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CO2
Free
Air

SERIE NDL CLEAN DRY AIR

MD Scientific
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SERIE NDC CO2 FREE AIR

APPLICATIONS : NMR / AA / GC-FID / ATD / RHEOMETERS

APPLICATIONS : TOC ANALYSER / FT-IR / MICROSCOPE PURGE / LASER PURGE

E-DGSI DESSICANT DRYERS are ideal for laboratory use, providing a constant flow of clean, dry compressed air from your existing compressed air network.

- > Water dewpoint < -40°C.
- > Purity particles < 1 µ.
Non methane HCs < 0.01 mg/m3.

MODELS	Outlet flow rate L/min based on 7 barg inlet pressure	Total air inlet flow required L/min at 7 barg	Size H x W x D (mm)	Weight (kg)
NDL-010	70	85	447 x 241 x 160	8.3
NDL-020	113	141	447 x 241 x 160	8.3
NDL-030	226	283	647 x 241 x 160	12.8
NDL-040	333	425	897 x 241 x 160	16.4
NDL-050	543	680	1097 x 241 x 160	19.3
NDL-060	786	983	734 x 440 x 295	40
NDL-070	960	1200	734 x 440 x 295	40



Replace high pressure oxygen or nitrogen gas cylinders by **GENERATING YOUR OWN CO2** and moisture free air.

- > Water dewpoint < -70°C.
- > Purity particles < 1 µ.
- > CO2 < 1 ppm.
- > Non methane HCs < 0.003 ppm.

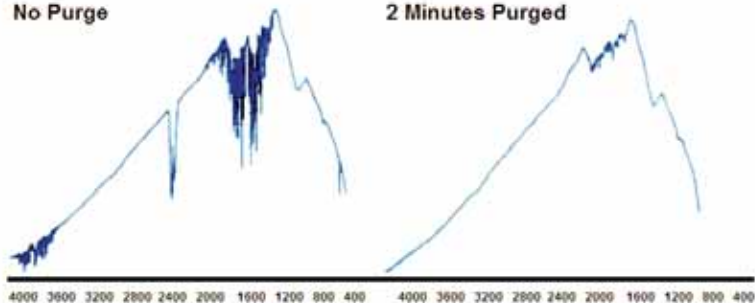
MODELS	Outlet flow rate L/min based on 7 barg inlet pressure	Total air inlet flow required L/min at 7 barg	Size H x W x D (mm)	Weight (kg)
NDC-015	1.5	2.5	447 x 241 x 160	8.3
NDC-140	14	23	447 x 241 x 160	8.3
NDC-300	30	50	647 x 241 x 160	12.8
NDC-600	60	100	1097 x 241 x 160	19.3
NDC-900	90	150	734 x 440 x 295	40
NDC-1200	120	200	734 x 440 x 295	40

BENEFITS AND SAVINGS

- > Fully regenerative PSA technology.
- > Point of use installation provides clean and dry air where you need it.
- > Compact and quiet operation.
- > Can be bench or wall mounted.
- > Larger flow rate models available.
- > Unique factory built filtration and adsorption cartridge makes servicing simple.

No Purge

2 Minutes Purged



Result achieved with co2 free air.

BENEFITS AND SAVINGS

- > Fully regenerative PSA technology.
- > Reduce signal to noise ratio improves instrument performance.
- > Protects sensitive optics and air bearings from moisture.
- > Safety increased before the analytical instruments.
- > Compact and quiet operation.
- > Can be bench or wall mounted.
- > Unique factory built filtration and adsorption cartridge makes servicing simple.

MEMBRANE AIR DRYERS



HOW DOES THIS MEMBRANE TUBE WORKS?

- The humid compressed air flows through a bundle of hollow fibers. The dryer incorporates the highest efficiency membrane available, to attract water vapor. This means that the water vapor on the inside of the hollow fiber is absorbed and is then diffused through the very thin selective layer until the water vapor molecules have reached the outside of the membrane.
- Here, they are again desorbed and removed from the membrane. Depending on the operational parameters, the water vapor is removed selectively from the compressed air so that the compressed air on the outlet of the membrane dryer shows only little residual water vapor. The higher the pressure in the compressed air system, the better the operation of the membrane dryer.
- In order to desorb the water vapor from the outside of the membrane, partial flow is taken from the dried compressed air, expanded to atmospheric pressure, conducted on the outside through the hollow fiber bundle in counter flow to the entering compressed air flow and led to the flushing air outlet. Depending on the work load of the module, different drying grades of the compressed air can be obtained.
- The membrane air dryers will supply oil and particulate free dry compressed air to atmospheric dewpoint as low as -40°C maximum. Others dew point reduction can be achieved to reduce the purge air consumption. The only maintenance required is changing the prefilter cartridge once each year.
- The dryers are lightweight, compact and can be easily installed on an existing airline. In a vertical or horizontal orientation (depending upon model), a high efficiency coalescing prefilter is installed directly upstream from the dryer module to protect the membrane from potential contamination caused by pipe scale, liquids or other solids.

FEATURES AND BENEFITS

- > **Low dew point instrument air:** prevents analytical instrument contamination.
- > **Dry air for hazardous areas.**
- > **No electricity required:** low operating costs.
- > **No refrigerants or freons:** environmentally sound.
- > **Explosion proof.**
- > **No moving parts or motors:** silent operation.
- > **Easy to install, Wall mountable, Maintenance free.**
- > **Low pressure drop** < 0.2 bar.



INLET CONDITIONS	35 °C/ 7 BARG								SIZE			
TYPE	Dewpoint Reduction (outlet pressure dewpoint)								HIGH (mm)	B diameter (mm)	C diameter (mm)	Connection BSP
	20 K (15°C)		35K (0°C)		55K (-20°C)		75 K (-40°C)					
	m³/h Inlet	m³/h Outlet	m³/h Inlet	m³/h Outlet	m³/h Inlet	m³/h Outlet	m³/h Inlet	m³/h Outlet				
SPN 0003	3,0	2,7	2,2	1,9	1,4	1,1	1,0	0,7	224	43.2	58.4	1/4»
SPN 0006	6,0	5,4	4,3	3,7	2,8	2,2	2,0	1,4	325			
SPN 0009	9,0	8,1	6,4	5,5	4,3	3,4	3,1	2,2	427			
SPN 0012	12,0	10,8	8,5	7,3	5,7	4,5	4,1	2,9	503			

PURGE AIR CONSUMPTION		
Inlet PD	Outlet PDP	Approx %
35°C	15°C	10
35°C	3°C	14
35°C	-20°C	20
35°C	-40°C	29

PERFORMANCE CORRECTION FACTORS FOR DIFFERENT PRESSURES							
Pressure (bar)	4	5	6	7	8	9	10
Factor	0.41	0.56	0.76	1	1.22	1.48	1.76

AIR TREATMENT PRESENTATION

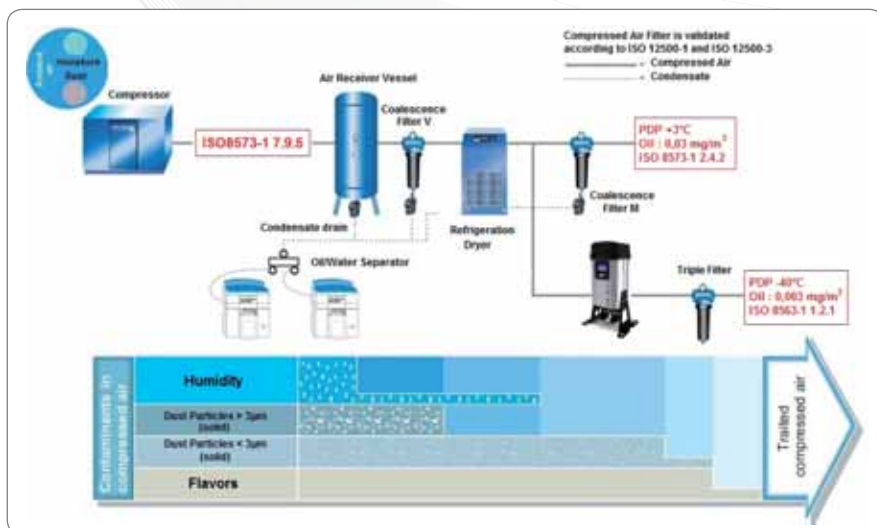
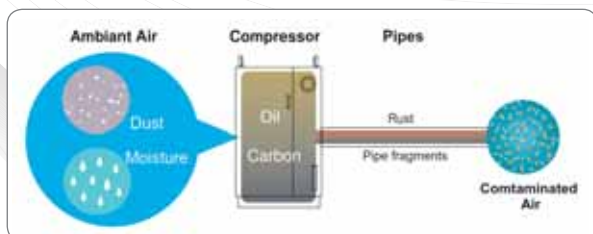
The supply of compressed air in the laboratories is of an essential utility. But the compressed air contains water, oil and dust which can deteriorate the pneumatic instruments and affect the lifespan of the analytical instruments.

International ISO Standards ISO 8573.1 for compressed air is classified in 3 main component of the air: solid, water and oil.

CLASS	SOLID			WATER		OIL	
	Maximum particle size	Maximum concentration size		Maximum pressure Dewpoint		Maximum concentration size	
	Micron	ppm	(mg/m3)	°C	(°F)	ppm	(mg/m3)
1	0.1	0.08	(0.1)	-70	(-94)	0.008	(0.1)
2	1	0.8	(1)	-40	(-40)	0.08	(0.1)
3	5	4.2	(5)	-20	(- 4)	0.83	(0.1)
4	15	6.7	(8)	+ 3	(37)	4.2	(0.1)
5	40	8.3	(10)	+ 7	(45)	21	(0.1)
6	-	-	-	+10	(50)	-	-

PROBLEMS MEET WITH COMPRESSED AIR

The compressed air is formed by compressing the ambient air. During this process, substances are taken with the ambient air and during the compression and delivery of the air, other substances are added.



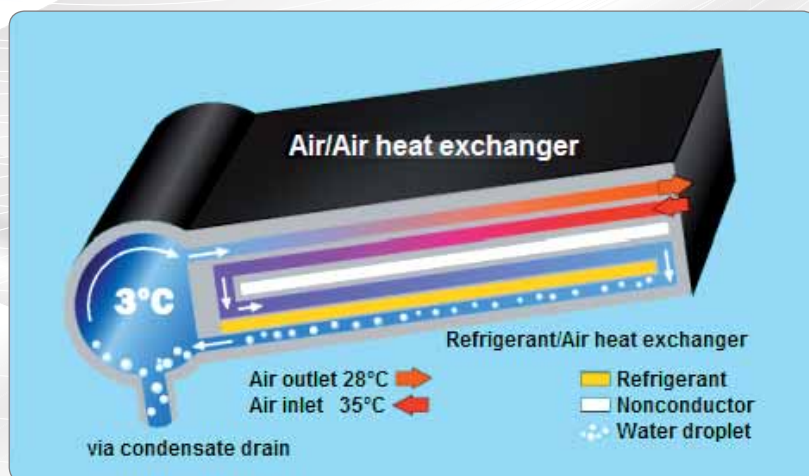
- At the outlet of the compressor the air is saturated with water vapors which can reach 116°C. The air cools with the room temperature in the distribution lines and water condenses throughout the air distribution system. About 2/3 of the total water content of the air will be condensed when the air has cooled to 38°C. A condensate drain on the Air buffer will remove most of the water load from the system, additional filter located after the vessel will protect instrument after the tank. By adding a fridge dryer and filters located at end-use points which will be required to remove water condensed downstream from the main line filter, you will reach an air class 2.4.2 with a lubricated compressor and 1.4.1 class with a non lubricated compressor, which will be enough for certain application.
- The source of oil in compressed air is the compressor lubricant. To remove oil vapor from the air you can add an adsorption dryer after the fridge dryer with filtration adapted: just like water vapor, oil vapor will condense to liquid when the temperature reduced or the air pressure is increased at constant temperature. You can add also active carbon filter for residual oil vapor.
- To protect refrigerated dryer, you will need to use a coalescing pre filter to prevent oil and condensed water from entering the dryer. Oil entering dryer coats the cooling coil and reduces its efficiency, condensed water increases the cooling load and reduce dryer capacity.
- Desiccant dryer are very sensitive to water and oil droplets: water can saturate the desiccant and reduce its drying efficiency or even destroy it. Oil can coat the desiccant, rendering it ineffective, that's why it is always installed after adapted filtration and fridge dryer.
- Membrane dryers are sensitive to water and oil droplets. Oil can permanently damage the hollow fiber core. That's why it's always important to change filters, once per year. The filter cartridge can continue to coalesce indefinitely, but solids loading in the depth of the cartridge will cause a pressure drop. The element should be changed when the pressure drop reach 10psi.

FRIDGE DRYERS

SERIE CQ



THE FRIDGE DRYER makes possible to treat the air coming from a compressor by lowering the dewpoint of water to +3°C and to ensure a quality of air in conformity with the standard ISO 8573.1 Class 1.4.1. It is advised for: All analytical instruments where moisture in too great quantity can be problematic.



MAIN FEATURES AND BENEFITS

- > **Quality of the air obtained:** ISO8573.1 Class 1.4.1.
Water dewpoint +3°C.
HCs non CH₄ < 0,01 ppm.
particles <0,1 micron.
- > **Without danger to the environment:**
the cooling agent used R134a is inoffensive and not polluting.
- > **Easy maintenance:**
frontal access to all the elements.
- > **Compact, easy to install.**
- > **Timer controlled solenoid valve to drain the condensates.**
- > **High operating temperature:**
until 60°C in compressed air and 50°C in ambient air thanks to the R134a refrigerant.

TECHNICAL SPECIFICATIONS

MODELS	CQ 0020A	CQ 0035A	CQ 0050A	CQ 0065A
Flow rate at the outlet (NM ³ /H) at 7 barg pressure, temperature of 35°C of compressed air inlet	20	35	50	65
Air quality	ISO8573 Class 1.4.1 (Water dewpoint +3°C, HCs non CH ₄ < 0,01 ppm ; particles <0,1 micron)			
Min/max. inlet air pressure	2 – 16 barg			
Electrical supply	230 V			
Pre filter of 1 micron at the inlet	CFM 0035 1/4"			
Inlet / outlet connections	3/8 BSP	1/2 BSP	1/2 BSP	1/2 BSP
Power	0.16 kW	0.18 kW	0.19 kW	0.22 kW
Dimensions (W x D x H) cm	36 x 41 x 65	36 x 41 x 65	36 x 41 x 65	36 x 41 x 65
Weight (Kg)	24	26	27	29

OPERATING MODE

- Compressed air is fed into the dryer and is precooled in the air to air heat exchanger by the outgoing cold compressed air.
- The precooled air then passes through the refrigerant to air heat exchanger where it is further cooled to the required pressure dew point. The moisture in the compressed air condenses out and is collected and discharged automatically.
- Finally, the cold discharged air is rewarmed by the incoming compressed air. This saves energy and prevents any moisture forming beyond the dryer in the compressed air system.

MEAN FEATURES

- > Different type of elements filters are suitable (V, M, S, A).
- > Mechanical drain purge integrated.
- > **Flexibility:** following the position of the keyed inside the housing filter, we treat either residual droplet content (water/oil) or dust.
- > Mounted bracket for wall fixation in option.



TECHNICAL SPECIFICATION :

- > **Max flow treated:** 35 Nm³/hr @ 7 bar (Others flow available).
- > Specification validated according to standard ISO12500-1 for residual droplet content (base of inlet concentration of 3mg/m³) and standard ISO5011 for particles.
- > Inlet/outlet connection: 1/4" GF.

V FILTER

FINE FILTER - PREFILTER

Filter reference: CFV 0035 / Element reference: EFV 0035

FIRST PROTECTION OF YOUR SYSTEM

Remove either: Residual droplet content (oil/water) < 1 mg/m³.

or

Particles 1μ 100%.



M FILTER

MICRO FILTER - COALESCING FILTER

Filter reference: CFM 0035 / Element reference: EFM 0035

MEDIUM FILTRATION USED GENERALLY AFTER A PREFILTER

OR AFTER A FRIDGE DRYER

Remove either: Residual droplet content (oil/water) < 0,02 mg/m³.

or

Particles < 1μ 100%.



S FILTER

SUBMICRONIC FILTER - COALESCING FILTER

Filter reference: CFS 0035 / Element reference: EFS 0035

THE FINEST FILTRATION IN OIL AND PARTICLES CONTENT,

NEED TO BE PLACE AT THE POINT OF USED

Remove either: Residual droplet content (oil/water) < 0,01 mg/m³.

or

Particles < 1μ 100%.



A FILTER

OIL VAPOR FILTER - ACTIVATED CARBON

Filter reference: CFA 0035 / Element reference: EFA 0035

IN ORDER TO ELIMINATE OIL FLAVOR AND TASTE,
BUT M OR S FILTER NEEDS TO BE POSITIONED UPSTREAM

Residual Oil content < 0,003 mg/m³.



THREE-STAGE FILTER

TFS0050



APPLICATIONS : POINT-OF-USE TRIPLE FILTER FOR COMPRESSED AIR REATMENT

To protect your analytical instrument from any dust, water droplet and oil content in compressed air.

SYSTEM UNIQUE AND PATENTED

The three-stage filter is ideally suitable as point-of-use filter, where the highest quality of compressed air is necessary and only small place for installation is available.

> The filter element combines 3 purification stages in one filter :

- 1- Coalescence filter for the removal of oil, aerosols and particles.
- 2- Activated carbon adsorber (packed bed) for the removal of oil vapors and other hydrocarbons, to achieve compressed air quality class 1 acc. to ISO 8573-1:2010 for oil.
- 3- High performance particle filter to achieve the quality class 1 acc. to ISO8573-1:2010 for particles.



MAIN FEATURES AND BENEFITS

> Economizer for monitoring / controlling of the element

The Economizer integrated in the filter housing indicates the service lifetime of the filter element and signals the necessary exchange at expiration of the specified time of use.

It indicates the differential pressure of the filter and signals when reaching the adjusted limit that an exchange of the filter element is required.

As the Economizer signals alarm at oil break-through it is an ideal solution to protect downstream equipment.

> Meets the requirements for the use as a point-of-use filter.

> 3 purification stages in one filter (space savings up to 60% vs. traditional solutions).

> Mounted bracket for wall fixation in option.



ETFS0050
Filter element needs to be replaced every 6 months



Filter performance data at nominal flow rate, defined by the following operation conditions

Outlet operating overpressure	7bar
Outlet operating temperature	20°C
Content of oil aerosol at inlet	3mg/m3
Service lifetime Filter element	6 months

GAS CLEAN FILTERS

Unique POINT-OF-USE diffusion proof **SUPER-CLEAN GAS FILTERS**, purify the delicate carrier and burner gases for your GC and GC/MS system for Hydrocarbons, Oxygen (color indicated) and Moisture (color indicated) to better-as 6.0 gas (99,9999%) quality, independent of the original gas quality.

- > The specified lifetimes are strongly depending of the quality of the incoming gas.
- > Effectivity: <0.1 ppm at a flowrate of 2 liters/minute.



ACCURATE ANALYSIS FOR YOUR GC SYSTEM

- > **The right filter for every gas purification:** Four different filters are available. Each absorbent is packed in a transparent and unbreakable heavy-walled polycarbonate housing.
- > **Oxygen filter:** Oxygen removal prevents oxidation of the liquid stationary phase, septum, and glass wool.
- > **Moisture filter:** Water removal prevents hydrolization of the stationary phase, fused silica surface, glass wool, and septum.
- > **Charcoal filter:** Removes organic compounds, and ensures proper performance of FID detectors.
- > **GC/MS filter:** One filter unit with a combination of filters for removing oxygen, moisture, and hydrocarbons from carrier gas for MS application.

BENEFITS

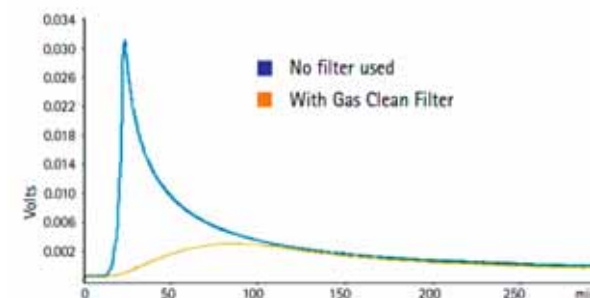
- > Longer lifetime of analytical columns, avoids bleeding, espec. important for MS and ECD.
- > Better sensitivity, decreases baseline noise, eliminates spikes.
- > Filter-change during analysis within seconds, system stays online: Eliminates GC downtime.
- > Highly visible sensitive indicators.
- > Economical: Immediate pay back.
- > Tool-less filter replacement: Easy handling.
- > Diffusion-proof Baseplate (also during filter replacement): Eliminates analytical disturbance.
- > Baseplates can be wall-mounted: Convenient positioning.

GAS PURIFIER RECOMMENDATIONS		
Detector	Gas Stream	Recommended purifier
SYSTEM PACKED COLUMN GC		
All	Carrier Gas	Hydrocarbon, Moisture, Oxygen, and indicating oxygen
SYSTEM CAPILLARY COLUMN GC		
All	Carrier Gas	Hydrocarbon, Moisture, Oxygen, and indicating oxygen
ECD	Make-up	Moisture an Oxygen
FID	Make-up	Hydrocarbon
FID	Air for FID	Hydrocarbon
FID	H2 for FID	Hydrocarbon
ELCD	Reaction Gas	Hydrocarbon

The graph shows the difference in bleed levels with and without a filter when running a temperature program (50 °C to 350 °C, 20 °C/min.).

When no filter is used, an extreme rise in the bleed profile is clearly visible due to moisture in the carrier gas.

By using Gas Clean Filters, a normal bleed profile is achieved with the removal of all moisture in the carrier gas.



APPLICATIONS : GC AND GCMS GASES

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DIFFERENT STANDARD CONFIGURATIONS

> GC/MS CARRIER GAS PURIFICATION SYSTEM

- Removal of Oxygen, moisture and hydrocarbons for longer column lifetime and cleaner baseline.
- This configuration is excellent for Carrier Gas and ECD, MS applications.

*In this configuration, you need to use:
1-position baseplate + 1 Triple Filter.*

> GC/MS CARRIER GAS HELIUM SPECIFIC PURIFICATION SYSTEM

- System for Purifying Helium in GC/MS systems.

*In this configuration, you need to use:
1-position baseplate + 1 Triple filter gas specific Helium.*

> FUEL GAS PURIFICATION SYSTEM USED IN A FID

- Removal of moisture and hydrocarbons in the gases of the FID for a better baseline.

*In this configuration, you need to use:
2 units of 1-position baseplate + 2 Combi filters (hydrocarbons/moisture).
One combi filter for purifying Air and other combi filter for purifying hydrogen.*

> CARRIER GAS PURIFICATION AND FID GASES

- The full solution for your GC/FID system Purifying all gases used in a FID operated GC.

*In this configuration, you need to use:
3 units of 1-position baseplate + 1 triple filter (O2/Moisture/Hydrocarbons)
for purifying carrier gas.
+ 2 Combi Filter (Hydrocarbons/Moisture)
for purifying gases used in a FID.*

> CARRIER GAS PURIFICATION AND ELECTRON CAPTURE DETECTOR-ECD

- Removal of moisture and hydrocarbons in the gases of carrier gas and back up and purge gas source on nitrogen source.

*In this configuration, you need to use:
2-position baseplate + 2 Triple filter gas (O2/Moisture/Hydrocarbons)
for purifying carrier gas and gases used in a ECD.*

The moisture trap should be placed first in line. Both hydrocarbon and oxygen traps will adsorb water. Installing a moisture trap before these traps prevents them from becoming prematurely saturated with moisture. It also allows them to more effectively remove their specified contaminants from the gas stream. The hydrocarbon trap should be placed after the moisture trap. We recommend installing the series of purifiers as close to the GC.

PURIFIER CARTRIDGE CAPACITY

Type of Purifier	Outlet Gas Quality	Usable for	Indicator Color Change	Capacity		
				H2O(gr)	2	Hydrocarbons
Moisture	> 6.0	Inert carrier gas, air hydrogen	Brown to white	7,2	-	-
Oxygen	> 6.0	Inert carrier gas	Green to grey	-	1000	-
Hydrocarbon	> 6.0	Inert carrier gas, air hydrogen	No indicator	-	-	12 (as n-butane)
Combi (moisture/hydrocarbon)	> 6.0	Inert carrier gas, air hydrogen	Brown to white	3,5	-	6 (as n-butane)
Triple (moisture/oxygen/hydrocarbon)	> 6.0	-	Brown to white Green to grey	1,8	500	4 (as n-butane)

FILTERS AND BASEPLATES PART NUMBERS

FILTER CARTRIDGES	
DESCRIPTION	REFERENCE
Triple Filter (Argon packed)	ATF-0301
Triple Filter (Helium packed)	HTF-0302
Combi Filter	COMBIF-0201
Moisture Filter	MOISTF-0101
Oxygen Filter	O2F-0102
Hydrocarbon Filter	HCF-0103
BASEPLATES	
DESCRIPTION	REFERENCE
1-Position Baseplate 1/8	BP00118
1-Position Baseplate 6	BP00106
2-Position Baseplate 1/8	BP00218
2-Position Baseplate 6	BP00206
3-Position Baseplate 1/8	BP00318
3-Position Baseplate 6	BP00306
4-Position Baseplate 1/8	BP00418
4-Position Baseplate 6	BP00406