BNM Filters
Nylon 6,6 Membrane

The BNM cartridge and capsule filters are made with Nylon 6,6 membrane. These long-proven filters are used for bioburden control in water, solvents and aqueous solutions. Pore sizes range from 0.10 to 0.65 µm and the filter sizes scale from laboratory to full production using identical materials to ensure consistent results.

BNM filters have broad chemical compatibility making them well suited for the filtration of solvents and other harsh chemicals. They are used to prevent bacteria contamination and remove microbials before final sterilizing filters.

The BNM filters have high retention and throughput. They are flushed to remove manufacturing debris and reduce extractables. Products are 100% integrity tested. BNM capsules are available pre-sterilized.

Critical Process provides unrivaled delivery times, technical consulting before purchasing, and very competitively priced high-performance products. Our comprehensive testing & analysis and validation services support your team whenever they need it. Your process experts partnering with our filtration experts is how we deliver your company’s solution right the first time.

BNM bioburden control filters are recommended for:
- SVPs & LVPs
- Diagnostics
- Buffers
- WFI, Water Purification
- Non-protein Solutions
- Chemicals

Bioburden Control
Clarification & Prefiltration

CARTRIDGES – Nominal Dimensions
Length: 5 to 40 in. (12.7 to 101.6 cm)
Outside Diameter: 2.75 in. (7.0 cm)

CAPSULES – Nominal Dimensions
Length: 2 to 30 in. (5.1 to 76.2 cm)
Outside Diameter: 3.50 in. (8.9 cm)
### Maximum Operating Parameters

<table>
<thead>
<tr>
<th></th>
<th>CARTRIDGES</th>
<th>CAPSULES</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Liquid Operational Pressure</strong></td>
<td>N/A</td>
<td>80 psi at 68 °F (5.52 barg at 20 °C)</td>
</tr>
<tr>
<td><strong>Gases Operational Pressure</strong></td>
<td>N/A</td>
<td>60 psi at 68 °F (4.14 barg at 20 °C)</td>
</tr>
<tr>
<td><strong>Operating Temperature (water)</strong></td>
<td>180 °F at 30 psid (82 °C at 2.07 barg)</td>
<td>110 °F at 30 psid (43 °C at 2.07 barg)</td>
</tr>
<tr>
<td><strong>Forward Differential Pressure</strong></td>
<td>80 psid at 68 °F (5.52 barg at 20 °C)</td>
<td>80 psid at 68 °F (5.52 barg at 20 °C)</td>
</tr>
<tr>
<td><strong>Reverse Differential Pressure</strong></td>
<td>50 psid at 68 °F (3.45 barg at 20 °C)</td>
<td>50 psid at 68 °F (3.45 barg at 20 °C)</td>
</tr>
<tr>
<td><strong>Recommended Changeout Pressure</strong></td>
<td>35 psid (2.41 barg)</td>
<td>35 psid (2.41 barg)</td>
</tr>
</tbody>
</table>

### Sanitization & Sterilization

<table>
<thead>
<tr>
<th>Sanitization Type</th>
<th>CARTRIDGES</th>
<th>CAPSULES</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Filtered Hot Water</strong>*</td>
<td>90 °C (194 °F), 30 minutes, multiple cycles, max 3 psid forward flow</td>
<td>N/A</td>
</tr>
<tr>
<td><strong>Inline Steam</strong>*</td>
<td>275 °F (135 °C), 30 min, 25+ cycles</td>
<td>N/A</td>
</tr>
<tr>
<td><strong>Autoclave</strong>*</td>
<td>250 °F (121 °C), 30 min, 25+ cycles</td>
<td>250 °F (121 °C), 30 min, 25+ cycles</td>
</tr>
<tr>
<td><strong>Chemical Sanitization</strong></td>
<td>Performed using industry standard concentrations of hydrogen peroxide, peracetic acid, and other selected chemicals.</td>
<td></td>
</tr>
</tbody>
</table>

*Cartridge Filters – For all elevated temperature procedures above, a stainless-steel support ring is required.

### Filtration Area (Nominal)

<table>
<thead>
<tr>
<th>Length</th>
<th>CAPSULES</th>
<th>CARTRIDGES AND CAPSULES</th>
<th>CARTRIDGES</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2”</td>
<td>5”</td>
<td>10”</td>
</tr>
<tr>
<td>5.08cm</td>
<td>12.7cm</td>
<td>25.4cm</td>
<td>50.8cm</td>
</tr>
<tr>
<td></td>
<td>1.2 ft²</td>
<td>3.3 ft²</td>
<td>7.0 ft²</td>
</tr>
<tr>
<td>0.11 m²</td>
<td>0.31 m²</td>
<td>0.65 m²</td>
<td>1.30 m²</td>
</tr>
</tbody>
</table>

### Integrity Testing

<table>
<thead>
<tr>
<th>PORE SIZE</th>
<th>DIFFUSION TEST PRESSURE*</th>
<th>BUBBLE POINT MINIMUM*</th>
</tr>
</thead>
<tbody>
<tr>
<td>μm</td>
<td>PSIG</td>
<td>BARG</td>
</tr>
<tr>
<td>0.10</td>
<td>48</td>
<td>3.31</td>
</tr>
<tr>
<td>0.22</td>
<td>35</td>
<td>2.41</td>
</tr>
<tr>
<td>0.45</td>
<td>20</td>
<td>1.38</td>
</tr>
<tr>
<td>0.65</td>
<td>15</td>
<td>1.03</td>
</tr>
</tbody>
</table>

### Diffusion Specifications*

<table>
<thead>
<tr>
<th>Length</th>
<th>2”</th>
<th>5”</th>
<th>10”</th>
<th>20”</th>
<th>30”</th>
<th>40”</th>
</tr>
</thead>
<tbody>
<tr>
<td>mL/min</td>
<td>≤ 4.3</td>
<td>≤ 12.9</td>
<td>≤ 30</td>
<td>≤ 60</td>
<td>≤ 90</td>
<td>≤ 120</td>
</tr>
</tbody>
</table>

* All specifications are for water wetted membrane
** Test pressure exceeds operational limits of capsule filters. Use the Diffusion Test method.
Validation
BNM filters are validated using test procedures that comply with ASTM F 838-15(ae1) protocols for the determination of bacterial retention in filters used for liquid filtration. The filters are challenged with the organisms listed below.

- 0.10μm: *Brevundimonas diminuta*
- 0.22μm: *Brevundimonas diminuta*
- 0.45μm: *Serratia marcescens*
- 0.65μm: *Saccharomyces cerevisiae*

Endotoxins
The levels of bacterial endotoxins in aqueous extracts from BNM filters are below current USP limits as specified for water for injection.

Extractables
BNM filters typically exhibit low levels of non-volatile residues.

TOC and Conductivity
BNM filters conform with TOC standards of USP <643> and the water conductivity standards of USP <645> after an appropriate flush with purified water.

Toxicity Compliance
The materials used to construct BNM filters are non-toxic and meet the requirements for the MEM Elution Cytotoxicity Test and the requirements for Biological Reactivity Tests in the current version of the United States Pharmacopeia (USP) for Class VI - 121 °C Plastics.

Non-Fiber Releasing
BNM filters comply with Title 21 CFR sections 210.3 (b)(6) and 211.72, for non-fiber releasing filters.

FDA Compliance
Materials meet the requirements listed by the FDA as appropriate for use in articles intended for repeated food contact as specified in Title 21 CFR sections 174.5, 177.1500, 177.1520, 177.1630, 177.2440, and 177.2600 as applicable.

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**Construction Materials**

| Filtration Media          | Nylon 6,6 Membrane with polyester support |
| End Caps, Center Core, Outer Support Cage, Capsule Housing | Polypropylene |
| Sealing Method            | Thermal Bonding |
| O-Rings/Gaskets Cartridges only | Buna, Viton® (or FKM), EPDM, Silicone, FEP Encapsulated Silicone, FEP Encapsulated Viton (or FKM) |
Flow rates for Cartridge filters are per 10-inch length. The test fluid is water at ambient temperature.

Flow rates for Capsule filters are tested using a 2” capsule filter with 1” sanitary inlet and outlet ports. The test fluid is water at ambient temperature. Flow rates for larger capsules will scale with filtration area. Rates will vary based on end configuration of the capsule.
BNM Filters Ordering Information

Fill in the corresponding codes in the boxes below to build your Part Number.

To consult with one of our technical team members, request a quote or place an order:
call (603) 880-4420 or contact us here.

Cartridge Filters

- Pore Size Code:
  - -10 = 0.10 μm
  - -20 = 0.22 μm
  - -40 = 0.45 μm
  - -60 = 0.65 μm

- SS Ring:
  - S = Ring
  - N = No Ring

- Length:
  - 05 = 5 in. (12.7 cm)
  - 97 = 9.75 in. (24.8 cm)
  - 01 = 10 in. (25.4 cm)
  - 02 = 20 in. (50.8 cm)
  - 03 = 30 in. (76.2 cm)
  - 04 = 40 in. (101.6 cm)

- O-Ring/Gasket Code:
  - S = Silicone
  - B = Buna
  - V = Viton (or FKM)
  - T = FEP Encapsulated
  - E = EP
  - R = FEP Encapsulated

- End Cap Code:
  - 0 = Flat Gasket, DOE
  - 1 = Flat Gasket/Plug
  - 2 = 2-222 O-ring/Plug
  - 3 = 213/119 Internal O-ring DOE
  - 4 = 213/119 Internal O-ring/Plug
  - 5 = 2-222 O-ring/Flat
  - 6 = 2-226 O-ring/Flat
  - 7 = 020 O-ring/Plug
  - 8 = 2-222 O-ring/Spear
  - 9 = 2-226 O-ring/Spear
  - 21 = 2-223 O-ring/Flat
  - 22 = 2-223 O-ring/Spear
  - 23 = 2-222 O-ring 3 Tab/Flat
  - 24 = 2-222 O-ring 3 Tab/Spear
  - 25 = Short 2-222/Plug

- Side Vent Options:
  - 1 = Luer Lock
  - 2 = Bleed Valve

Capsule Filters

- Pore Size Code:
  - -10 = 0.10 μm
  - -20 = 0.22 μm
  - -40 = 0.45 μm
  - -60 = 0.65 μm

- Pre-Sterilized or Not:
  - S = Pre-Sterilized
  - G = Gamma Stable
  - N = Not Sterilized

- Length:
  - A = 2"
  - B = 5"
  - 1 = 10"
  - 2 = 20"
  - 3 = 30"

- Inlet:
  - A = 1/4” Female NPT
  - B = 1/4” Male NPT
  - C = 3/8” Female NPT
  - D = 1/2” Female NPT
  - E = 1/2” Male NPT
  - F = 1” Sanitary
  - G = Hose Barb
  - H = 1 ½” Sanitary with side vent
  - I = ½” Single Stepped Barb with side vent

- Outlet:
  - A = 1/4” Female NPT
  - B = 1/4” Male NPT
  - C = 3/8” Female NPT
  - D = 1/2” Female NPT
  - E = 1/2” Male NPT
  - F = 1” Sanitary
  - G = Hose Barb
  - H = 1 ½” Sanitary with side vent
  - I = ½” Single Stepped Barb with side vent
  - IB = ½” Single Stepped Barb with filling bell and side vent

- O-Ring (For Bleed valve Only):
  - S = Silicone
  - E = EP
  - V = Viton
  - B = Buna
  - K = FFKM

*Additional end configurations available

*Fits hoses/tubes with inner diameter 11/32 to 9/16 inches