Polyfil™ Junior
Absolute Rated Pleated Polypropylene Cartridge Filters
Small-Scale Applications

A range of absolute rated cartridge filters from Porvair Filtration Group, designed for retrofitting into existing Junior-style housings. Featuring the latest developments in meltblown polypropylene filter media technology, Polyfil™ Junior cartridges are based on a robust all polypropylene construction, offering removal ratings from 0.5 to 5 micron absolute.

Polyfil™ Junior cartridges are suitable for absolute removal of unwanted particulates and for prefiltration to membrane filters. The graded multi-layer polypropylene media provide prefiltration of the process fluid prior to the absolute rated final layer. The unique design of the Polyfil™ Junior cartridges helps to achieve lower running costs and a smaller process footprint.

The Polyfil™ Junior are also resistant to integrity failure caused by steam sterilisation and have excellent chemical compatibility characteristics. They are suitable for applications ranging from bioburden reduction and the clarification of a wide range of process liquids and end products.

Available in J-style with internal O-ring, S-style with moulded flange seal and L-style with 4-lug locking end cap with double external O-rings.

Applications

Polyfil™ Junior cartridges provide absolute filtration where reproducibility and consistency of performance are critical. Suitable for the filtration of aqueous and organic liquids, Polyfil™ Junior cartridges can be used as prefilters or final filters in the following applications:

- **Small-scale biopharmaceuticals**
  For the prefiltration of ingredients, intermediates, make-up waters and final products, including clarification and bioburden reduction.

- **Ophthalmic solutions**
  Prefiltration for the protection and longevity of final membrane filters.

- **Electronics and semiconductors**
  For the prefiltration of process water and chemicals, including solvents, developers and photoresists.

- **Small-scale fine chemicals**
  For the clarification of a wide range of process chemicals.

- **Pilot-scale studies**
  For the scale-up and optimisation of prefiltration in sterile filtration processes.

- **Inks and coatings**
  For removal of agglomerates and gels with minimal loss of product.
Features and Benefits

- **Polyfil™ Junior cartridges**
  Extensive research and selection of the latest and most advanced polypropylene meltblown microfibre filter media, results in improved performance, leading to extended filter life at a given efficiency.

- **Graded multi-layer media**
  The multi-layer media structure provides prefiltration of the process fluid prior to the absolute rated final layer. This combination provides economy of use and a smaller process footprint.

- **High filtration area**
  Large surface area for low clean pressure drop.

- **Guaranteed removal ratings**
  Polyfil™ Junior cartridges are validated using the recognised industry standard modified OSU-F2 single pass test to Beta 5000 (99.98% efficiency).

- **Suitable for steam and hot water sanitisation**
  Polyfil™ Junior J-style and L-style cartridges are resistant to repeat steam sterilisation up to 135°C (275°F) and hot water cycles at up to 90°C (194°F). S-style cartridges are designed for sterilisation by autoclave.

- **Environmentally friendly**
  Polyfil™ Junior filters are environmentally friendly, all spent cartridges can be readily incinerated to trace ash.

- **Full traceability**
  All Polyfil™ Junior cartridges are identified with a batch serial number. Each Polyfil™ Junior cartridge is supplied with a Certificate of Quality and an operating instruction leaflet.

- **Controlled manufacturing environment**
  Polyfil™ Junior cartridges are manufactured in an ISO Cleanroom environment by fully gowned staff, minimising the risk of contamination.

Cartridge Construction

The high quality robust all polypropylene construction of Polyfil™ Junior cartridges, allows for excellent chemical compatibility within a wide range of fluids.

The meltblown polypropylene media provides a bonded matrix thus eliminating fibre migration. The inherent structural stability of the Polyfil™ Junior prevents ‘channelling’ and avoids the risk of particle unloading even under impulse conditions. The multi-layer combination of filter media, irrigation mesh and drainage material carefully pleated and thermally bonded maximises the media area and ensures an efficient flow throughout the cartridge.

The Polyfil™ Junior fusion bonded construction ensures cartridge integrity. No surfactants or bonding agents are used, minimising extractables.

### Table 1: Particle Retention Rating

<table>
<thead>
<tr>
<th>Code</th>
<th>Pore Rating (microns)</th>
<th>Absolute Rating 99.98% Beta 5000 (microns)</th>
<th>Nominal Rating 99.90% Beta 1000 (microns)</th>
<th>Nominal Rating 99% Beta 100 (microns)</th>
</tr>
</thead>
<tbody>
<tr>
<td>PP5</td>
<td>0.5</td>
<td>0.5</td>
<td>0.45</td>
<td>0.35</td>
</tr>
<tr>
<td>PP8</td>
<td>0.8</td>
<td>0.8</td>
<td>0.6</td>
<td>0.4</td>
</tr>
<tr>
<td>P01</td>
<td>1.0</td>
<td>1.0</td>
<td>0.9</td>
<td>0.55</td>
</tr>
<tr>
<td>P02</td>
<td>2.0</td>
<td>2.0</td>
<td>1.7</td>
<td>1.2</td>
</tr>
<tr>
<td>P05</td>
<td>5.0</td>
<td>5.0</td>
<td>2.6</td>
<td>1.25</td>
</tr>
<tr>
<td>P10</td>
<td>10.0</td>
<td>10.0</td>
<td>8.0</td>
<td>7.5</td>
</tr>
<tr>
<td>P20</td>
<td>20.0</td>
<td>17.5</td>
<td>12.5</td>
<td>10.0</td>
</tr>
<tr>
<td>P40</td>
<td>40.0</td>
<td>35.0</td>
<td>30.0</td>
<td>20.0</td>
</tr>
</tbody>
</table>
**Specifications**

**Materials of Manufacture**
- Filter media: Polypropylene
- Support layers: Polypropylene
- Inner core: Polypropylene
- Outer support: Polypropylene
- End fittings: Polypropylene
- Support ring: Stainless steel

**Cartridge Dimensions (Nominal)**
- Diameter: 56mm (2.2")
- Length: 77.5mm (2.5")
- 136mm (5")

**Effective Filtration Area**
Up to 0.15m² (1.6ft²) per 136mm module (depending on pore rating).

**Cartridge Treatment**
- Standard: Cleaned without further treatment.
- Flushed: Flushed with pyrogen-free water.
- Rinsed: Ultra-clean, pulse flushed to give a system resistivity of 18MΩ.cm.

**Gaskets and O-Rings**
- J-style: Silicone (other materials are available on request).
- S-style: Not supplied.
- L-style: Silicone (other materials are available on request).

**Maximum Differential Pressure**
Normal flow direction at:
- 20°C (68°F): 6.0 bar (87psi)
- 80°C (176°F): 4.0 bar (58psi)
- 100°C (212°F): 3.0 bar (44psi)
- 120°C (248°F): 2.0 bar (29psi)
- 125°C (257°F): 1.5 bar (22psi)

Reverse flow direction at:
- 20°C (68°F): 2.1 bar (30psi)
- 80°C (176°F): 1.0 bar (15psi)
- 100°C (212°F): 0.5 bar (7psi)

**Operating Temperature**
- Maximum continuous: 80°C (176°F)

**Sterilisation**
- J-style: In situ steam 70 x 25 minute cycles at 125°C (257°F).
- S-style: Autoclave 100 x 25 minute cycles at 125°C (257°F).
- L-style: In situ steam 70 x 25 minute cycles at 130°C (266°F).

**Extractables**
Minimum total extractables. Please refer to the Polyfil™ II Validation Guide.

**Integrity Testing**
Polyfil™ Junior filter cartridges are batch tested for integrity using the Bubble Point Test. Procedural details are available from Porvair.

**Clean Water Flow Rates**
- Typical clean water flow rate:
  A 136mm (5") Polyfil™ Junior cartridge exhibits the flow-ΔP characteristics indicated below, for solutions with a viscosity of 1 centipoise.
- Other solutions:
  For solutions with a viscosity of greater than 1 centipoise, multiply the indicated differential pressure by the viscosity in centipoise.

---

![Graph showing clean water flow rates](image-url)
Range
Polyfil™ Junior cartridges are designed for retrofitting into existing Junior-style housings as direct replacements for existing cartridges. Available in two formats of 2.5 and 5 inch lengths, and a choice of five microbial ratings: 0.5, 0.8, 1, 2 and 5 micron:

- J-style, a single open-ended element with a single internal o-ring seal on the downstream end cap.
- S-style, a single open-ended element incorporating an integral flange on the downstream end cap.
- L-style, a single open ended element with 4 locating lugs and double external ‘o’-rings.

Quality Assurance
Polyfil™ Junior cartridges are manufactured in an ISO Cleanroom environment by staff fully gowned to minimise any risk of contamination during production. Polyfil™ Junior cartridges are batch tested and flushed with pyrogen-free ultra-pure water. As a further safeguard, every cartridge is identified with a batch serial number, allowing users to maintain their own process records.

Registered to ISO 9001, Porvair Filtration Group procedures are subject to high standards of quality assurance as demonstrated through its Drug Master File status.

Material Conformity and Validation
The bio-safety of all materials used in the manufacture of Polyfil™ Junior cartridges is assured by FDA approval, USP Class VI and meets or exceeds the latest EC Directives for Food Contact. A comprehensive validation guide for Polyfil™ II cartridges is available on request.

Chemical Compatibility
The Polyfil™ Junior materials of construction are compatible with a wide range of chemicals and solvents, however care must be taken to select the appropriate seal material. A comprehensive chemical compatibility guide is available. Since operating conditions vary considerably between applications, verification by the end user is recommended.