The Protec® filter is a glass microfiber prefilter optimized to protect downstream sterile filters. The Protec® RF filter contains a single layer of borosilicate glass fiber media in a choice of absolute-rated 0.5 µm or 1 µm. The Protec® RM filter is available in a choice of absolute-rated 0.2 µm, 0.3 µm or 0.5 µm and combines an outer layer of borosilicate glass fiber media with an inner layer of Meissner’s proprietary hydrophilic SteriLUX® PVDF membrane.

Protec® filters provide consistent submicron contaminant removal, high dirt-holding capacity and high flow rates, while removing colloids, aggregated and non-product proteins, lipids and other particles. Protec® effectively protects downstream membrane filters and equipment. These filter cartridges are available in lengths of 10, 20, 30 and 40 inches.

**Features and Benefits**

- RF version can be specified in 0.5 µm and 1 µm absolute-rated
- RM version can be specified in absolute-rated 0.2 µm, 0.3 µm and 0.5 µm
- High flow rates and excellent filtration economics
- High contaminant holding capacity provides a long service life
- All-polypropylene support materials provide wide chemical compatibility and permit use in a broad range of fluids
- Protec® RM combines the retention performance of a PVDF membrane with the high adsorption and contaminant-holding capacity of a glass fiber media

**Typical Applications**

Protec® filters are ideal for clarification, prefiltration and bioburden reduction in a variety of applications.

- Biological liquids, including serum, plasma fractions and other blood products
- Vaccines
- Tissue and cell culture media
- Protein solutions
- Fermentation media and feeds
- Cell removal from fermentation broths
- Pre-column chromatography
- Biopharmaceuticals
Materials of Construction

Filter Media
RF (single layer): Borosilicate glass microfiber
RM (double layer): Borosilicate glass microfiber with SteriLUX® PVDF membrane
Core/Outer Guard: Polypropylene
End Caps: Polypropylene
Sealing Method: Thermal Bonding
O-ring/Gasket Seal: Buna, EPR, polyethylene, silicone, Teflon® over silicone, Teflon® over Viton®

All materials of construction listed above are FDA approved for food contact use per 21 CFR 177.

Protec® filters are manufactured in conformance to cGMP. Protec® filters meet the requirements as specified in the current USP Class VI plastics, physicochemical, oxidizable substances, and cytotoxicity tests. Protec® filters are non-fiber-releasing as defined in 21 CFR 210.3(b)(6) and 211.72.

Filtration Ratings

Filter Grade | Absolute Particulate Ratings
---|---
RF | 0.5 μm, 1 μm
RM | 0.2 μm, 0.3 μm, 0.5 μm

Cartridge Dimensions (nominal)
Diameter: 2.75" (7 cm)
Lengths: 10", 20", 30", 40"
(25 cm, 50 cm, 75 cm, 100 cm)

Typical Microbial Retention per cm²

<table>
<thead>
<tr>
<th>Grade</th>
<th>Rating</th>
<th>Organism</th>
<th>LRV</th>
</tr>
</thead>
<tbody>
<tr>
<td>RF</td>
<td>0.5 μm</td>
<td><em>Saccharomyces cerevisiae</em></td>
<td>6</td>
</tr>
<tr>
<td>RM</td>
<td>0.5 μm</td>
<td><em>Serratia marcescens</em></td>
<td>5</td>
</tr>
<tr>
<td>RM</td>
<td>0.2 μm</td>
<td><em>Saccharomyces cerevisiae</em></td>
<td>≥7</td>
</tr>
<tr>
<td>RM</td>
<td>0.3 μm</td>
<td><em>Serratia marcescens</em></td>
<td>6</td>
</tr>
<tr>
<td>RM</td>
<td>0.2 μm</td>
<td><em>Serratia marcescens</em></td>
<td>≥7</td>
</tr>
</tbody>
</table>

Sterilization

Steam-in-place (SIP):
Saturated steam @ 121-135 °C, 30-60 minutes
[15 psi (1 bar) to 30 psi (2 bar), 30-60 minutes]

Autoclave: 121-135 °C, 30-60 minutes

For applications requiring autoclave/SIP, a stainless steel reinforcement ring must be ordered. See “Reinforcement Ring Option” within Ordering Information.

Maximum Operating Temperatures & Pressures

\[ \Delta p \] 80 psi @ 32 °F to 100 °F
\( \Delta p \) 5,5 bar @ 0 °C to 38 °C

\[ \Delta p \] 60 psi @ 150 °F
\( \Delta p \) 4,1 bar @ 66 °C

\[ \Delta p \] 30 psi @ 180 °F
\( \Delta p \) 2,1 bar @ 82 °C

Typical Water Flow Rates per 10" Cartridge
End Cap Configuration

- **-226 O-ring**
  - External -226 O-rings; open end for C1 and F1 SOE configurations

- **-222 O-ring**
  - External -222 O-rings; open end for C2 and F2 SOE configurations

- **-226 nO-Ring®**
  - External -226 nO-Ring® with locking tabs; open end for C5 and F5 SOE configurations

- **-226 O-ring**
  - External -226 O-rings with locking tabs; open end for C6 and F6 SOE configurations

- **Flat Gasket**
  - Flat Gasket; open end for GS and GL DOE configurations

- **Internal O-ring**
  - Internal O-ring; open end for DN and DA DOE or RN and RA SOE configurations

- **Button Cap**
  - Button Cap; closed end for C2, C3 and C6 SOE configurations

- **Alignment Fin**
  - Alignment Fin; closed end for F1, F2, F5 and F6 SOE configurations

- **Recessed Cap**
  - Recessed Cap; closed end for RN and RA SOE configurations

Ordering Information

<table>
<thead>
<tr>
<th>Filter Grade</th>
<th>Absolute Rating (μm)</th>
<th>Cartridge Length</th>
<th>End Cap Configuration</th>
<th>Reinforcement Ring Option</th>
<th>Seal Material (O-ring or Gasket)</th>
</tr>
</thead>
<tbody>
<tr>
<td>RM 0.2</td>
<td>0.5, 1</td>
<td>10&quot; (25 cm)</td>
<td>DOE; flat gaskets (9.75&quot;, 19.5&quot;, 29.25&quot;, 39&quot; length filters)</td>
<td>(Blank) = Standard - no reinforcement ring</td>
<td>B = Buna</td>
</tr>
<tr>
<td>RM 0.2, 0.3, 0.5</td>
<td>2</td>
<td>20&quot; (50 cm)</td>
<td>DOE; flat gaskets (20&quot;, 30&quot;, 40&quot; length filters)</td>
<td>R = Reinforcement ring; required for autoclave/ SIP applications</td>
<td>E = EPR</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>30&quot; (75 cm)</td>
<td>SOE; -222 nO-Ring®, button cap end</td>
<td></td>
<td>S = Silicone</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>40&quot; (100 cm)</td>
<td>SOE; -222 O-rings, fin end</td>
<td></td>
<td>T = Teflon® over silicone</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>SOE; -226 nO-Ring®, button cap end</td>
<td></td>
<td>V = Viton®</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>SOE; -226 O-rings, button cap end</td>
<td></td>
<td>X = Teflon® over Viton®</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>F5 = SOE; -226 nO-Ring®, fin end</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>F6 = SOE; -226 O-rings, fin end</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>DN = SOE; internal -120 O-rings</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>RN = SOE; internal -120 O-ring, recessed cap end</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>DA = SOE; internal -213 O-rings</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>RA = SOE; internal -213 O-ring, recessed cap end</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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