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 10^7/cm²
- *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

Removal Ratings

Air/Gases: <0.003 µm, particulate
Liquids: 0.2 µm, sterilizing

Configurations (AB Code 7)

- 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 ft² (0.8 m²) per 10 in. (254 mm) element
- 4.1 ft² (0.4 m²) per 5 in. (127 mm) element

Operating Conditions

Max. Differential Pressure/Temp.

- 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:

- 12 months to 166°F (60°C)

Typical Vent Service Life:

- 6 months to 176°F (80°C)

Autoclave/Steaming

- Cumulative Steaming Time: 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) ≤ 15 cc/min at 15 psi (1035 mbar)
- Water Intrusion: ≤ 0.33 cc/min at 36 psi (2485 mbar)

1 Other polymers available.
2 By NaCl CNC particle analysis. Also retains 100% of *Brevundimonas diminuta* bacteria, bacteriophage and virus aerosols.
3 Lot samples of assemblies retain >10⁷ cfu/cm² of *Brevundimonas diminuta* in liquid per mod. ASTM F838-83 and FDA guidelines.
4 AB05 style is Code 2 flat end. Other adapter codes available.
5 In air/N₂ service or other compatible gases.
6 For continuous air flow above 60 °C. Emflon CPFR filters are recommended. Emflon PFR can be operated at higher temperatures for shorter time periods.
7 Lab tests to establish multi-cycle resistance. Filters should be qualified in actual use. Contact Pall for recommended procedures.
8 Per lot sample soak or rinse-up flush aliquots.
9 Contact Pall for multi-element values. AB05PFR value is 7.8 cc/min.

Performance

Pressure Drop vs. Air Flow Rates 10
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

<table>
<thead>
<tr>
<th>Part Number(^{11})</th>
<th>Nominal Length</th>
<th>AB Style Code(^{12})</th>
</tr>
</thead>
<tbody>
<tr>
<td>AB05PFR2PVH4</td>
<td>5 in. (127 mm)</td>
<td>2</td>
</tr>
<tr>
<td>AB1PFR7PVH4</td>
<td>10 in. (254 mm)</td>
<td>7</td>
</tr>
<tr>
<td>AB2PFR7PVH4</td>
<td>20 in. (508 mm)</td>
<td>7</td>
</tr>
<tr>
<td>AB3PFR7PVH4</td>
<td>30 in. (762 mm)</td>
<td>7</td>
</tr>
<tr>
<td>AB4PFR7PVH4</td>
<td>40 in. (1016 mm)</td>
<td>7</td>
</tr>
</tbody>
</table>

\(^{11}\) 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.

\(^{12}\) 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.
STL Series – 6 and 10 Cartridge Filter Housings

Specifications

Materials
- Housing: 316L stainless steel
- O-Ring: Silicone

Surface Finishes
- Interior: Electropolished to 25μIN Ra (0.63μm Ra)
- Exteriors: High quality sanitary finish and electro-polished (excluding legs)

Connections
- Inlet/Outlet: 3” (76mm) sanitary clamp
- Valve/Drain Options: Sanitary valves with ½” (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
- Capacities: STLOS style: up to 6 cartridges
- STL10 style: up to 10 cartridges

Housing Sealing Mechanism
- Swing bolt closures

Operating Conditions
- Maximum Pressure: 125 psig (8.6 bar) at 180°F (82°C) and full vacuum

Sterilization
- Steamable in situ

Minimum Bowl Removal Height

<table>
<thead>
<tr>
<th>Filter Height</th>
<th>Removal Height</th>
</tr>
</thead>
<tbody>
<tr>
<td>10” (254mm)</td>
<td>11.5” (292mm)</td>
</tr>
<tr>
<td>20” (510mm)</td>
<td>21.5” (546mm)</td>
</tr>
<tr>
<td>30” (762mm)</td>
<td>31.5” (800mm)</td>
</tr>
<tr>
<td>40” (1016mm)</td>
<td>41.5” (1054mm)</td>
</tr>
</tbody>
</table>

1 Other polymers available.
2 See Appendix for AB-style Code descriptions.
**Pressure Drops vs. Water and Air Flow Rates**

![Pressure Drop Graphs](image)

**Dimensions**

![Housing Diagram](image)

3 Empty housings, including cartridge core loss factors: water at 68°F (20°C), 1 cfm 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.

**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.

**Part Numbers / Ordering Information**

<table>
<thead>
<tr>
<th>Part Number&lt;sup&gt;4&lt;/sup&gt;</th>
<th>Filter Capacity</th>
<th>Fits Cartridge Height (nom.)</th>
<th>Housing Height (L)</th>
<th>Min. Bowl Removal Ht.</th>
</tr>
</thead>
<tbody>
<tr>
<td>STLO316731H4</td>
<td>3</td>
<td>10&quot; (254 mm)</td>
<td>31&quot; (787 mm)</td>
<td>11.5&quot; (292 mm)</td>
</tr>
<tr>
<td>STLO326731H4</td>
<td>3</td>
<td>20&quot; (508 mm)</td>
<td>41&quot; (1041 mm)</td>
<td>21.5&quot; (546 mm)</td>
</tr>
<tr>
<td>STLO336731H4</td>
<td>3</td>
<td>30&quot; (762 mm)</td>
<td>51&quot; (1295 mm)</td>
<td>31.5&quot; (800 mm)</td>
</tr>
<tr>
<td>STLO346731H4</td>
<td>3</td>
<td>40&quot; (1016 mm)</td>
<td>61&quot; (1549 mm)</td>
<td>41.5&quot; (1064 mm)</td>
</tr>
</tbody>
</table>

<sup>4</sup>H suffix = Silicone O-ring material (standard), Buna-N, Ethylene Propylene and Fluorocarbon Elastomer O-rings are 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.
STL Series - 3 Cartridge Filter Housings

Specifications

Materials
- Housing: 316L stainless steel
- O-Ring: Silicone

Surface Finishes
- Interiors: Electropolished to 25 μN Rₐ (0.63 μm Ra).
- Exteriors: High quality sanitary finish and electropolished (excluding legs)

Connections
- Inlet/Outlet: 2” (51 mm) tube O.D. sanitary flare
- Vent/Drain Options: Sanitary valves with ½" (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
- Capacity: up to 3 cartridges

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

Sterilization
- Steamable in situ

Housing Weights (approximate)

<table>
<thead>
<tr>
<th>Filter Height</th>
<th>Empty Wt.</th>
<th>Full (Water) Wt.</th>
</tr>
</thead>
<tbody>
<tr>
<td>10” (254 mm)</td>
<td>76 lbs (34 kg)</td>
<td>100 lbs (45 kg)</td>
</tr>
<tr>
<td>20” (510 mm)</td>
<td>84 lbs (38 kg)</td>
<td>136 lbs (62 kg)</td>
</tr>
<tr>
<td>30” (762 mm)</td>
<td>92 lbs (42 kg)</td>
<td>167 lbs (76 kg)</td>
</tr>
<tr>
<td>40” (1016 mm)</td>
<td>100 lbs (46 kg)</td>
<td>196 lbs (88 kg)</td>
</tr>
</tbody>
</table>

1 Other polymers available.
2 See Appendix for AB style code descriptions.
 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

<table>
<thead>
<tr>
<th>Cartridge Grade</th>
<th>Removal Rating in Microns (µm)</th>
<th>Clean Pressure Drop in Water Per 10&quot; / 254 mm Element</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>at % Efficiency&lt;sup&gt;1&lt;/sup&gt;</td>
<td>psi / gpm</td>
</tr>
<tr>
<td></td>
<td>90%</td>
<td>mbar / 10L / min</td>
</tr>
<tr>
<td></td>
<td>99.98%</td>
<td></td>
</tr>
<tr>
<td>UY020</td>
<td>&lt;1</td>
<td>1.03</td>
</tr>
<tr>
<td>UY045</td>
<td>1.2</td>
<td>0.085</td>
</tr>
<tr>
<td>UY060</td>
<td>2.5</td>
<td>0.035</td>
</tr>
<tr>
<td>UY100</td>
<td>4.3</td>
<td>0.030</td>
</tr>
<tr>
<td>UY200</td>
<td>10.5</td>
<td>0.025</td>
</tr>
<tr>
<td>UY300</td>
<td>16.5</td>
<td>0.020</td>
</tr>
<tr>
<td>UY400</td>
<td>19</td>
<td>0.015</td>
</tr>
<tr>
<td>UY500</td>
<td>25</td>
<td>≤ 0.010</td>
</tr>
<tr>
<td>UY700</td>
<td>35</td>
<td>≤ 0.010</td>
</tr>
<tr>
<td>UY1000</td>
<td>60</td>
<td>≤ 0.010</td>
</tr>
</tbody>
</table>

### Removal Rating/Pressure Drop

<table>
<thead>
<tr>
<th>Cartridge Grade</th>
<th>Removal Rating in Microns (µm)</th>
<th>Clean Pressure Drop in Water Per 10&quot; / 254 mm Element</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>at % Efficiency&lt;sup&gt;1&lt;/sup&gt;</td>
<td>psi / gpm</td>
</tr>
<tr>
<td></td>
<td>90%</td>
<td>mbar / 10L / min</td>
</tr>
<tr>
<td></td>
<td>99.98%</td>
<td></td>
</tr>
<tr>
<td>UY020</td>
<td>&lt;1</td>
<td>1.03</td>
</tr>
<tr>
<td>UY045</td>
<td>1.2</td>
<td>0.085</td>
</tr>
<tr>
<td>UY060</td>
<td>2.5</td>
<td>0.035</td>
</tr>
<tr>
<td>UY100</td>
<td>4.3</td>
<td>0.030</td>
</tr>
<tr>
<td>UY200</td>
<td>10.5</td>
<td>0.025</td>
</tr>
<tr>
<td>UY300</td>
<td>16.5</td>
<td>0.020</td>
</tr>
<tr>
<td>UY400</td>
<td>19</td>
<td>0.015</td>
</tr>
<tr>
<td>UY500</td>
<td>25</td>
<td>≤ 0.010</td>
</tr>
<tr>
<td>UY700</td>
<td>35</td>
<td>≤ 0.010</td>
</tr>
<tr>
<td>UY1000</td>
<td>60</td>
<td>≤ 0.010</td>
</tr>
</tbody>
</table>

### Part Numbers / Ordering Information

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Nominal Length&lt;sup&gt;3&lt;/sup&gt;</th>
<th>O-Ring/Gasket Material&lt;sup&gt;3&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>AB1UY0203H4</td>
<td>10 / 254</td>
<td>Silicone</td>
</tr>
<tr>
<td>R1FUY020J8</td>
<td>10 / 254</td>
<td>Polyethylene</td>
</tr>
<tr>
<td>AB1UY0453H4</td>
<td>10 / 254</td>
<td>Silicone</td>
</tr>
<tr>
<td>R1FUY045J8</td>
<td>10 / 254</td>
<td>Polyethylene</td>
</tr>
<tr>
<td>AB1UY0603H4</td>
<td>10 / 254</td>
<td>Silicone</td>
</tr>
<tr>
<td>R1FUY060J8</td>
<td>10 / 254</td>
<td>Polyethylene</td>
</tr>
<tr>
<td>AB1UY1003H4</td>
<td>10 / 254</td>
<td>Silicone</td>
</tr>
<tr>
<td>R1FUY100J8</td>
<td>10 / 254</td>
<td>Polyethylene</td>
</tr>
<tr>
<td>AB1UY2003H4</td>
<td>10 / 254</td>
<td>Silicone</td>
</tr>
<tr>
<td>R1FUY400J8</td>
<td>10 / 254</td>
<td>Polyethylene</td>
</tr>
<tr>
<td>AB1UY10003H4</td>
<td>10 / 254</td>
<td>Silicone</td>
</tr>
</tbody>
</table>

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1 Rating of filter is based upon the modified Oklahoma State University (OSU) F-2 Filter Performance (Beta Rating) Test.
2 Precision evaluation of the 99.98% removal efficiency for these coarse grades is not possible with the OSU test procedure utilized.
3 Other lengths, configurations and gasket materials are available.

Unit conversion: 1 bar = 100 kilopascals
Filter Cartridge Housings
Liquid and Air/Gas

**Pressure Drop vs. Water and Air Flow Rates**

- **Water Flow Rate (gpm)**
  - Flow Rate: 0, 15, 30, 45, 60, 120, 180, 240, 300, 360, 420, 480, 540, 600
  - Pressure Drop (psig): 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10

- **Air Flow Rate (Nm³/hr) at Ambient Temperature**
  - Flow Rate: 0, 1200, 2400, 3600, 4800, 6000
  - Pressure Drop (psig): 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10

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

3. 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, all 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.

**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.

**Part Numbers & Ordering Information**

<table>
<thead>
<tr>
<th>Part Number*</th>
<th>Filter Capacity Code*</th>
<th>Fits Cartridge Height (nom.)</th>
<th>Housing Height (L)</th>
<th>Empty Weight</th>
<th>Full (Water) Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>STL** 1G747H4</td>
<td>06 or 10</td>
<td>10” (254mm)</td>
<td>34” (864mm)</td>
<td>149lbs (68mm)</td>
<td>213lbs (97mm)</td>
</tr>
<tr>
<td>STL** 2G747H4</td>
<td>06 or 10</td>
<td>20” (508mm)</td>
<td>44” (1118mm)</td>
<td>160lbs (73mm)</td>
<td>269lbs (122mm)</td>
</tr>
<tr>
<td>STL** 3G747H4</td>
<td>06 or 10</td>
<td>30” (762mm)</td>
<td>54” (1372mm)</td>
<td>172lbs (78mm)</td>
<td>326lbs (148mm)</td>
</tr>
<tr>
<td>STL** 4G747H4</td>
<td>06 or 10</td>
<td>40” (1016mm)</td>
<td>164” (1626mm)</td>
<td>184lbs (83mm)</td>
<td>383lbs (174mm)</td>
</tr>
</tbody>
</table>

*Select Filter Capacity Code: 06 = accepts up to six cartridges; 10 = accepts up to ten cartridges. STL12 option (accepts up to 12 cartridges) available on special order.

*The suffixes 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.