Compressed Air Filtration

AG / SG / HD

Depth Filter / Coalescence Filter / Particle Filter

UltraPleat® FFP

MAIN FEATURES & BENEFITS:

- Coalescence / particle filter, silicone-free, for the retention of oil and water aerosols as well as particles from compressed air or gases in industrial applications
- Innovative filtration technology UltraPleat®; pleated high performance filter media with special coating (oleophobic / hydrophobic) for reliable achievement of high retention rates with low differential pressure
- Validated performance data acc. to ISO 12500; reliable achievement of compressed air quality acc. to ISO 8573-1
- Flow-optimised design, minimum pressure loss for economic compressed air purification (saving of energy costs)

Depth Filter
UltraPleat® FFP

INDUSTRIES

- Automotive industry (painting applications)

- Chemical and pharmaceutical industry

- PCB assembly and CD manufacturing

- Surface finishing

- Machine building industry and plant engineering / construction

- Energy and power generation

C/Alcalde Asúnsolo, nº 10 Bajo Izq, 15007, La Coruña, España, T: 981 210 314, email: retecno@gmail.com CIF: B15061583

UltraPleat® FFP

PRODUCT DESCRIPTION

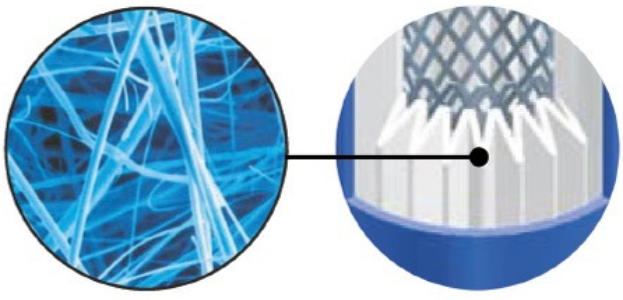
The silicone-free filter elements type UltraPleat® FFP are designed for the purification of compressed air or gases in industrial applications.

Validated performance data acc. to ISO 12500-1 (oil aerosol retention) and ISO 12500-3 (particulate retention) for reliable achievement of compressed air quality suitable to achieve ISO 8573-1 quality classes.

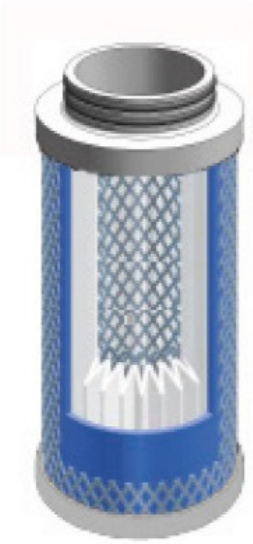
Due to a flow-optimised design of the filter element as well as by the assigned filter media and the advanced production technology, the differential pressure is minimized and a continuously high separation effiency is ensured.

The filter elements type UltraPleat® FFP are based on the three-dimensional micro fibre fleece made of coated borosilicate glass fibers, which works oleophobic and hydrophobic.

By utilising various filtration mechanisms such as retention by direct impact, sieve effect and diffusion effect, liquid aerosols and solid particles down to the size of 0.01µm are being retained in the filter.



Cross section of the depth filter with SEM micrograph of the filter media



Cross section of the depth filter

The UltraPleat® FFP filter element is designed and developed for the following applications:

- **Automotive industry:**
  Purification of paint- and lacqering finishing air
- **Central compressed air processing:**
  Prefilter for the protection of fridge dryers and adsorption dryers,
  applications with expected high particle intake
- **Downstream applications:**
  Final filtration for control and process air
- **Adsorption dryers / activated carbon adsorbers:**
  Particle filter for the retention of adsorbent abrasion

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PRODUCT SPECIFICATIONS

Features	Benefits
UltraPleat® technology, silicone-free	Reliable achievement of highest retention rate for oil and water aerosols as well as particles with lowest differential pressure
Validated performance data acc. to ISO 12500-1 and ISO 12500-3	Reliable achievement of the compressed air quality according to ISO 8573-1
Intelligent overall concept	Flow range, filtration grades, efficiencies and available options perfectly meet requirements of compressed air purification
Flow-optimised Design	Minimum pressure losses, thereby savings of energy costs
Pleated filter media	High dirt retention capacity by enlarged filter surface with lowest pressure loss
Coalescence sleeve fixed by outside support liner	Flow area between element and housing guaranteed long term and at any time; optimised drainage function by constant stable structure of the coalescence sleeve
Support liner made of stainless steel stretch metal	Protection of the filter media against pressure shocks. Low pressure loss by a large free cross-sectional area
Use of stainless steel material in combination with aluminium	Good corrosion protection and high temperature resistance

Materials	
Filter media	Borosilicate glass fibre fleece
Coalescence sleeve	Polyester fleece
Inner and outer support liner	Stainless steel 1.4301 / 304
End caps	Aluminium
O-ring	Viton, labs-free: silicone-free and free of compound (Standard)
Bonding	Polyurethane
Validation	
Validation of high-effiency filters acc. to ISO 12500-1 and ISO 12500-3	

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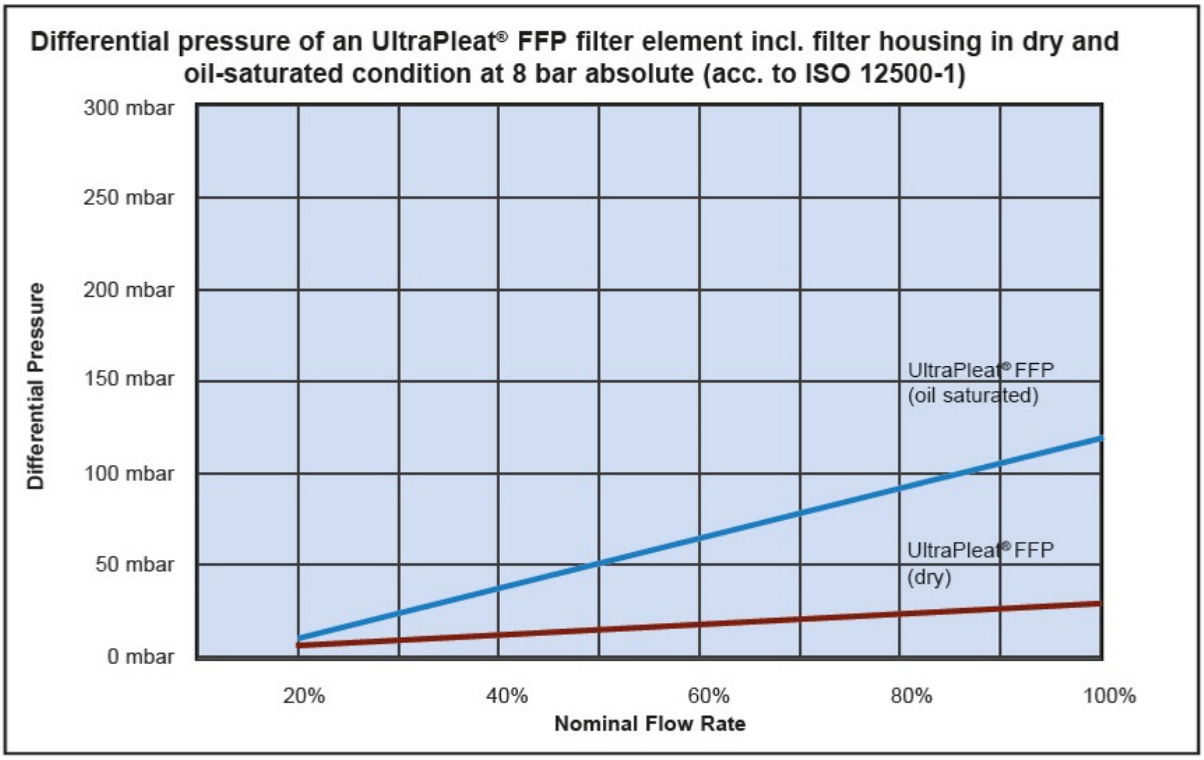
PERFORMANCE DATA



Operating pressure bar g	1	2	3	4	5	6	**7**	8	9	10	11	12	13	14	15	16
Conversion factor fp	0,25	0,38	0,50	0,63	0,75	0,88	**1,00**	1,13	1,25	1,38	1,50	1,63	1,75	1,88	2,00	2,13

Element Type	Nominal Flow Rate at 7 bar g m³/h*
02/05	20
03/05	40
03/10	60
04/10	90
04/20	120
05/20	180
05/25	270
07/25	360
07/30	480
10/30	720
15/30	1080
20/30	1440
30/30	1920
30/50	2880

Sizing example for pressure which deviates from nominal pressure

V_{nom} = 192 m³/h, operating pressure = 9 bar (g)

$V_{korr} = \frac{V_{nom}}{fp}$

$V_{korr} = \frac{192\ m^3/h}{1,25} = 153,6\ m^3/h$

Calculated size: Type 05/20

* m³ related to 1 bar abs. and 20°C

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CERTIFICATE

Certificate of compliance with the order

according to
DIN EN 10204 2.2

Confirmation of Design and Performance Data with Test Report.
Results of the type test (validation) are listed below.

Filter type	UltraPleat® FFP		Filter size			02/05 - 30/50	
Retention of oil aerosols acc. to ISO 12500-1							
Oil retention rate at 8 bar absolute and 10 mg/m³ inlet concentration						99%	
Residual oil concentration at inlet concentration of				10 mg/m³		≤ 0,1 mg/m³	
				3 mg/m³		≤ 0,03 mg/m³	
Retention of particles acc. to ISO 12500-3							
Particle diameter [µm]	lower	0,19	0,24	0,36	0,52	0,81	1,16
	upper	0,24	0,36	0,52	0,81	1,16	1,78
Particle retention rate at 8 bar absolute [%]		98,5	99,6	99,98	99,993	99,998	99,999
Particle retention rate related to particle diameter **0,01 µm** at 1 bar absolute					99,999%		

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P-FF, P-MF, P-SMF

COALESCING FILTER ELEMENTS

Process Filtration

Donaldson® P-FF, P-MF, and P-SMF coalescing depth filters are used for the removal of water, oil aerosols and solid particles from compressed air and gases with absolute retention efficiency.

The coalescing filter uses a three dimensional micro fiber fleece made out of binderfree glass fiber. A 1 µm pre-filter medium is integrated and allows for effective two-stage filtration.

By using various filtration mechanisms such as impaction, sieving, and diffusion, liquid aerosols and solid particles down to the size of 0.01 µm are being retained in the filter.

P-FF, P-MF, and P-SMF

APPLICATIONS

The P-FF, P-MF and P-SMF coalescing filters are used in the following industries:

- Chemical
- Petrochemical
- Pharmaceutical
- Plastics
- Paint
- General machine fabrication
- Food
- Beverage
- Instrumentation and control air

FEATURES	BENEFITS
Expanded inner and outer stainless steel support sleeves for the secure hold of the filter medium	No danger of corrosion – large openings ensure low differential pressure drop and high throughput
Binderfree depth filter medium made of borosilicate glass	Low differential pressure drop
Removal of liquid aerosols and solid particles down to 0.01 µm	Validated retention efficiency, high level of contaminant removal
Large media surface area	High dirt holding capacity, long service life

SPECIFICATIONS

MATERIALS	
Filter Media	Borosilicate microfiber with polyurethane foam drainage layer
Pre- & After-Filter Media	Cerex®*
Outer Foam Socks	Blue polyurethane foam sock up to 176°F HT/CR sock up to 248°F HT/NX sock up to 356°F
Bonding	Polyurethane
End Caps	304 SS
O-Rings	Buna
Inner and Outer Support Sleeves	304 SS

* Cerex® is a registered trademark of Cerex Advanced Fabrics, Inc.

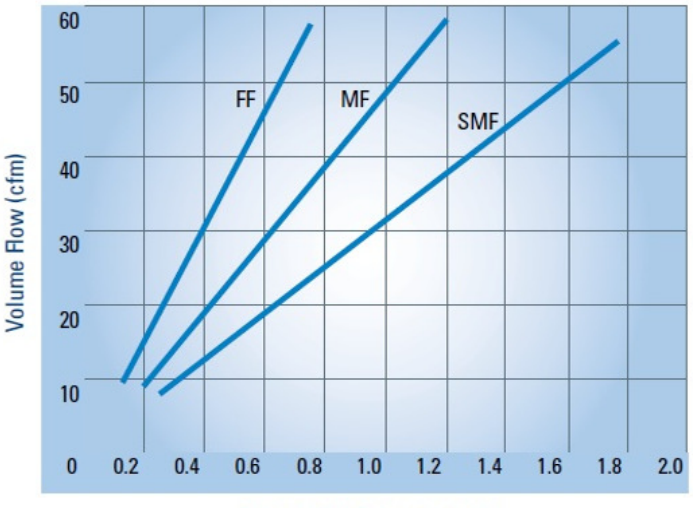
Validation	Validation of high-efficiency filters by Technical University Dresden
Residual oil content at an inlet concentration of 3 mg/m³	FF = 0.1 mg/m³ MF = 0.03 mg/m³ SMF = <0.01 mg/m³
Retention rate related to particles of 0.01 µm	FF = 99.999% MF = 99.99998% SMF = 99.99999%
Maximum Differential Pressure	72.5 psi at 68°F regardless of system pressure
Initial Differential Pressure at Nominal Flow	FF = 0.73 psi MF = 1.20 psi SMF = 1.70 psi

Pressure Drop Calculations

Element Size	Correction Factor Filter Surface (C_F)
03/10	0.12
04/10	0.17
04/20	0.19
05/20	0.25
05/25	0.32
07/25	0.47
07/30	0.68
10/30	1.00
15/30	1.55
20/30	2.10
30/30	3.20
30/50	5.65

The performance curve is based on 1030 element, or one ten inch equivalent (TIE), and the correction factor for filter surface C_F for a 1030 = 1.00.

P-FF, P-MF, P-SMF Element Performance — Compressed Air



These curves define the flow of a 1030 filter element at standard conditions (14.7 psia; 68°F; R.H.= 70%)