Pall Corporation

Ultipleat®

High Flow Filter Systems

Designed for High Flow Applications

*Filtration. Separation. Solution.*SM

ULTIPLEAT

Ultipleat High Flow Filter Systems

High solids, low-flux operator-friendly horizontal and vertical designs

The Ultipleat® High Flow filter satisfies the need for an economical and reliable filter system for high flow applications. Don't settle for traditional bag and cartridge filter systems that won't meet your critical filtration requirements.

Smaller, more economical filter systems

Pall's proven filtration technology offers higher flow rates per filter cartridge than ever before. In fact, just one 152.4 mm (6 in) diameter Ultipleat High Flow filter element can handle flow rates up to 1,900 lpm (500 gpm). The unique crescent-shaped pleat geometry of the Ultipleat filter combined with its large diameter and proprietary range of available filter media enables the use of significantly fewer elements and smaller housings for high flow applications. Greater performance may now be achieved with a system that is two to four times smaller than conventional depth or pleated filter technologies. Smaller systems are also less costly to install and maintain (see Figure 1).

Significant advantages to reduce operating cost and operator intervention can be gained when this format is employed in a low-flux mode.

Lower waste disposal costs

Longer service life and coreless construction equate to minimized disposal volumes and costs. The use of Ultipleat High Flow elements can result in up to four times less volume of spent filters compared to conventional depth filters (see Figure 2).

The inside-to-outside flow configuration and coreless construction of the Ultipleat High Flow filter allows it to be tightly compacted to further minimize disposal costs. Also, since the elements contain no metallic components, incineration is a viable disposal option.

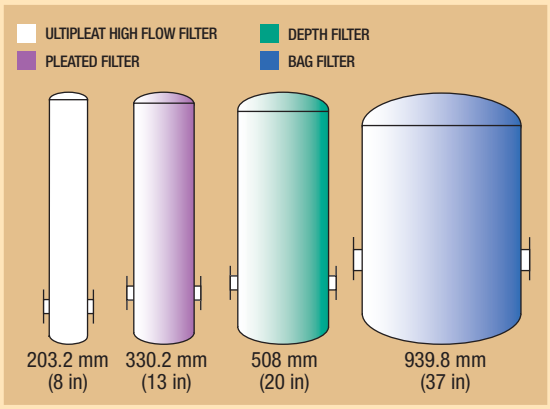
Waste disposal savings are even greater when you consider the longer service life of the Ultipleat High Flow filters. Longer service life means fewer changeouts and fewer elements to dispose.

Lower maintenance costs

Maintenance requirements and production downtime are dramatically reduced with 30 times fewer filters to change out, compared to conventional depth filters (see Figure 3). Removal of spent elements is neither difficult nor messy since all of the solid contamination is trapped inside the filter.

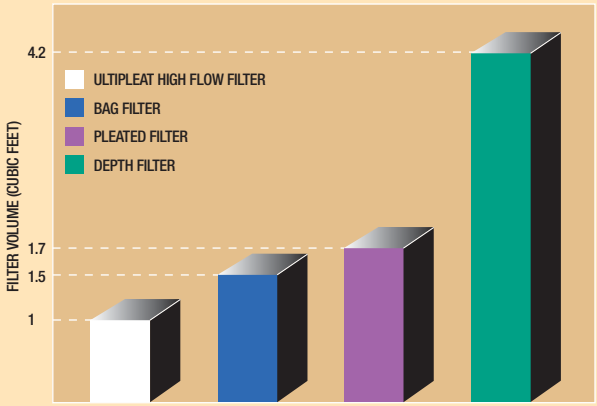
Filter comparison - 5 micron, 1900 lpm (500 gpm) filter

FIGURE 1. TYPICAL HOUSING DIAMETER



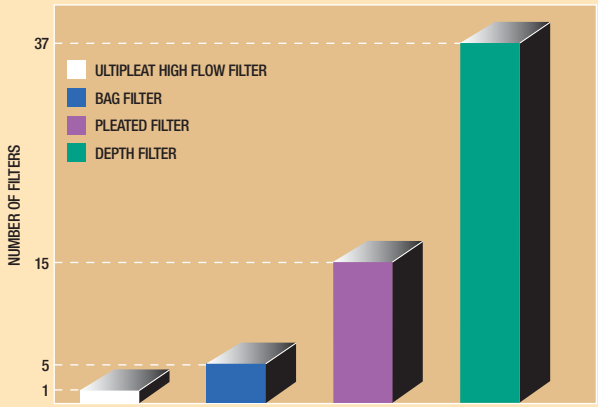
Benefit: Smaller housing diameter, lower capital investment

FIGURE 2. TYPICAL DISPOSAL VOLUME PER CHANGEOUT

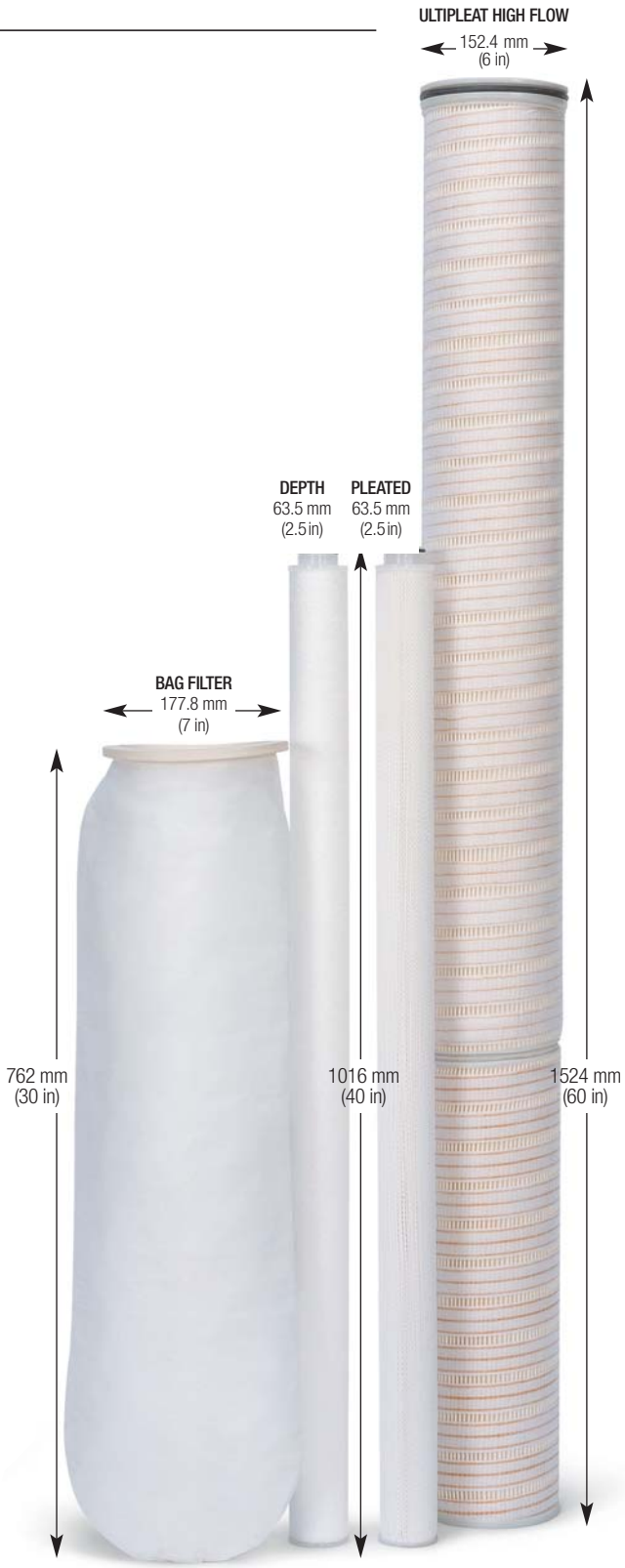


Benefit: Reduced disposal cost

FIGURE 3. TYPICAL NUMBER OF FILTERS



Benefit: Fewer filters required per year, lower changeout costs



Typical Applications

Ultipleat High Flow filter systems are used in a wide variety of applications where high flow rates and long service life are primary requirements. Ultipleat High Flow filter systems are successfully used around the world in installations with flow rates up to 15,140 lpm (4,000 gpm).

Fuels & Chemicals

Chemical Plants, Refineries, Amines, Diesel Fuel, Specialty Chemicals, Petrochemicals, Polymer, Oil Recovery, Sea Water Injection, Gas Pigging, Film, Fiber & Resins, High-Performance Plastics

Machinery & Equipment

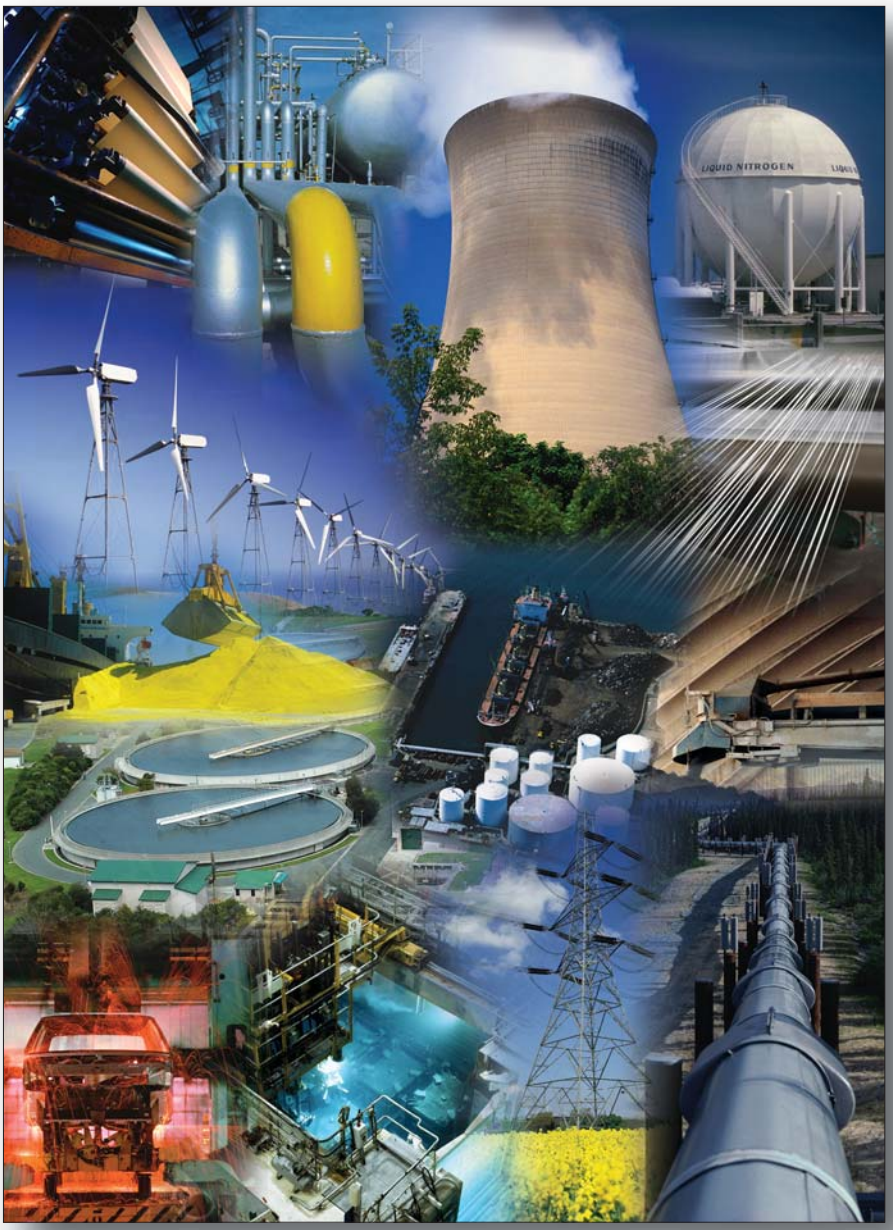
Electrodeposited Primers, Paints & Coatings, Pulp & Paper, Automotive Manufacturing, Mobile Equipment, Primary Metals

Power Generation

Boiler Condensate, Nuclear and Fossil Power Plants, Cogeneration, Gas Turbines

Water Processing

Reverse Osmosis, Centralized Water Systems, Process Water, Municipalities, Desalination, Process Wastewater



Lower Operating Costs, Longer Filter Life

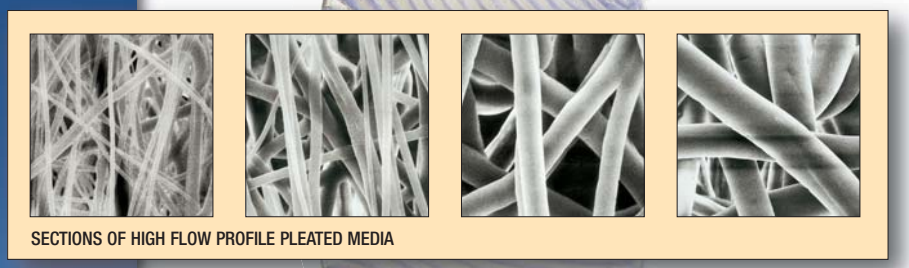
The Ultipleat High Flow filter system's innovative design provides long filter service life and low operating costs in a compact design. Don't compromise on service life and operating costs…let Pall's unique technology give you the durability and affordability you require.

Innovation: High-performance filter media

Many of Pall's available filter media incorporate a tapered pore structure made from fine fibers. This results in a range of filter media with excellent dirt-holding capacity and low resistance to flow. In addition, the fixed pore media provide precise and reliable fluid quality.

Result: Economical and reproducible filtration

ULTIPLEAT HIGH FLOW FILTERS



SECTIONS OF HIGH FLOW PROFILE PLEATED MEDIA

Unique Pleat Design, Reliable Particle Removal

Innovation: Ultipleat filter technology

The Ultipleat High Flow filter system leverages Pall's patented crescent-shaped pleat design allowing for a large amount of filter area to be packed into a single cartridge while still fully utilizing the media for solids collection. The Ultipleat High Flow filters can be operated in either high-flux or low-flux modes. Each 60- or 80-inch length filter can process up to 1,900 lpm (500 gpm) in service with relatively clean fluids to minimize the housing size and capital expenditure. At low fluxes and higher incoming contaminant levels, the Ultipleat High Flow filters have been found to provide exceptional filter service life reducing the number of filter changeouts and lowering the cost for replacement cartridges and disposal of spent filters.

In addition to the innovative crescent-shaped pleat design, Pall's proprietary media are also key to the excellent performance, providing high dirt capacities and absolute micron removal efficiencies. Pall's Ultipleat High Flow filters are available in a wide range of materials and micron ratings to optimize your application.

ULTIPLEAT HIGH FLOW FILTER SYSTEM

ILLUSTRATION OF HORIZONTAL HOUSING

Uniform flow distribution over the filter's entire surface

The fluid flow is completely uniform across the entire surface of the filter medium. This evenly distributed flow is maintained by the flow channel being of the same width and length on both sides of the filter medium (see Figure 4). This uniform flow is maintained, even with high differential pressures across the element, due to the uniquely designed upstream support and downstream drainage layers. These layers, which sandwich the filter medium, hold the flow channels open. The pleats are then held in place and preserved by the proprietary external helical wrap that is bonded to each pleat tip along the outer diameter of the cartridge. Comparatively, the upstream flow channel of the medium in a conventional triangular-shaped pleat structure is much more open than the downstream side (see Figure 5). Consequently, the flow is highest at the bottom of the pleat. This non-uniform flow distribution may result in areas of rapid plugging where the flow is the highest. Additionally, such a flow pattern through a conventional triangular-shaped pleat structure may cause inconsistent particle removal.

The drainage and support materials used in conventional pleated filters are often thin and structurally weak. Consequently, pleats may become compacted and produce lower flow rates, and ultimately limit on-stream filter service life (see Figure 5).

Ultipleat High Flow filter's uniform flow yields:

- ☑ Maximum filter service life through full utilization of media
- ☑ Reliable particle removal
- ☑ Low resistance to flow for longer periods of time

FIGURE 4. UNIFORM FLOW DISTRIBUTION
AMOUNT OF FLOW DEPICTED BY SIZE OF ARROW

ULTIPLEAT HIGH FLOW FILTER CONSTRUCTION

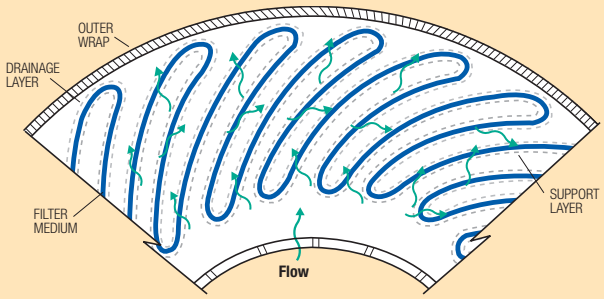
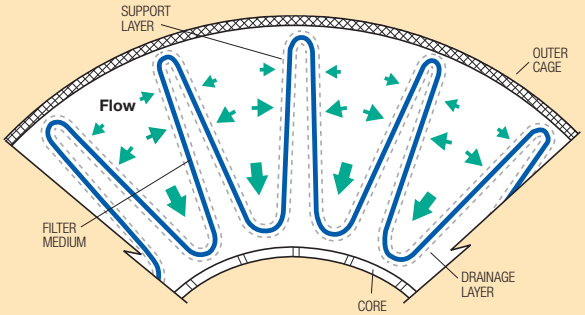
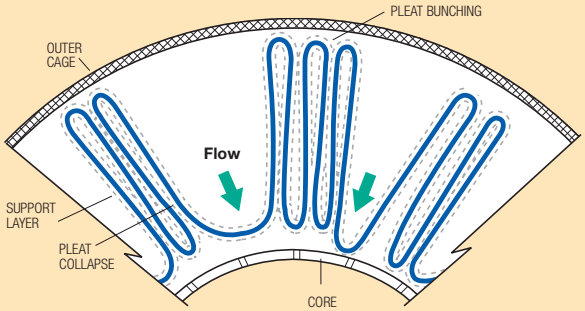


FIGURE 5. NON-UNIFORM FLOW DISTRIBUTION
AMOUNT OF FLOW DEPICTED BY SIZE OF ARROW

CONVENTIONAL PLEATED ELEMENT CONSTRUCTION



PLEAT COLLAPSE AND BUNCHING IN A POORLY DESIGNED FILTER



PLEAT COLLAPSE AND BUNCHING
Loss of effective area leading to:
- Shorter filter service
- Media migration
- Bypass of contaminants

Materials of Construction

Filter Medium Type	Filter Medium	Support/Drainage Materials	End Caps	Wrap Materials
HDC® II Medium	High Area Polypropylene Structure	Polypropylene	Glass Filled Polypropylene	Polypropylene and Polyolefin Hotmelt
Profile® Medium in Ultipleat Format	Pleated Polypropylene Depth Structure	Polypropylene	Glass Filled Polypropylene	Polypropylene
Ultipor® GF Medium	Resin Bonded Glass Fiber / Polyester Support	Polyester / Nylon	Glass Filled Acetal	Polyester and Polyamide Hotmelt
Ultipleat CAS Medium	Pleated Polypropylene / Polyether Sulfone Membrane	Polypropylene	Glass Filled Polypropylene	Polypropylene

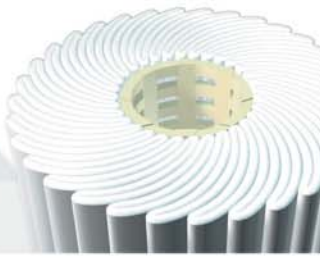
Operating Conditions

	Polypropylene Medium/ CAS Composite Medium	Glass Fiber Medium[2]
Maximum Differential Pressure[1] (normal inside to outside flow)	50 psid at 180˚F 3.4 bar at 82˚C	50 psid at 250˚F 3.4 bar at 121˚C

1) For fluids compatible with the filter element at the stated temperature.

2) Maximum temperature in aqueous systems is 60°C / 140°F for GF medium.

ULTIPLEAT HIGH FLOW FILTER CARTRIDGE



Ordering Information/Specifications

Filter Cartridge Part Numbers

HFU▲●◆

Code ▲	Filter Dimensions, nominal, diameter (mm/in) x length (mm/in)	Suggested Maximum Water Flow Per Cartridge (lpm/gpm/mgd)
620	152.4/6 x 508/20	663/175/0.25
640	152.4/6 x 1016/40	1325/350/0.5
660	152.4/6 x 1524/60	1900/500/0.7
680	152.4/6 x 2032/80	1900/500/0.7

Medium Type	Grade ●	Removal Rating (microns) at Beta 5000 (99.98%) in liquid service[1]	Typical Element Aqueous Pressure Drop[2]							
			20 inch length		40 inch length		60 inch length		80 inch Length	
			(psid/100 gpm)	(mbar/M³/hr)	(psid/100 gpm)	(mbar/M³/hr)	(psid/100 gpm)	(mbar/M³/hr)	(psid/100 gpm)	(mbar/M³/hr)
HDC II Medium	J060	6	0.158	0.48	0.080	0.24	0.058	0.17	0.040	0.12
	J100	10	0.120	0.36	0.060	0.18	0.040	0.12	0.030	0.09
	J200	20	0.100	0.30	0.050	0.15	0.033	0.10	0.025	0.08
Profile Medium in Ultipleat Format	UY020	2[3]	1.091	3.31	0.540	1.64	0.362	1.10	0.270	0.82
	UY045	4.5	0.489	1.48	0.242	0.73	0.162	0.49	0.121	0.37
	UY060	6	0.395	1.20	0.196	0.59	0.131	0.40	0.098	0.30
	UY100	10	0.344	1.04	0.170	0.52	0.114	0.35	0.085	0.26
	UY200	20	0.243	0.74	0.120	0.36	0.080	0.24	0.060	0.18
	UY400	40[4]	0.182	0.55	0.090	0.27	0.060	0.18	0.045	0.14
	UY700	70[4]	0.040	0.12	0.020	0.06	0.013	0.04	0.010	0.03
	UY1000	90[4]	0.027	0.08	0.013	0.04	0.009	0.03	0.007	0.02
Ultipor GF Medium	GF020	2	0.219	0.66	0.110	0.33	0.073	0.22	0.055	0.17
	GF060	6	0.180	0.55	0.090	0.27	0.060	0.18	0.045	0.14
	GF100	10	0.159	0.48	0.080	0.24	0.053	0.16	0.040	0.12
	GF200	20	0.119	0.36	0.060	0.18	0.040	0.12	0.030	0.09
	GF400	29[4]	0.100	0.30	0.050	0.15	0.033	0.10	0.025	0.08
Ultipleat CAS Medium	CAS010	1	1.496	4.54	0.740	2.25	0.496	1.51	0.370	1.12

Code ◆	O-ring Materials
H13 (standard for glass fiber filters)	Buna N
H13U[5]	Buna N U-Cup
J (standard for polypropylene filters)	Ethylene propylene
JU[5]	Ethylene propylene U-Cup
H4	Silicone
H	Fluoroelastomer

[1] The test procedure used is an adaptation of ISO 4572, modified to determine the micron size above which particles are quantitatively removed.

[2] Multiply this value by the total system flow to determine the aqueous pressure drop. For fluids other than water, multiply this value by the fluid's viscosity at the operating temperature in centipoise. This value is the pressure drop across the Ultipleat High Flow filter(s) only; it must be added to the pressure drop contribution from the Ultipleat High Flow filter housing.

[3] 2 micron at 99% efficiency.

[4] The removal efficiency was determined by the maximum spherical particle analysis.

[5] U-Cup seal is standard for the 1 micron composite filter.

High-Purity Systems

Safe water with Ultipleat High Flow systems

The media within our Ultipleat High Flow (CAS010) filter provides greater than 3 log reduction of *Giardia* oocysts and *Cryptosporidium* cysts. This unsurpassed removal of Cryptosporidium and Giardia from process water gives manufacturers the protection required to provide their customers with safe products.

Sanitation of Ultipleat High Flow 1-micron filters

Ultipleat High Flow 1-micron filters may be sanitized by any of the following methods:

- ☑ Hot water: 85° - 90°C (185° - 194°F)
- ☑ For information on other sanitization chemicals/methods, contact Pall

Housings

HOUSING DESIGN FEATURES

Orientation	Horizontal or vertical
Pressure/temperature rating[1]	10.0 bar (145 psi) @ 80.0°C (176°F)
Housing seal	Ethylene propylene (J)[2]
Material (wetted parts)	316L stainless steel
Number of elements	1

[1] Higher temperatures allowable for lower pressures.
[2] Seal materials meet FDA requirements for food contact use detailed in 21 CFR Section 177.2600 (excluding milk and edible oils).
[3] Please contact Pall for availability of specific or additional options.

Part Numbers/Ordering Information ▲■1●G◆J▼

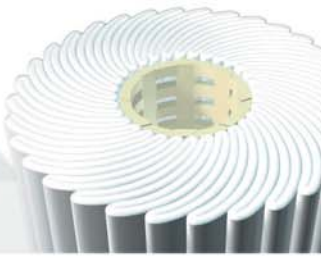
Code ▲	Surface Treatment
UHFS	Mechanically polished to 32 u-inch / 0.8 um Ra, pickled and passivated
EWHF	Glass beaded, passivated

Code ■	Housing Configuration
H	Horizontal
V	Vertical

Code ●	Nominal Element Length (mm/in)
2	508/20
4	1016/40
6	1524/60

Code ◆	Inlet/Outlet Connection[3]
31	2" Clamp coupling
47	3" Clamp coupling
NW80	DIN 11851 80 mm thread
NW100	DIN 11851 100 mm thread

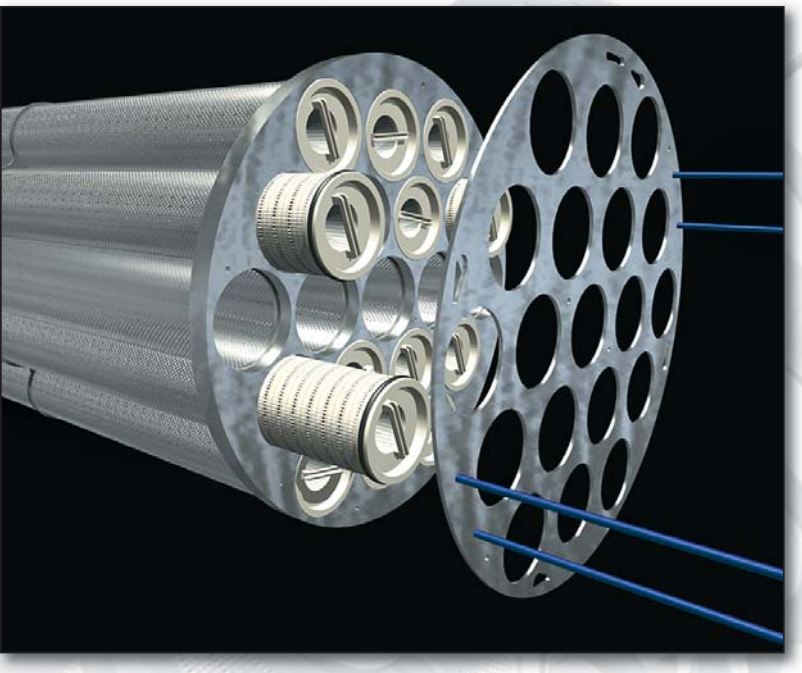
Code ▼	Type
Blank	EWHF housing
W	UHFS housing



Industrial Housings

Designs

Housings are available in both horizontal* and vertical configurations. The inline horizontal configuration minimizes pressure drop and is more easily accessible for filter changeout. Vertical configurations are an option, depending on your application and space limitations.



UNIQUE FILTER ELEMENT-TO-TUBESHEET SEAL, IS SHOWN HERE WITH ELEMENT HOLD DOWN PLATE.

INDUSTRIAL HOUSING DESIGN FEATURES

Design	ASME, section VIII Division 1 code
Orientation	Horizontal or vertical
Maximum Differential Pressure Across Tubesheet	5.2 bard (75 psid) maximum
Standard Closure Gasket	Spiral wound 304 stainless/mineral filler
Exterior Surfaces	Sandblasted and coated with an inorganic zinc primer
Vent and Drains	1" (2.54 cm) FNPT

INDUSTRIAL HOUSING DESIGN RATINGS

Vessel Material	Pressure Rating at 82°C (180°F) (bar/psig)	Pressure Rating at 135°C (275°F) (bar/psig)
Carbon steel	18.3/265	16.3/237
304 stainless steel	16.8/243	14.6/212
304L stainless steel	13.9/202	12.4/180
316 stainless steel	17.0/247	15.2/220
316L stainless steel	13.9/202	12.4/180

Innovation: Unique element sealing mechanism

In multi-cartridge housings, the elements are sealed into the tubesheet, independent of the housing closure, utilizing a unique sealing arrangement.

Result: Consistent fluid quality

These innovations make the Ultipleat High Flow filter system a compact, economical, environmentally sound and user-friendly product that will provide the highest performance and best overall value.

* Required for 80 inch length elements.

Ordering Information - Standard Horizontal and Vertical Housings

ASME Coded Pressure Vessels

Part Number	Number of Filters	Max Aqueous Rated Flow Per Housing[1] (lpm/gpm)	Nominal Housing Outer Diameter (D) (mm/in)	Inlet/Outlet Flange Diameter (mm/in)	Housing Overall Nominal Length (L)[2] (mm/in)	Horizontal Housing Nominal Height (H) (mm/in)
1HF ■ ● 0804F1 ▲ ◆	1	1893/500	219.1/9	101.6/4	2261/89	817/32
2HF ■ ● 1606F1 ▲ ◆	2	3785/1000	406.4/16	152.4/6	2527/100	1023/40
3HF ■ ● 1808F1 ▲ ◆	3	5680/1500	457.2/18	203.2/8	2642/104	1093/43
4HF ■ ● 2008F1 ▲ ◆	4	7570/2000	508/20	203.2/8	2654/105	1175/46
7HF ■ ● 2412F1 ▲ ◆	7	13248/3500	609.6/24	304.8/12	2832/112	1487/59
12HF ■ ● 3016F1 ▲ ◆	12	22710/6000	762/30	406.4/16	3073/121	1480/58
19HF ■ ● 3620F1 ▲ ◆	19	35958/9500	914.4/36	508/20	3264/129	1718/68

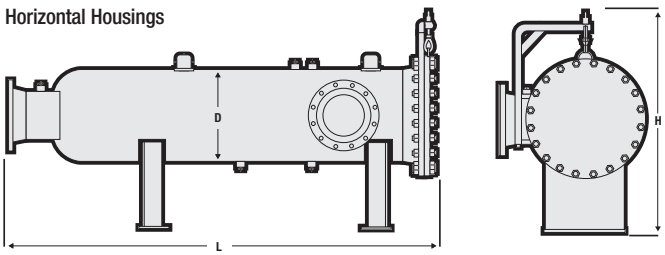
Code ■	Housing Configuration
H	Horizontal
V	Vertical

Code ●	Nominal Element Length (mm/in)
2	508/20
4	1016/40
6	1524/60
8	3032/80

Code ▲	Housing Metallurgy
285	Carbon steel vessel, 304 stainless steel tubesheet
S3	304L stainless steel
S8	304 stainless steel
L3	316L stainless steel
L8	316 stainless steel

Code ◆	Optional Outlet Style Horizontal Housings[3]
XU	Upper outlet location
XL	Lower outlet location

Horizontal Housings



[1] The housing aqueous pressure drop at the maximum flow rating with the connection sizes noted will be approximately 5 psig (0.3 bar). To calculate the actual housing pressure drop, multiply this aqueous pressure drop by the fluid's specific gravity. This housing pressure drop must be added to the filter pressure drop calculated on page 9, above to determine the pressure drop of the Ultipleat High Flow Filter System.

[2] For 60-inch filter lengths.

[3] If the housing is to be used as a prefilter to a horizontal liquid/liquid coalescer, then the vessel should be ordered using the XU or XL option for the outlet location. The orientation of the outlet should be the same as that of the sump on the coalescer. In this way no buildup of coalesced liquid will occur in the prefilter.

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Filtration. Separation. Solution.SM

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