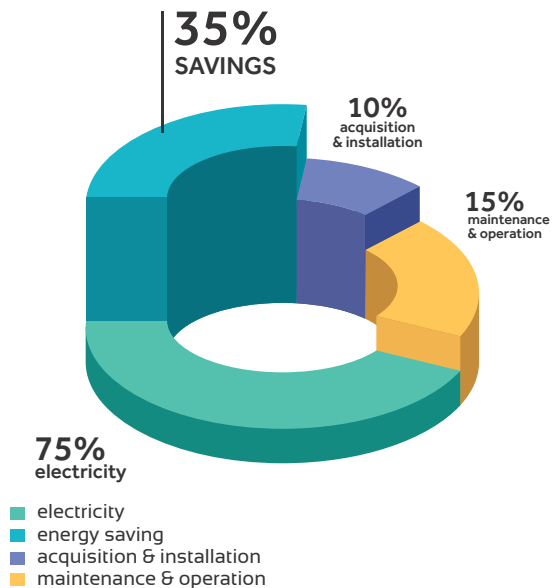
*"Since they started operating,
Metalplan screw compressors have
greatly contributed to the success
of Cacau Show!"*

Alexandre Costa
President



FLEX TECHNOLOGY

FLEX technology - variable speed - ensures up to 35% energy consumption reduction compared to conventional compressors.



SCREW COMPRESSOR TOTALPACK FLEX DD WITH INTEGRATED DRYER & FILTERS




rotary
SCREW

INTEGRATED
DRYER &
FILTERS

10 to
250 hp

Over twenty thousand installed units attest to the reliability of Metalplan compressors, recognized for their energy efficiency, simplicity, robustness, embedded electronics, and low maintenance costs.

FREQUENCY INVERTER MODULE

SPEED CONTROLLER

Controls the rotation of the electric motor and produces compressed air according to user demand, with proportional energy savings.



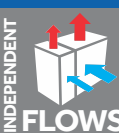
MASTERCONTROL

Microprocessed panel with intuitive HMI. Allows the operator comprehensive vision and control, with memorization of fundamental data.



COOLING

Airflow is independent in each module. The exhaust of hot air occurs on the upper face, avoiding recirculation and facilitating its extraction.



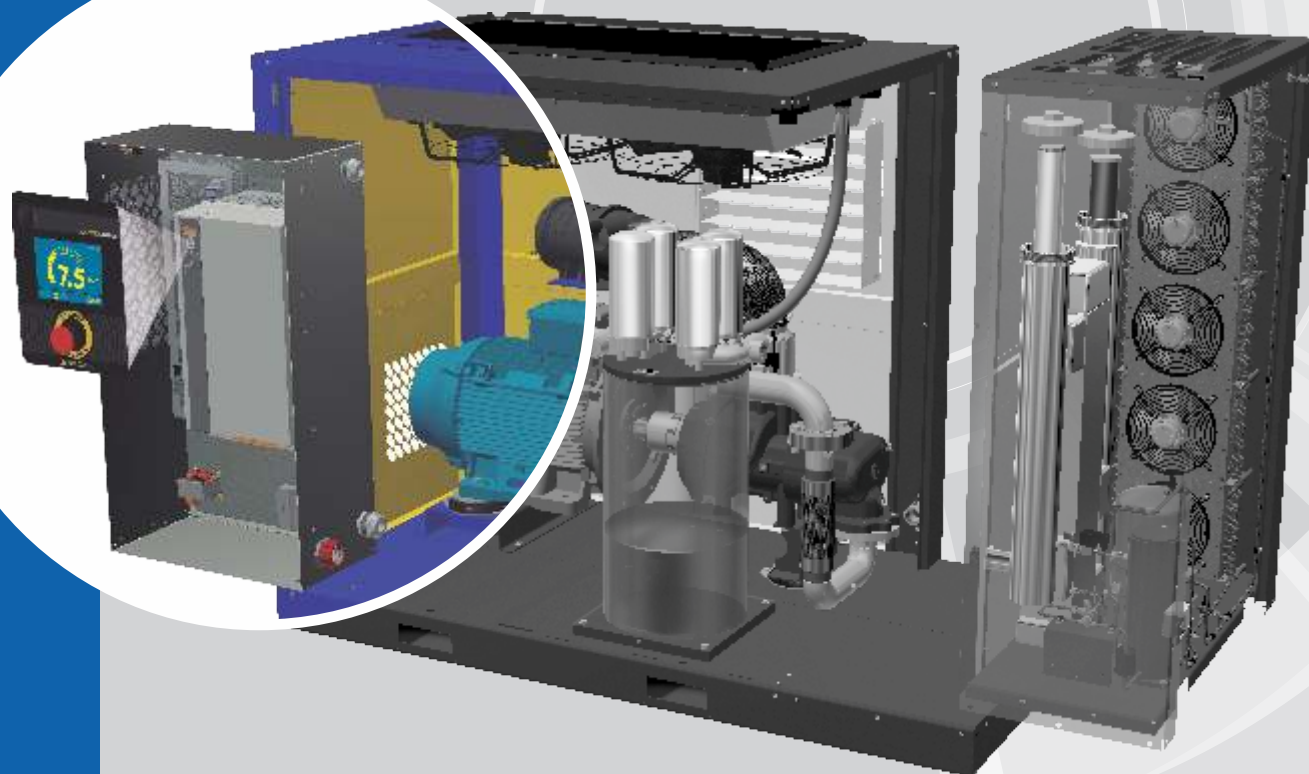
NOISE LEVEL

In compliance with current legislation, Metalplan compressors provide a noise level of 72 ± 3 dBA, according to ISO 2125. This allows them to be installed close to users.



TOTALPACK FLEX DD

FULLY INTEGRATED MODULES





INTEGRATED VALVES

Few moving parts contribute to the reliability of the assembly and ease of repair. Contains the thermostatic valve, minimum pressure valve, and thermal probe.



HIGH-EFFICIENCY MOTOR

Standard market motors (IR2 and IR3): reduce energy consumption between 7% and 14%. Attention to compressors that use motors with customized housings that are difficult to replace.



DIRECT COUPLING

1 x 1 SPEED RATIO
Electric motor RPM = Compressor unit RPM.



INTAKE FILTER HEAVY DUTY

With three stages of filtration, it presents high separation efficiency, low flow restriction, and maximum protection for the compressor, even in contaminated environments.



SPIN ON FILTERS

Oil filter and coalescing separator located away from the oil tank: quick maintenance and maximum purity of compressed air.

ROTOR OIL EXTRA ECOBLUE

High-durability synthetic lubricant (8000 hours), with additives to operate in hot climates and high humidity.

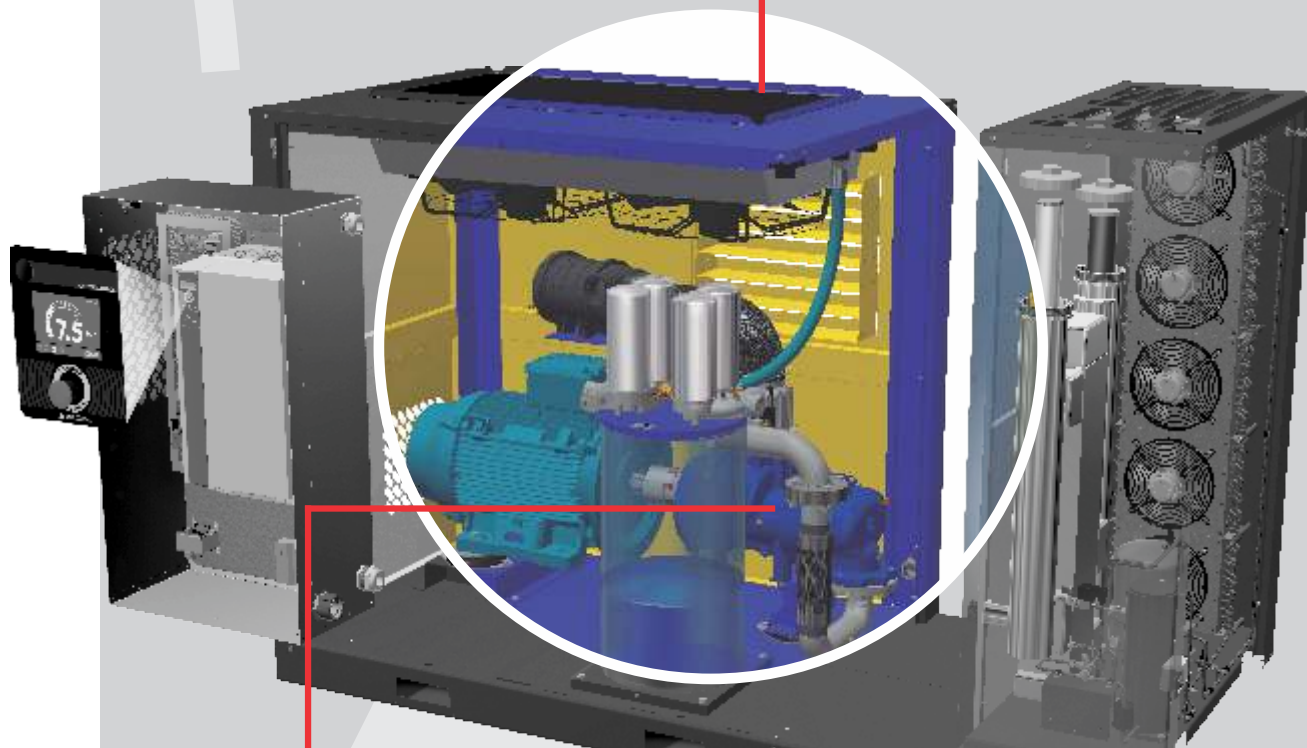
ROTOR OIL EXTRA FOOD GRADE

100% oil-free equivalent. Non-toxic and indispensable in the food industry.

COMPRESSOR MODULE THE HIGHEST ISOTHERMAL EFFICIENCY IN ITS CATEGORY

HEAT EXCHANGERS

Brazed aluminum, oversized, and responsible for the low temperatures of the system. Alongside the large compressor unit, they ensure maximum isothermal efficiency and unbeatable energy efficiency.



COMPRESSOR UNIT

Made in Italy since 1912, one of the most efficient in the world, with the first overhaul capable of reaching up to 48,000 hours of operation! Due to its large size and low rotation, it operates at lower temperatures in the compression chamber and also facilitates heat transfer to the lubricating oil, legitimizing the reputation for high isothermal efficiency of the assembly. This implies a higher airflow per kWh consumed.



INTEGRATED DRYER & FILTERS



fine coalescing prefilter

refrigeration dryer

ultra-thin coalescent post-filter

ISO 8573

EXCLUSIVITY TECHNICAL

Unique in the correct sequence
of ISO 8573 [1.4.1].



**MOST
RESISTANT**

HIGH TEMPERATURE DESIGN

The most resistant at high
temperatures. Designed
for all climates (ISO 7183-A2).

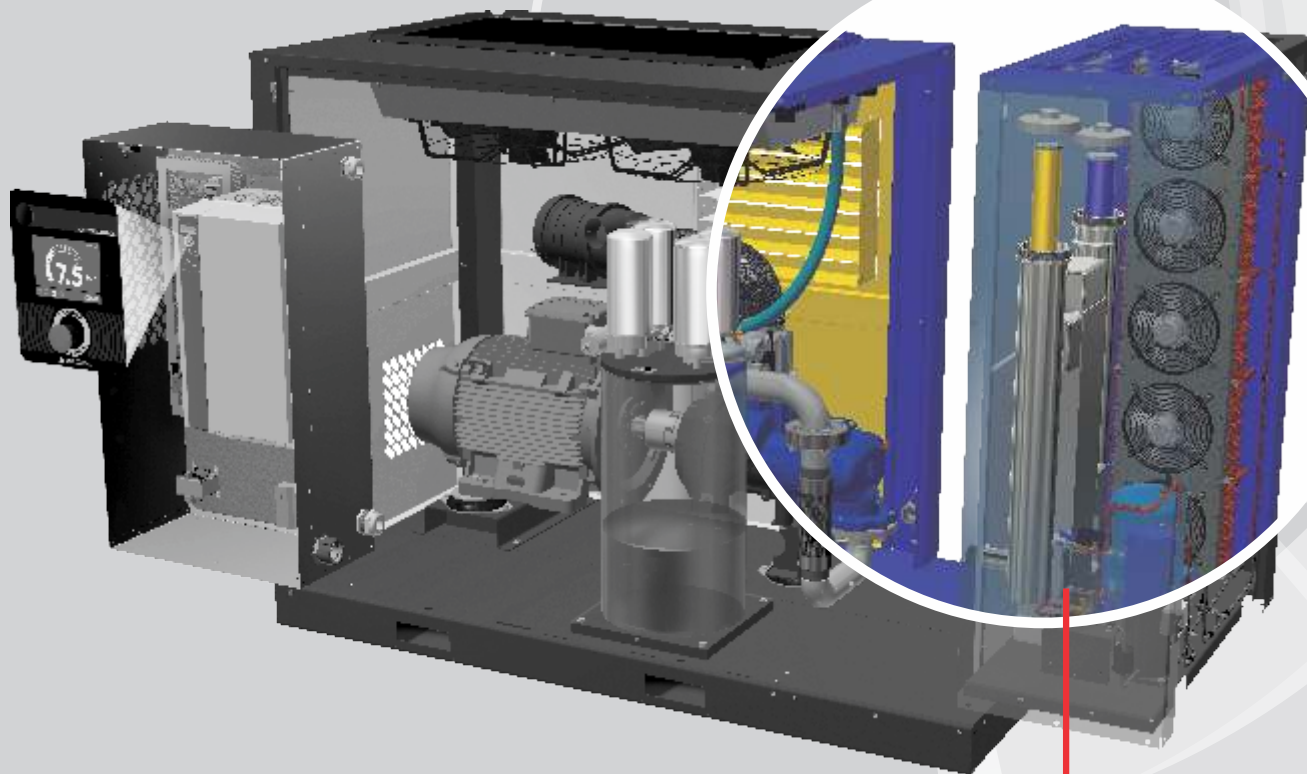


**TRIPLE
INSULATION**

TRIPLE INSULATION

The dryer & filters module is
insulated from the compressor
module by a steel plate and two
layers of thermal insulation,
with a thickness of 60 mm.

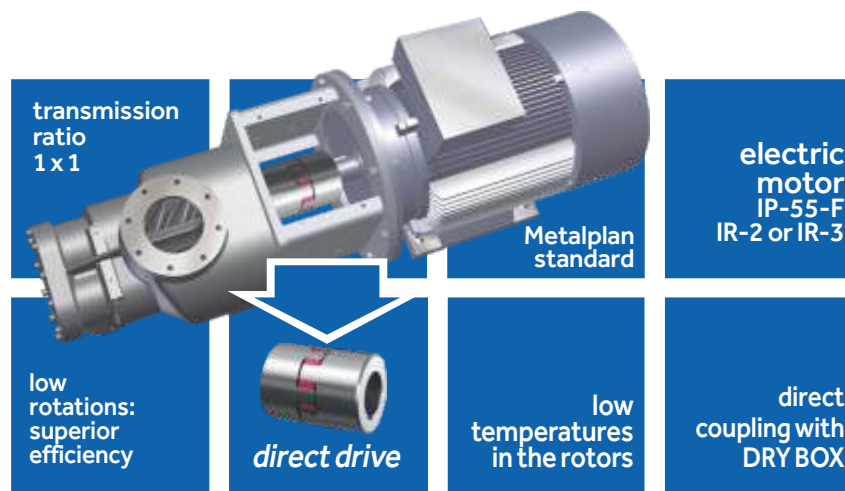
DRYER & FILTERS MODULE



EXCLUSIVE

DIRECT COUPLING: HIGHER ENERGY EFFICIENCY Unit RPM = Motor RPM

- Eliminates losses from traditional transmissions.
- Allows low speeds in the compressor unit.
- Results in lower oil and air temperatures.
- Provides high energy efficiency.
- Ensures the highest flow per horsepower in the market.

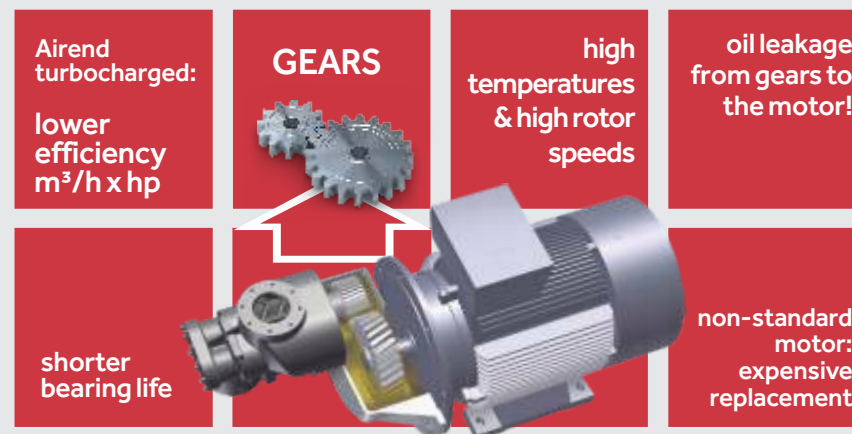


ADVANTAGES OF DIRECT COUPLING

The direct coupling of Metalplan's TotalPack DD compressors represents the latest in transmission technology, approaching 100% efficiency, while gears do not exceed 97%. The box where the direct coupling is located is limited to a depressurized and lubrication-free structure.

DISADVANTAGES OF "DIRECT TRANSMISSION"

The so-called direct transmission is nothing more than a lubricated and pressurized gear case, in direct contact with the electric motor. Sealing is done by seals and seals subject to rupture, causing motor burnout. Since it is a motor with a specific housing and attached gears, its cost is at least 4 times higher than a conventional motor and cannot be purchased from retailers.





MASTERCONTROL

Comprehensive and user-friendly, the MasterControl allows the user fast, intuitive, and secure navigation, simplifying the operation and maintenance of the compressor.

MAN-MACHINE INTERFACE TOUCHCONTROL

Permanent display of the compressor's main functions:

- Off/Starting/Stopped
- Load/Relief-Maintenance/Failures
- Standby
- Compressed air inlet temperature
- Condensation temperature
- Discharge pressure/temperature
- Dew Point (TotalPack)
- Load/Relief hour meter
- Pressures and temperatures in graphic format
- AUDIBLE AND VISUAL MAINTENANCE AND FAULT ALARM

DUAL CONTROL FUNCTION

When there is air consumption, the Dual Control function operates the compressor in the load/relief system. When the compressed air consumption ceases, Dual Control automatically shuts down the compressor, provided a pre-defined minimum time has been reached. This feature saves energy and extends compressor life.

ENERGY OPTIMIZATION SETTINGS

- Load/Relief pressure adjustment
- Pressure set point adjustment (Flex only)
- Motor rotation control
- Automatic flow adjustment based on set point
- Standby mode switching to continuous mode
- Stepped operation with more than one compressor
- Timing for low-pressure alarm in case of major leaks in the compressed air network

PREVENTIVE MAINTENANCE WARNING

Text messages based on countdown time indicate the correct time for part and component replacement, component cleaning, and overall compressor inspection.

GENERAL DIAGNOSTIC

- Failure and alert history of the last 50 records
- Overcurrent of all electric motors
- High oil and dew point temperatures
- High compressed air pressure
- High/Low pressure of the integrated dryer
- Pre-cooling timing of the integrated dryer
- Sensor failure/Calibration of temperature and pressure sensors
- Optimized timing of main motor/purge start
- General failure (via terminals)

SPECIAL FUNCTIONS

- Temperature and pressure calibration
- Optimized motor start timing
- Remote start/stop - Remote load/relief
- 100% communication via modbus
- Unit conversion (°C/°F) - (bar/psi)
- Languages: Portuguese/English/Spanish

INTEGRAL TELEMETRY *

* optional

TECHNICAL DATA

TOTALPACK FLEX DD/ POWERPACK FLEX DD FLOW RATES X PRESSURES

Power	Effective Flow Rate		Pressure	
	hp (kW)	pcm m³/h	bar(e) psig	
50 (37)		83 – 245	141 – 416	7,5 109
		82 – 231	139 – 393	9 131
		81 – 212	138 – 361	11 160
		80 – 197	136 – 336	12,5 181
60° (45)		115 – 302	196 – 514	7,5 109
		114 – 284	194 – 482	9 131
		111 – 257	189 – 437	11 160
		109 – 237	185 – 403	12,5 181
75° (55)		115 – 378	196 – 643	7,5 109
		114 – 351	194 – 596	9 131
		111 – 315	189 – 536	11 160
		109 – 288	185 – 489	12,5 181
100° (75)		212 – 529	360 – 900	7,5 109
		210 – 476	357 – 809	9 131
		208 – 404	354 – 687	11 160
		205 – 352	349 – 598	12,5 181
125° (90)		212 – 625	360 – 1063	7,5 109
		210 – 588	357 – 1000	9 131
		208 – 538	354 – 914	11 160
		205 – 499	349 – 849	12,5 181
150° (110)		303 – 791	515 – 1345	7,5 109
		297 – 738	505 – 1255	9 131
		295 – 668	502 – 1135	11 160
		293 – 615	498 – 1045	12,5 181
200° (150)		435 – 1075	740 – 1828	7,5 109
		362 – 867	615 – 1475	9 131
		324 – 770	550 – 1308	11 160
		307 – 709	522 – 1205	12,5 174
250° (185)		497 – 1202	845 – 2044	7,5 109
		443 – 987	753 – 1678	9 131
		397 – 859	675 – 1460	11 160
		359 – 768	610 – 1306	12,5 174

*Available only in 380V and 440V for FLEX models (frequency inverter)

TOTALPACK FLEX DD/ POWERPACK FLEX DD DIMENSIONS

Model	Dimensions (mm)		
	length	height	width
PowerPack Flex DD 050	1084	1725	1782
TotalPack Flex DD 050	1084	1725	2272
PowerPack Flex DD 060	1084	1725	1782
TotalPack Flex DD 060	1084	1725	2272
PowerPack Flex DD 075	1084	1725	1782
TotalPack Flex DD 075	1084	1725	2272
PowerPack Flex DD 100	1287	1857	1867
TotalPack Flex DD 100	1287	1857	2452
PowerPack Flex DD 125	1653	1915	2396
TotalPack Flex DD 125	1653	1915	2954
PowerPack Flex DD 150	1653	1915	2396
TotalPack Flex DD 150	1653	1915	2954
PowerPack Flex DD 200	1965	2224	2692
TotalPack Flex DD 200	1965	2224	3546
PowerPack Flex DD 250	1965	2224	2692
TotalPack Flex DD 250	1965	2224	3546

OPTIONAL ITEMS & ENGINEERED EQUIPMENT

Metalplan compressors can be customized according to your application. Special colors, weather protection, extended sound insulation, heat exchangers, filters for aggressive environments, and many other items are available for consideration.

TOTALPACK FLEX/ POWERPACK FLEX FLOW RATES X PRESSURES

Power	Effective Flow Rate		Pressure	
	hp (kW)	pcm m³/h	bar(e) psig	
10 (7,5)		39,8 36,5 34,9 32,2	67,7 62,1 59,3 54,7	7,5 109 9,0 131 11,0 160 12,0 174
15 (11)		61,4 55,9 51,3 47,6	104,4 95,0 87,2 80,9	7,5 109 9,0 131 11,0 160 12,0 174
25 (18,5)		108,2 96,6 87,6 80,6	183,9 164,2 148,9 137,0	7,5 109 9,0 131 11,0 160 12,0 174
30 (22)		127,3 116,7 106,1 95,5	216,4 198,4 180,3 162,3	7,5 109 9,0 131 11,0 160 12,0 174
40 (30)		179,5 167,1 157,7 142,1 116,5	305,2 284 268,1 241,6 198,8	7,5 109 9,0 131 11,0 160 12,0 174 16,0 232
50 (37)		216,9 201,3 188,9 176,4	368,7 342,2 321 299,9	7,5 109 9,0 131 11,0 160 12,0 174
60° (45)		250,7 233 212,5 199,4	426,2 396,1 361,3 339	7,5 109 9,0 131 11,0 160 12,0 174
75° (55)		330 303,2 284,4 265,6	561 515,4 483,5 451,5	7,5 109 9,0 131 11,0 160 12,0 174
100° (75)		429 398,8 368,6 328,6	729,3 677,9 626,6 558,6	7,5 109 9,0 131 11,0 160 12,0 174

*Available only in 380V and 440V for FLEX models (frequency inverter)

TOTALPACK FLEX/ POWERPACK FLEX DIMENSIONS

Model	Dimensions (mm)		
	length	height	width
PowerPack 010	452	1022	1027
TotalPack 010	452	1022	1344
PowerPack Flex 010	452	1022	1027
TotalPack Flex 010	452	1022	1344
PowerPack 015	500	1191	1027
TotalPack 015	500	1191	1394
PowerPack Flex 015	500	1191	1027
TotalPack Flex 015	500	1191	1394
PowerPack 025	532	1380	1307
TotalPack 025	532	1380	1674
PowerPack Flex 025	532	1380	1277
TotalPack Flex 025	532	1380	1674
PowerPack 030	1142	1465	1098
TotalPack 030	1142	1465	1554
PowerPack Flex 030	1142	1465	1098
TotalPack Flex 030	1142	1465	1554
PowerPack 040	1142	1465	1098
TotalPack 040	1142	1465	1554
PowerPack Flex 040	1142	1465	1098
TotalPack Flex 040	1142	1465	1554
PowerPack 050	1142	1465	1098
TotalPack 050	1142	1465	1554
PowerPack Flex 050	1142	1465	1098
TotalPack Flex 050	1142	1465	1554
PowerPack 060	1468	1633	1405
TotalPack 060	1468	1633	1877
PowerPack Flex 060	1468	1633	1865
TotalPack Flex 060	1468	1633	2337
PowerPack 075	1468	1633	1405
TotalPack 075	1468	1633	1877
PowerPack Flex 075	1468	1633	1865
TotalPack Flex 075	1468	1633	2337
PowerPack 100	1468	1633	1405
TotalPack 100	1468	1633	1877
PowerPack Flex 100	1468	1633	1865
TotalPack Flex 100	1468	1633	2337

Performance according to ISO1217:2009, Annexes C and E

IMPORTANT

- 1 - The compressor should never be exposed to adverse weather conditions (rain, sun, snow, etc.).
- 2 - The ambient temperature at the chosen compressor installation site should always be within the limits indicated in the instruction manual.
- 3 - Have a backup compressor in case the main compressor stops due to malfunction or activation of its protection devices.





Madero's production line features two Metalplan ScrollTech Zero Oil compressors, purchased during the implementation and expansion of the hamburger factory in Ponta Grossa, Paraná.

MADERO



ROTARY COMPRESSOR OIL FREE AIR

5 to
50 hp



The ScrollTech Zero Oil Free compressors are compact, extremely quiet, and have no oil in any of their components, representing total safety against contamination, especially when associated with a ModuCarb CLASS ZERO* module equipped with oil sensors to prevent system contamination from oil vapors from the ambient air.

APPLICATIONS

- Medical and dental clinics
- Hospitals
- Research laboratories
- Food and beverage industry
- Critical purposes

* see specific catalogue.



ROTARY COMPRESSOR **SCROLLTECH ZERO** OIL FREE AIR



**ISO
22000**

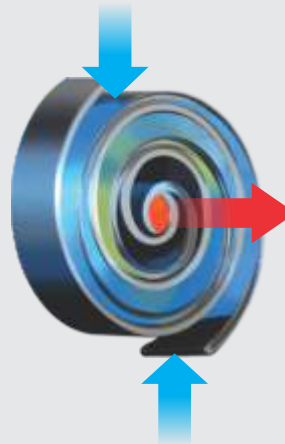
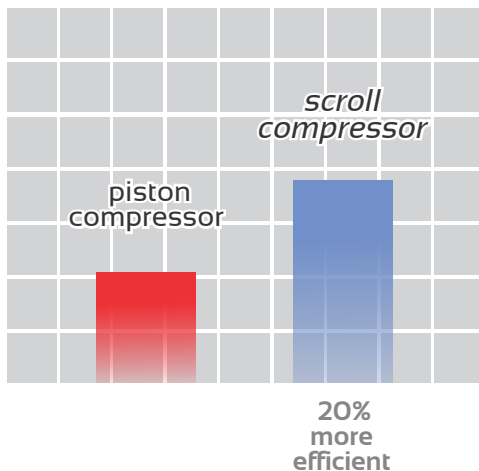
ISO 22000 is the specific standard for food and beverages, applied throughout the chain of this industry.

ISO 22000 certification ensures consumers the perfect quality of the final product, according to international standards of safety and reliability.



ScrollTech Zero Oil Free compressors are suitable for sophisticated industrial processes, laboratories, medical and dental clinics, as well as for human respiration and supply of therapeutic compressed air, through specific treatment, according to RDC 50 National Health Surveillance Agency

The scroll technology in air and gas compression systems is relatively recent but has been gaining preference among users due to its reliability, efficiency, and durability, especially when compared to obsolete oil-free piston compressors.



The scroll compression chamber consists of a fixed helix and an orbital helix, whose eccentric movement progressively reduces the volume of air until the desired pressure is reached. This operation is continuous, smooth, extremely quiet, and vibration-free.

The condensate from ScrollTech Zero Oil Free compressors is clean and oil-free, and can be freely discharged into the environment. The condensate from lubricated compressors requires proper treatment to avoid soil contamination.



TECHNICAL DATA

Model	Power	Effective Flow Rate		Dimensions (mm)			Weight
	hp	pcm	m³/h	length	height	width	(kg)
PPS-05 Zero	5	15,5	26,4	570	875	865	135
PPS-10 Zero	10	31,0	52,7	570	1260	1135	271
PPS-15 Zero	15	46,5	79,1	570	1650	1135	406
PPS-20 Zero	20	62,0	105,4	570	1060	1135	542
PPS-25 Zero	25	77,5	131,8	1000	1440	1420	678
PPS-30 Zero	30	93	158,1	1000	1440	1420	813
PPS-35 Zero	35	108,5	184,5	1000	1820	1420	949
PPS-40 Zero	40	124	210,8	1000	1820	1420	1084
PPS-45 Zero	45	139,5	237,2	1000	2150	1420	1220
PPS-50 Zero	50	155	263,5	1000	2150	1420	1355



Effective operating pressures: 8 and 10.5 bar(g) / 116 and 150 psig Flow rates referenced to 7 bar(g) / 100 psig pressure Optional frequency inverter
Consult about the technical characteristics and availability of TotalPach versions with integrated dryers and filters Noise level: 45 - 50 dBA

Available in
60 Hz / 3 / 220, 380, 440 V
50 Hz / 3 / 380 V





The production of **EMBRAER's** E190-E2 jets relies on three **Energy Plus** dryers and six **Hyperfilter** coalescing filters (4000 m³/h each) in uninterrupted operation for over fifteen years, ensuring the necessary safety for the aerospace industry.

Among the reasons for this high performance is the fact that Metalplan was the first manufacturer of filters and dryers in Latin America to certify its quality system according to ISO-9001.



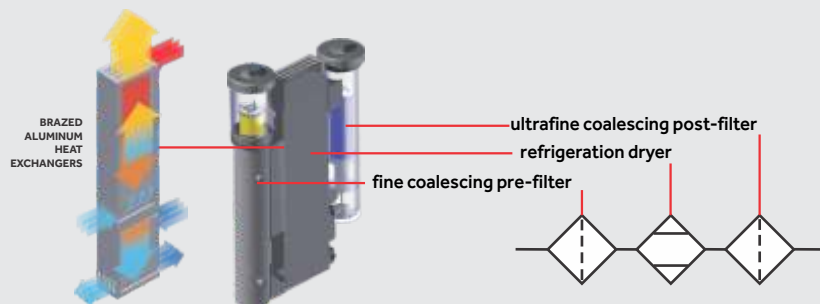


ABSOLUTE LEADERSHIP IN COMPRESSED AIR TREATMENT



Metalplan is the leading manufacturer of dryers in Latin America, a position held since 1998. We have already delivered over thirty thousand of these devices to companies of all sizes in various countries. Our dryers are recognized for their durability, low pressure drop, and excellent performance, due to the standard use of brazed aluminum heat exchangers, integrated filters, and cold coalescing filter, ensuring extremely reliable operation, in full compliance with ISO 8573 standards.

UNIQUE WITH PRE-FILTER & POST-FILTER
IN THE SEQUENCE DETERMINED BY ISO:
BEFORE AND AFTER THE DRYER, AT THE
COLDEST POINT:

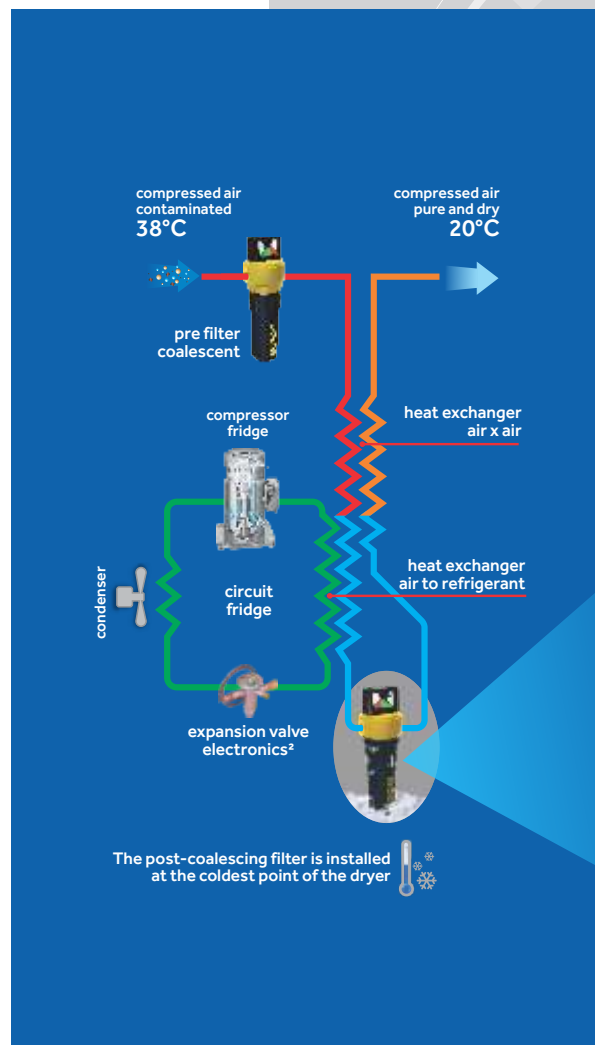


COMPRESSED AIR DRYER **ENERGY PLUS** HIGH EFFICIENCY AIR DRYER



OPERATING PRINCIPLE

In Energy Plus dryers, compressed air is cooled in stages until it reaches 3°C, according to ISO 8573 class [:4:]. This temperature corresponds to the dew point of the compressed air. Upon entering the dryer, the air temperature should not exceed 38°C¹ to prevent the refrigeration circuit from overheating. At this point, the first coalescing filtration stage occurs, eliminating pre-existing condensate harmful to equipment performance. Next, to save energy, the air passes through an air-to-air heat exchanger (recuperator), where it is cooled to 20°C by the cold compressed air exiting the dryer. The next cooling phase is the air passing through the air-to-refrigerant heat exchanger (evaporator), where the temperature reaches 3°C, its coldest point, and the separation/filtration stage by coalescence – **cold coalescing** – essential for the high efficiency of the system occurs. Additionally, the Energy Plus features sophisticated controls² that prevent excessive cooling of the compressed air, avoid the risk of freezing, and stabilize the dew point. To complete the drying cycle, after leaving the cold coalescing post-filter, the air returns to the air-to-air heat exchanger, where it is reheated to about 20°C by the hot compressed air entering the dryer.

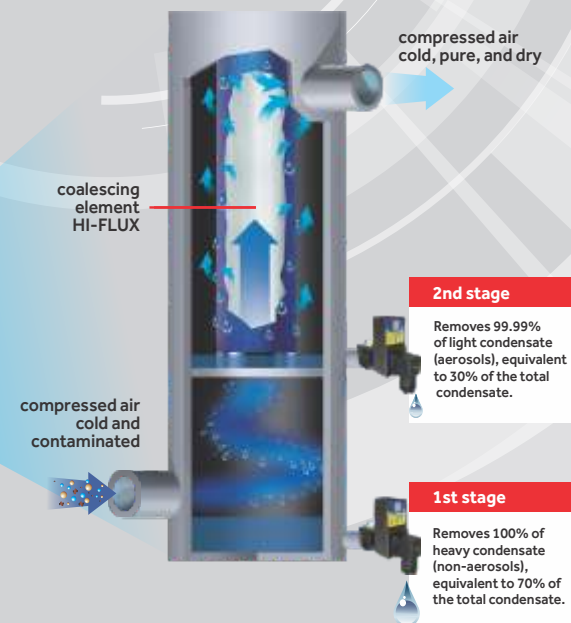


ENERGY PLUS

HIGH EFFICIENCY AIR DRYER

post cold
coalescing
filter

TOTAL REMOVAL OF
ZERO HUMIDITY
CONTAMINATION



COLD COALESCING FILTRATION IS UNBEATABLE

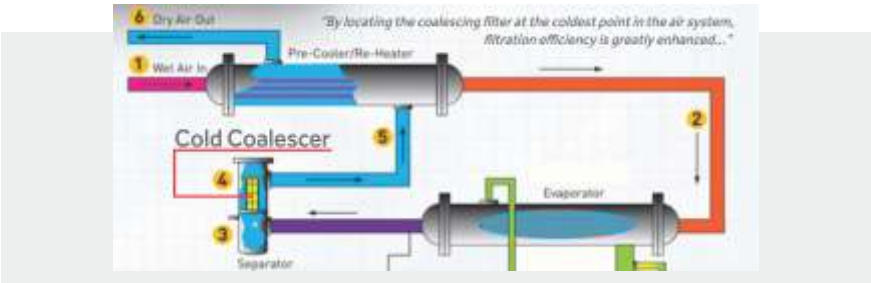
See what three global manufacturers of refrigeration dryers have to say about the condensate separation efficiency with coalescing filters at the coldest point of the dryer.

Alongside Metalplan, they are the only ones in the world adopting this technology. In Brazil, only Metalplan provides this benefit to users.

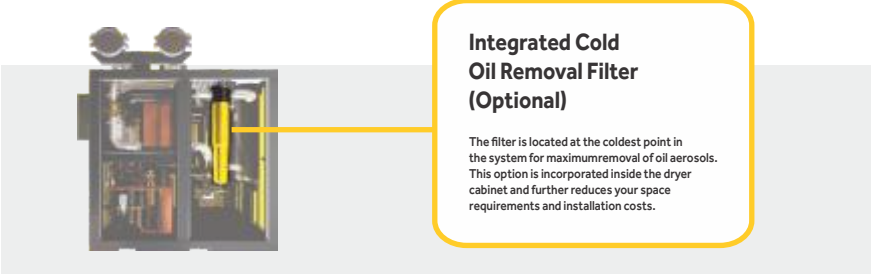
Manufacturer A (USA)



Manufacturer B (UK)



Manufacturer C (Germany)



All Energy Plus dryers are designed for high temperatures, according to ISO 7183, option A2. This means maximum operational reliability even under the most severe operating conditions.

Conventional dryers, designed for temperate climates, lose 20% of their capacity when exposed to tropical and equatorial temperatures

ISO 7183	Option A1	Option A2
Ambient Temperature	25°C	38°C ✓
Compressed Air Temperature (at dryer inlet)	35°C	38°C ✓

The user should note that overlapping some critical parameters, such as flow and temperature, alters the dew point and may compromise dryer operation.

ISO 7183 Correction Factors (A2)

AMBIENT TEMPERATURE						
°C	25	35	38	40	42	43
factor	1	1	1	0,93	0,86	0,79
COMPRESSED AIR TEMPERATURE						
°C	30	35	38	40	45	48
factor	1,1	1,05	1	0,9	0,8	0,68
OPERATING PRESSURE						
bar(e)	5	6	7	8	10	12
factor	0,9	0,95	1	1,03	1,07	1,11



FILTRATION DEGREES	M40 fine coalescing	M20 ultrafine coalescing
Oil Residual (mg/m³)	0,5	0,01
Particle Retention (µm)	1,0	0,01
D.O.P. Efficiency (%)	99,9	99,99



MASTERCONTROL

The MASTERCONTROL oversees and monitors the primary functions of the high-efficiency Energy Plus dryer to ensure maximum reliability with low energy consumption. Additionally, it automatically drains the condensate retained in the pre and post-filters.

PREVENTIVE MAINTENANCE ALERT

- Time countdown and text messages to communicate all preventive maintenance on the dryer.
- Indicates the ideal time to replace the coalescing elements in the pre and post-filters.

GENERAL DIAGNOSTICS & SPECIAL FUNCTIONS

- History of alerts and faults from the last 50 events:
 - High dew point temperature
 - Overcurrent in the refrigeration compressor
 - High pressure in the refrigeration circuit
 - Low pressure in the refrigeration circuit
 - Phase inversion or lack of phases
 - High compressed air inlet temperature
 - High condensation temperature
 - High superheat temperature
- Calibration of temperature and pressure sensors
- Remote Start/Stop (via cable)
- Remote fault signal (via cable)
- Serial communication (Modbus)
- Unit conversion (°C / °F)
- Purge time calibration
- Local date and time adjustment



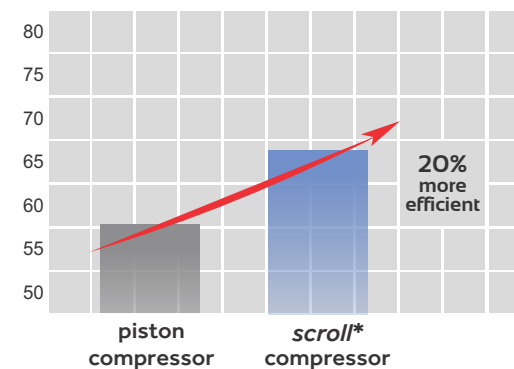
HUMAN/MACHINE INTERFACE TOUCHCONTROL

- Dew Point Temperature
- Compressed air inlet temperature
- Condensation temperature
- Superheat temperature
- Hourmeter
- Maintenance alerts
- Fault alerts
- Audible and visual alarm for faults and maintenance



SCROLL REFRIGERATION COMPRESSOR

- Silent and vibration-free operation.
- Permanent balancing.
- Supports higher liquid return rates.
- Dispenses with suction and discharge valves.
- Volumetric efficiency ~100%.
- Much more compact.
- Compresses under any pressure condition.



SIMPLIFIED MAINTENANCE

The removal of only one side door allows quick and easy access for replacing filter elements and for all types of maintenance, preventive or corrective.



OTHER FEATURES*

- Eco-friendly gases R134a, R404, R407, R410, and R22.
- Pre-selected filters: facilitates installation, prevents specification errors, and eliminates the need for piping and labor.
- Hot gas bypass valve, anti-freezing.
- Powder electrostatic painting.
- **AVAILABLE FOR HIGH PRESSURE: 35 bar**

check availability by model

Integrated pre-coalescing filter M40 grade	Dryer	Integrated post-coalescing filter M20 grade	Flow rate		Connection (inches)	Dimensions (mm)			Weight (kg)	Energy ¹	condensation
			pcm	m³/h		length	height	width			
MFCi-250-M40	MDR-250	MFCi-250-M20	250	425	L2	530	760	650	125	220/1/60	AIR
MFCi-300-M40	MDR-300	MFCi-300-M20	300	510	L2	1250	1600	490	210	220/3/60 380/3/60 440/3/60	
MFCi-400-M40	MDR-400	MFCi-400-M20	400	680	L2	1250	1600	490	215		
MFCi-500-M40	MDR-500	MFCi-500-M20	500	850	L2	1250	1600	490	221		
MFCi-600-M40	MDR-600	MFCi-600-M20	600	1020	L2 1/2	1605	1840	560	321		
MFCi-800-M40	MDR-800	MFCi-800-M20	800	1360	L2 1/2	1605	1840	560	551		
MFCi-1000-M40	MDR-1000	MFCi-1000-M20	1000	1700	F4	1704	2050	915	614		
MFCi-1500-M40	MDR-1500	MFCi-1500-M20	1500	2550	F4	1704	2050	915	970		
MFCi-2000-M40	MDR-2000	MFCi-2000-M20	2000	3400	F4	1186	2200	1473	1090		
MFCi-2500-M40	MDR-2500	MFCi-2500-M20	2500	4250	F4	1186	2200	1473	1350		
MFCi-3000-M40	MDR-3000	MFCi-3000-M20	3000	5100	F6	2020	2090	1473	1850		
MFCi-3600-M40	MDR-3600	MFCi-3600-M20	3600	6120	F6	2020	2090	1473	2050		
MFCi-4800-M40	MDR-4800	MFCi-4800-M20	4800	8160	F6	2020	2090	1473	2560		
MFCi-5800-M40	MDR-5800	MFCi-5800-M20	5800	9860	F8	2230	2090	1473	3100		
MFCi-7200-M40	MDR-7200	MFCi-7200-M20	7200	12240	F8	2860	2090	1473	3920		
MFCi-9600-M40	MDR-9600	MFCi-9600-M20	9600	16320	F8	3280	2090	1473	4860	WATER	

L = NPT sleeve F = ANSI B 16.5 #150 flange

1 - Also available in 50Hz



*For complete elimination of compressed air moisture, **Eurofarma** needed to install an adsorption dryer, even though aware of its higher energy consumption. After a thorough analysis of available options, a **Hybrid 3000** model was selected, with a dew point of -40°C and **heaterless** regeneration.*



OIL
FREE

ISO
CLASS
ZERO


HYBRID HD 651
adsorber


negative
dew points
(up to -100°C)


*
MASTER
CONTROL


TOUCH
CONTROL

HYBRID

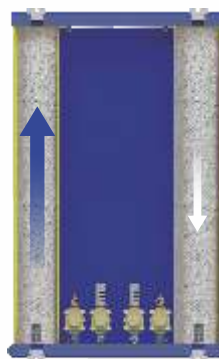
ADSORPTION DRYER

**NEGATIVE MELTING POINTS (DOWN TO -100°C)
FOR SPECIAL APPLICATIONS**

Some applications require completely dry compressed air, with negative dew points (see ISO 8573 table). Adsorption drying can meet numerous needs, with dew points of up to -100°C .

Adsorption is a physical-chemical phenomenon, in which water molecules in the gaseous state are attracted to and retained on the surface of an adsorbent material. After some time, this surface becomes saturated, requiring regeneration.

To allow adsorption and regeneration to be a continuous process, the adsorption dryer has two towers filled with adsorbent material. While one tower adsorbs water molecules, the other tower is in regeneration, with air flows in opposite directions. A system of valves and electronic control directs the flows and determines the adsorption and regeneration times.

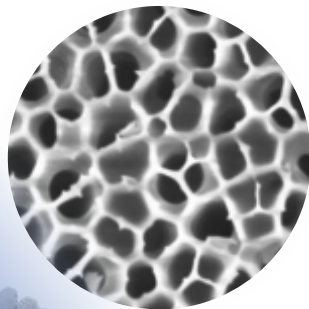


ADSORPTION DRYER

HYBRID

MultiplAir Technology

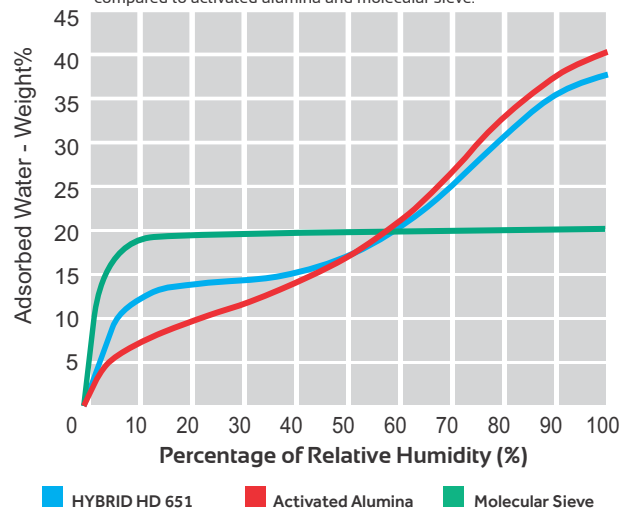




HYBRID HD 651 AN EXCLUSIVE ADSORBENT

- Hybrid material of activated alumina and molecular sieve.
- High retention capacity of water vapor molecules on its surface, both at low and high relative humidity rates.

Performance of Hybrid-HD 651 at different relative humidities, compared to activated alumina and molecular sieve.



HYBRID ADSORPTION DRYERS WERE DESIGNED TO PROVIDE THE FOLLOWING BENEFITS:

- High adsorption capacity.
- Low air consumption.
- High energy efficiency.
- Modular capacity control.
- Prevention of bed fluidization.
- Prevention of air flow channeling.
- Low pressure drop.
- Operational simplicity.
- High reliability.
- Compressed air with dew point from -40°C to -100°C .
- Absolute humidity from $0.0104\text{g H}_2\text{O/kgAr}$ to $0.000001\text{g H}_2\text{O/kgAr}$.
- Five different regeneration alternatives.
- Exclusive Hybrid HD 651 adsorbent material*.
- Available for flow rates from 8.5 to $34000\text{ m}^3/\text{h}$.

*optional



TYPES OF ADSORPTION DRYERS

TYPE	REGENERATION AIR	EXTERNAL HEAT SOURCE	MAINTENANCE COST	ADSORBENT MATERIAL LIFE
HEATERLESS	15%	No	Very low	3 to 6 years
VACUUM ASSISTED	1 to 2%	No	low	4 to 8 years
INTERNALLY HEATED	1 to 8%	Yes	low	2 to 4 years
EXTERNALLY HEATED	8%	Yes	low	2 to 4 years
BLOWER PURGE	Zero	Yes	Medium	2 to 4 years

TECHNICAL DATA

Model <i>HEATERLESS</i>	Nominal Flow Rate		Regeneration Flow Rate		Connections	length	height	width	Weight	Layout
	pcm	m³/h	pcm	m³/h		mm	mm	mm	kg	
MSA - 015	15	25,5	2,3	3,8	L1/2" NPT	200	467	634	36	expandable aluminum modules
MSA - 020	20	34	3	5,1	L1/2" NPT	200	527	634	38	
MSA - 030	30	51	4,5	7,7	L1/2" NPT	200	598	634	40	
MSA - 040	40	68	6	10,2	L1/2" NPT	200	740	634	45	
MSA - 050	50	85	7,5	12,8	L1/2" NPT	450	882	634	50	
MSA - 060	60	102	9	15,3	L3/4" NPT	450	1025	634	54	
MSA - 080	80	136	12	20,4	L3/4" NPT	450	1309	634	64	
MSA - 100	100	170	15	25,5	L1" NPT	450	1594	634	73	
MSA - 200	200	340	30	51	L2.1/2" NPT	900	1715	700	146	
MSA - 300	300	510	45	76,5	L2.1/2" NPT	950	1715	700	220	
MSA - 400	400	680	60	102	L2.1/2" NPT	960	1765	700	293	
MSA - 500	500	850	75	127,5	L2.1/2" NPT	1150	1765	700	366	
MSA - 600	600	1020	90	153	L2.1/2" NPT	1260	1765	700	439	
MSA - 800	800	1360	120	204	L2.1/2" NPT	1560	1765	700	586	carbon steel or stainless steel
MSA - 1000	1000	1700	150	255	L2.1/2" NPT	1860	1765	700	732	
MSA - 1250	1250	2125	188	318,8	F3" ANSI B16.5 150	1250	2427	1670	1318	
MSA - 1500	1500	2550	225	382,5	F3" ANSI B16.5 150	1060	2700	2290	1771	
MSA - 2000	2000	3400	300	510	F3" ANSI B16.5 150	1060	3060	2290	1995	
MSA - 2500	2500	4250	375	637,5	F4" ANSI B16.5 150	1220	2708	2360	2631	
MSA - 3000	3000	5100	450	765	F4" ANSI B16.5 150	1220	3060	2360	2939	
MSA - 4000	4000	6800	600	1020	F4" ANSI B16.5 150	2340	2540	2670	4147	
MSA - 5000	5000	8500	750	1275	F6" ANSI B16.5 150	2490	3600	1500	4913	



carbon steel or
stainless steel



Power: 45W

Engineered models available upon request



Rexam's aluminum cans have been part of our daily lives for decades. As consumers, we trust they are produced within the strictest standards of hygiene and sterilization.

*Since the early 1990s, when **Rexam** installed its first factory in Brazil, various **Hyperfilter** filters have been ensuring the highest level of purity required by the food industry.*

REXAM

MAXIMUM EFFICIENCY IN COMPRESSED AIR AND GAS PURIFICATION

With over a hundred thousand units in operation, Hyperfilter coalescing, adsorbing, and microbiological filters meet the needs of the industry in dozens of countries, providing pure and clean compressed air within stringent international standards, with extremely low operating costs.

Hyperfilter was designed to meet the requirements of all quality classes of ISO 8573 standard through coalescing, adsorbing, and microbiological Hi-Flux filter elements, based on hydrophobic and three-dimensional borosilicate nanofibers, highly efficient in depth retention of solid particles (up to $0.01\ \mu\text{m}$) through direct interception, and in promoting the phenomena of inertial impact and diffusion, essential for the agglomeration process of water and oil aerosols.

KEY FEATURES

- High energy efficiency
- Low pressure drop
- Maximum filtration efficiency
- Wide range of flow rates
- Compliant with ISO-8573, : National Health Surveillance Agency, and other standards

HYPERFILTER

COALESCING, ADSORBING &
MICROBIOLOGICAL FILTERS

ISO
8573

ANVISA

pressure
from 4 to
250
bar

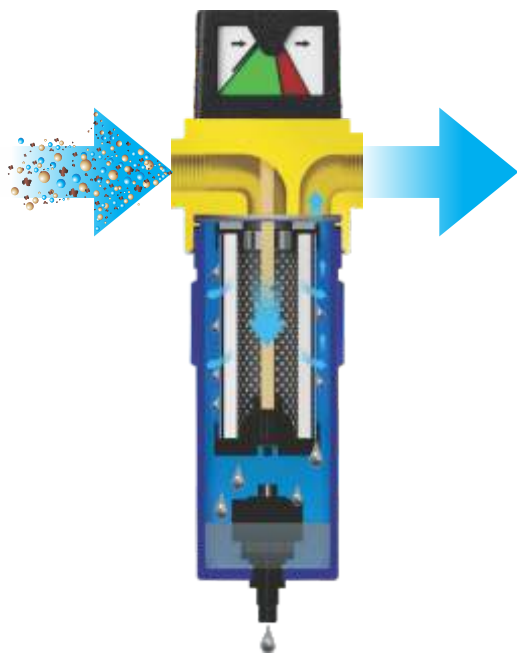
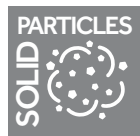
flow rate
15 to
10000
pcm



MAXIMUM EFFICIENCY IN COMPRESSED AIR AND GAS PURIFICATION

Compressed air contamination takes various forms, with special emphasis on water, oil, and solid particles, as taught by the international ISO-8573 standard. Water comes from the moisture present in the ambient air (water vapor), and oil and solid particles have two origins: atmospheric air and the compressor itself. In compressed air, we also find viruses, bacteria, amoebas, and other microorganisms, usually classified as "solid particles," but which deserve particular classifications depending on the application.

Hyperfilter filters can receive coalescing, adsorbing, and microbiological elements, developed to eliminate each specific form of contamination, providing maximum quality to the compressed air generated by any type of compressor, in any environment.



THREADED AND FLANGED HOUSINGS (1/2" to 8")

DIFFERENTIAL PRESSURE GAUGE

High-visibility, double-faced differential pressure gauge indicates the ideal time for filter element replacement.

AUTOMATIC DRAIN

- Standard in threaded housings (PL16165)
 - Operates only in the presence of condensate
 - Instant opening mechanism
 - Optional Zeromatic (magnetic) and Cronomatic (electronic) models for all housings
- Differential Pressure Gauge

SAFETY IN ELEMENT REPLACEMENT

- **Threaded housing opening system**
 - Audible depressurization alarm
 - No need for tools
 - O-ring seal
- **Opening system for flanged casings**
 - Speeds up the operation
 - Does not require disassembly of the trap
 - O-ring seal



Manometer differential

Security in replacement of the elements



HI-FLUX

PREMIUM ELEMENTS with borosilicate nanofibers

premium
elements
hi-flux


borosilicate
nanofibers

Among the Hi-Flux elements, coalescent models are the most versatile, proving capable of retaining solid contaminants as small as 0.01 micron, as well as water and oil aerosols of negligible mass, whose behavior resembles that of a gas.

Hydrophobic borosilicate nanofibers, impermeable to oil and water, are responsible for coalescence, which is the agglomeration of small condensate droplets (aerosols) into larger droplets, subject to gravity.

The condensate precipitated at the bottom of the filter housing is drained to the exterior by an automatic drain valve.

Appropriate condensate neutralization systems allow for disposal into the environment without risk of contamination.

Solid particles, in turn, are trapped inside the nanofibers, causing the saturation of the element. For this reason, coalescent filters are also notable for their high efficiency in promoting "depth filtration."

**5000X
magnification**



In addition to the M40 (fine) and M20 (ultrafine) coalescent grade elements, there are two more Hi-Flux filter media: adsorbent elements (grade MA) and microbiological elements (grade MB).

The main component of adsorbent elements is activated carbon, based on highly porous carbon, capable of selectively retaining gases or impurities inside, with high clarifying, deodorizing, purifying, and removal properties for toxic and radioactive materials. Activated carbon is obtained through controlled burning (800°C to 1000°C) of selected organic matter in an atmosphere with a low oxygen content.

Microbiological elements, on the other hand, have pores with a diameter equivalent to 20 nm (nanometers) and are designed to retain microorganisms as small as parvoviruses (the smallest cataloged viruses), with dimensions much smaller than SARS-CoV-2 (Covid 19), as well as bacteria of any proportions. The basic material of the membrane of this element is modified hydrophilic polyvinylidene difluoride, extremely resistant to adverse physical and chemical conditions of flow. All other components of the element are equally non-toxic and allow for sterilization in autoclaves or steam.



FILTRATION GRADES	M40 Fine Coalescent	M20 Ultrafine Coalescent	MA Adsorbent	MB Microbiological
Oil Residual	0,5 mg/m ³	0,01 mg/m ³	0,003 mg/m ³	NA
Particle Retention	1,0 µm	0,01 µm	NA	20 nm
D.O.P. Efficiency	99,9 %	99,99 %	NA	NA
Lifecycle	4.000 - 6.000 h	4.000 - 6.000 h	1.000 h	2.000 h
Sterilizable	NA	NA	NA	autoclave/steam
ΔP max.	2 bar	2 bar	2 bar	3 bar

Filtration through borosilicate nanofibers is not absolute.

NA = Not Applicable

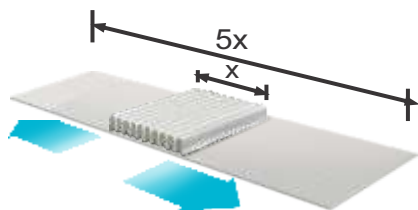


FILTRATION
5X
larger

PLEATED FILTER MEDIUM

Five times larger filtration area than "rolled" elements

- extends lifespan
- reduces pressure loss
- increases mechanical resistance of the element
- reduces maintenance costs



EXTERNAL LAYER

Dri-fit is a high-tech non-woven fabric developed by Nike.

In HI-FLUX, Dri-fit repels and prevents contamination from re-entering the airflow. Additionally, it is resistant to mineral and synthetic lubricants used in most compressors. Dri-fit never disintegrates like typical foams in other coalescent elements, preserving the quality of compressed air.



*dri-fit is a registered trademark of Nike

HI-FLUX

PREMIUM ELEMENTS

The end caps of Hi-Flux M40, M20, and MA grade elements are injection molded with proprietary tooling, in chrome-plated aluminum or fiberglass-reinforced nylon, withstanding high mechanical stresses.

They are also exceptionally resistant to oxidation and attack by chemical agents present in synthetic or mineral compressor lubricants.

In addition to these advantages, Hi-Flux element end caps feature a unique and patented, perfectly symmetrical geometry, turning each element into a "tool" for screwing and unscrewing another element of the same model. In other words, the new element acts as a tool to unscrew the used element from the housing; likewise, the used element serves to screw the new element into the housing, greatly simplifying element replacement.

EXCLUSIVE END CAP



end caps
corrosion-resistant
end Caps

Metalplan began exporting to the USA in 1999, meeting UL, NEMA, and ASME standards, as well as other specific requirements, such as tornado protection.

Among the more than three thousand units supplied, we highlight the dryer delivered to NASA, which required performance verification and elevated us to an unprecedented level in our history.

Aeronautical engineer Cor Stakenborg, president of NewGate Technologies, attests: "Over the years, Metalplan has developed and provided us thousands of compressed air products. Still today many of them are operating at the end users."

You can count on Metalplan, as a serious, respected and innovative world leader of quality products."

NASA

TECHNICAL DATA

Select the filter by flow rate and not by connection

Available for pressures up to 250 bar

Stainless steel housings available upon request



	Model	Filtration degree @ 7 bar(e)				Dimension			Accessories		
		M40		M20/MA		Height	Width	Connection	PL16165 trap by buoy	DPP- 405 ² pressure gauge differential	
		Flow rate ¹		Flow rate ¹							
		pcm	m³/h	pcm	m³/h	mm	mm	pol.			
THREADED (ALUMINUM)	MFC-0025	25	43	17	29	215	96	1/2	BSP	STANDARD	OPTIONAL
	MFC-0050	50	85	34	58	215	96	1/2			
	MFC-0070	69	117	47	80	215	96	1/2			
	MFC-0110	109	185	74	126	287	96	3/4			
	MFC-0170	171	291	116	198	282	150	1			
	MFC-0300	295	502	201	341	466	150	1 ½			
	MFC-0470	467	794	318	540	566	150	1 ½			
	MFC-0700	691	1175	470	799	741	150	1 ½			
FLANGED (STEEL)	MFC-0910	1000	1700	680	1156	919	294	2	ANSI B 16.5	NOT AVAILABLE	STANDARD
	MFC-1350	1500	2550	1020	1734	1188	294	2			
	MFC-1950	2000	3400	1360	2312	1136	390	3			
	MFC-2420	2500	4250	1700	2890	1289	390	3			
	MFC-4000	4000	6800	2720	4624	1509	556	6			
	MFC-5400	5500	9350	3740	6358	1509	556	6			
	MFC-6800	7000	11900	4760	8092	1509	556	6			
	MFC-8100	8000	13600	5440	9248	1671	658	8			
	MFC-9500	10000	17000	6800	11560	1671	658	8			

1 - Refers to the volume displaced by the compressor at 20°C and 0 bar(g).
2 - Differential pressure gauge is not applicable to grade MA.

Filtration does not alter the "dew point" of the air.
If there is a temperature drop after the filter, condensation may occur.

Coalescence and adsorption should occur at the lowest possible air temperature, although never below 0°C, to avoid subsequent condensation and element fatigue.

the average lifespan of the filter element is directly related to the concentration and dimensions of contaminants before the filter. The lifespan of Hi-flux elements is based on the contamination typically found in a typical industrial atmosphere. To understand concepts such as Filtration Efficiency (E), Filtration Rate (β), Penetration (P), Brownian Motion, Van der Waals Forces, etc., please contact our Application Engineering department.

The warranty for filter elements covers defects in raw materials and workmanship, proven through tests in independent laboratories, but does not cover saturation caused by solid particles or deterioration resulting from abnormal contamination of the main fluid, such as acidic vapors, among others.

CORRECTION FACTORS		OPERATING LIMITS	
PRESSURE bar(e)	FACTOR	GLASS OF ALUMINUM	MA ELEMENT (activated charcoal)
5	0,75	TEMPERATURE	
7	1,0	60° C	30° C
10	1,38	PRESSURE	
12	1,63	16,0 bar(e)	
16	2,13		

COMPRESSED AIR CLASS ZERO WITH ZERO RISK

No international standard (ISO 22000, etc.) requires "oil-free" compressors to obtain Class Zero compressed air, since oil-free compressors DO NOT guarantee oil-free compressed air. For an oil-free compressor to deliver oil-free compressed air, the ambient air would need to be completely free of oil, which never happens.

This means that it is possible to keep your lubricated compressors in operation, with a method that guarantees, with zero risk, an oil residue within Class Zero limits.

To meet this demand, we developed the MODUCARB - Class Zero Safety Module, certified by the Compressed Air and Gas Systems Laboratory at IPT.

MODUCARB is an oversized barrier against oil passage, with negligible pressure loss and a guarantee of meeting Class Zero ($\leq 0.003 \text{ mg/m}^3$) thanks to its bed of activated carbon pellets, with controlled nanoporosity.

OIL
FREE
AIR

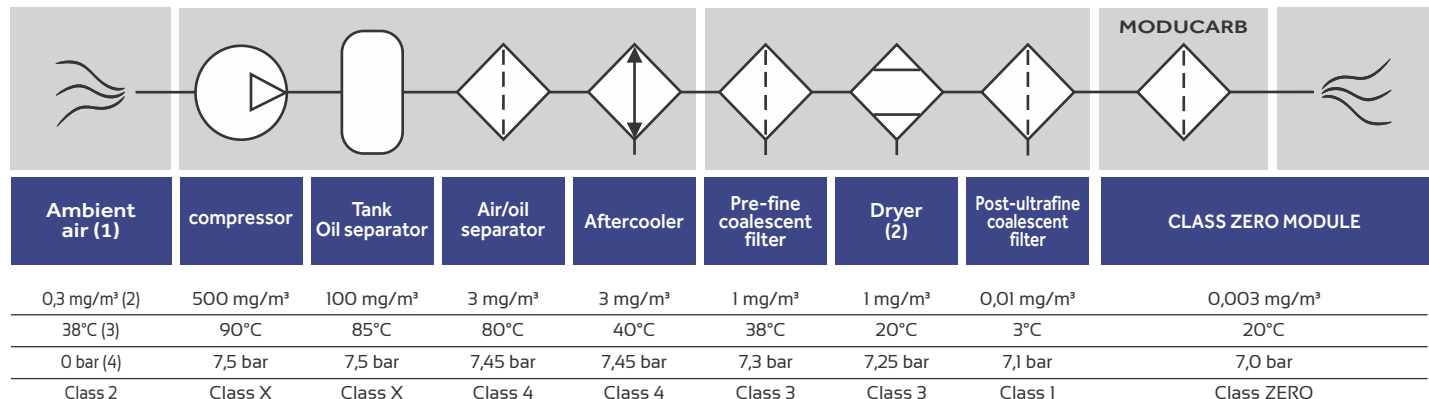
ISO
CLASS
ZERO

RISK
FREE

CLASS ZERO MODULE MODUCARB



STANDARD INSTALLATION ISO 8573 / CLASS ZERO



(1) CAGI average - (2) Refrigeration/adsorption/absorption - (3) ISO 7183 - Option A2 - (4) Pressure gauge - ΔP average: 0.5 bar/min.: 0.25 bar/max.: 1 bar | The average pressure drop is not arithmetic mean.

TECHNICAL DATA

Model	Nominal flow rate		Connection (in.)	Dimensions (mm)			Weight (kg)	Material Towers/ Tubes
	pcm	m ³ /h		length	height	width		
MCZ - 060	60	102	L 1/2" NPT	150	531	630	38	Aluminum
MCZ - 100	100	170	L 1" NPT	150	744	630	45	
MCZ - 160	160	272	L 1" NPT	350	1029	630	54	
MCZ - 200	200	340	L 2" NPT	350	1313	630	64	
MCZ - 500	500	850	L2. 1/2" NPT	500	1598	630	146	
MCZ - 800	800	1360	L2. 1/2" NPT	650	1598	630	220	
MCZ - 1000	1000	1700	L2. 1/2" NPT	800	1598	630	293	
MCZ - 1300	1300	2210	FL.4" ANSI B16.5 150	950	1598	630	366	
MCZ - 1600	1600	2720	FL.4" ANSI B16.5 150	1100	1598	630	439	
MCZ - 2000	2000	3400	FL.4" ANSI B16.5 150	1400	1598	630	586	



At the Moducarb inlet, the compressed air must comply with ISO 8573 class [1.4.1] or higher.
 The maximum temperature of the compressed air and the environment should not exceed 38°C.
 Under these conditions, the activated carbon pellets, with controlled nanoporosity, should be replaced every 4,000 hours of operation.



***On-site** oxygen production requires compressed air of extremely high purity, with no detectable traces of oil, in accordance with ISO 8573 Class Zero. This is due to the risk of explosion when a fuel (oil) comes into contact with an oxidizer (oxygen). In systems supplied to **Air Liquide**, the **ModuCarb** module is a mandatory component (EIS) for the total removal of oil, regardless of the type of compressor used.*



COMPRESSED AIR FOR HUMAN BREATHING

Local and international standards establish minimum quality standards for compressed air for human breathing in:

- Laboratories
- Sandblasting/Painting
- Tank cleaning
- Amateur and professional diving
- Mining
- Hospitals
- Areas at risk of infection
- Chemical Processing
- Handling of toxic products
- Rescue and salvage

Since the air generated by any type of compressor - lubricated or oil-free - is not breathable, the installation of a treatment system capable of removing all unwanted contaminants is mandatory.

To meet this demand, Metalplan has developed the INSPIRE, an "all in one" equipment that controls risks in environments contaminated by smoke, hydrocarbons, vapors, gases, solid particles, microorganisms, and other impurities.

The combination of coalescent filters, activated carbon filter, and adsorption dryer eliminates 100% of bacteria and provides a pressurized dew point of -40°C, equivalent to -60°C at atmospheric pressure. Additionally, its carbon monoxide catalyst reduces the presence of this lethal contaminant to levels completely safe for breathing, below 5 ppm.



MAXIMUM LIMITS OF CONTAMINATION OF COMPRESSED AIR FOR HUMAN BREATHING (RDC-50 - : National Health Surveillance Agency):

N ₂	Balance
O ₂	20.4% to 21.4% v/v oxygen
CO	Maximum 5 ppm v/v
CO ₂	Maximum 500 ppm v/v
SO ₂	Maximum 1 ppm v/v
NO _x	Maximum 2 ppm v/v
Oils and solid particles	Maximum 0.1 mg/m ³ v/v
Water vapor (dew point)	-45.5°C at atmospheric pressure



INSPIRE

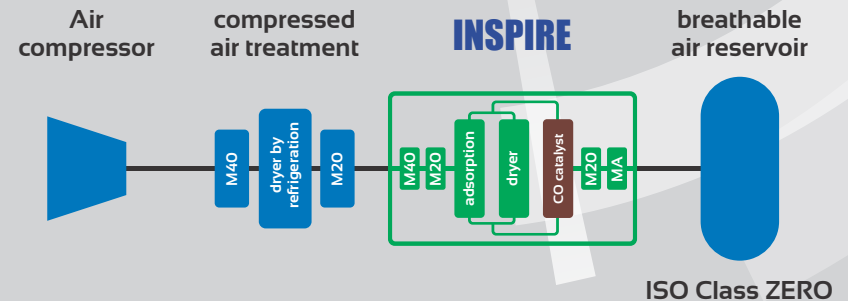
BREATHING AIR PURIFIER

OIL
FREE

CO
FREE

ISO
CLASS
ZERO

NBR
12188
ABNT



TECHNICAL DATA

Model	Nominal flow rate		Regeneration flow rate		NPT connections	Length	Height	Width	Weight
	pcm	m³/h	pcm	m³/h		mm	mm	mm	kg
INSPIRE - 015	15	25,5	2,25	3,83	L1/2" NPT	250	471	570	40
INSPIRE - 020	20	34	3	5,1	L1/2" NPT	250	471	570	40
INSPIRE - 030	30	51	4,5	7,65	L1/2" NPT	300	602	570	44
INSPIRE - 040	40	68	6	10,2	L1/2" NPT	300	744	570	50
INSPIRE - 050	50	85	7,5	12,75	L3/4" NPT	300	886	570	55
INSPIRE - 060	60	102	9	15,3	L3/4" NPT	300	1029	570	60
INSPIRE - 080	80	136	12	20,4	L3/4" NPT	300	1313	570	72
INSPIRE - 100	100	170	15	25,5	L1" NPT	300	1598	570	89
INSPIRE - 200	200	340	30	51	L1 1/2" NPT	450	1598	570	170
INSPIRE - 300	300	510	45	76,5	L1 1/2" NPT	750	1598	570	260
INSPIRE - 400	400	680	60	102	L1 1/2" NPT	900	1598	570	360
INSPIRE - 500	500	850	75	127,5	L1 1/2" NPT	1200	1598	570	450
INSPIRE - 600	600	1020	90	153	F2" ANSI B16.5 150	1350	1598	570	540
INSPIRE - 800	800	1360	120	204	F2" ANSI B16.5 150	1800	1598	570	700

Power: 45W



*Next to a compressor and a dryer manufactured by Metalplan, an Inspire equips each mobile school set up by **National Service for Industrial Training** for dissemination and training on NR standards, which establish basic work safety criteria throughout Brazil.*





*In 1993, Metalplan provided 600 m³ of **compressed air reservoirs** for the Segredo and Salto Santiago hydroelectric power plants (**COPEL**).*

Over 250 tons of ASTM-A-285-C steel were used, distributed in 22 reservoirs of up to 130 m³ each, with 100% radiographed welds.

Photo: Secret Hydroelectric Power Plant - Iguaçu River - PR





SVA

VERTICAL RESERVOIRS

COMPRESSED AIR WITH STABLE PRESSURE

A properly sized compressed air reservoir serves to supply the system during momentary consumption peaks and stabilize the network pressure, avoiding the oscillations that impair the operation of machines and tools.

For a more sophisticated calculation of the reservoir volume, a formula is adopted that considers the air flow required by the system over a certain interval, based on the maximum acceptable pressure decay in that interval. For a quicker calculation, we adopt the following formula, applicable to rotary compressors:

$$\text{Volume (m}^3\text{)} = 0.1 \times \text{Total System Flow Rate (m}^3\text{/min)}$$

SAFETY AND RESPONSIBILITY

Due to the risk of serious accidents, compressed air reservoirs are regulated by national and international safety standards.

- Mandatory accessories - pressure gauge and safety valve
- Design and construction standard: ASME, sec. VIII, div. 1
- Ministry of Labor safety standard: NR-13
- Anti-corrosive treatment
- Operating pressures: up to 42 bar(g)



TECHNICAL DATA

Model	Volume	Pressure Work	Height	Diameter	Connections	Weight
	m ³	bar(e)	mm	mm	(pol)	kg
SVA 300	0,300	14,0	1970	480	2", Luva NPT	111
SVA 300	0,300	20,0	1530	616	2", Luva NPT	148
SVA-500	0,425	12,1	2007	559	2", Luva NPT	137
SVA-1000	1,0	11,0	2767	763	2", Luva NPT	290
SVA-1000	1,0	15,0	2780	766	2", Luva NPT	371
SVA-2000	2,0	11,0	3335	953	2", Luva NPT	451
SVA-2000	2,0	15,0	3342	919	2", Luva NPT	650
SVA-3000	2,85	11,0	3439	1136	4", FL #150	756
SVA-3000	2,85	15,0	3453	1139	4", FL #150	884
SVA-4000	4,051	11,0	3542	1336	4", FL #150	944
SVA-4000	4,0	15,0	3500	1345	4", FL #150	1420
SVA-5000	5,0	11,0	3605	1470	4", FL #150	1182
SVA-5000	5,0	15,0	3670	1475	4", FL #150	1525
SVA-6000	6,1	11,0	3674	1610	6", FL #150	1366
SVA-6000	6,05	14,0	3665	1615	6", FL #150	1739
SVA-8000	8,10	11,0	6030	1396	6", FL #150	1660
SVA-8000	8,107	14,0	6013	1396	6", FL #150	1711
SVA-10000	9,6	11,0	6070	1519	6", FL #150	2116
SVA-10000	10,0	15,0	6133	1525	6", FL #150	2981

NPT Sleeve FL= ANSI B 16.5 # 150 flange

Subject to change without prior notice.
Request drawing and data sheet at the time of proposal.



BR FOODS CHOSE METALPLAN

BRF FOODS has adopted the Aqua+ condensate treatment system at its facilities, ensuring proper environmental protection for the disposal of liquid waste from its air compressors.



AQUA+

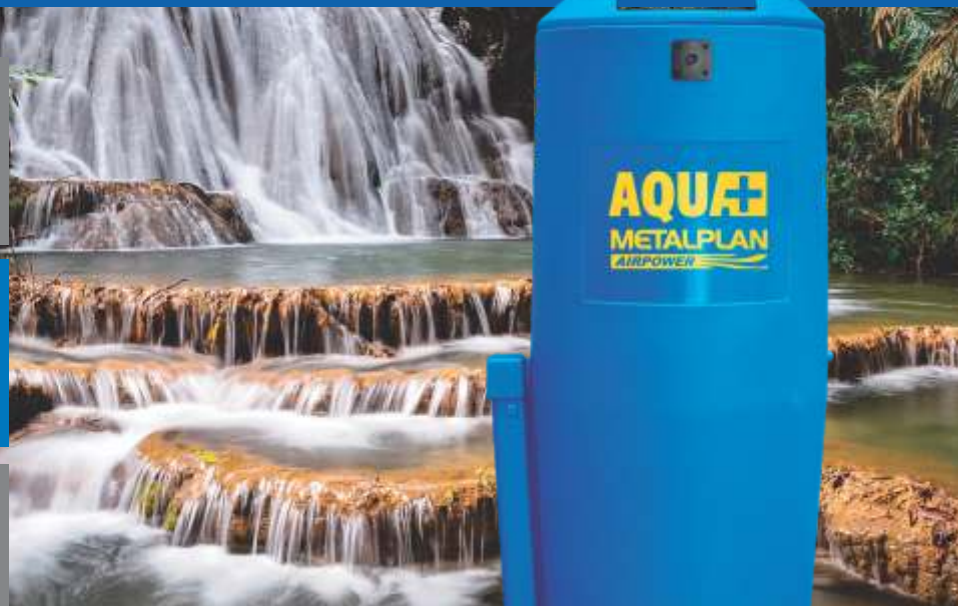
WATER-OIL SEPARATOR

ISO
14001



preserves the
environment

compatible
with
synthetic
lubricants



CONDENSATE TREATMENT

COMPRESSED AIR IN HARMONY WITH NATURE

Metalplan's Aqua+ Separators are compatible with compressed air condensate generated by any type of lubricated compressor. Its innovative design eliminates the need for gravity pre-separation and level adjustment, required in conventional separators to prevent overflow.

Aqua+ strictly follows CETESB regulations (Art.18 and 19A) and meets the requirements of CONAMA 430 and **Brazilian Association of Technical Standards 14.605**. Due to its guaranteed tightness, there is no possibility of soil contamination by the separated oil, allowing your company's compressed air system to balance with the environment at a very low cost.

MAXIMUM PERFORMANCE

Contamination control by the **Aqua+** water/oil separator is essential in **disposing of condensate with any hydrocarbon content**, whether in the compressor room or in the compressed air distribution network. Improper handling of this waste can lead to serious environmental problems. In addition, **finest and penalties** are imposed on companies that fail to comply with environmental protection legislation.

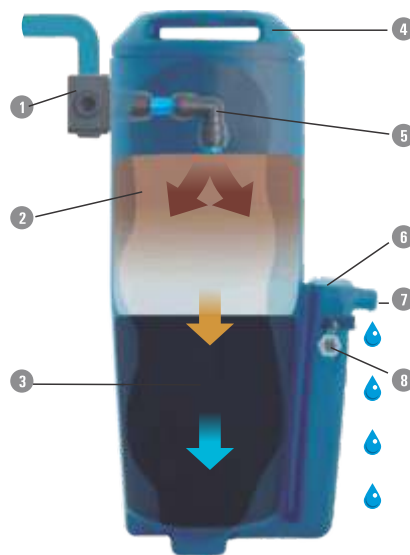
Simple and quick installation and maintenance



ADVANTAGES OF AQUA+

- Filtration purity with low carbon content
- 100% performance with synthetic lubricants
- High performance (<5 ppm)
- Filters with a lifespan of up to 4000 hours
- Does not overflow
- High reliability and resistance
- Simple installation
- Quick, clean, and low-frequency maintenance

OPERATION



- 1 Condensate inlet:** flexible, allows up to 4 connections.
- 2 Pre-filter:** designed to withstand large amounts of oil, responsible for depressurizing the condensate through resilient permeable layers, retaining all solids before the post-filter.
- 3 Post-filter:** designed for maximum condensate purity, achieving an excellent level of quality before disposal (<5ppm).
- 4 Access cover:** large-sized, facilitates and speeds up maintenance.
- 5 Discharge piping:** super-resistant, conducts the condensate until it is completely depressurized.
- 6 Housing:** resistant, stable, corrosion-free, and leak-proof.
- 7 Condensate outlet:** allows easy connection to the sewer or rainwater system, according to current legislation.
- 8 Test sight glass:** checks condensate purity and any maintenance needs.

Separator Water/Oil	Flow rate		Connections		Dimensions (mm)			Weight
	pcm	m ³ /h	In	Out	length	height	width	kg
Aqua+ 120	120	204	4 x 1/2" BSP	20mm	257	500	345	2,7
Aqua+ 500	500	850	4 x 1/2" BSP	20mm	345	785	285	8,4
Aqua+ 900	900	1530	4 x 1/2" BSP	20mm	495	989	432	14,7

One of the world's largest manufacturers of subsea pipelines chose AIRLINE for its compressed air network

One of the world's largest manufacturers of subsea pipelines chose AIRLINE for its compressed air network

The Pre-Salt oil continues to attract the most important oil & gas companies in the world.

Italian Saipem (Agip-ENI) chose the city of Guarujá (SP) to host an important industrial complex, destined for the construction of subsea pipelines.

*The entire compressed air system of this unit was designed and executed by Metalplan, with 1300 hp **TotalPack Flex DD** screw compressors and over 2 thousand meters of **AirLine** tubing, 100% aluminum.*



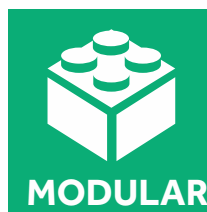


AIRLINE

100% ALUMINUM TUBES AND CONNECTIONS

AirLine is the only tubing and fitting system for compressed air networks made of 100% aluminum, an exclusive from Metalplan.

With AirLine, the time frame for implementing a network is radically shorter than any other system, the leak guarantee is total, the pressure drop is minimal, corrosion is zero, and your savings are maximum!



**ASSEMBLE, DISASSEMBLE
AND REMOUNT AS MANY
TIMES AS YOU WANT**

MODULAR



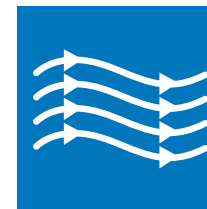
ZERO LEAKAGE

- Does not corrode.
- Does not leak in the tubes.
- Does not leak in the connections.



**NO NEED FOR
SPECIAL TOOLS AND
PREVENTS LEAKS**

THREADLESS



MINIMAL PRESSURE LOSS

- Ultra-smooth internal surface reduces flow turbulence.
- Low Reynolds number.
- Energy savings.



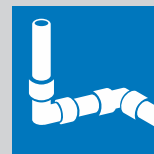
ZERO CORROSION

- Zero maintenance.
- Increases the lifespan of tubes and fittings.



70% FASTER ASSEMBLY

- Easy and quick tube cutting system.
- Instantaneous coupling connections.



AVAILABILITY

- Easy to add connections.
- Wide variety of fittings.



DIAMETERS FROM 25 TO 160 mm

- Flexibility in designs.
- Meets flow rates exceeding 10,000 cfm.



CONSTANT QUALITY

- Calibrated diameters.
- Reduced tolerances.
- Controlled thickness painting.



MAXIMUM CHEMICAL AND MECHANICAL RESISTANCE

- Resists all types of lubricants and condensate.
- Does not deform under mechanical stress.



HIGH ENERGY EFFICIENCY

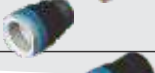
- Minimized pressure drop reduces compressor load time.



ALLOW MODIFICATION, EXPANSION, AND REUSE OF ALL MATERIALS

AIRLINE

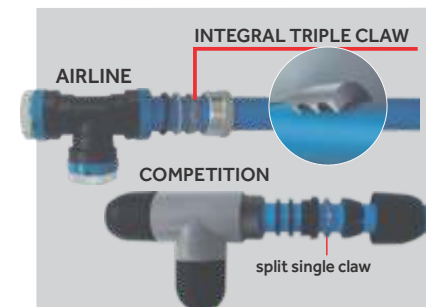
100% ALUMINUM
CONNECTIONS FOR
ALL PURPOSES

		EXTERNAL DIAMETER					
		25 mm	40 mm	63 mm	90 mm	110 mm	160 mm
	UNION (SLEEVE)	✓	✓	✓	✓	✓	✓
	MALE ADAPTER	25x $\frac{3}{4}$ "	40x1 $\frac{1}{4}$ "	63x2"	90x3"	ND	ND
	FEMALE ADAPTER	25x $\frac{3}{4}$ "	40x1 $\frac{1}{4}$ "	63x2"	ND	ND	ND
	FLANGE ADAPTER	ND	ND	ND	ND	110x4"	160x6"
	ELBOW	✓	✓	✓	✓	✓	✓
	MF ELBOW	✓	✓	✓	ND	ND	ND
	FLANGE ELBOW	ND	ND	ND	ND	110x4"	160x6"
	TE	✓	✓	✓	✓	✓	✓
	CENTRAL TE BSP	25x $\frac{3}{4}$ " x25	40x1 $\frac{1}{4}$ " x40	63x2"x63	ND	ND	ND
	COLLAR	25x $\frac{1}{2}$ "	40x $\frac{1}{2}$ " 40x $\frac{3}{4}$ "	63x $\frac{1}{2}$ " 63x $\frac{3}{4}$ " 63x1"	90x1" 90x2"	110x1" 110x2"	160x3"
	DERIVATION	ND	40x25	63x25	ND	ND	ND
	REDUCTION	ND	40 x 25	63 x 40	90 x 63	110 x 90	160 x 110

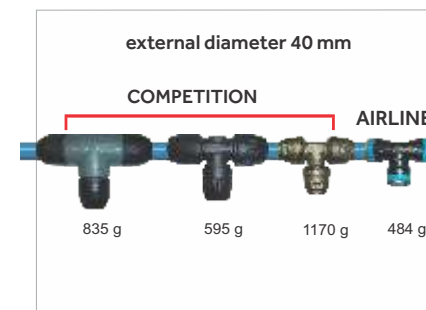
CONNECTIONS

Color	black
Maximum working pressure	70 bar(g) (1015 psi)
Design pressure	105 bar(g)
Hydrostatic test pressure	280 bar(g)
Continuous working temperature	-20°C to 100°C
Material	EN AW 6061 - T6
O-ring material	NBR 65°/75° Shore A
Ring material	Pa66
Tightening ring material	Stainless Steel AISI 304

HIGH AND LOW PRESSURE



AirLine connections ensure perfect and complete crimping with the tube. Together with the O-ring, they ensure total sealing of the piping.



AirLine connections are the only ones produced in aluminum: smaller, lighter, and more efficient.



Only AirLine compressed air networks are fully made of extruded and calibrated aluminum, including the connections.

Pressure drop for every 10 meters of pipe length (psi)

	FLOW RATE pcm	EXTERNAL DIAMETER					
		25 mm	40 mm	63 mm	90 mm	110 mm	160 mm
	50	0,44	0,03				
	100	1,74	0,10				
	200		0,44	0,04			
	300		0,94	0,08			
	500			0,23	0,03		
	750			0,52	0,07	0,02	
	1000			0,93	0,13	0,04	
	1250			1,45	0,20	0,07	
	1500				0,29	0,10	
	2000				0,52	0,17	0,02
	2500				0,81	0,27	0,04
	3000				1,17	0,39	0,06
	4000					0,69	0,10
	6000					1,56	0,22
8000						0,40	
10000						0,62	
Equivalent length of pipe	ELBOW	0,67 m	0,96 m	1,40 m	1,70 m	2,00 m	2,40 m
	TE	0,60 m	1,00 m	1,95 m	2,40 m	3,10 m	8,30 m
	VALVE GATE	0,20 m	0,31 m	0,52 m	0,58 m	0,76 m	0,98 m

AIRLINE

**ALUMINUM PIPES FOR
LOW AND HIGH PRESSURE
(16 to 70 bar)**

EXCLUSIVE SOFTWARE

Calculates the diameter of each section of the network and finds the exact balance between pressure drop and energy consumption.



PIPES

LOW PRESSURE

HIGH PRESSURE

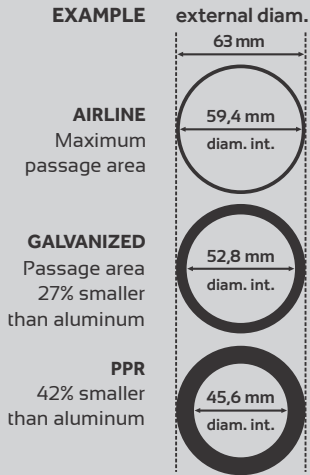
Color (compressed air blue - NBR standard)	RAL 5012			RAL 5017		
Maximum working pressure	16 bar(e) (232 psi)			70 bar(e) (1015 psi)		
Design pressure	24 bar(e)			105 bar(e)		
Hydrostatic test pressure	64 bar(e)			280 bar(e)		
Continuous working temperature	-20°C to 100°C			-20°C to 100°C		
Mechanical resistance	standard EN-755-2/2008			standard EN-755-2/2008		
Material	EN AW 6060 - T5			EN AW 6060 - T5		
Standard bar	6 m			6 m		
External diameter	25 mm	40 mm	63 mm	90 mm	110 mm	160 mm
Weight per linear meter	0,22 kg/m	0,43 kg/m	0,94 kg/m	1,79 kg/m	2,36 kg/m	3,22 kg/m
Wall thickness	1,1 mm	1,3 mm	1,8 mm	2,4 mm	3,0 mm	4,3 mm

*Safety is essential in air transport.
That's why GOL chose AirLine for its
hangar at Congonhas Airport.*



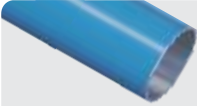
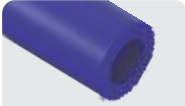
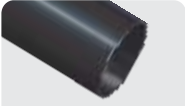
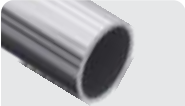
WITH ALUMINUM, YOU GET HIGHER FLOW AND LOWER PRESSURE DROP

For the same external diameter, aluminum piping always has the largest internal diameter. Other materials require a much thicker wall to withstand pressure and meet additional requirements for strength and durability. The larger internal area of aluminum pipes results in lower pressure drop. Or higher flow. Or both.

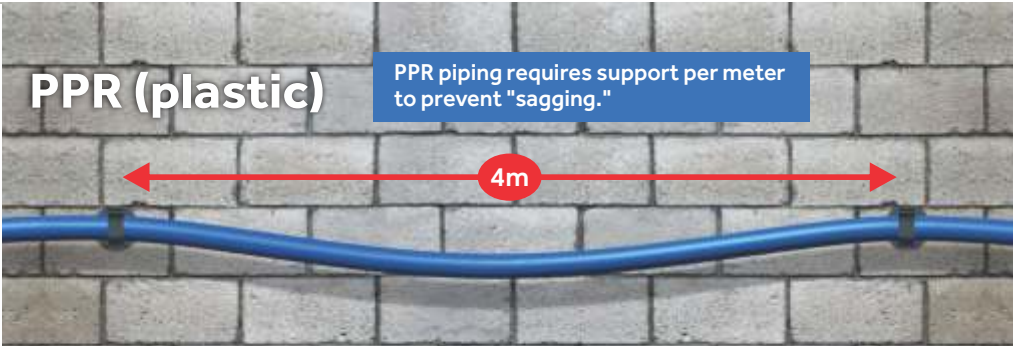
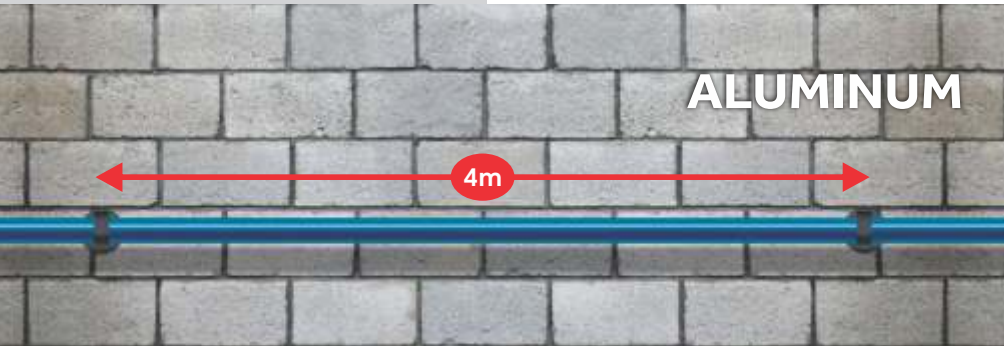


AIRLINE

ALUMINUM X OTHER MATERIALS

					
	Aluminum	PPR (plastic)	Galvanized (carbon steel)	Black (carbon steel)	Stainless Steel
Energy efficiency	excellent ✓	regular ✗	regular ✗	poor ✗	excellent ✓
Pressure drop	minimum ✓	low ✓	average ✗	high ✗	low ✓
Leaks	0% ✓	0% ✓	10 - 40% ✗	10 - 40% ✗	0% ✓
Internal roughness	0.000004 mm ✓	0.007mm ✓	0.15 mm ✗	2.0 mm ✗	0.015 mm ✓
Corrosion-resistant	excellent ✓	great ✓	average ✗	low ✗	excellent ✓
Heat-resistant	high ✓	low ✗	high ✓	high ✓	high ✓
Impact-resistant	high ✓	low ✗	high ✓	high ✓	high ✓
UV radiation-resistant	high ✓	low ✗	high ✓	high ✓	high ✓
Hydrocarbon-resistant	high ✓	low ✗	high ✓	high ✓	very high ✓
Pressure-resistant	high ✓	low ✗	very high ✓	very high ✓	high ✓
External painting	electrostatic (blue) ✓	blue pigment ✓	requires painting* ✗	requires painting* ✗	requires painting* ✗
Reusable	yes ✓	rarely ✗	rarely ✗	rarely ✗	rarely ✗
Assembly time	very low ✓	high ✗	high ✗	high ✗	high ✗
Pressure x Temperature	16/70 bar(g) at 100°C ✓	20 bar(e) at 20°C ✗	OK ✓	OK ✓	OK ✓
Distance between supports	3 to 4 meters ✓	0.4 to 1.4 meters ✗	3 to 4 meters ✓	3 to 4 meters ✓	3 to 4 meters ✓

*Brazilian Association of Technical Standards-6493/1994 - Use of colors for pipe identification.
Compressed air: blue-security Munsell 2.5PB 4/10.



AIRLINE INSTALLATIONS



The compressed air network at Cervejaria Colorado is AirLine, ensuring the excellence of its production in Ribeirão Preto (SP). When you enjoy a Colorado beer, you are savoring the quality of compressed air provided by Metalplan. Cheers!





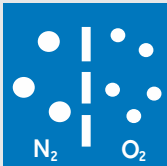
*The world's largest manufacturer of automotive air conditioning, Japan's **Denso**, replaced the outsourced nitrogen tank at the Manaus plant with an integrated on-site gaseous nitrogen generation system from Metalplan. It comprises **TotalPack Flex DD** screw compressors, **Energy Plus** refrigeration dryers, **Hyperfilter** coalescing filters, **SVA** reservoirs, **ModuCarb** towers, and **NitroMax** PSA generators. Denso's total production of gaseous nitrogen 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

NITROGEN GENERATOR **NITROMAX**

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.

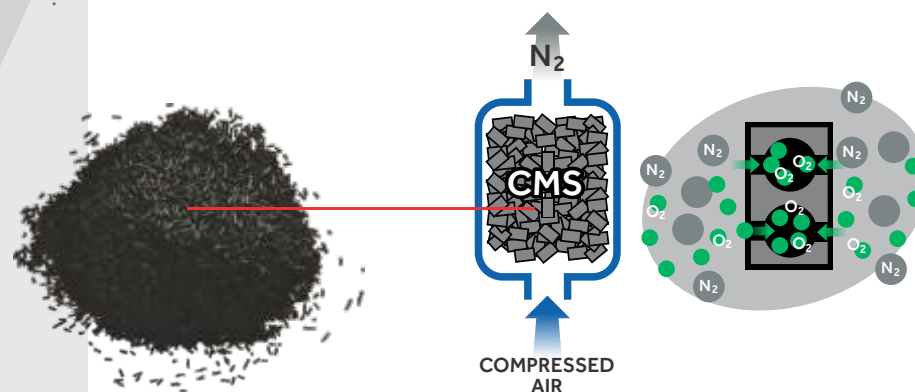
Each NitroMax nitrogen generator is customized to meet the specific needs of the user in terms of purity, pressure, flow rate, layout, safety, and embedded electronics.

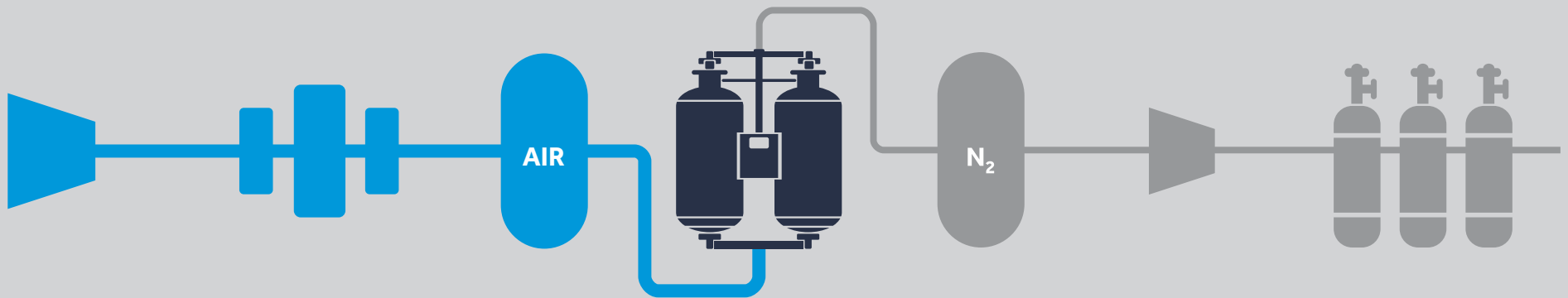
MOLECULAR SIEVE

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.





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.





N₂ 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



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.



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.



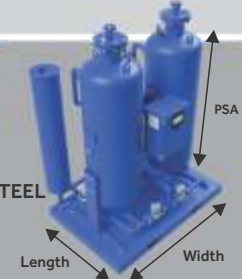
"We, at **Café LaSanté**, were aware of the importance of nitrogen in the packaging and preservation of the quality of our gourmet coffee, but we lacked an efficient and economical way to supply this gas. The **NitroMax** from Metalplan met our needs in the best possible way, producing nitrogen at low 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)								IN/OUT (BSP)	Dimensions (mm)			Weight (kg)	LAYOUT
	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	1/4"	737	440	877 / NA	47			
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	1/4"	737	440	1000 / NA	52			
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	1/4"	737	440	1177 / NA	59			
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	1/4"	700	1150	1140 / 1353	121			
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	1/2"	700	1150	1490 / 1353	135			
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	1/2"	700	1200	1990 / 2100	155			
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	1/2"	700	1300	1990 / 2100	248			
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	3/4"	700	1490	1990 / 2100	355			
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	3/4"	700	1640	1990 / 2100	373			
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	1"	700	2000	1990 / 2100	436			
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	1"	700	2300	1990 / 2100	498			
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	1 1/4"	700	2500	1990 / 2100	656			
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	1 1/4"	700	2650	1990 / 2100	719			
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	1 1/2"	700	2800	1990 / 2100	781			
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	2"	700	3000	1990 / 2900	844			
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	2"	1800	3200	2500 / 2900	1050			
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	2"	1800	3200	2600 / 3600	1462			
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	2"	2000	3200	2750 / 3600	2030			
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	3"	2500	3500	2750 / 3950	3045			
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	3"	2500	3500	3200 / 3950	3800			

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.





*At **Melitta**, three **Polar chillers** support hundreds of tons of roasted, ground, and packaged coffee monthly, with extreme care in preserving their various aromas and flavors.*



0.1°C PRECISION IN CONTROLLING THE TEMPERATURE OF CHILLED WATER AND OTHER FLUIDS

All the technology developed by Metalplan in the field of heat exchangers and industrial refrigeration is present in the new generation of Polar, a chiller for water and other fluids of high reliability and robustness, designed to withstand continuous operation and adverse environments.

The fluid temperature is regulated directly on the Mastercontrol panel, and the control instruments keep it constant with a precision of 0.1°C, ensuring the quality of your process. Thousands of units installed in industries and institutions across various countries attest to the unbeatable quality of the Polar.

1.000 to
720.000
kcal

-45 to +25
°C

gas
ecological

EVAPORATOR

EVAPORATOR
Type stainless steel plates,
compact and efficient.



POLAR

HIGH-PRECISION CHILLERS





MICROCHANNEL aluminum condenser brazed. Withstands high temperatures environments, with low resistance to flow. It comes equipped with a dust filter.



ELECTRONIC EXPANSION VALVE. Allows extremely precise control of refrigerant flow in the circuit, providing significant energy savings.



ULTRA-SILENT FANS, high flow rate, and low energy consumption. The noise level is 60% lower than conventional fans.



Corrosion-free hydraulic piping. 100% aluminum reservoir. Stainless steel water pump*.

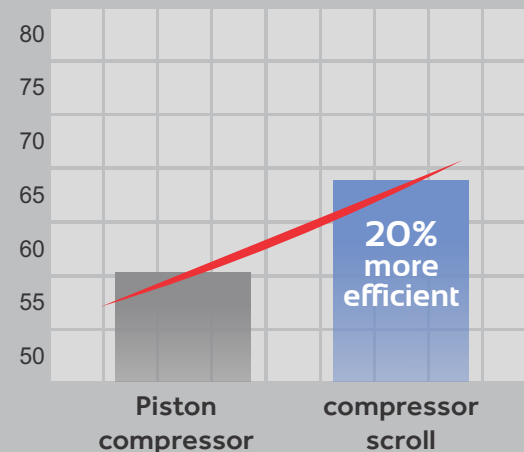
✓ Powder-coated electrostatic paint, with anti-corrosive treatment.

✓ Level sensor and external bypass.



SCROLL REFRIGERATION COMPRESSOR

- Quiet and vibration-free operation.
- Permanent balancing.
- Supports higher liquid return rates.
- Dispenses with suction and discharge valves.
- Volumetric efficiency ~100%.
- Much more compact.
- Compresses under any pressure condition.



A Metalplan **Polar chiller** was essential for improving the dimensional quality and production speed of injected caps, mainly due to the stability of water flow and temperature, maintained within very strict limits.

PRATA
DESDE 1876

TEMPERATURE CONTROL PRECISION

Temperature control is essential in various industries, especially in the plastics processing sector. Several devices perform this task with precision, but only the Polar chiller is suitable for all applications.



APPLICATIONS	COOLING SOLUTIONS			
	POLAR CHILLER	DryCooler	Thermoregulator	Thermo-chiller
Thermoforming	✓		✓	
Cutting and welding	✓			
Lamination	✓		✓	
Tube extrusion	✓			
Sheet extrusion	✓		✓	
Flexography	✓		✓	
Blowing	✓	✓	✓	✓
Balloon extrusion	✓			
Injection	✓	✓	✓	✓

*Jacto is focused on innovative solutions that provide significant productivity and quality gains to its users. For several years, **Jacto** has introduced the **Polar chiller**, associated with the **SubZero** ultra-chiller (both from Metalplan), into its plastic packaging blowing line. Currently, Jacto has sixteen of these units, which contribute significantly to the production of parts ranging from 5 to 200 liters.*





MASTERCONTROL

MASTERCONTROL controls and monitors the main functions of the Polar chiller to ensure total reliability. Additionally, it has an automatic shutdown function for the refrigeration compressors when the water temperature reaches the set point, resulting in significant energy savings.

HUMAN/MACHINE INTERFACE TOUCHCONTROL

- Outlet water temperature
- Inlet water temperature
- Pump operation indication
- Fan operation indication
- Refrigeration compressor operation indication
- Circuit diagram
- Superheat
- Percentage of expansion valve opening and closing
- Refrigeration circuit pressures
- Fault alerts
- Audible and visual fault alarms



GENERAL DIAGNOSTICS & SPECIAL FUNCTIONS

- History of alerts and faults from the last 50 events:
 - High pressure in the refrigeration circuit
 - Low pressure in the refrigeration circuit
 - Phase inversion or lack of phases
 - Overcurrent in the pump
 - Overcurrent in the refrigeration compressor
 - Overcurrent in the fan
 - Water insufficiency
 - Sensor errors
- Temperature sensor calibration
- Remote start/stop (via cable)
- Remote fault signal
- Serial communication (modbus)
- Unit conversion
- Local date and time adjustment



TECHNICAL DATA

REFRIGERATION CAPACITIES UP TO 720,000 kcal/h

The Polar chiller can meet industrial and commercial refrigeration applications with a maximum capacity of up to 240 TR.



Model	Nominal capacity ¹ kcal/h	Dimensions (mm)			Process pump		Water reserv. ⁴ liters	fluid ³ condenses m³/h	Energy	Piping BSP		Weight kg
		length	height	width	m³/h	mca				process	condenser	
AIR CONDENSATION ²	PA-1	1000	760	700	432	0,8	25	20	220/1/60	3/4"	-	50
	PA-2	2000	760	700	432	0,8	25	20		3/4"	-	50
	PA-3	3000	810	910	690	0,8	25	25		3/4"	-	60
	PA-5	5000	810	910	690	2,4	30	25	220/1/60 or 380/3/60	3/4"	-	65
	PA-9	9000	770	1270	790	2,2	30	50		1"	-	280
	PA-15	15000	1060	1400	850	3,7	30	40		1 1/4"	-	400
	PA-22	22000	1130	1600	850	5,5	30	65	220/3/60 380/3/60 440/3/60	1 1/2"	-	570
	PA-30	30000	1680	1850	850	7,5	30	75		1 1/2"	-	600
	PA-45	45000	1680	1850	850	11,2	30	95		2"	-	800
	PA-60	60000	1680	1850	850	15	30	145		2"	-	900
	PA-75	75000	2550	2300	1040	18,7	30	175		2"	-	1250
	PA-90	90000	2550	2300	1040	22,5	30	215		2"	-	1350
	PA-120	120000	3526	2238	1720	30	30	350		3"	-	1800
	PA-150	150000	3526	2238	1720	37,5	30	350		3"	-	1850
	PA-180	180000	3526	2238	1720	45	30	350		3"	-	2050
	PA-240	240000	3526	2238	1720	60	30	350		3"	-	2230
	PA-300	300000	3526	2238	1720	75	30	350		4"	-	2450
WATER CONDENSATION ³	PW-9	9000	770	1200	790	2,2	30	50	220/3/60 380/3/60 440/3/60	1"	1 1/2"	280
	PW-15	15000	1060	1100	850	3,7	30	40		1 1/4"	1 1/2"	400
	PW-22	22000	1130	1260	850	5,5	30	65		1 1/2"	1 1/2"	570
	PW-30	30000	1680	1510	850	7,5	30	75		1 1/2"	1 1/2"	600
	PW-45	45000	1680	1510	850	11,2	30	95		2"	1 1/2"	800
	PW-60	60000	1680	1510	850	15	30	145		2"	2"	900
	PW-75	75000	2550	2100	1040	18,7	30	175		2"	2"	1250
	PW-90	90000	2550	2100	1040	22,5	30	215		2"	2"	1350
	PW-120	120000	3526	2070	1720	30	30	350		3"	3"	1610
	PW-150	150000	3526	2070	1720	37,5	30	350		3"	3"	1650
	PW-180	180000	3526	2070	1720	45	30	350		3"	3"	1800
	PW-240	240000	3526	2070	1720	60	30	350		3"	3"	1970
	PW-300	300000	3526	2070	1720	75	30	350		4"	4"	2150

1 - Capacities valid for water temperature at 10°C
2 - Air-cooled, ambient temperature below 35°C

3 - Water-cooled, tower water temperature below 30°C and minimum pressure of 2 kgf/cm²
4 - Valid only for equipment with internal reservoir

Other capacities and engineered equipment available upon request.

Check the availability of some of these items in the offered model.



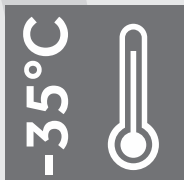
"The Institute of Physics at University of São Paulo hosts the Laboratory of Solid State and Low Temperatures, founded in 1962 and a pioneer in Brazil. Here, research is conducted under extreme conditions of low temperatures (down to 0.01 K) and high magnetic fields (up to 20 T). The heart of this laboratory is the Cryogenic Plant that produces liquid helium, a basic input for obtaining low temperatures and keeping the superconducting coils cooled, which generate the magnetic fields. Since 2009, the cooling system for the helium liquefaction compressors has been based on a **Polar chiller** from Metalplan, which has operated with high reliability, ensuring the laboratory's operation."

Prof. Dr. Valdir Bindilatti
INSTITUTE OF PHYSICS - USP



The companies of the **Jacto** group are focused on innovative solutions that represent significant gains in productivity and quality. About 20 years ago, **Unipac** introduced the **SubZero** into its plastic packaging blowing line. Currently, **Unipac** has ten **SubZero** units, which contribute significantly to the production of parts ranging from 5 to 200 liters.



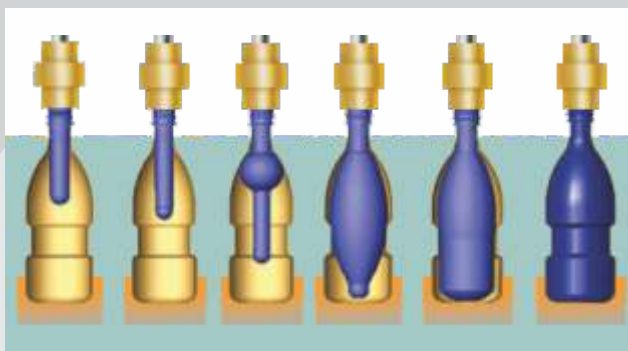


SUPER-COOLED COMPRESSED AIR FOR PLASTIC PACKAGING BLOWING AND OTHER APPLICATIONS

Compressed air at -35°C increases the blowing speed of plastic parts by up to 80% compared to compressed air at ambient temperature.

With the help of a new blowing pin, air renewal during blowing, and an increase in parison extrusion capacity, the cooling time/permanence of the part in the mold can be drastically reduced, with a notable gain in productivity.

There is also more quality and uniformity in the part, as its cooling occurs on both the internal (super-cooled air) and external (chilled water in the mold) surfaces.



SUBZERO

ULTRA-COOLER
COMPRESSED AIR



OPERATING PRINCIPLE

Upon entering the SubZero, compressed air is treated according to ISO 8573 quality class [1:2:1], with a dew point below -60°C .

This procedure prevents the freezing of any moisture trace inside the SubZero when compressed air is cooled to -35°C .

TECHNICAL DATA

MODEL	NOMINAL FLOW		MINIMUM FLOW		REGENERATION FLOW		CONNECTIONS AIR	DIMENSIONS (mm)		
	pcm	m ³ /h	pcm	m ³ /h	pcm	m ³ /h		length	height	width
SUBZERO 140	80	140	40	70	15	25	3/4"	1500	1720	800

EcoBlue, the premium lubricant
with Metalplan's blue DNA



ROTOR OIL EXTRA *EcoBlue*

100% SYNTHETIC LUBRICANT
FOR HIGH ENERGY EFFICIENCY
SCREW COMPRESSORS

In 2012, ahead of other compressor manufacturers worldwide, Metalplan achieved ISO 50001 certification - Energy Management, providing Brazil with unprecedented know-how in energy efficiency.

Our determination to offer products to the market that deliver maximum performance drove the development of **EcoBlue**, an unbeatable synthetic lubricant, no matter what aspect is evaluated.

All Metalplan screw compressors are originally supplied with **EcoBlue**, ensuring absolute operational reliability and **maximum isothermal efficiency**.

3
mg/m³

Minimizes residual oil content in the discharge.

8000
hours

Provides long oil change intervals



Reduces sludge and scale formation.



Minimizes friction and provides longer life for compressor unit bearings.



Allows the compressor to operate at lower temperatures with high **isothermal efficiency**.



High antifoaming and antioxidant power.



Excellent stability and anticorrosive protection in the presence of moisture.



For situations where the slightest presence of oil is not tolerable, a synthetic, non-toxic, colorless, odorless lubricant of the food-grade type approved and recommended by: National Health Surveillance Agency



MARKS 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.



Typical facade

COMPREHENSIVE INVENTORY OF ORIGINAL PARTS

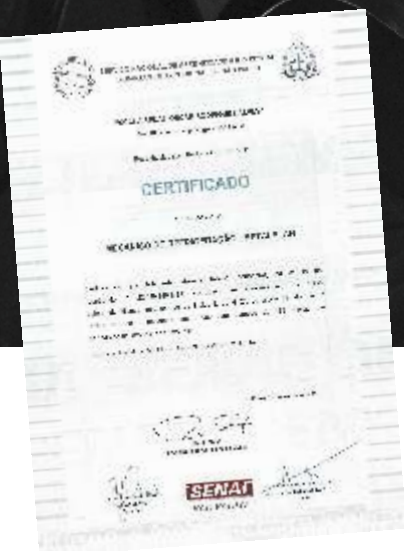


MAXIMUM EFFICIENCY
IN AFTER-SALES SERVICE



70
CERTIFIED
WORKSHOPS

200
SPECIALIZED
TECHNICIANS

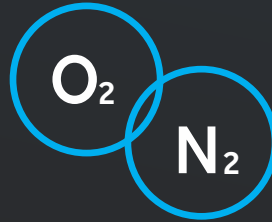


OUR SOLUTIONS



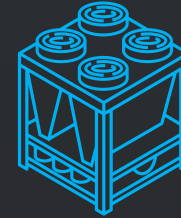
COMPRESSED AIR

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



OXYGEN & NITROGEN

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



REFRIGERATION & THERMAL CONTROL

- 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