

## Pall Filters

**Mfg: Pall**

**Model:**

**Stock No. QCAI476.a**

**Serial No.**

Pall Filter

(64) Pall Ultipleat Profile Filter. Part No. AB2U3007H4

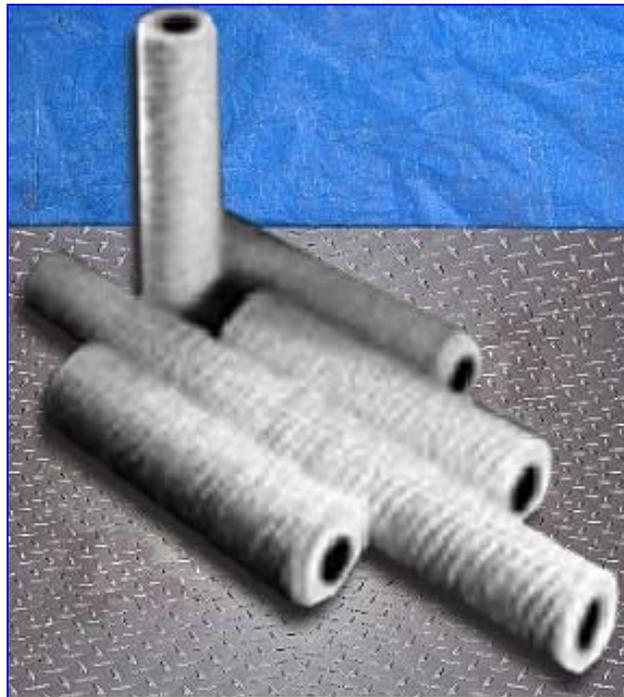
Pall Lot No. 313. 30 micron filters.

(10) Pall Emflon Filter. Part No. AB3PFR7PVH4.

Pall Lot No. IE2038. 0.2 microns in liquids, 0.003 microns in gases.

(6) Pall Emflon Filter. Part No. AB2PFR7PVH4.

Pall Lot No. IE3424. 0.2 microns in liquids, 0.003 microns in gases.



## Emflon® PFR Sterile Air Membrane Cartridges

### Description

#### High Strength, Long Life Sterilizing Filters for Air and Gas

### Description

Emflon® PFR filters have been developed from the successful Emflon filter range launched in 1981 and widely used as air and gas sterilizing filters in the pharmaceutical and biotechnology industries. The double layer PTFE membrane is inherently hydrophobic, chemically inert and designed specifically for removal of contaminating bacteria and viruses. Emflon PFR filters meet the ever increasing demand for air filters with greater strength, longer life and the ability to withstand the rigours of *in-situ* steaming in the forward or reverse direction.



### Superior Performance

Emflon PFR filters provide high assurance of filter integrity and long life, even during continuous use in hot air up to 60°C, in vent applications up to 80°C and during repeated steaming. The filters can withstand up to 1 bar (14.5 psi) differential pressure (forward direction) under steam sterilization conditions (125°C). This is combined with high flow rates and excellent dewetting characteristics resulting in very economical filtration through the use of smaller installations and reduced energy costs. In addition, the filters can be tested *in-situ* by the Forward Flow integrity test or by a Water Intrusion test. Both tests are correlated to liquid bacterial challenge - the 'worst case' challenge.

### Scientific Validation

Emflon PFR filters have been extensively and scientifically validated using the most advanced methods and the most sensitive equipment available. They have an absolute removal rating of 0.2 µm in liquids and 0.003µm in gases and have been validated by:

- *Brevundimonas (Pseudomonas) diminuta* liquid challenge at 10<sup>7</sup>/cm<sup>2</sup>
- *Brevundimonas (Pseudomonas) diminuta* aerosol challenge
- PP7 bacteriophage aerosol challenge
- Airborne sodium chloride aerosol challenge at 100 l/min flow (0.003 µm rated in gases).

### Features and Benefits

Comprehensive validation assures highest removal efficiency and highest safety margins. High flow rates and low pressure drop allow use of small systems, reducing installation and running costs. Robust construction ensures integrity and reliability. Long steaming life and long service offer low cost filtration.

## Specifications

### Materials

- FDA-listed materials per 21-CFR
- Membranes: double layer PTFE
- Support/Drainage: Polypropylene, oxidation resistant
- Core/Cage/End Caps/Adapters: Polypropylene, oxidation resistant
- Code 7/2 adapters with encapsulated stainless steel reinforcing ring
- O-rings: silicone <sup>1</sup>

### Removal Ratings

Air/Gases: <0.003 µm, particulate <sup>2</sup>

Liquids: 0.2 µm, sterilizing <sup>3</sup>

### Configurations (AB Code 7) <sup>4</sup>

- Single open ended
- Double 226 O-ring adapter
- Finned end, bayonet lock.

### Dimensions (nominal)

- Lengths: 5 in. (127 mm), 10 in. (254 mm), 20 in. (508 mm), 30 in. (762 mm), 40 in. (1016 mm)
- Diameter: 2.75 in. (70 mm)

### Filter Area (nominal)

- 8.6 ft<sup>2</sup> (0.8 m<sup>2</sup>) per 10 in. (254 mm) element
- 4.1 ft<sup>2</sup> (0.4 m<sup>2</sup>) per 5 in. (127 mm) element

### Operating Conditions

Max. Differential Pressure/Temp:<sup>5</sup>

- 77 psid (5.3 bar) at 68°F (20°C)
- 60 psid (4.1 bar) to 176°F (80°C)

Typical Continuous Air Service Life:<sup>6</sup>

- 12 months to 166°F (60°C)

Typical Vent Service Life:

- 6 months to 176°F (80°C)

### Autoclave/Steaming

- Cumulative Steaming Time:<sup>7</sup> 165 hrs (1hr cycles) to 289°F (140°C)
- Max. Forward Steaming Conditions:  
14.5 psid (1.0 bard) at 257°F (125°C)  
4.4 psid (0.3 bard) at 289°F (142°C)
- Max. Reverse Steaming Conditions:  
7.3 psid (0.5 bard) at 257°F (125°C)  
3.0 psid (0.2 bard) at 289°F (142°C)

## Aqueous Extractables (20 °C)

- <5 mg per 10 in. (254 mm) element after 1 hour steam at 257 °F (125 °C)

## Quality/Bio-Safety

Biological Tests:

- Meets USP Biological Reactivity, *In Vivo*, for Class VI-121 °C plastics.

Effluent Quality Tests: 8

- Meets Cleanliness per USP Particulates in Injectables.
- Non-Fiber-Releasing per 21CFR
- Non-Pyrogenic per USP Bacterial Endotoxins (<0.25 EU/ml).
- Meets Oxidizables and pH per USP packaged waters.

Steam Resistance: Lot samples multicycle autoclave challenged.

## Integrity Test Values

Per 10 in. (254 mm) Cartridge: 9

- Forward Flow (air test gas):  
60:40 IPA:Water wet (v:v)  $\leq$  15 cc/min at 15 psi (1035 mbar)
- Water Intrusion:  $\leq$  0.33 cc/min at 36 psi (2485 mbar)

<sup>1</sup> Other polymers available.

<sup>2</sup> By NaCl CNC particle analysis. Also retains 100% of *Brevundimonas diminuta* bacteria, bacteriophage and virus aerosols.

<sup>3</sup> Lot samples of assemblies retain  $>10^7$  cfu/cm<sup>2</sup> of *Brevundimonas diminuta* in liquid per mod. ASTM F838-83 and FDA guidelines.

<sup>4</sup> AB05 style is Code 2 flat end. Other adapter codes available.

<sup>5</sup> In air/N<sub>2</sub> service or other compatible gases.

<sup>6</sup> For continuous air flow above 60 °C, Emflon CPFR filters are recommended. Emflon PFR can be operated at higher temperatures for shorter time periods.

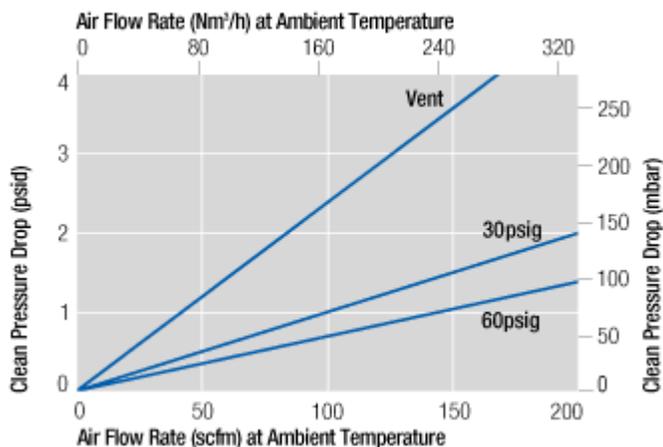
<sup>7</sup> Lab tests to establish multi-cycle resistance. Filters should be qualified in actual use. Contact Pall for recommended procedures.

<sup>8</sup> Per lot sample soak or rinse-up flush aliquots.

<sup>9</sup> Contact Pall for multi-element values. AB05PFR value is 7.8 cc/min.

## Performance

### Pressure Drop vs. Air Flow Rates <sup>10</sup>



<sup>10</sup> Typical initial clean medium  $\Delta P$  per 10 in. (254 mm) element, air at 68°F (20°C). For multi-element cartridges, divide pressure drop by number of 10 in. (254 mm) elements. Non-linear cartridge turbulence factors are incorporated into housing pressure drop values. For complete assembly pressure drop, add filter cartridge medium value to housing value at specified flow rate. For gases other than air or nitrogen, contact your local Pall distributor.

**Note:** Curve labels denote inlet pressures.

## Ordering Information

### Part Numbers / Ordering Information

Part Number <sup>11</sup>	Nominal Length	AB Style Code <sup>12</sup>
AB05PFR2PVH4	5 in. (127 mm)	2
AB1PFR7PVH4	10 in. (254 mm)	7
AB2PFR7PVH4	20 in. (508 mm)	7
AB3PFR7PVH4	30 in. (762 mm)	7
AB4PFR7PVH4	40 in. (1016 mm)	7

<sup>11</sup> P at end of part number indicates optimized and qualified for Pharmaceutical use including encapsulated stainless steel reinforcing adapter ring for steaming *in situ*, 100% integrity testing and Certificate of Test provided. V indicates optimized for vent/air/gas service. H4 suffix=Silicone O-rings (standard). See Appendix for available alternate O-ring polymers and codes.

<sup>12</sup> AB05 standard with Code 2 flat cap, other lengths Code 7 with finned cap. Both with double 226 O-rings. See Appendix for adapter dimensions and alternate codes.

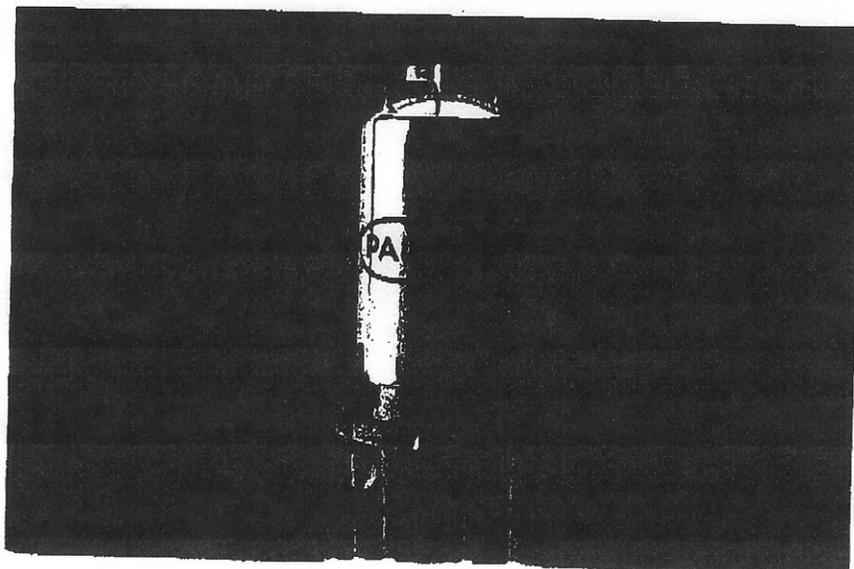
**Note:** For sizing filters or other information, please contact your local Pall distributor.

**Specifications and Availability:** The information provided is a guide to the part number structure and possible options. Product availability may be subject to change without notice. All specifications are nominal. This literature was reviewed for accuracy at the time of publication. For current information on the products and test methodologies, consult your local Pall distributor.

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# STL Series - 6 and 10 Cartridge Filter Housings



## Specifications

### Materials

- Housing: 316L stainless steel
- O-Ring: Silicone<sup>1</sup>

### Surface Finishes

- Interiors:
- Electropolished to 25µIN R<sub>a</sub> (0.63µm R<sub>a</sub>); welds are ground flush.
- Exteriors:
- High quality sanitary finish and electropolished (excluding legs)

### Connections

- Inlet/Outlet:
- 3" (76mm) sanitary clamp.
- Vent/Drain Options:
- Sanitary valves with 3/8" (10mm) hose barb and insulating plastic knob

### Configuration

- T-Type flow pattern

### Filter Cartridges

- Accepts AB (SOE) Style
- 10" - 40" (254 - 1016mm) AB style Code 7 cartridges.<sup>2</sup>
- Capacity:
  - STL06 style: up to 6 cartridges
  - STL10 style: up to 10 cartridges

### Housing Sealing Mechanism

- Swing bolt closures

### Operating Conditions

- Maximum Pressure: 125psig (8.6bar) at 200°F (93°C) and full vacuum

### Sterilization

- Steamable *in situ*

### Minimum Bowl Removal Height

Filter Height	Removal Height
10" (254mm)	11.5" (292mm)
20" (510mm)	21.5" (546mm)
30" (762mm)	31.5" (800mm)
40" (1016mm)	41.5" (1054mm)

<sup>1</sup> Other polymers available.

<sup>2</sup> See Appendix for AB-style Code descriptions.

## Filter Cross Reference

Filter, AB Style	Page
Bio-Inert <sup>®</sup>	114
Emflon <sup>®</sup> Family	120, 168-174
Fluorodyne <sup>®</sup> II	118
HDC <sup>®</sup> II	92, 166
N <sub>66</sub> <sup>®</sup> Posidyne <sup>®</sup>	116
PallCell <sup>®</sup>	86, 162
Profile <sup>®</sup> II Family	96
Profile Ster	100
Starclear <sup>™</sup> Family	104
Ultripleat <sup>®</sup> Profile	100
Ultipor <sup>®</sup> BPC	106
Ultipor GF Plus <sup>®</sup>	88, 164
Ultipor N <sub>65</sub>	108-112
Ultipor VF <sup>™</sup>	122

## Description

Pall STL Series sanitary design filter housings have no threaded connections in contact with the product being filtered and are designed to provide maximum flows with minimal pressure drops. Housings are designed, manufactured and in accordance with the ASME BPVC Section VIII, DIV 1.

- Accepts up to 6 or 10 AB style cartridges up to 40" (102cm) high
- Flow rates to 400gpm (1500lpm)
- ASME Coded pressure vessels
- Fast-action swing bolt closures permit rapid cartridge change-outs
- Electropolished 316L stainless steel
- 3-A Sanitary Standard Symbol for optimized CIP/cleanable design
- Removable cartridge tube sheet provides easy manual cleaning
- Manufactured for use in conformance with cGMP
- Manufacturing Quality System Certified to ISO 9000 Standards

For information or to order, call:

**1-800-717-7255**

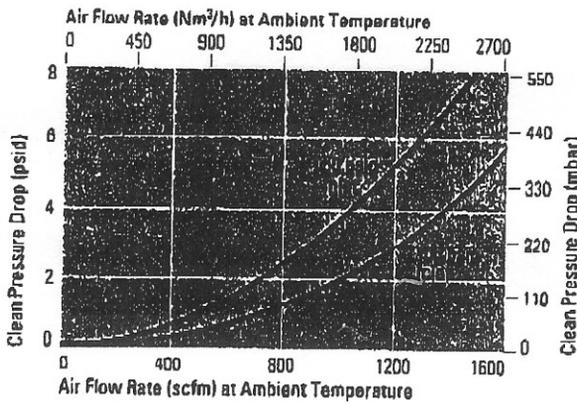
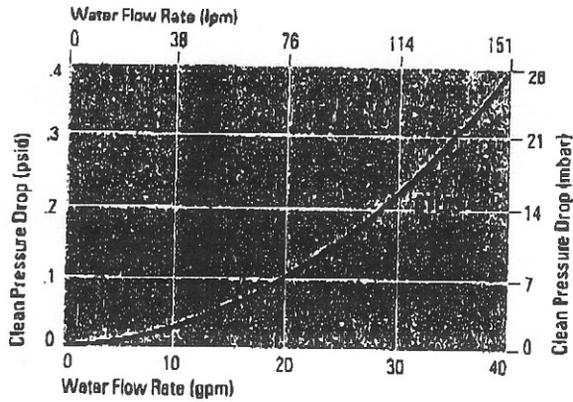
or 516-484-5400 – Fax: 516-625-3610  
 pharmafilter @ pall.com  
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**Filter Cartridge Housings**  
 Liquid and Air/Gas

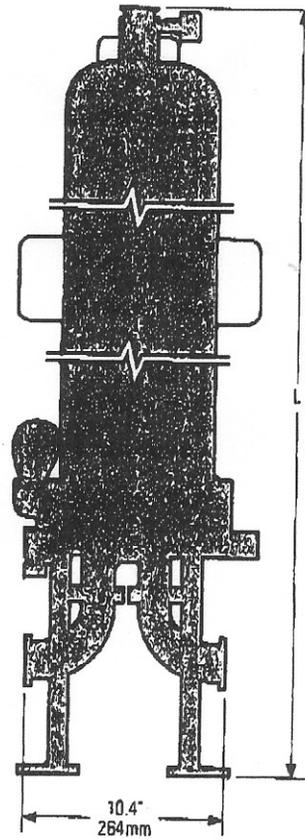
Filter Cartridge Housings

**Pressure Drop vs. Water and Air Flow Rates<sup>1</sup>**

**Dimensions**



**STL Housing**



**Note:** For Housing Length (L) and Minimum Bowl Removal Heights, see Ordering Information below.

**Specifications and Availability:** The information provided is a guide to the part number structure and possible options. Product availability may be subject to change without notice. All specifications are nominal. Elements not supplied with housings. This literature was reviewed for accuracy at the time of publication. For current information on the products and test methodologies, consult your local Pall distributor.

<sup>1</sup> Empty housings, including cartridge core loss factors; water at 68°F (20°C), 1 cp; air at 68°F (20°C). For complete assembly including AB style filter cartridge, add housing and cartridge media pressure drop values. For liquids with other viscosities, other gases and temperatures, and for sizing sterile vent service applications, contact your local Pall distributor.

**Part Numbers / Ordering Information**

Part Number <sup>4</sup>	Filter Capacity	Fits Cartridge Height (nom.)	Housing Height (L)	Min. Bowl Removal Ht.
STL031G731H4	3	10" (254mm)	31" (787mm)	11.5" (292mm)
STL032G731H4	3	20" (508mm)	41" (1041mm)	21.5" (546mm)
STL033G731H4	3	30" (762mm)	51" (1295mm)	31.5" (800mm)
STL034G731H4	3	40" (1016mm)	61" (1549mm)	41.5" (1054mm)

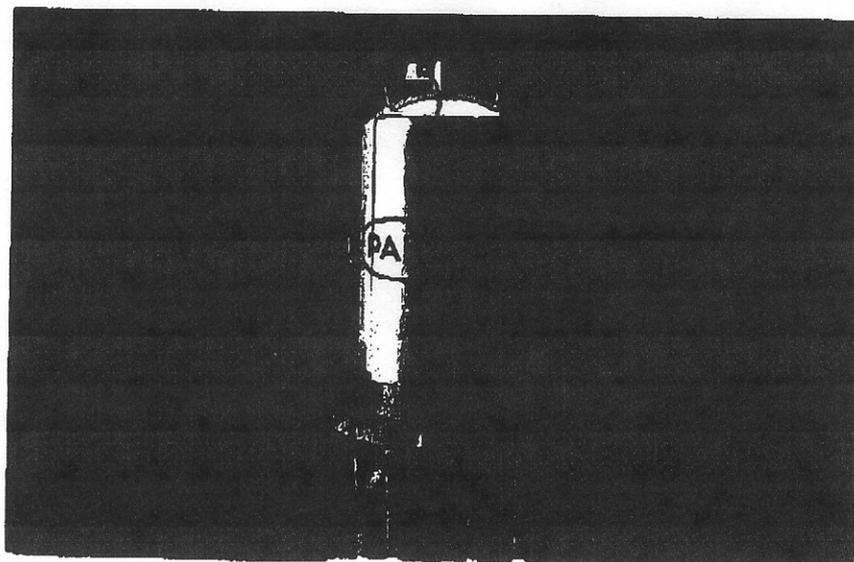
<sup>4</sup> H4 suffix = Silicone O-ring material (standard). Buna-N, Ethylene Propylene and Fluorocarbon Elastomer O-rings also available. See Appendix for alternate O-ring polymer codes.

**Note:** Code 7 is standard filter cartridge fitting (see Appendix for adapter code descriptions). For Code 8 housing, filter sizing or other information, contact your local Pall distributor.



Filter Cartridge Housings

# STL Series - 3 Cartridge Filter Housings



## Specifications

### Materials

- Housing: 316L stainless steel
- O-Ring: Silicone<sup>1</sup>

### Surface Finishes

#### Interiors:

- Electropolished to 25µin R<sub>a</sub> (0.63µm R<sub>a</sub>). Welds are ground flush.

#### Exteriors:

- High quality sanitary finish and electropolished (excluding legs)

### Connections

#### Inlet/Outlet:

- 2" (51 mm) tube O.D. sanitary flange.

#### Vent/Drain Options:

- Sanitary valve with 3/8" (10mm) hose barb and insulating plastic knob

### Configuration

- T-Type flow pattern

### Filter Cartridges

- Accepts AB (SOE) Style
- 10" - 40" (254 - 1016mm) AB style Code 7 cartridges<sup>2</sup>
- Capacity: up to 3 cartridges

### Housing Sealing Mechanism

- Swing bolt closures

### Operating Conditions

- Maximum Pressure: 125 psig (8.6 bar) at 200°F (93°C) and full vacuum

### Sterilization

- Steamable *in situ*

### Housing Weights (approximate)

Filter Height	Empty Wt.
10" (254 mm)	76 lbs (34 kg)
20" (510 mm)	84 lbs (38 kg)
30" (762 mm)	92 lbs (42 kg)
40" (1016 mm)	100 lbs (45 kg)

Filter Height	Full (Water) Wt.
10" (254 mm)	109 lbs (49 kg)
20" (510 mm)	138 lbs (63 kg)
30" (762 mm)	167 lbs (76 kg)
40" (1016 mm)	196 lbs (89 kg)

<sup>1</sup> Other polymers available.

<sup>2</sup> See Appendix for AB style Code descriptions.

## Filter Cross Reference

AB Style Cartridges	Page
Bio-Inert <sup>®</sup>	114
Emflon <sup>®</sup> Family	120, 168-174
Fluorodyne <sup>®</sup> II	118
HDC <sup>®</sup> II	92, 166
N <sub>66</sub> <sup>®</sup> Posidyne <sup>®</sup>	116
PallCell <sup>®</sup>	86, 162
Profile <sup>®</sup> II Family	96
Profile Star	100
Starclear <sup>™</sup> Family	104
Ultipleat <sup>®</sup> Profile	100
Ultipor <sup>®</sup> BPC	106
Ultipor GF Plus <sup>®</sup>	88, 164
Ultipor N <sub>66</sub>	108-112
Ultipor VF <sup>™</sup>	122

## Description

Pall STL Series sanitary design filter housings have no threaded connections in contact with the product being filtered and are designed to provide maximum flows with minimal pressure drops with single open ended (SOE) AB sanitary style filter cartridges. STL Series Housings are designed, manufactured and stamped in accordance with the ASME BPVC Section VIII, DIV 1.

- Accepts up to 3 AB style filter cartridges up to 40" high
- Flow rates to 400 gpm (1500 lpm)
- ASME Coded pressure vessels
- Fast-action swing bolt closures permit rapid cartridge change-outs
- Electropolished 316L stainless steel
- 3-A Sanitary Standard Symbol for optimized CIP/cleanable design
- Removable cartridge tube sheet provides easy manual cleaning
- Manufactured for use in conformance with cGMP
- Manufacturing Quality System Certified to ISO 9000 Standards

## Ultipleat Profile® Filter



### Description

The Ultipleat Profile filter combines the unique medium of Profile II depth filters with a crescent shaped pleat design. The result is a resin trap, pre-RO or cooling water filter with superior flow vs. differential pressure capabilities.

- All polypropylene construction
- High particle removal efficiency
- Long service life
- Fixed pore structure
- Low extractables
- No surfactants or binder resins used during manufacture
- Available in many removal ratings
- Available in an RF configuration so the cartridge may fit into a housing designed to hold either a 2½" or 2¾" O.D. filter
- Very low clean pressure drop

### Specifications

#### Materials

- Medium: Polypropylene
- Core, cage, end caps: Polypropylene
- Gasket: Polyethylene
- O-ring: Silicone

#### Removal Ratings

- 3.2 µm, 4.5 µm, 6 µm, 10 µm, 20 µm, 30 µm, 40 µm, 50 µm, 70 µm, 100 µm

#### Configurations

- RF style filter available as a 10" / 254 mm, 20" / 508 mm, 30" / 762 mm, or 40" / 1016 mm long filter cartridge
- Diameter: 2½" / 64 mm
- Double open end, flat gasket welded to each end
- AB style Code 3, 7 and 8 available as 10" / 254 mm, 20" / 508 mm, 30" / 762 mm, or 40" / 1016 mm long filters

### Operating Characteristics

- Maximum Differential Pressure:  
60 psid @ 86°F / 4.1 bar @ 30°C;  
50 psid @ 122°F / 3.4 bar @ 50°C;  
30 psid @ 158°F / 2 bar @ 70°C;  
15 psid @ 176°F / 1 bar @ 80°C

## Removal Rating/Pressure Drop

Cartridge Grade	Removal Rating in Microns (µm) at % Efficiency <sup>1</sup>		Clean Pressure Drop in Water Per 10" / 254 mm Element	
	90%	99.98%	psi / gpm	mbar / 10L / min
UY020	< 1	3.2	0.13	23.7
UY045	1.2	4.5	0.085	15.5
UY060	2.5	6	0.035	6.4
UY100	4.3	10	0.030	5.5
UY200	10.5	20	0.025	4.6
UY300	16.5	30	0.020	3.6
UY400	19	40	0.015	2.7
UY500	25	50	0.010	1.8
UY700	35	— <sup>2</sup>	0.010	1.8
UY1000	60	— <sup>2</sup>	0.010	1.8

## Part Numbers / Ordering Information

Part Number	Removal Rating (µm)	Nominal Length <sup>3</sup> (in / mm)	Configuration <sup>3</sup> Code	O-Ring/Gasket Material <sup>3</sup>
AB1UY0203H4	3.2	10 / 254	3	Silicone
R1FUY020J8	3.2	10 / 254	Double Open End / Flat Gasket	Polyethylene
AB1UY0453H4	4.5	10 / 254	3	Silicone
R1FUY045J8	4.5	10 / 254	Double Open End / Flat Gasket	Polyethylene
AB1UY0603H4	6	10 / 254	3	Silicone
R1FUY060J8	6	10 / 254	Double Open End / Flat Gasket	Polyethylene
AB1UY1003H4	10	10 / 254	3	Silicone
R1FUY100J8	10	10 / 254	Double Open End / Flat Gasket	Polyethylene
AB1UY2003H4	20	10 / 254	3	Silicone
AB1UY4003H4	40	10 / 254	3	Silicone
R1FUY400J8	40	10 / 254	Double Open End / Flat Gasket	Polyethylene
AB1UY10003H4	100	10 / 254	3	Silicone

<sup>1</sup> Rating of filter is based upon the modified Oklahoma State University (OSU) F-2 Filter Performance (Beta Rating) Test.

<sup>2</sup> Precision evaluation of the 99.98% removal efficiency for these coarse grades is not possible with the OSU test procedure utilized.

<sup>3</sup> Other lengths, configurations and gasket materials are available.

**Unit conversion:** 1 bar = 100 kilopascals



Microelectronics

2200 Northern Boulevard  
East Hills, New York 11548-1289 USA

1.800.360.7255 toll free (Only in US)  
1.516.484.5400 phone  
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For information or to order, call:

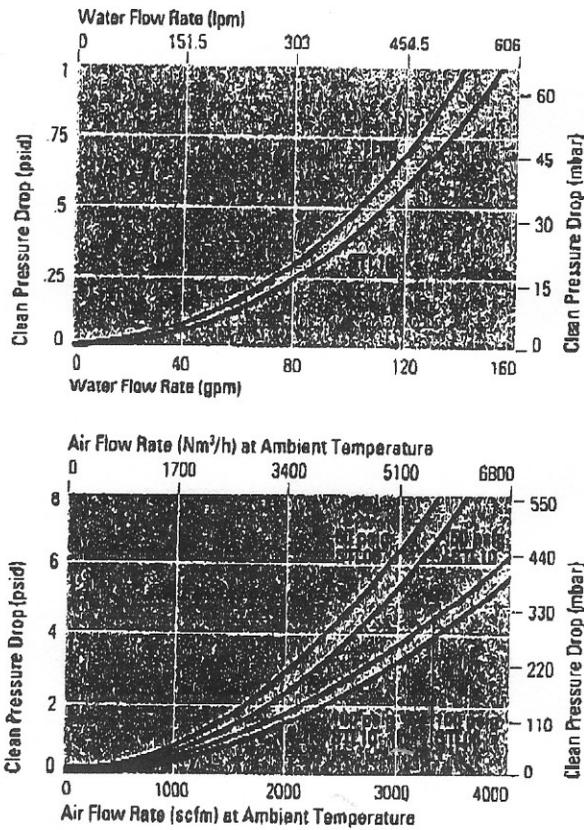
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**Filter Cartridge Housings**  
 Liquid and Air/Gas

Filter Cartridge Housings

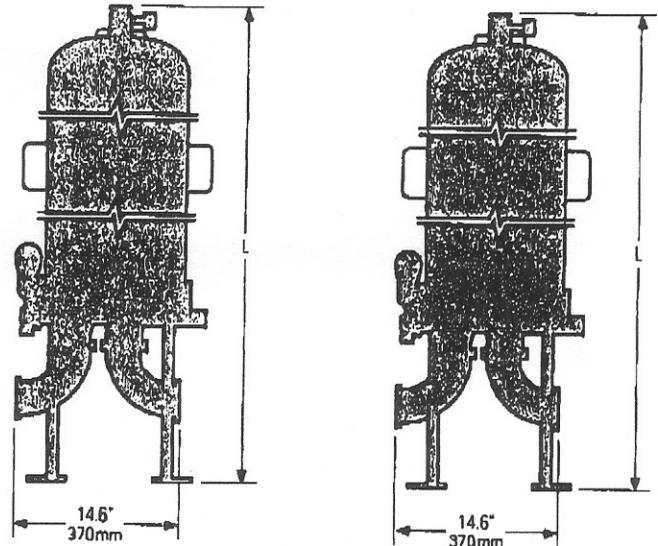
**Pressure Drop vs. Water and Air Flow Rates<sup>1</sup>**



Note: Curve labels denote inlet pressure.

<sup>2</sup> Empty housings, including cartridge core loss factors; water at 68°F (20°C), 1 cp; air at 68°F (20°C). For complete assembly including AB style filter cartridge, add housing and cartridge media pressure drop values. For liquids with other viscosities, other gases and temperatures, and for sizing sterile vent service applications, please contact your local Pall distributor.

**Dimensions**



STL08 Housing

STL10 Housing

Note: For Housing Height (L) and Weights, see Ordering Information below.

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**Part Numbers / Ordering Information**

Part Number <sup>4</sup>	Filter Capacity Code <sup>5</sup>	Fits Cartridge Height (nom.)	Housing Height (L)	Empty Weight	Full (Water) Weight
STL* 1G747H4	08 or 10	10" (254 mm)	34" (864 mm)	149 lbs (68 mm)	213 lbs (97 mm)
STL* 2G747H4	08 or 10	20" (508 mm)	44" (1118 mm)	160 lbs (73 mm)	269 lbs (122 mm)
STL* 3G747H4	06 or 10	30" (762 mm)	54" (1372 mm)	172 lbs (78 mm)	326 lbs (148 mm)
STL* 4G747H4	08 or 10	40" (1018 mm)	164" (1626 mm)	184 lbs (83 mm)	383 lbs (174 mm)

<sup>4</sup> Select Filter Capacity Code: 08 = accepts up to six cartridges; 10 = accepts up to ten cartridges. STL12 option (accepts up to 12 cartridges) available on special order.

<sup>5</sup> H4 suffix = Silicone O-ring material (standard), Buna-N, Ethylene Propylene and Fluorocarbon Elastomer O-rings also available. See Appendix for other O-ring polymer option designations.

Note: Code 7 is standard filter cartridge fitting (see Appendix for adapter code descriptions). For Code 8 fittings, filter sizing or other information, contact your local Pall distributor.