PALL

Pall Corporation

Ultipleat®

High Flow Filter Systems

Designed for Large Flow Applications

*Filtration. Separation. Solution.*SM

ULTIPLEAT®

Ultipleat High Flow Filter Systems

...fewer elements
smaller housings
higher flow rates
and bigger cost savings

The Pall Ultipleat® High Flow filter system addresses your need for an economical and reliable filter system for high flow applications. You no longer have to rely on traditional bag or cartridge filter systems that do not meet all of your requirements.

Smaller, more economical filter systems

This proven filtration technology has advanced to the next level with even higher flow rates per filter cartridge. In fact, just one six-inch diameter Ultipleat High Flow filter element can handle up to 500 gpm (1900 lpm). The unique crescent-shaped pleat geometry, combined with its large diameter and proprietary range of available filter media, permits 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).

Lower waste disposal costs

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

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

Waste disposal savings are even greater when the longer service life of Ultipleat High Flow filters is considered. Less frequent change outs provide even fewer elements for disposal.

Lower maintenance costs

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

Filter Comparison-500 GPM at 5 micron

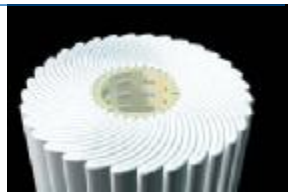


FIGURE 1. TYPICAL HOUSING DIAMETER

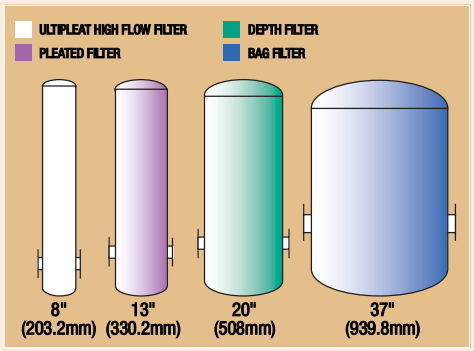


FIGURE 2. TYPICAL DISPOSAL VOLUME PER CHANGEOUT

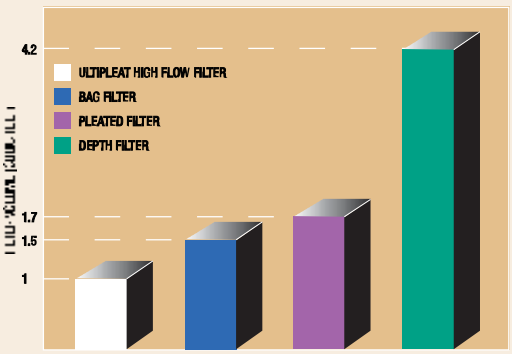
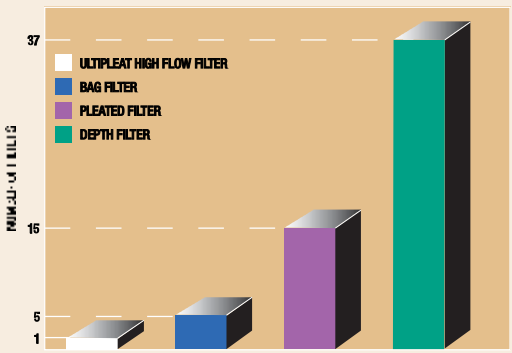
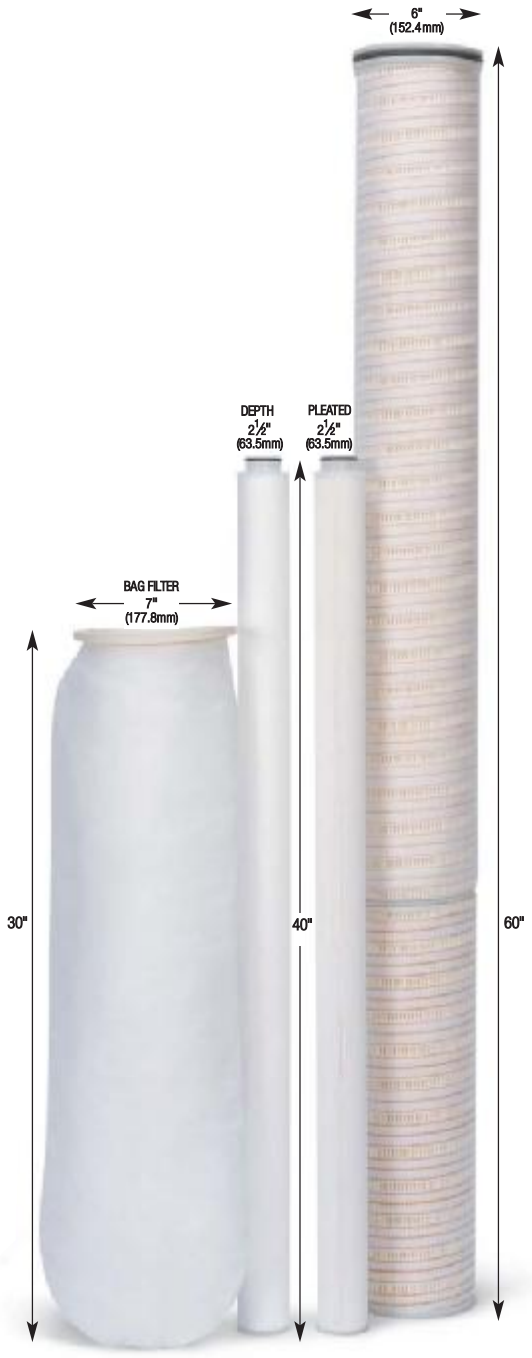


FIGURE 3. TYPICAL NUMBER OF FILTERS





Ultipleat High Flow Filter System Applications

Biopharmaceutical:

Pharmaceuticals, Cosmetics, Fragrances, Toiletries, Bioprocesses

Food & Beverage:

Beer, Wine, High Fructose Corn Syrup, Fats, Edible Oils, Soft Drinks, Dairy, Juice, Cyst and Oocyst Barrier, Bottled Water, Pre-RO, Utility Water

Fuels & Chemicals:

Chemical Plants, Refineries, Amines, Diesel Fuel, Specialty Chemicals, Petrochemicals, Polymer, Oil Recovery, Film, Fiber and Resins, High Performance Plastics

Machinery & Equipment:

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

Microelectronics:

Makeup Water, Semiconductors, Microlithography, Chemical Mechanical Polishing, Process Chemicals

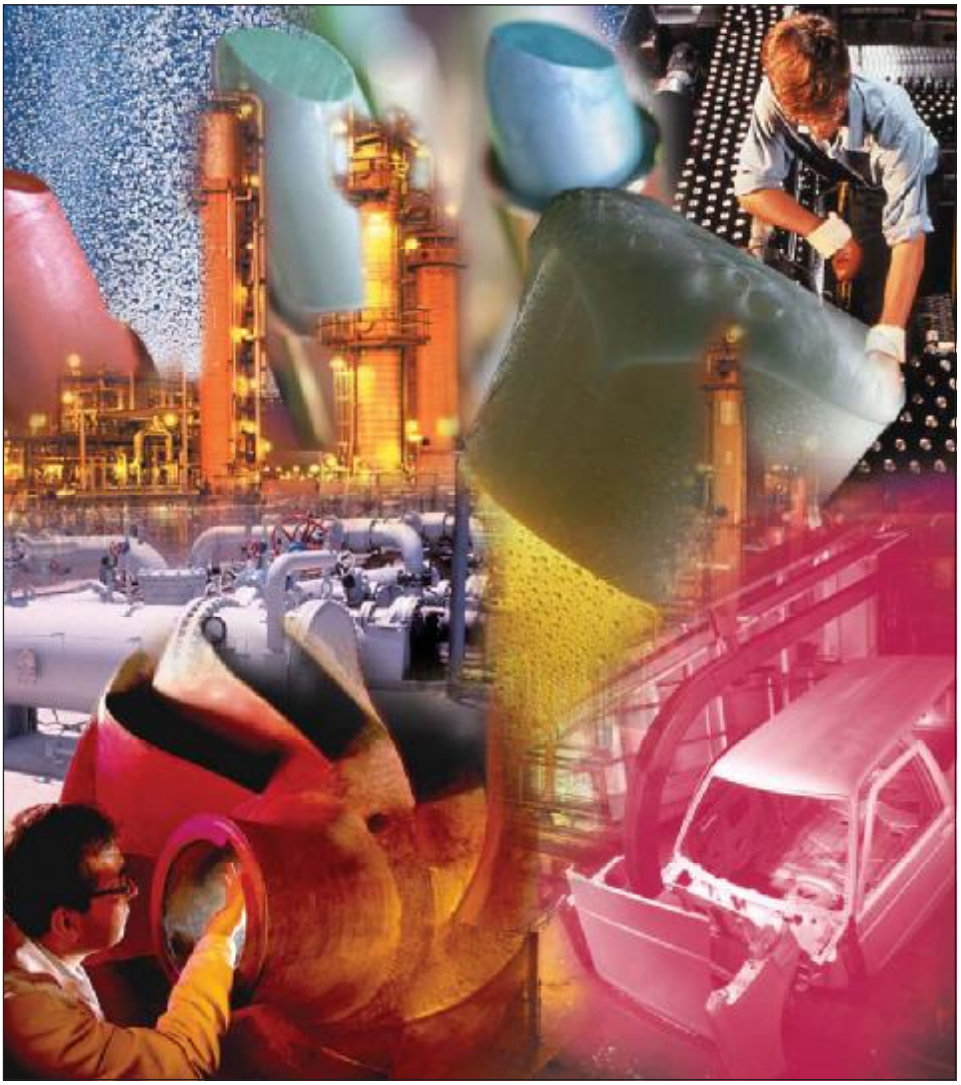
Power Generation:

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

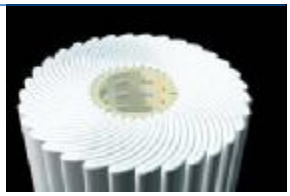
Water Processing:

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

Ultipleat High Flow filter systems are used in a wide variety of applications where high flow rates and long service life are primary requirements. These filter systems are used successfully in installations ranging up to 4,000 gpm (15,142 lpm).



Optimize filter life and lower operating costs with smaller Ultipleat High Flow filter systems

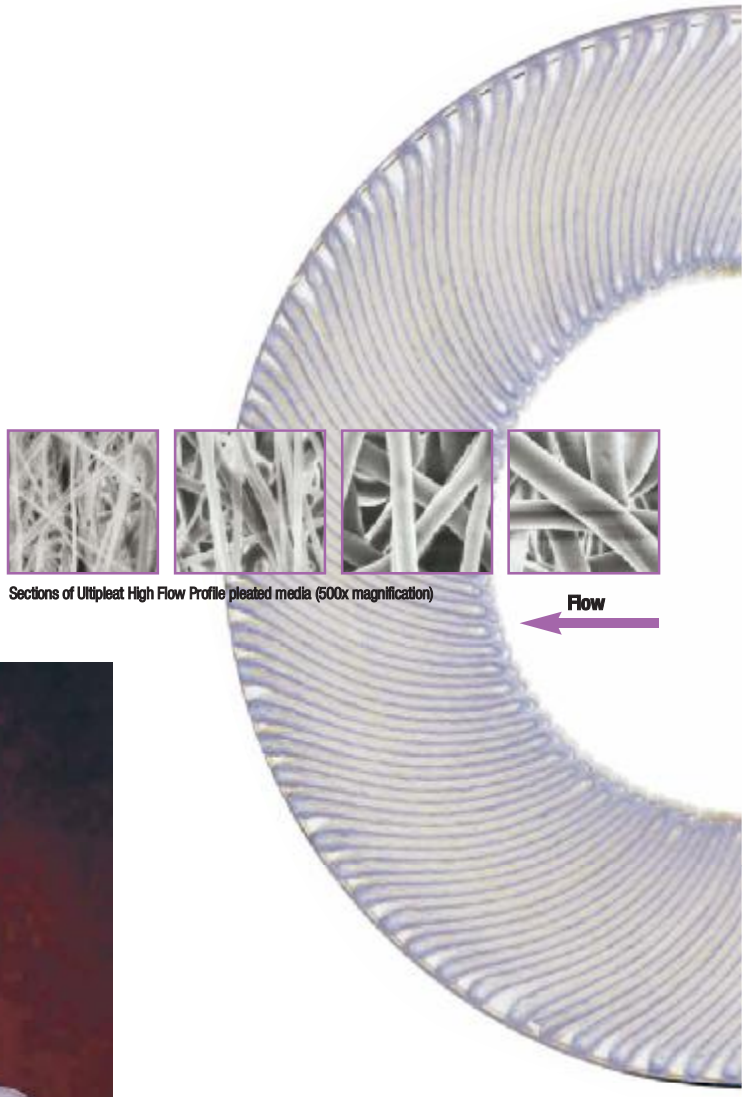


Long filter service life and low operating costs you require will not be compromised with the smaller Ultipleat High Flow filter systems due to innovative product features.

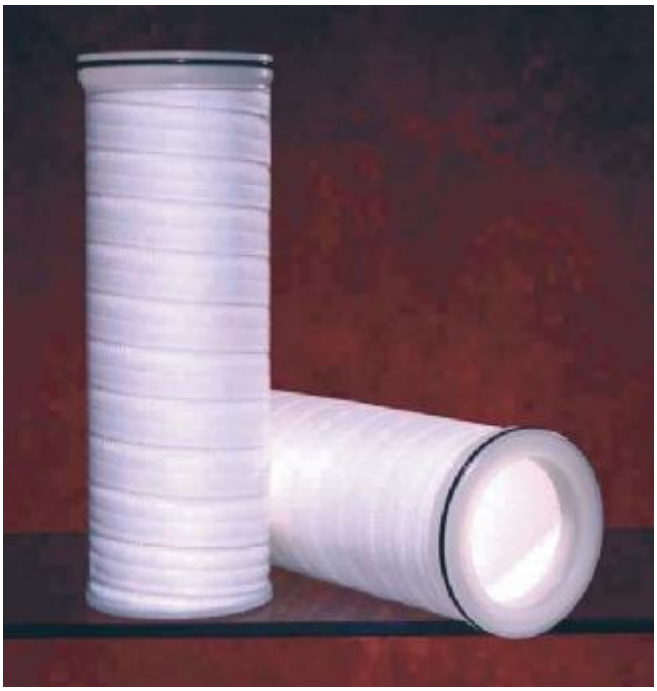
Innovation: High performance filter media

Many of the available filter media have 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



Sections of Ultipleat High Flow Profile pleated media (500x magnification)



Ultipleat High Flow Filter Systems

Innovation: Ultipleat filter technology

The Ultipleat High Flow filter system is an extension of Pall's proprietary Ultipleat filter technology. The crescent-shaped pleat design of the Ultipleat High Flow filter allows for a large amount of filter area to be packed into one cartridge capable of handling up to 500 gpm (1900 lpm). Such a high flow rate combined with long filter service life in a small vessel, results in the lowest overall cost of ownership. No other filter can provide such performance. However, large filter area is only one aspect behind the superior performance of the Ultipleat High Flow filter.

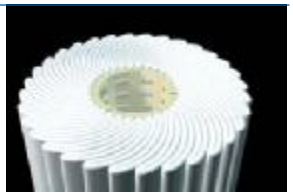
Uniform flow distribution over the filter's entire surface is the key.

The fluid flow is completely uniform across the entire surface of the filter medium. The evenly distributed flow is maintained since the flow channel is 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 thereby resulting in lower flow rates and, thus, limited on stream filter service life (see Figure 5).

Ultipleat High Flow filter's uniform flow yields:

- **Maximum filter service life**
- **Reliable particle removal**
- **Low resistance to flow for longer periods of time**



UNIFORM FLOW DISTRIBUTION
AMOUNT OF FLOW DEPICTED BY SIZE OF ARROW

Ultipleat High Flow Filter Construction

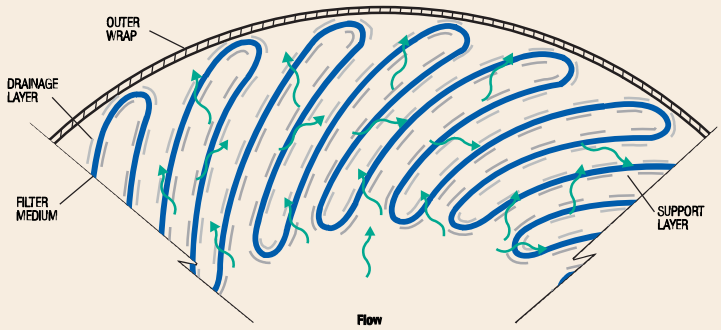
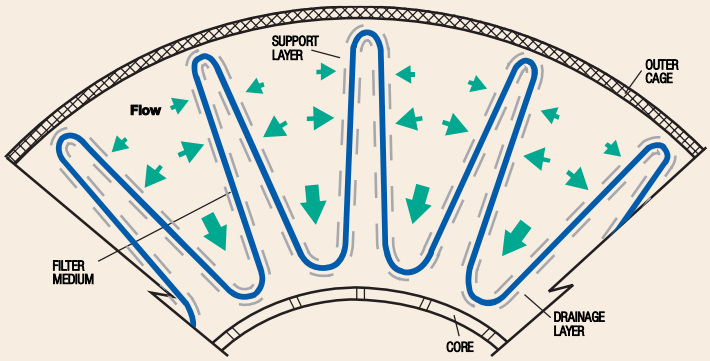


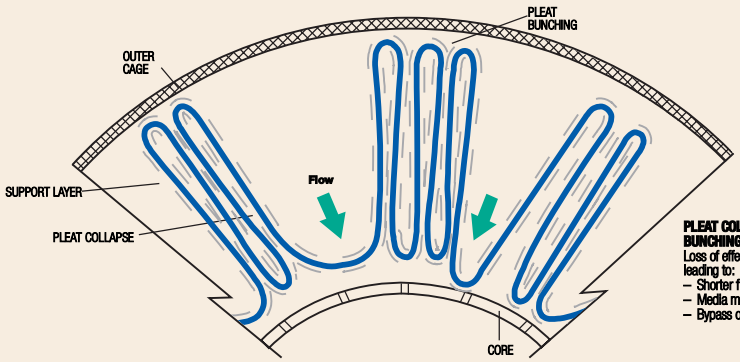
Figure 4.

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 life
- Media migration
- Bypass of contaminants

Figure 5.

Filter Ordering Information

Part Numbers HFU ▲●■

Select the appropriate part number from the tables below.

Medium Type	Code ●	Absolute Liquid Removal Rating at 99.98% Efficiency by Count[1] (um)	Maximum Allowable Pressure Drop at Temperature		Typical Element Aqueous Pressure Drop[2]					
					20" Length		40" Length		60" Length	
			(PSID/Bar)	Temp. (°F/°C)	(PSID/GPM)	(mBarD/M³/H)	(PSID/GPM)	(mBarD/M³/H)	(PSID/GPM)	(mBarD/M³/H)
HDC®-II Pleated Polypropylene[3]	J060	6	50/3.4	180/82	0.0016	0.48	0.0008	0.24	0.0005	0.15
	J100	10	50/3.4	180/82	0.0018	0.55	0.0006	0.18	0.0004	0.12
	J200	20	50/3.4	180/82	0.0011	0.30	0.0005	0.15	0.0003	0.09
Ultipleat Profile® Pleated Depth Polypropylene[3]	UY020[4]	2	50/3.4	180/82	0.0089	3.0	0.0054	1.6	0.0037	1.1
	UY045	4.5	50/3.4	180/82	0.0046	1.4	0.0023	0.70	0.0015	0.46
	UY060	6.2	50/3.4	180/82	0.0064	1.9	0.0032	1.0	0.0021	0.64
	UY100	10	50/3.4	180/82	0.0034	1.0	0.0017	0.52	0.0011	0.33
	UY200	20	50/3.4	180/82	0.0024	0.8	0.0012	0.36	0.0008	0.24
	UY400[5]	50	50/3.4	180/82	0.0018	0.55	0.0009	0.27	0.0006	0.18
	UY700[5]	70	50/3.4	180/82	0.004	0.11	0.0002	0.05	0.0001	0.04
	UY1000[5]	90	50/3.4	180/82	0.0008	0.26	0.0004	0.11	0.0003	0.08
Ultipor® Glass Fiber[6]	GF020	2	50/3.4	250/121	0.0022	0.67	0.0011	0.33	0.0007	0.21
	GF060	6	50/3.4	250/121	0.0039	1.2	0.0019	0.58	0.0013	0.40
	GF100	10	50/3.4	250/121	0.0016	0.49	0.0008	0.24	0.0005	0.15
	GF200	20	50/3.4	250/121	0.0012	0.36	0.0006	0.18	0.0004	0.12
Ultipor® GFK Medium	P100[7]	10	50/3.4	180/82	0.0016	0.49	0.0008	0.24	0.0005	0.15
	GFK100	10	50/3.4	250/121	0.0020	0.607	0.001	0.304	0.0007	0.213
Ultipor® K Medium	K200	20	50/3.4	200/93[8]	0.0031	0.941	0.0015	0.455	0.001	0.304
Ultipleat® Polyethersulfone Membrane[3]	CAS010	1	50/3.4	180/82	0.0128	3.9	0.0074	2.3	0.0049	1.5

Code ▲	Filter Dimensions (In/mm)**
620	6/152.4 x 20/508
640	6/152.4 x 40/1016
660	6/152.4 x 60/1524

Code ■	O-ring Materials
H13 (Standard for glass fiber filters)	Buna N
J (Standard for polypropylene filters)	Ethylene Propylene
H4	Silicone
H	Fluorocarbon Elastomer
H1	FEP Encapsulated Fluorocarbon Elastomer
H13U	Buna N U-Cup Seal
JU	Ethylene Propylene U-Cup Seal
JUW[9] (FDA Listed Materials)	Ethylene Propylene U-Cup Seal*

* Manufactured from Ethylene Propylene which is listed for food contact applications in Title 21 of the U.S. Code of Federal Regulations.

Footnotes:

1. The test procedure used is an adaption of ISO 4572, modified to determine the micron size above which particles are quantitatively removed.
2. Pressure drop in PSIG per GPM for the cartridge length shown. Multiply this value by the total system flow to determine the aqueous pressure drop. Next for fluids other than water, multiply this value by the fluid viscosity (in centipoise) at the operating temperature. Divide this calculated pressure drop by 3. This will determine the number of filters required to have a 3 psig/(0.2 bar) pressure drop across the filter elements at startup. This value is the pressure drop across the Ultipleat High Flow filter(s) only-It must be added to the pressure drop due to the Ultipleat High Flow housing to determine the total system pressure drop. Refer to the housing ordering information table to select a housing that can hold the number of filters you calculated.
3. Polypropylene medium and polyethersulfone membrane filters are made with FDA listed materials with the exception of the glass reinforced polypropylene end caps.
4. 99% efficiency.
5. Filters rated by Maximum Spherical Particle Passed test.
6. Maximum temperature in aqueous systems is 140°F/60°C.
7. Filter optimized for hydrogen peroxide working solution.
8. Rating in Aqueous Service
9. U-Cup Seal is standard for 1 micron CAS010 polyethersulfone filter.

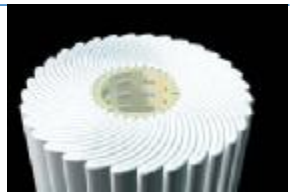
40" FILTER CARTRIDGE

Sizes**

Filter Diameter (in/mm)	Filter Length (in/mm)	Suggested Maximum Flow of Water (GPM/LPM)
6/152.4	20/508	175/663
6/152.4	40/1016	350/1325
6/152.4	60/1524	500/1900

** All dimensions are nominal.

High Purity Ultipleat High Flow Filter Systems



Cyst and Oocyst Protection with Ultipleat High Flow Systems

The one-micron Ultipleat High Flow filter with our proprietary polyethersulfone membrane 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.

Sanitization of Ultipleat High Flow 1-Micron Filters

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

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

High Purity Housings

Housing Design Features	
Orientation	Horizontal or Vertical
Pressure/Temperature Rating	145psi (10.0 bar)@176°F (80.0°C)
Housing Seal	FDA-listed Ethylene Propylene
Material	316L Stainless Steel
Electropolish finish	32 µ-inch/0.8 µm Ra
Number of elements	1

Part Numbers ▲ ■ 1 ● G ◆ J

Code ▲	Housing Design
UHFS	Sanitary, electropolished
EWHF	Non-electropolished

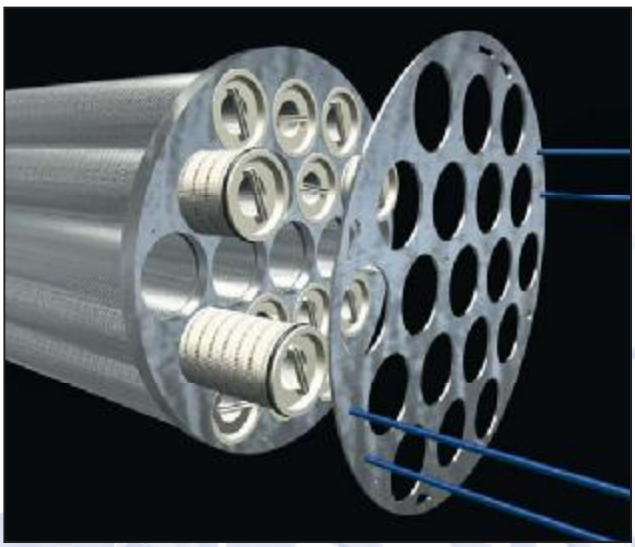
Code ●	Nominal Element Length (in/mm)
2	20/508
4	40/1016
6	60/1524

Code ■	Housing Configuration
H	Horizontal
V	Vertical

Code ◆	Inlet/Outlet Connection
31	2" Tri-clamp
47	3" Tri-clamp
NW80	80 mm DIN
NW100	100 mm DIN

Industrial Housing Designs

A series of 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	75 psid (5.2 bar) 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 180°F (82°C) (PSIG/Bar)	Pressure Rating at 275°F (135°C) (PSIG/Bar)
Carbon steel	265/18.3	237/16.3
304 stainless steel	243/16.8	212/14.6
304L stainless steel	202/13.9	180/12.4
316 stainless steel	247/17.0	220/15.2
316L stainless steel	202/13.9	180/12.4

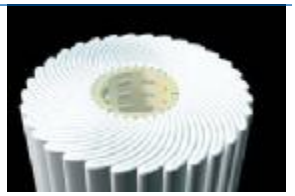
Innovation: Unique element sealing mechanism

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.

Industrial Housing Ordering Information



ASME Coded Pressure Vessels

Select the appropriate part number from the tables below.

Part Number	Number of Filters	Aqueous Rated Flow Per Housing (GPM/LPM[1])	Nominal Housing Outer Diameter (D) (in/mm)	Inlet/Outlet Flange Diameter (in/mm)	Housing Overall Length (L) (in/mm)	Horizontal Housing Height (H) (in/mm)	Housing Weight Empty (Lbs/KG)	Housing Weight Full of Water (Lbs/KG)
1HF ■ ● 0804F1 ▲ ◆	1	500/1893	8⅝/219.1	4/101.6	89/2261	32/817	471/214	621/282
2HF ■ ● 1606F1 ▲ ◆	2	1000/3785	16/406.4	6/152.4	100/2527	40/1023	1172/532	1771/803
3HF ■ ● 1808F1 ▲ ◆	3	1500/5680	18/457.2	8/203.2	104/2642	43/1093	1583/718	2384/1081
4HF ■ ● 2008F1 ▲ ◆	4	2000/7570	20/508	8/203.2	105/2654	46/1175	2087/947	3048/1382
7HF ■ ● 2412F1 ▲ ◆	7	3500/13248	24/609.6	12/304.8	112/2832	59/1487	3250/1474	4762/2160
12HF ■ ● 3016F1 ▲ ◆	12	6000/22710	30/762	16/406.4	121/3073	58/1480	4670/2118	7306/3314
19HF ■ ● 3620F1 ▲ ◆	19	9500/35958	36/914.4	20/508	129/3264	68/1718	7060/3202	11121/5045

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.

Code ■	Housing Configuration
H	Horizontal
V	Vertical

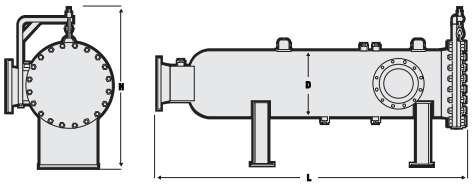
Code ●	Nominal Cartridge Length (in/mm)
2	20/508
4	40/1016
6	60/1524

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

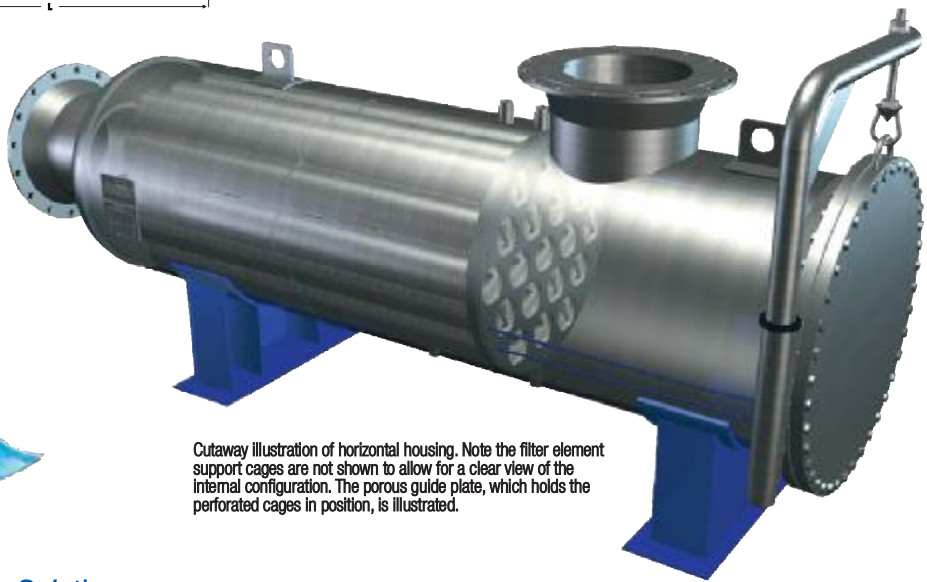
Code ◆	Optional Outlet style[1] Horizontal Housings
XU	Upper Outlet Location
XL	Lower Outlet Location

[1] 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.

Horizontal Housings



For information on larger horizontal housings, Pall's family of vertical housings, or noncode housing designs for these filter cartridges, please contact Pall or your distributor.



Cutaway illustration of horizontal housing. Note the filter element support cages are not shown to allow for a clear view of the internal configuration. The porous guide plate, which holds the perforated cages in position, is illustrated.

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Pall Corporation has offices and plants throughout the world.

UHF100 (version H)