porvair
filtration group

Bio-pharmaceutical Filtration

Product Range 2024

World Class Filtration Solutions

Porvair Filtration Group

Bio-Pharmaceutical Filtration

Product Range



www.porvairfiltration.com

Contents by Product

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Contact Information:

UK, New Milton Division
Tel: +44 (0)1425 612010
info@porvairfiltration.com

US, Ashland Division
Tel: +1 804 550 1600
infoUS@porvairfiltration.com

India, Mumbai Division
Tel: +91 22 2081 1148
infoIN@porvairfiltration.com

Our Locations

Segensworth, Hampshire, UK

Porvair Filtration Group's head office is located in Segensworth, UK. The following business units also operate out of Segensworth:

- Aerospace and Defence
- Energy
- Nuclear

ISO9001:2015, AS9100 Rev D, EASA (Part 21 Subpart G) approved.

Porvair Filtration Group Ltd., Segensworth Division
1 Concorde Close
Segensworth
Fareham
Hampshire
PO15 5RT
UK

Tel: +44 (0)1489 864330
Email: info@porvairfiltration.com

New Milton, Hampshire, UK

Our New Milton Division is home to our process departments, which include:

- Food and Beverage
- Pharmaceutical
- Polymer
- Printing
- Process

ISO9001:20015 approved.

Porvair Filtration Group Ltd., New Milton Division
Queensway
Stem Lane
New Milton
Hampshire
BH25 5NN
UK

Tel: +44 (0)1425 612010
Email: info@porvairfiltration.com

Europe

We also have a large network of distributors within Europe who distribute our products.

For more information, please contact our New Milton Office.

Tel: +44 (0)1425 612010
Email: info@porvairfiltration.com

Ashland, Virginia, USA

Ashland Division in Virginia is our USA head office, as well as the USA manufacturer for many of the industries we are involved with.

This includes Aerospace and Defence, Biosciences and Scientific, Energy, Food and Beverage, Pharmaceutical, Porous Media and OEM Materials, Printing, Process, Nuclear and Water.

ISO9001:2015 approved. AS9100 Rev D approved.

Porvair Filtration Group Inc., Ashland Division
301 Business Lane
Ashland, Virginia 23005
USA

Tel: +1 804 550 1600
Email: infoUS@porvairfiltration.com

Caribou, Maine, USA

Caribou, Maine, focuses on the manufacture of custom engineered porous sintered metal powder components and assemblies for use in a wide range of filtration and flow applications:

- Process and Analytical Instruments
- Porous Media and OEM Materials

ISO9001:2015 approved.

Porvair Filtration Group Inc., Caribou Division
15 Armco Avenue
Caribou, Maine 04736
USA

Tel: +1 207 493 3027
Email: infoUS@porvairfiltration.com

Boise, Idaho, USA

Boise, Idaho, focuses on the manufacture of custom metal filtration components and assemblies with porous sintered metal and PTFE media for use in a range of applications within:

- Semiconductor, Solar/Photovoltaic, HBLED, and Wafer Manufacturing
- Flat Panel Display and Hard Disk Drive Manufacturing

ISO9001:2015 approved.

Porvair Filtration Group Inc., Boise Division
1226 Caldwell Boulevard
Nampa, Idaho 83651
USA

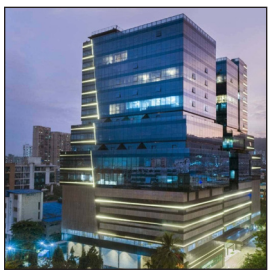
Tel: +1 208 461 2090
Email: infoUS@porvairfiltration.com

Mumbai, Maharashtra, India

Our Mumbai Division in India provides an operational base for marketing our extensive range of products within India.

Porvair Filtration India PVT. Ltd., Mumbai Division
401, 4th floor, Plot No C-3, Centrum IT Park,
Wagle Estate, Near Mulund Checknaka,
S.G. Barve Road, Thane West, Maharashtra, 400604

Tel: +91 22 2081 1148
Email: infoIN@porvairfiltration.com



Product Innovation, Manufacturing, Testing and Quality

We have a policy of continuous improvement in all areas of our business. Listening to customers' present and future requirements is a vital part of our operations and a key part of driving change.

We understand that product development involves building multidisciplinary teams, both within our company, and in partnership with our customers. This continuous development of products and materials is vital to enable us to offer new and better solutions. We have implemented various methodologies to drive out waste and process variance across the company to achieve our goal of zero defects.

Our dedicated team of scientists, engineers, production and quality professionals work towards the best possible filtration solutions for our customers. We have a fully equipped test house and laboratory, and our experienced design engineers use the latest technologies to give full structural assurance capability.

Research and Development

Development plays a fundamental part in our operations and has resulted in us developing a number of custom designed products based on our established porous polymeric materials (Vyon®) and sintered metal media (Sinterflo®), as well as developing a range of filters for fuel tank inerting applications.

We operate across many filtration and separation markets and there is significant interaction between each division in terms of product research and development. Our new product development team is drawn from scientists and engineers from across all divisions, encouraging new ideas and new solutions. The success of this approach has been in the interaction of chemists and engineers working together to find practical solutions to some extremely complex scientific challenges identified in the chosen market areas.

Manufacturing

Our filters, filtration systems and a range of porous materials are produced at our sites worldwide.

Our production capabilities include the complete element or cartridge construction, along with the build of entire tubeplate and vessel assemblies. We boast specialist fabrication skills and techniques in all of our manufacturing sites around the world and extensive ISO cleanroom facilities.




Engineering

From initial design concept through to manufacture and validation to in-service support, our highly experienced team of dedicated engineers work to develop the optimal filtration solution. Our knowledge and strong ethos of working closely with our customers, ensures that we supply filtration solutions that meet specific market requirements.

Testing and Laboratory

Our dedicated test, development and laboratory services underpin our design and development activity; from filtration media and material characterisation, product verification testing to customer system simulation trials and in service performance evaluation. Our capabilities include filtration characterisation, environmental testing and analysis.

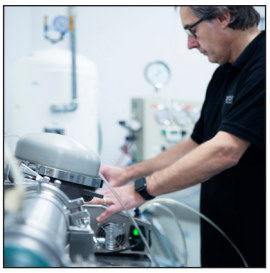
Technical Support Services

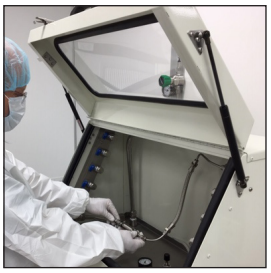
- **Validation services:**
  - Process specific validation
  - Filter compatibility
  - Retention studies
  - Microbial challenge tests
  - Endotoxin and particulate testing
  - Extractables testing
- **On-site services:**
  - Customer plant surveys
  - Process filter optimisation
  - Trouble-shooting
  - Pre-inspection review
- **Training:**
  - Integrity testing
  - SIP and CIP methods

Quality

Our policy is to provide products and services that consistently satisfy the commitments made to our customers by complying with their requirements, working together as a team and achieving continual improvement in our skills, systems, processes and performance.

We have a dedicated team of quality professionals with many years' experience in the definition, implementation and maintenance of quality management systems meeting multiple industry requirements. This extends across the workforce through a strong quality culture and a philosophy of 'getting it right first time' driven from the top of our organisation.



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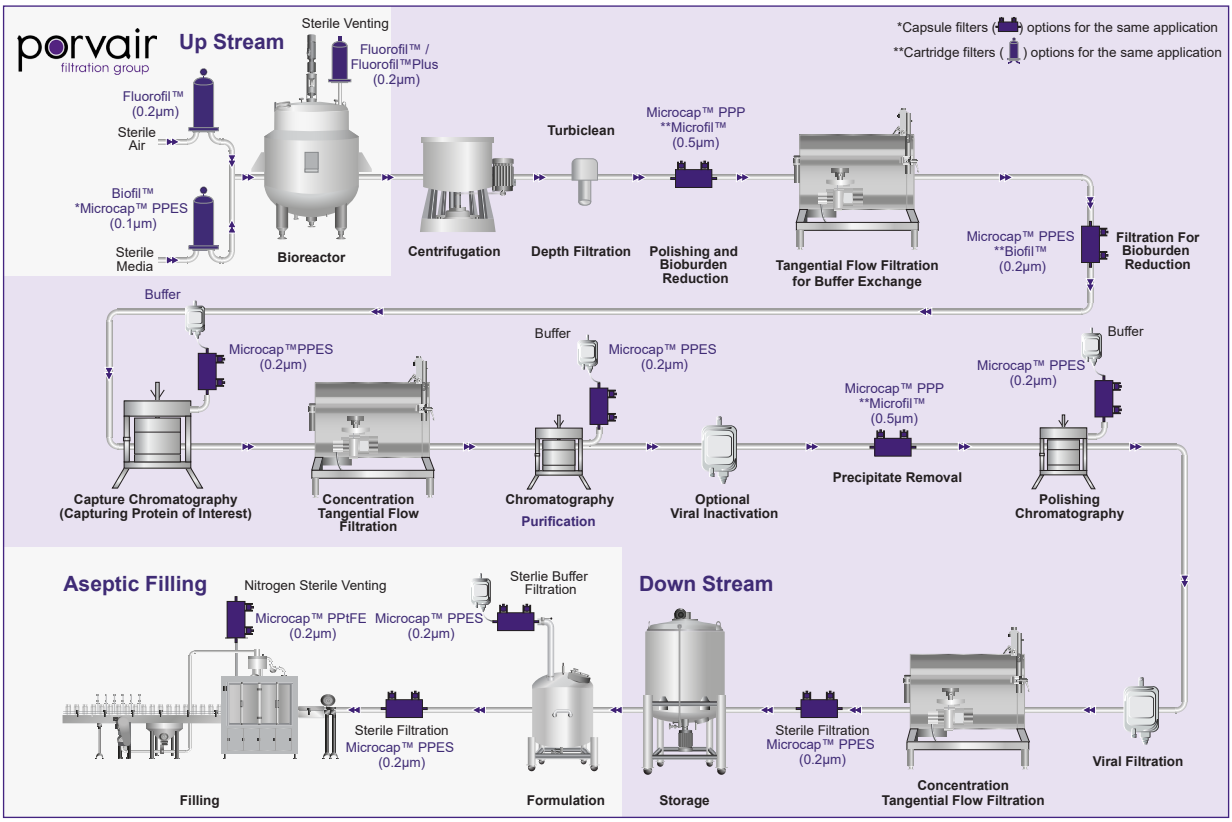
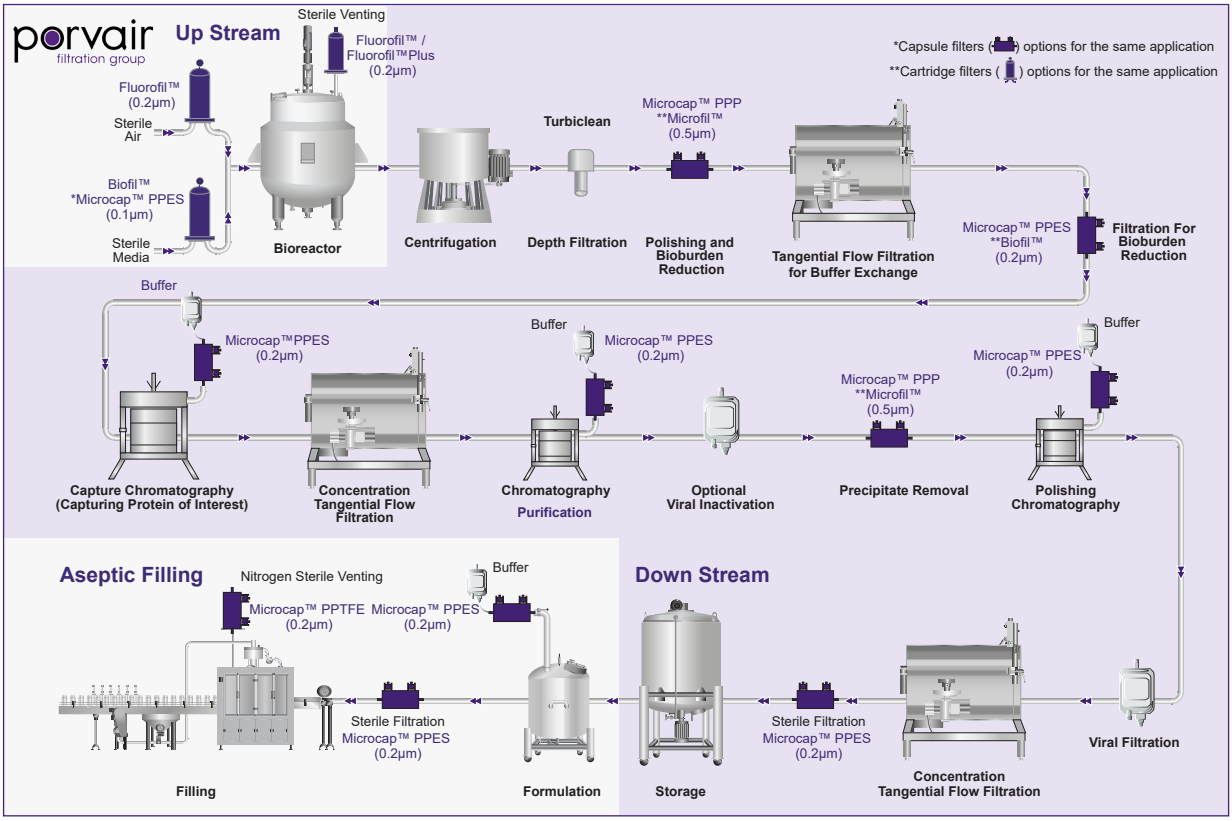
Bio-Pharmaceutical Applications

Aseptic Fill and Finish

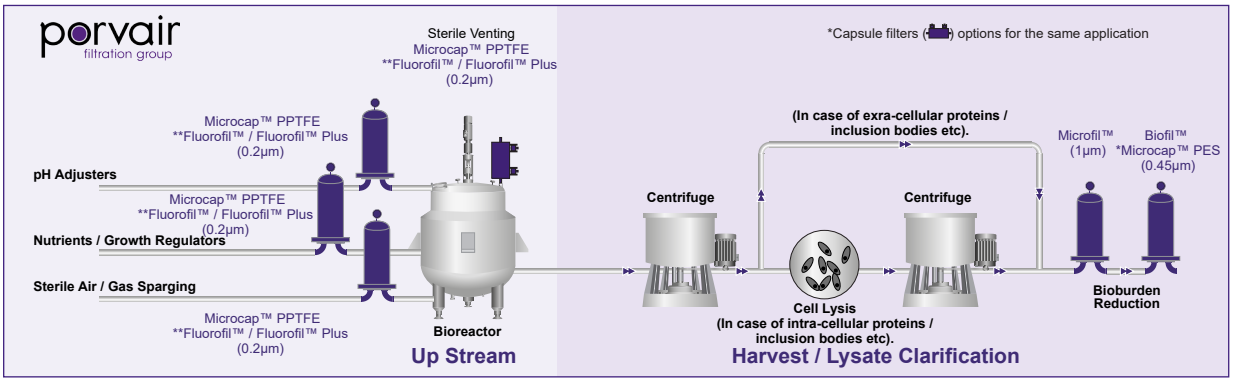


Downstream Processing

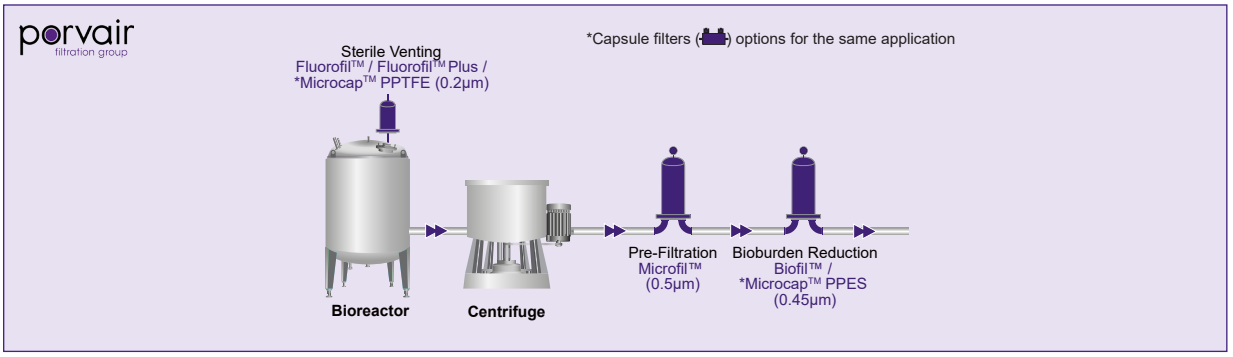


Bio-Pharmaceutical Applications

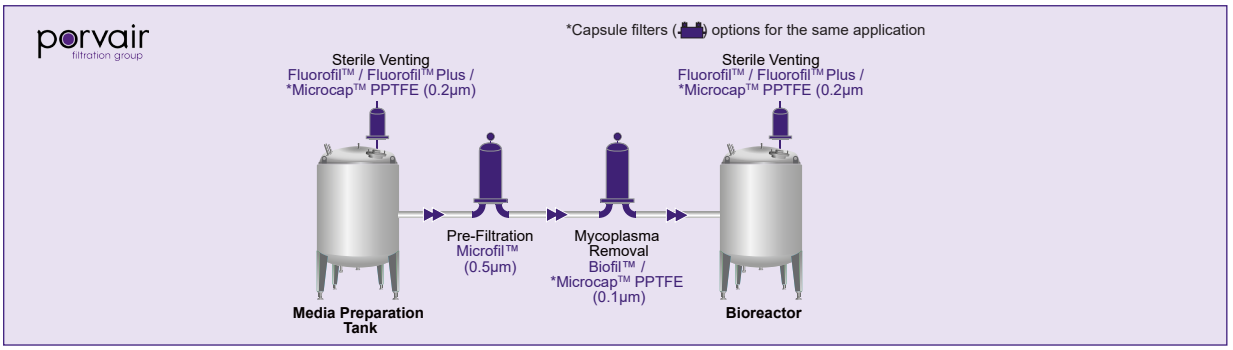
Harvesting and Clarification: Microbial Fermentation Broth Clarification



Harvesting and Clarification: Mammalian Cell Culture Clarification

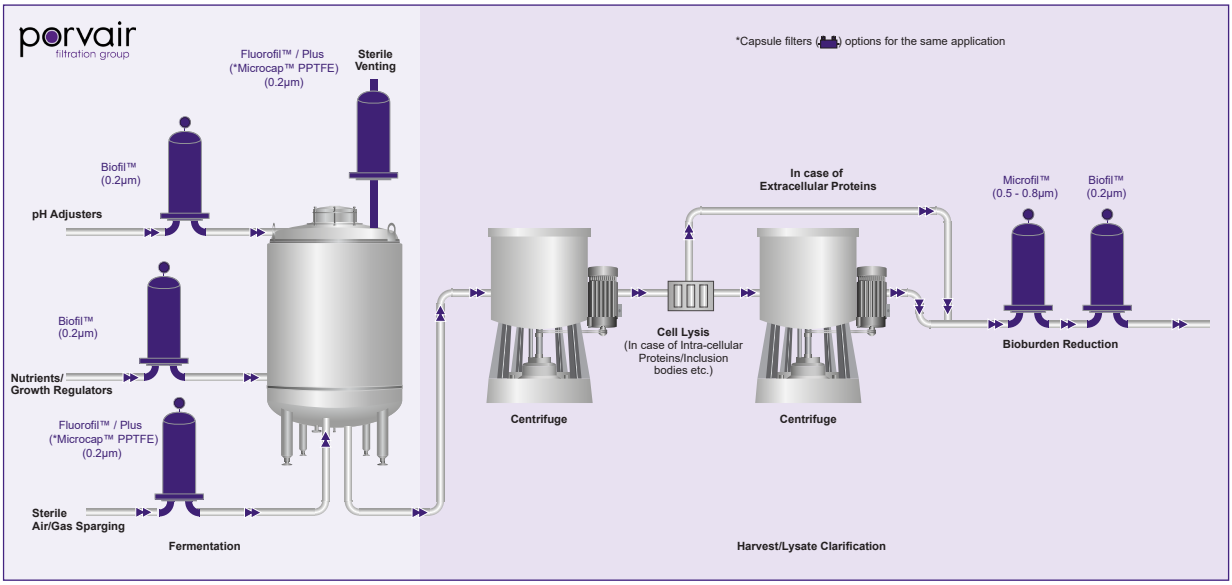


Mammalian Cell Culture

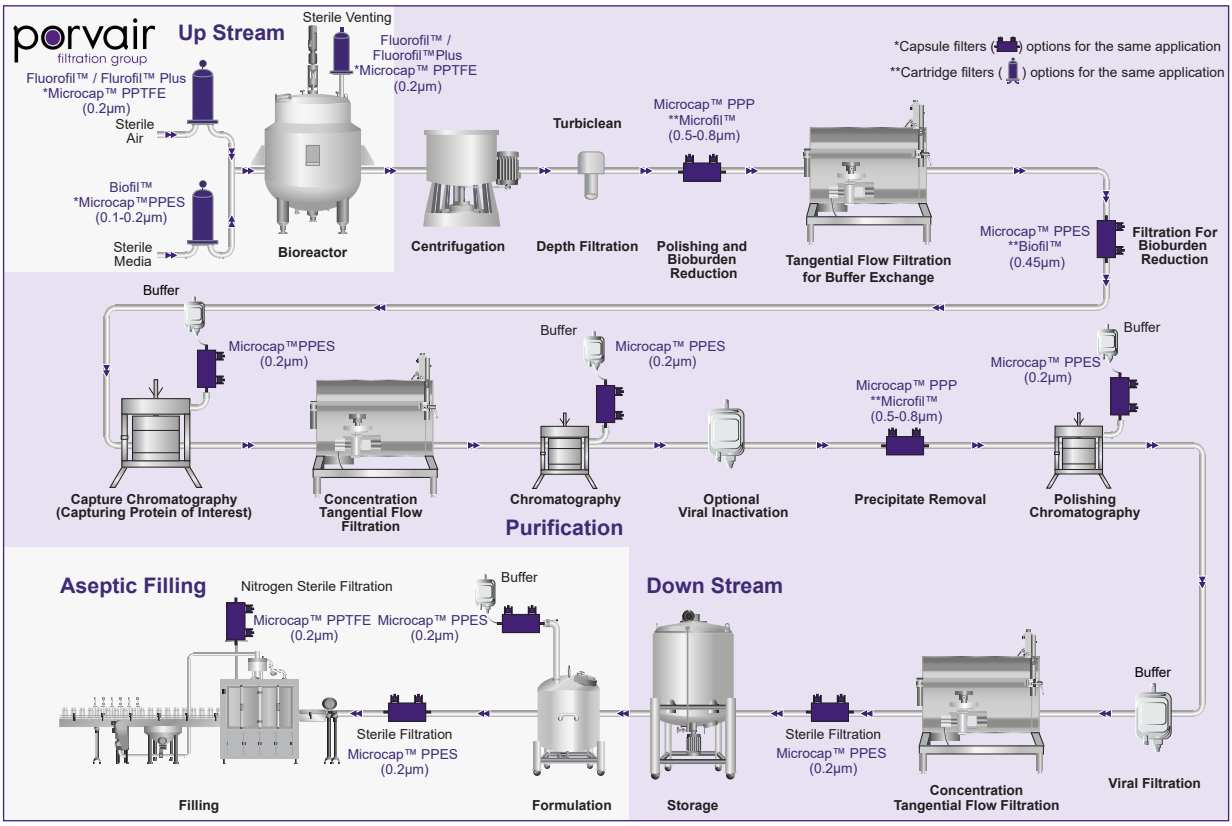


Bio-Pharmaceutical Applications

Microbial Fermentation

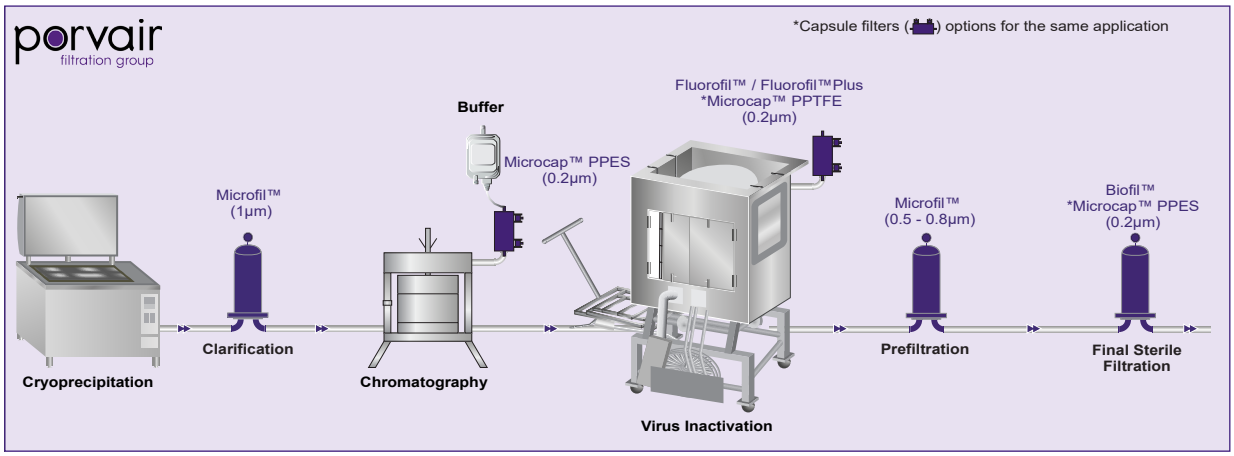


Monoclonal Antibodies

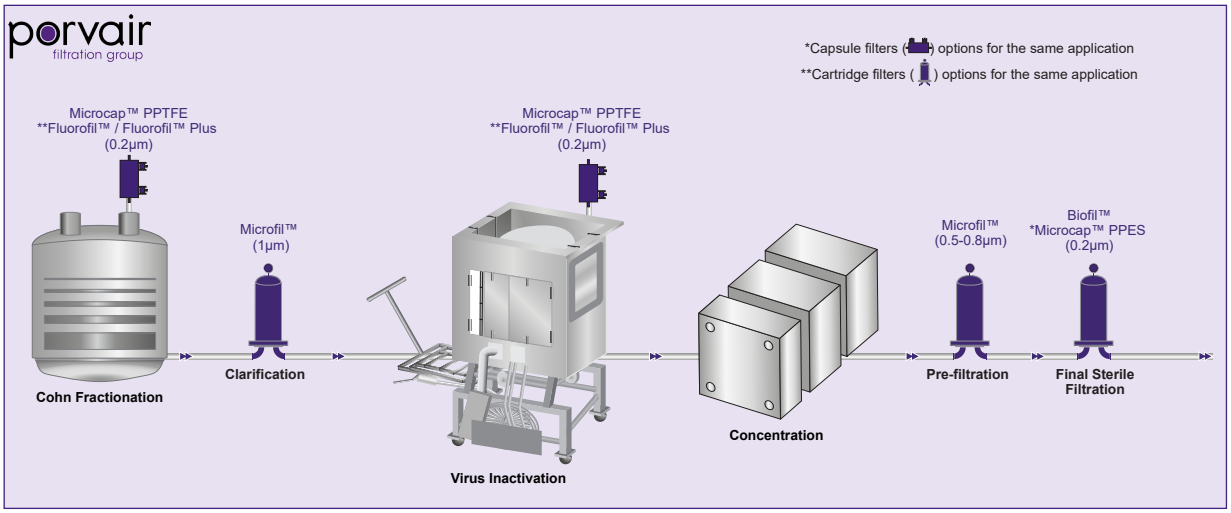


Bio-Pharmaceutical Applications

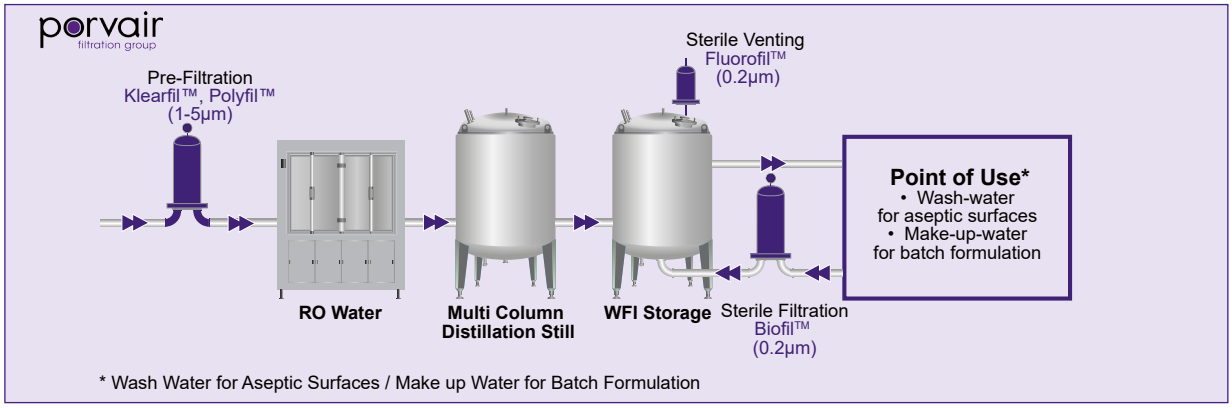
Plasma Fractionation: Clotting Factors



Plasma Fractionation: Albumin



Utilities: WFI



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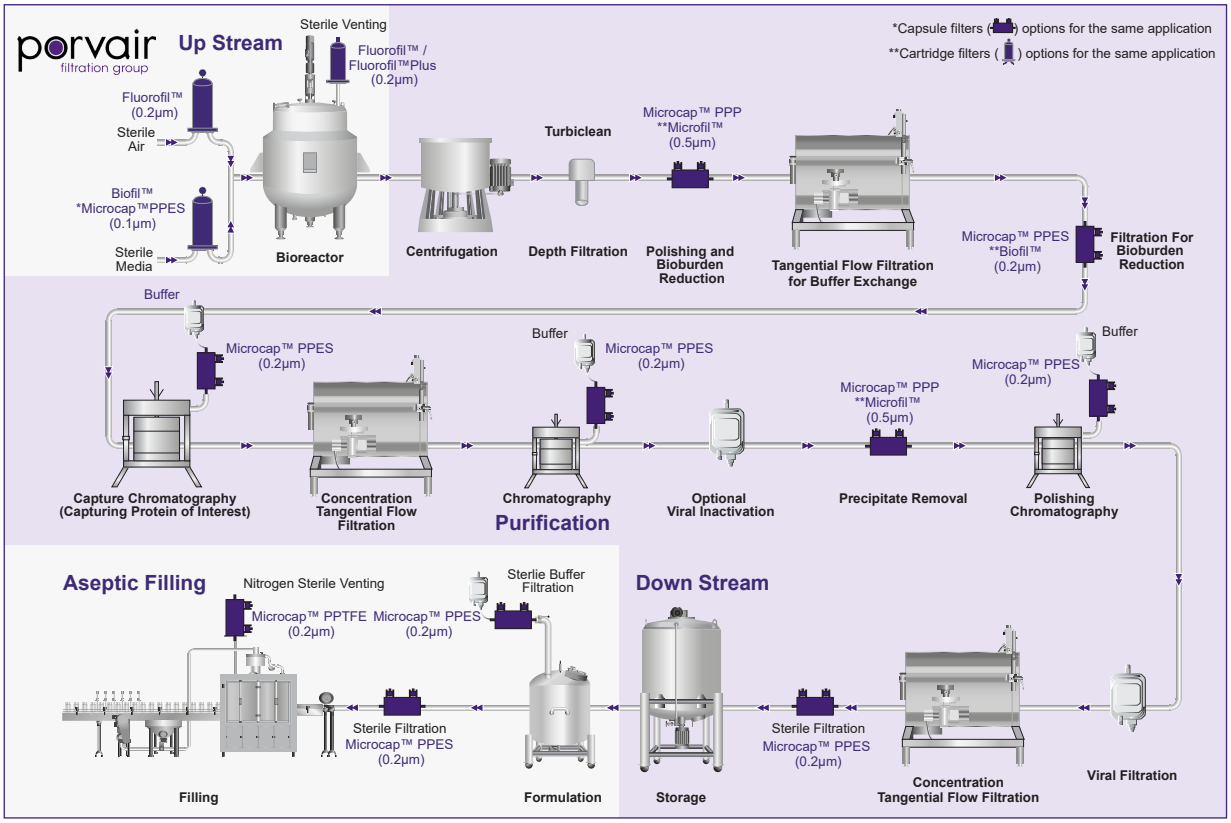
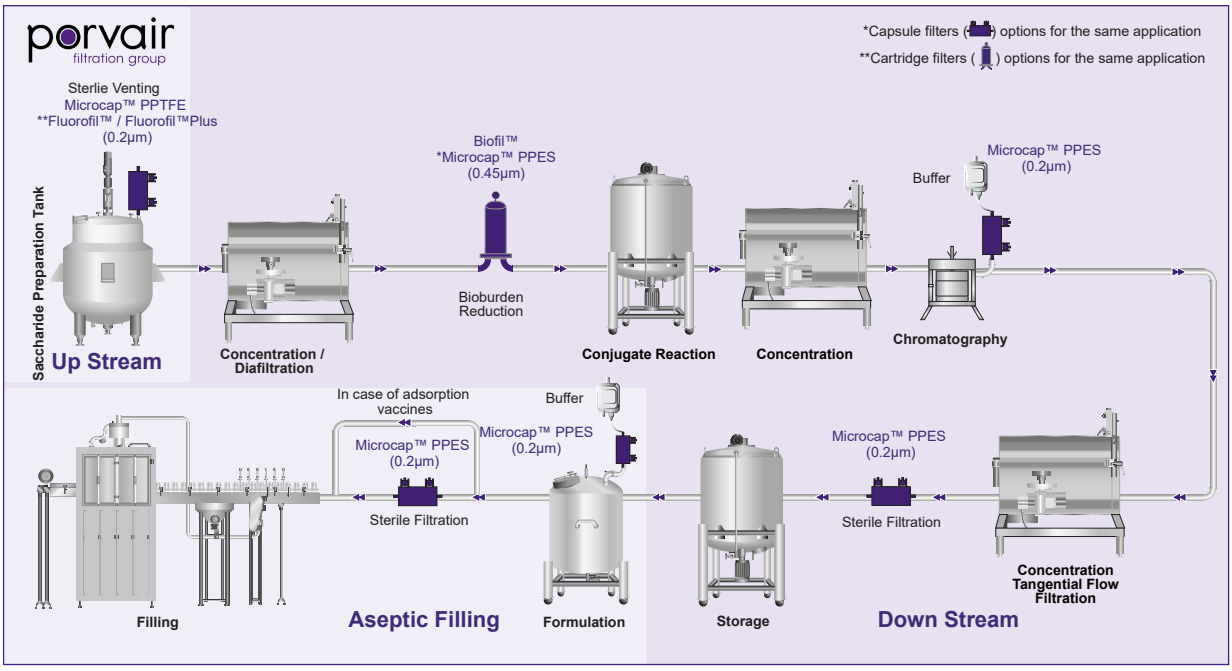
Bio-Pharmaceutical Applications

Recombinant Protiens

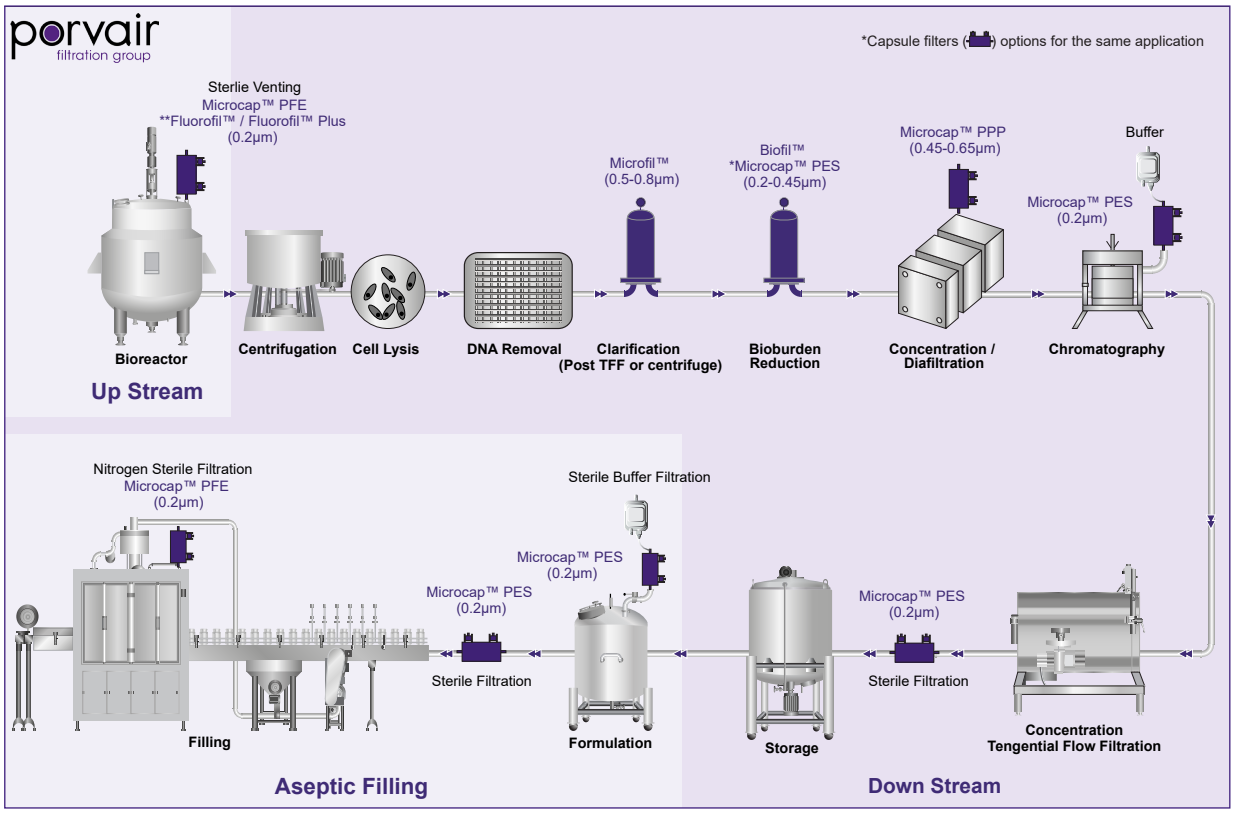


Vaccines: Conjugates

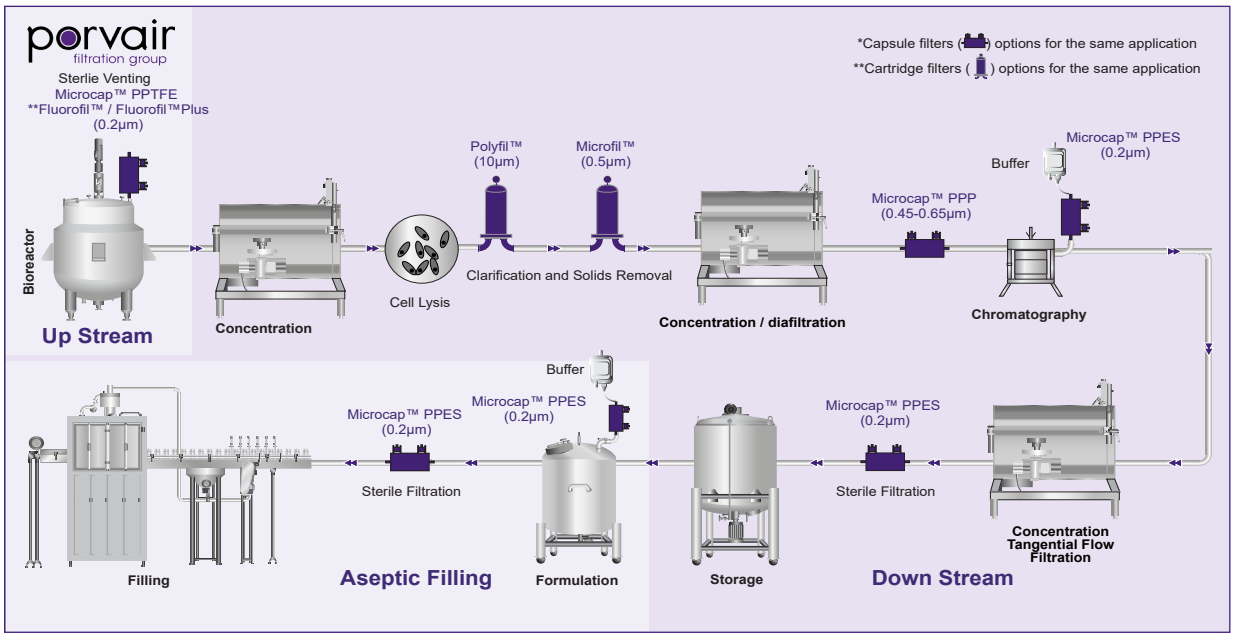


Bio-Pharmaceutical Applications

Vaccines: Mammalian Cell



Plasmid DNA



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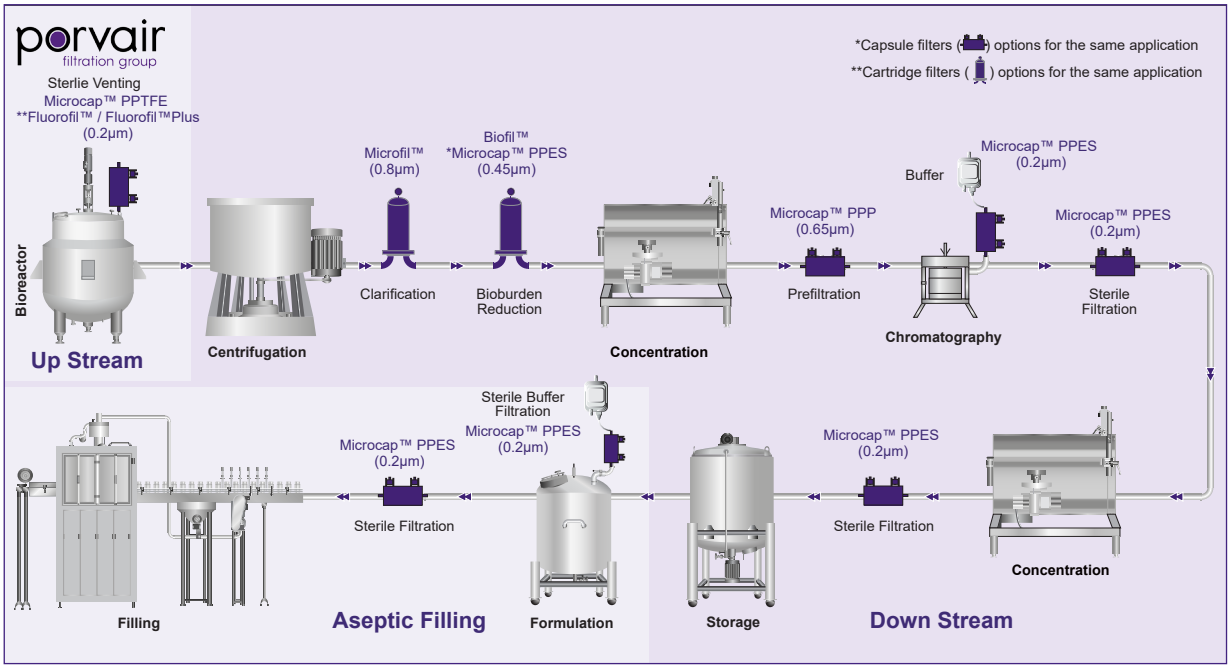
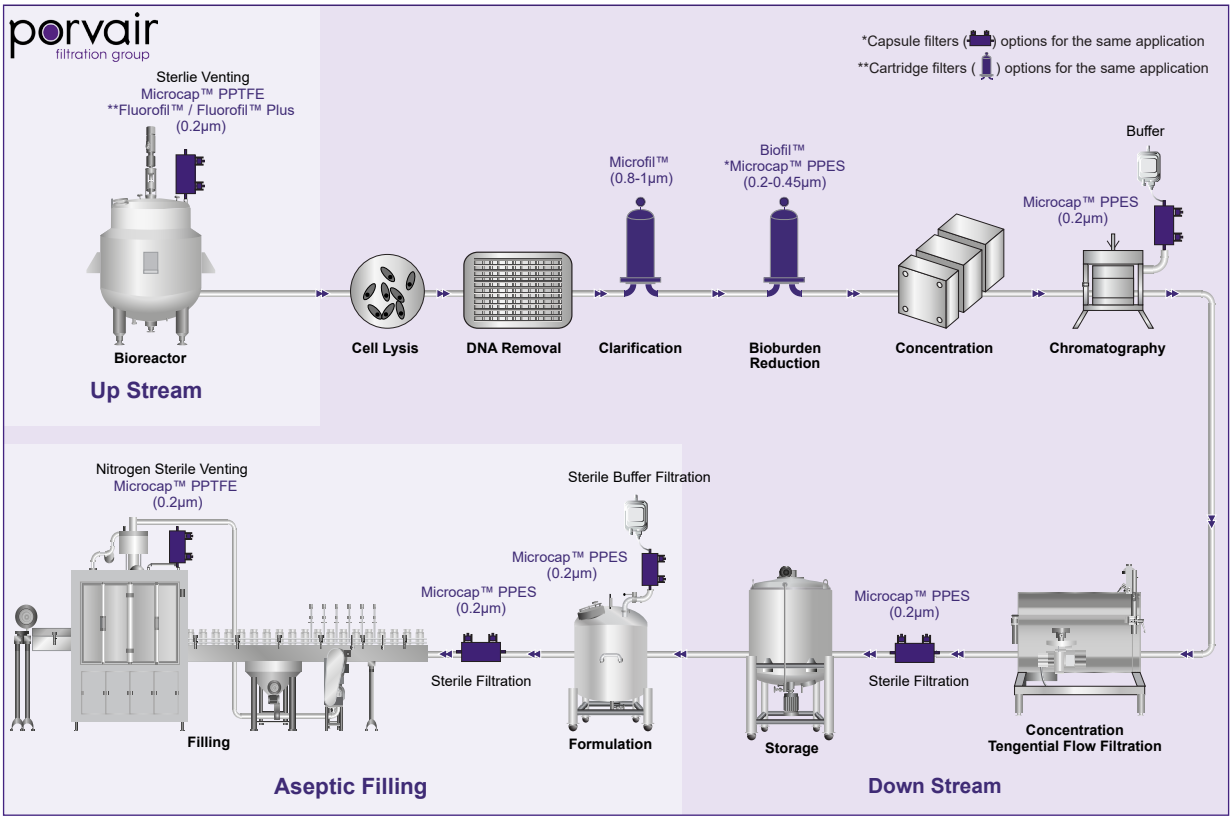
Bio-Pharmaceutical Applications

Vaccines: Polysaccharides

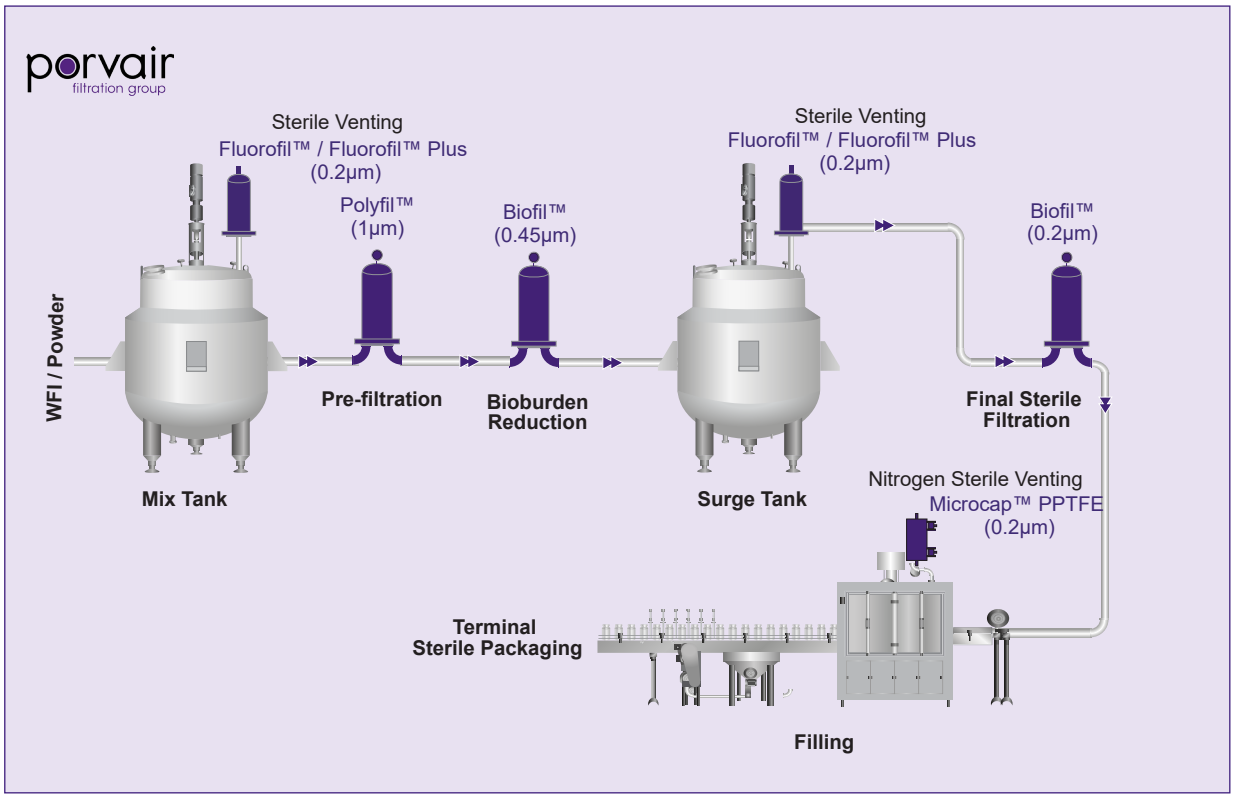


Vaccines: Viral Vectors

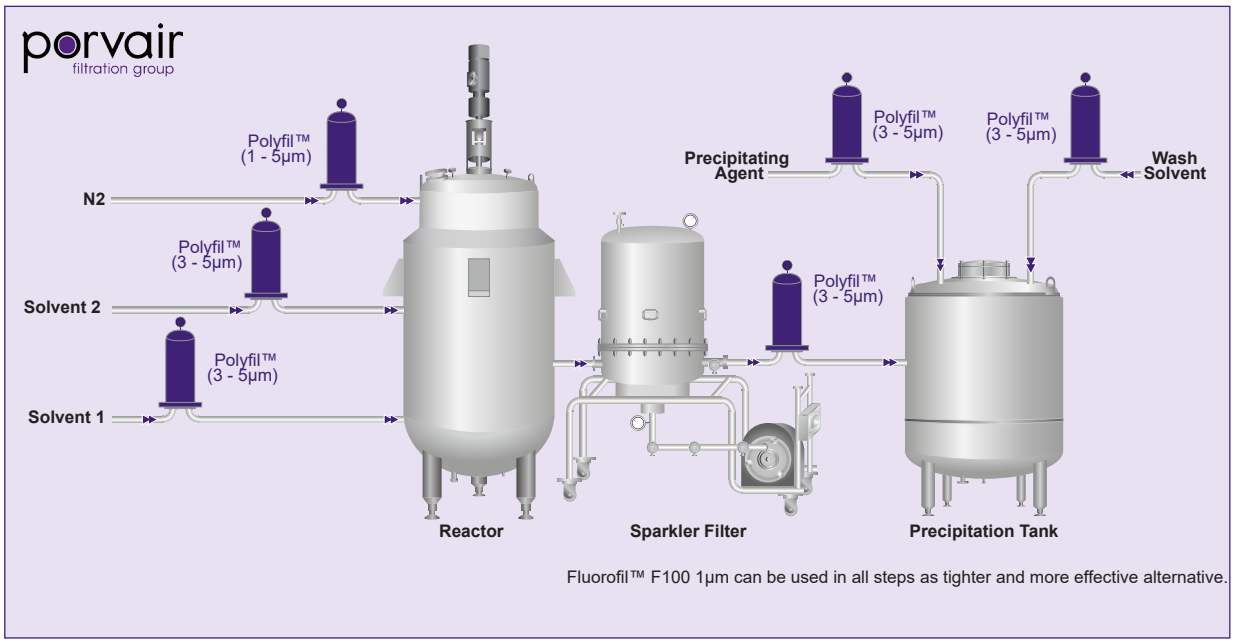


Bio-Pharmaceutical Applications

Large Volume Parenteral (LVP)



Non-Sterile API



Fluorofil™ F100 1µm can be used in all steps as tighter and more effective alternative.

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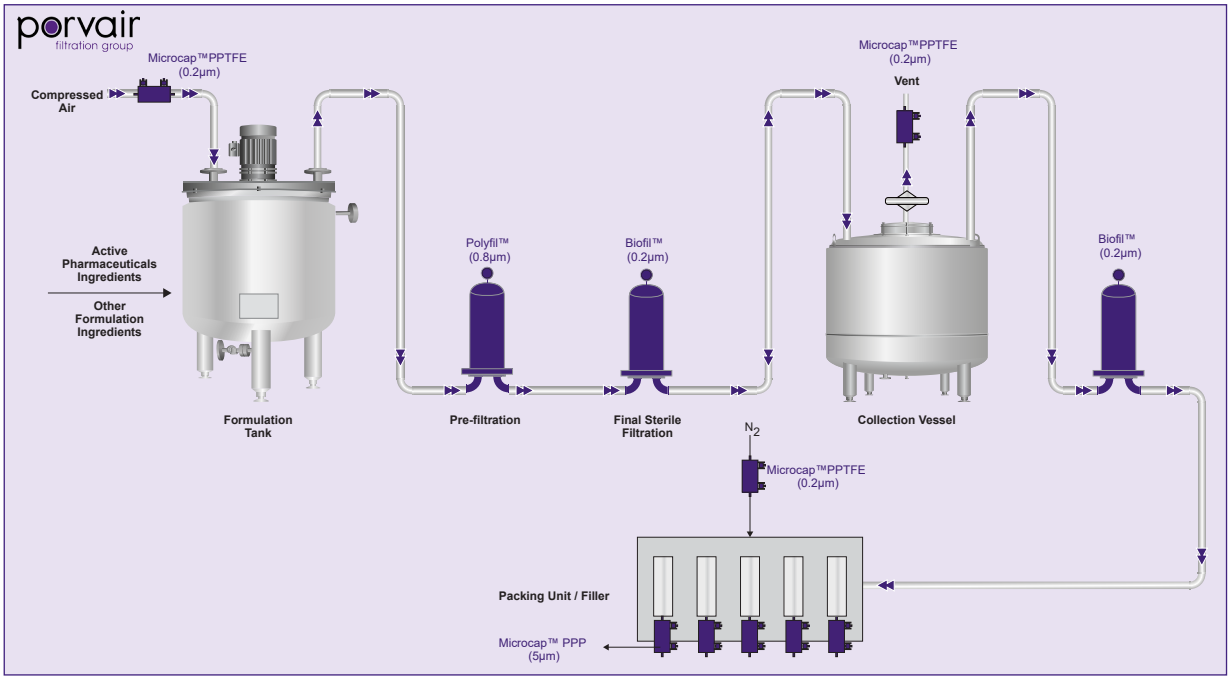
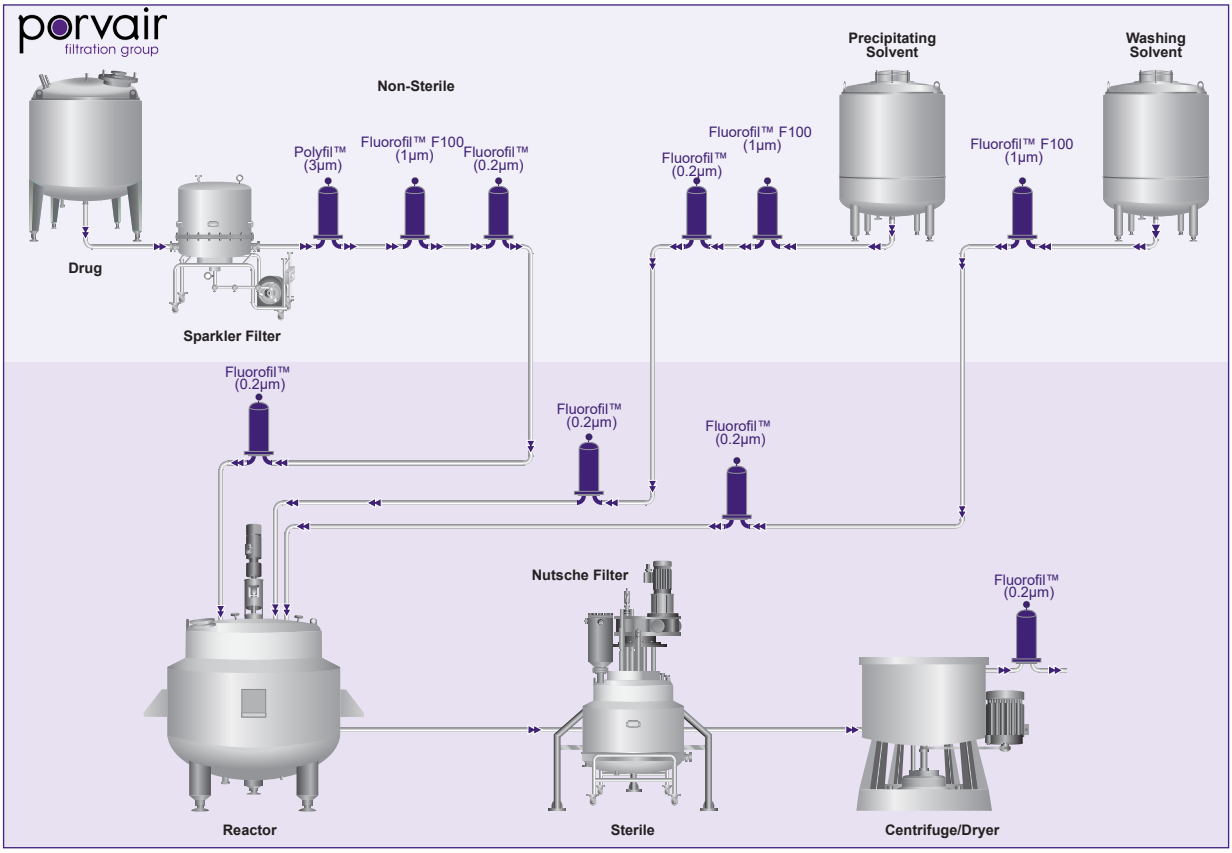
Bio-Pharmaceutical Applications

Small Volulme Parenteral (SVP)

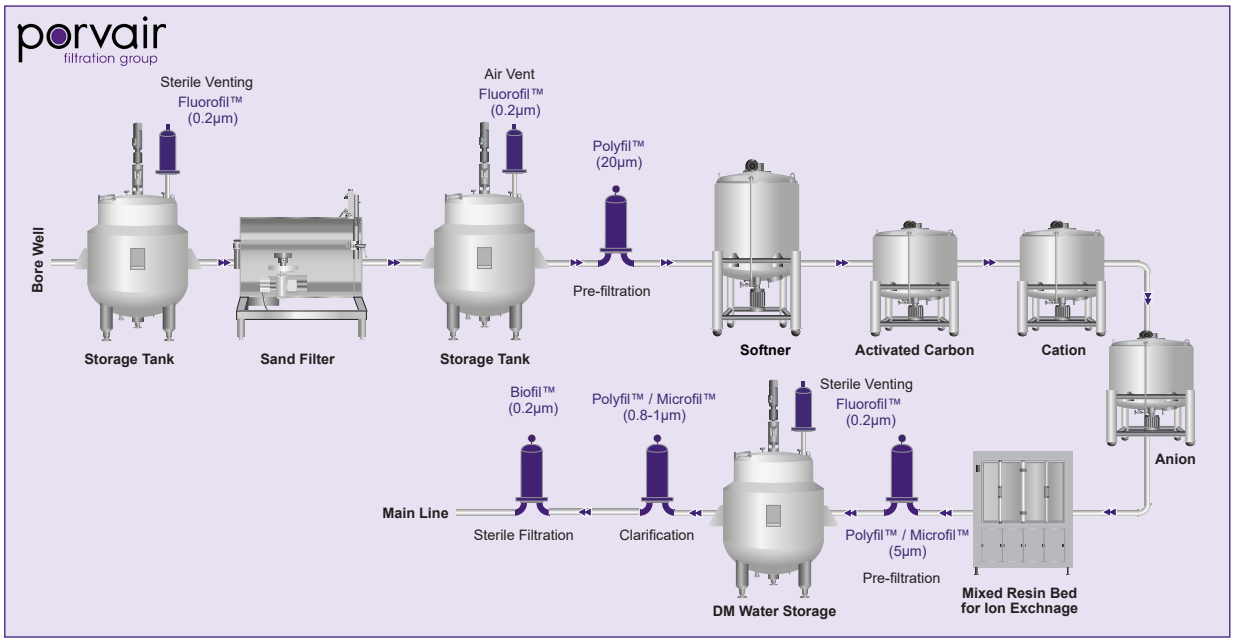


Sterile API

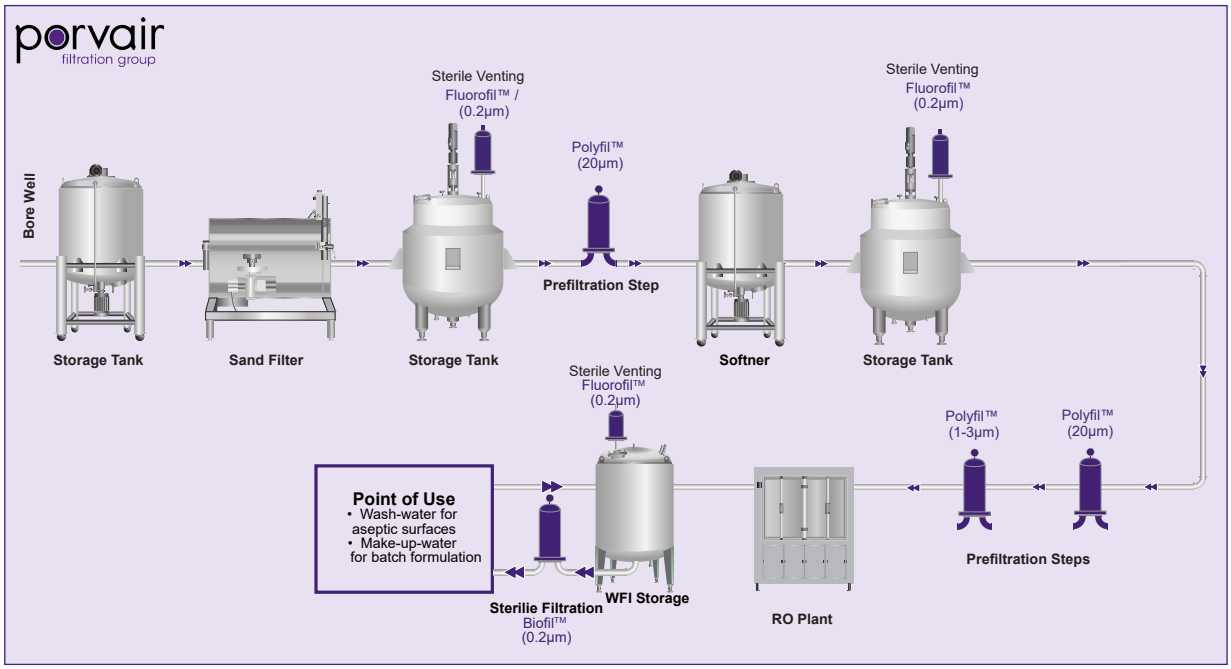


Bio-Pharmaceutical Applications

Utilities: DM Water



Utilities: Purified Water



porvair filtration group

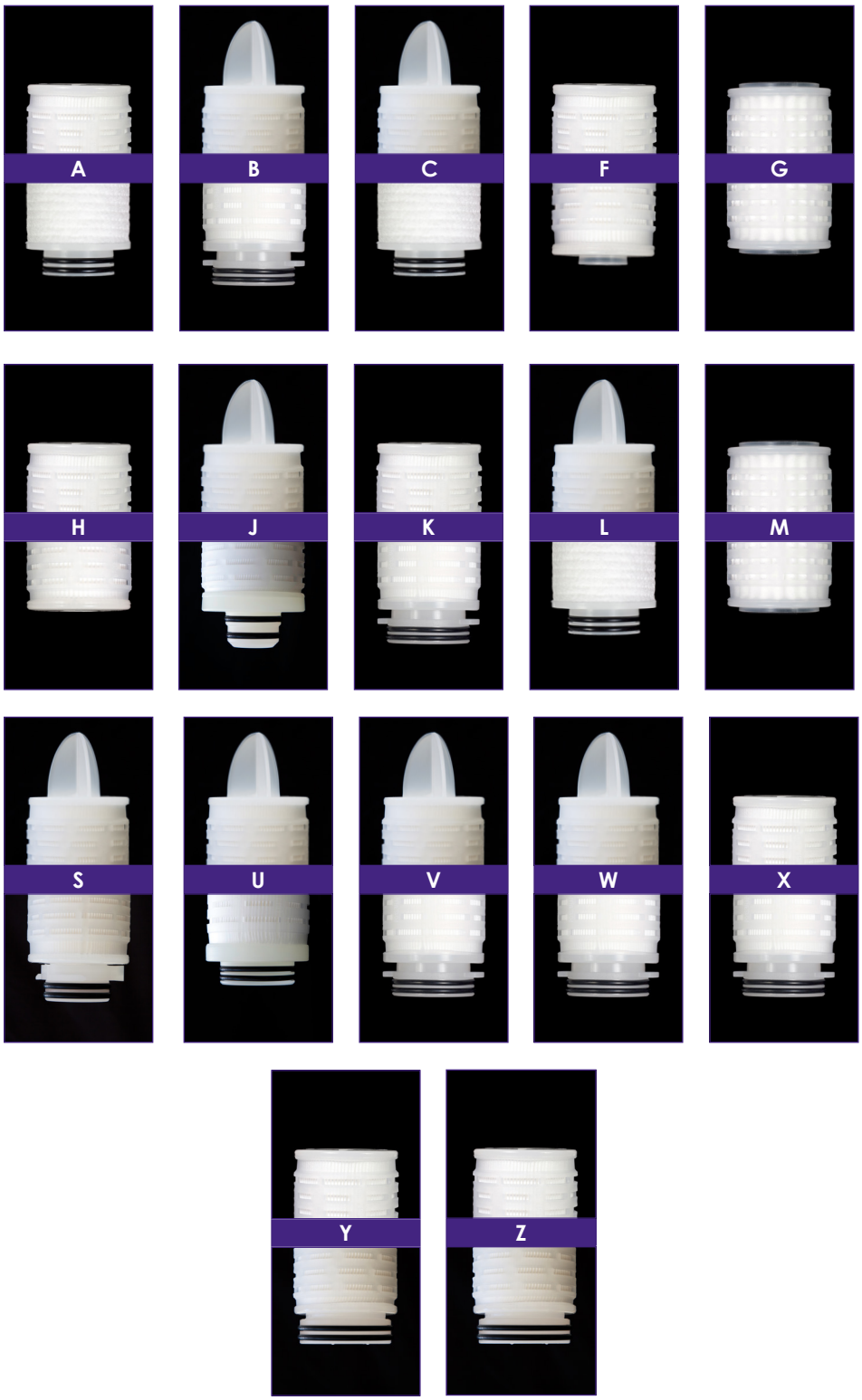
End Cap Adaptors

Disposable Cartridges

Cartridge Code	Description	Top End End Fitting	Seal	Quantity	Outlet End End Fitting	Seal	Quantity
A	Code 3	Flat	None		Open	O-ring 222	2
B	Code 7	Fin	None		Open	O-ring 226	2
C	Code 8	Fin	None		Open	O-ring 222	2
F	N SOE	Recess	None		Flat open	O-ring 213	1
G	G DOE (short length)	Flat open	Flat gasket	1	Flat open	Flat gasket	1
H	G SOE	Flat	None		Flat open	O-ring BS118 (fit into filter housing)	2
J	216 (218), fin	Fin	None		Open	O-ring 216 O-ring 218	1 1
K	Code 2	Flat	None		Open	O-ring 226	2
L	223, fin (no lugs)	Fin	None		Open	O-ring 223	2
M	DOE	Flat open	Flat gasket	1	Flat open	Flat gasket	1
S	Code 28, fin (3 lugs)	Fin	None		Open	O-ring 222	2
U	224, fin	Fin	None		Open	O-ring 224	2
V	226, fin	Fin	None		Open	O-ring 226	2
W	F 20+ Code 7 (stainless steel core)	Fin	None		Open	O-ring BS226	2
X	F 20+ Code 2 (stainless steel core)	Flat	None		Open	O-ring BS226	2
Y	BS832, flat	Flat	None		Open	O-ring BS832	2
Z	F 20+ Code Y (stainless steel core)	Flat	None		Open	O-ring BS832	2

Our pharmaceutical-grade filters are designed for use in cGMP manufacturing, processing or packaging facilities for injectable drug products and comply with the Federal Drug Administration's regulations CFR Title 21, parts 211.72 'Filters' and 210.3 (b) (6), and United States Pharmacopeia 788 'Particulate Matter in Injections'. These products contain a stainless steel insert.

Porvair seals are FDA compliant for food contact (CFR, Title 21). USP Class VI complaint seals are only fitted to "P" suffix products (Table 7) on the corresponding ordering guides.



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Microfil™

Absolute Rated Pleated Glass Fibre Cartridge Filters

A range of absolute rated cartridge filters are manufactured, featuring the latest developments in borosilicate glass fibre filter media technology; Microfil™ cartridges are constructed from robust glass fibre and polypropylene filtration layers, offering removal ratings from 0.5 to 5 micron absolute.

Microfil™ cartridges are suitable for absolute removal of unwanted particulates and for pre-filtration to membrane filters. Microfil™ cartridges incorporate a polypropylene pre-filtration layer, combined with a high dirt capacity glass fibre media. This has the effect of longer service life, improved operating costs and smaller process footprint.

Microfil™ filter cartridges are highly resistant to integrity failure caused by steam sterilisation and have excellent chemical compatibility characteristics.

High viscosity Microfil™ HV versions of this range are available upon request.

Typical Applications

- Foods and beverages
- Process water systems
- Pharmaceuticals and bio-processing
- Fine chemicals
- Cosmetics

Ordering Information

Product Code: 1 2 3 4 5 6 7

1: Pre-Filter	
M	Microfil™

2: Pore rating	
P5	0.5µm
P8	0.8µm
01	1µm
02	2µm
05	5µm

3: Version	
R	Rinsed
S	Standard Hard Cage

4: Length (Nominal)	
1	10" (254mm)
2	20" (508mm)
3	30" (762mm)
4	40" (1016mm)
5	5" (125mm)

5: End Fitting	
A	Code 3
B	Code 7
C	Code 8
F	N SOE
G	G DOE (short)
H	G SOE
J	216 (218), fin
K	Code 2
L	223, fin (no lugs)
M	DOE
S	Code 28, fin (3 lugs)
T	223, flat (no lugs)
U	224, fin
V	226, fin
Y	BS832, flat

6: Seals	
A	Ethylene Propylene
B	Silicone
C	Viton®
D	Nitrile
E	FEP Encap. Viton®
G	FEP Encap. Silicone
J	DOE PTFE

7: Additional	
A	N+U
N	Non-steamable (no insert)
P	Pharma Grade
U	Unbranded

Features and Benefits

- Zeta potential
- High filtration area
- Guaranteed removal ratings
- Suitable for steam and hot water sanitisation
- Resistance to Cleaning-In-Place (CIP) regimes
- Full traceability
- Controlled manufacturing environment

Specifications

Materials of Manufacture

Filter media:	Glass fibre
Pre-filtration layer:	Polypropylene
Support layers:	Polypropylene
Inner core:	Polypropylene
Outer support:	Polypropylene
End fittings:	Polypropylene
Support ring:	Stainless steel

Cartridge Dimensions (Nominal)

Effective Filtration Area:
0.4m² (4.4ft²) per 10" module.

Diameter:	70mm (2.8")	
Length:	1 module (short):	125mm (5")
	1 module:	254mm (10"), 508mm (20")
	2 modules:	762mm (30"), 1016mm (40")

Cartridge Treatment

Standard:	Cleaned without further treatment
Flushed:	Flushed with pyrogen-free water

Gaskets and O-Rings

Ethylene Propylene, FEP encapsulated, Silicone, Viton®, Nitrile or Polypropylene felt

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)

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

In situ steam 20 x 30 minute cycles at 125°C (257°F)
Hot water 200 x 20 minute cycles at 85-90°C (185-194°F)

Extractables

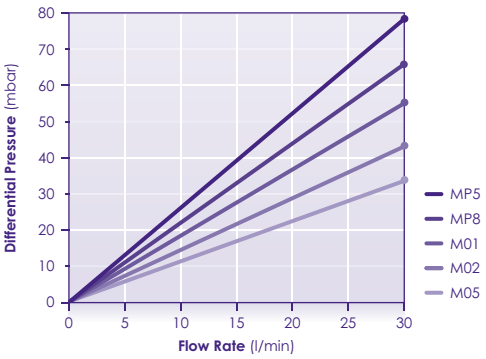
Minimum total extractables. Please refer to the Microfil™ Validation Guide.

Integrity Testing

Microfil™ filter cartridges are batch tested for integrity using the Bubble Point Test. Please contact us for procedural details.

Clean Water Flow Rates

- Typical clean water flow rate:
  A 254mm (10") Microfil™ single cartridge exhibits the flow-**Δ**P 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.



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porvair filtration group

Microfil™WF

Pleated Depth Filter or Final Polishing Filter

Microfil™ wide format (WF) filter cartridges are designed for applications requiring a very high flow rate. They are equally suitable for use as pre-filters or final polishing filters in applications that do not require membrane filtration. The use of a spacer mesh as an upstream pleat support means that fluid flow is uniform across the entire surface of the filter medium. The mesh holds the flow channels open thereby maximising dirt holding capacity and minimising pressure drop across the filter.

Our filter cartridges are absolute rated, tested to Beta 5000 using the industry standard single pass OSU-F2 test procedure with ISO 12103 part 1 A2 Fine and A4 Coarse test dust as appropriate. Manufactured in the UK using all polypropylene hardware with glass fibre filter media, these filter cartridges have excellent chemical compatibility.

Thermal bonded construction eliminates the requirement for adhesives, maintaining product integrity in demanding applications and minimising the level of extractables in the filtrate. All the materials conform to the relevant requirements of FDA CFR21 part 117.

Available with 304 stainless steel outer cage for high temperature and differential pressure applications.

Typical Applications

- Foods and beverages
- Process water systems
- Fine chemicals
- Cosmetics

Ordering Information

Product Code: 1 | 2 | 3 | GF | 4

1: Pre-Filter	
WF	Microfil™ WF

2: Pore rating	
P45	0.45µm
01	1µm
05	5µm
10	10µm
25	25µm
50	50µm
100	100µm

3: Length (Nominal)	
20	20" (508mm)
40	40" (1016mm)
60	60" (1524mm)

4: Seals	
E	EPDM
N	Nitrile
S	Silicone
V	Viton

**Other micron ratings available upon request*

Features and Benefits

- Available with 304 stainless steel outer cage for high temperature and differential pressure applications.
- Absolute micron ratings to ensure consistent, repeatable performance
- Inside to out flow ensures that contamination is collected inside the filter cartridge for easy disposal
- Manufactured in the UK
- Large surface area, typically 5 metres per 40", and pleat spacing mesh on the inner layer ensures low initial pressure drops and high dirt holding capacity, for extended service life
- All polypropylene hardware with glass fibre filter media, thermally bonded, means wide chemical compatibility and a minimum level of extractables
- Suitable for steam sterilisation, autoclaving and hot water sanitisation
- Available in 20", 40" and 60" lengths to retrofit into most existing installations

Specifications

Materials of Manufacture

Filter medium	Glass fibre
Drainage layers:	Polypropylene
Support mesh:	Polypropylene
Outer core:	Polypropylene
End caps:	Polypropylene

Cartridge Dimensions

Effective Filtration Area:

5m² (53.8ft²) per 40" module.

Outside Diameter:	154mm (6")
Inside Diameter:	75mm (3")
Length:	508mm (20") 1016mm (40") 1524mm (60")

Pore Sizes

0.5µm, 1.0µm, 5.0µm and 10µm

Gaskets and O-Rings

EPDM, FEP encapsulated, Silicone, Viton® and Nitrile

Maximum Differential Pressure

Normal flow direction at:

20°C (68°F):	3.5 bar (51psi)
65°C (149°F):	1.8 bar (26psi)
80°C (176°F):	1.0 bar (15psi)

Reverse flow is not recommended.

Recommended Changeout Differential Pressure

20°C (68°F):	1.5bar (22psi)

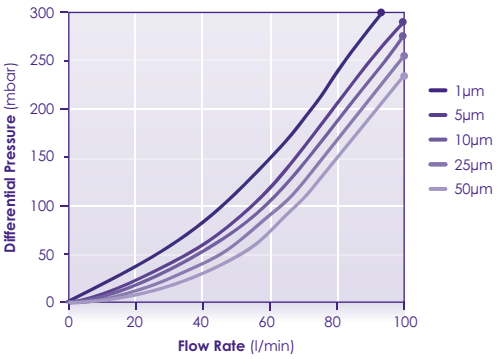
Sanitation

Steam or autoclave:	121°C (250°F) for 15 minutes
Hot water sanitation:	90°C (194°F) for 30 minutes repeatedly

Clean Water Flow Rates

- Typical clean water flow rate:
  A 1016mm (40") Microfil™ WF cartridge exhibits the flow-ΔP characteristics indicated below, for solutions with a viscosity of 1 centipoise.
- Other solutions:
  For solutions with a different viscosity, multiply the indicated differential pressure by the viscosity in centipoise.

Glass Fibre Media:



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porvair filtration group

Polyfil™ II

Absolute Rated Pleated Polypropylene Cartridge Filters

A range of absolute rated cartridge filters are created, featuring the latest developments in meltblown polypropylene filter media technology. Polyfil™ II cartridges are based on a robust all polypropylene construction, offering removal ratings from 0.5 to 150 micron absolute.

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

Polyfil™ II filters are also highly resistant to integrity failure caused by steam sterilisation and have excellent chemical compatibility characteristics.

Typical Applications

- Pharmaceuticals and bio-processing
- Foods and beverages
- Inks and coatings
- Fine chemicals
- Cosmetics
- Process water systems

Ordering Information

Product Code: 1 2 3 4 5 6 7

1: Pre-Filter	
P	Polyfil™

2: Pore rating	
P5	0.5µm
P8	0.8µm
01	1µm
02	2µm
03	3µm
05	5µm
07	7µm
10	10µm
15	15µm
20	20µm
30	30µm
40	40µm
60	60µm
90	90µm
105	105µm

3: Version	
R	Rinsed
S	Standard Hard Cage

4: Length (Nominal)	
1	10" (254mm)
2	20" (508mm)
3	30" (762mm)
4	40" (1016mm)
5	5" (125mm)

5: End Fitting	
A	Code 3
B	Code 7
C	Code 8
F	N SOE
G	G DOE (short)
H	G SOE
J	216 (218), fin
K	Code 2
L	223, fin (no lugs)
M	DOE
S	Code 28, fin (3 lugs)
T	223, flat (no lugs)
U	224, fin
V	226, fin
Y	BS832, flat

6: Seals	
A	Ethylene Propylene
B	Silicone
C	Viton®
D	Nitrile
E	FEP Encap. Viton®
G	FEP Encap. Silicone
J	DOE PTFE

7: Additional	
A	N+U
N	Non-steamable (no insert)
P	Pharma Grade
U	Unbranded

Features and Benefits

- Graded multi-layer media
- High filtration area
- Guaranteed removal ratings
- Suitable for steam and hot water sanitisation
- Full traceability
- Controlled manufacturing environment

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)

Effective Filtration Area:
Up to 0.6m² per 10" module
(depending on pore rating).

Diameter:	70mm (2.8")	
Length:	1 module (short):	125mm (5")
	1 module:	254mm (10"), 508mm (20")
	2 modules:	762mm (30"), 1016mm (40")

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

Ethylene Propylene, FEP encapsulated, Silicone, Viton®, Nitrile or Polypropylene felt

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 (30lb/in²)
80°C (176°F):	1.0 bar (15lb/in²)
100°C (212°F):	0.5 bar (7lb/in²)

Operating Temperature

Maximum continuous:	80°C (176°F)

Sterilisation

In situ steam 80 x 30 minute cycles at 135°C (275°F)
Hot water 200 x 20 minute cycles at 85-90°C (185-194°F)

Extractables

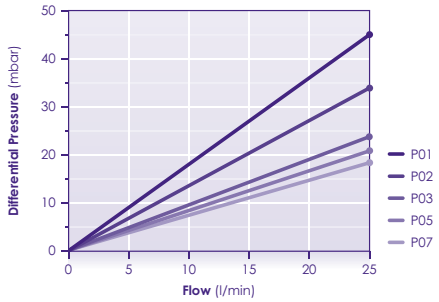
Minimum total extractables. Please refer to the Polyfil™ II Validation Guide.

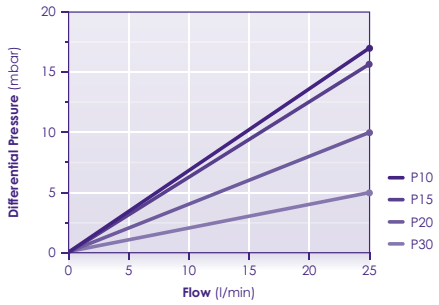
Integrity Testing

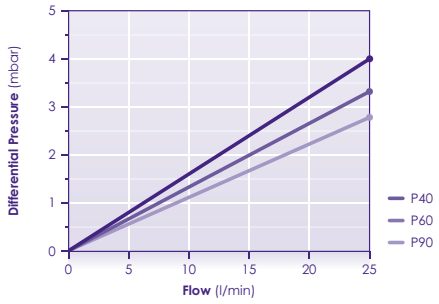
Polyfil™ II filter cartridges are batch tested for integrity using the Bubble Point Test. Please contact us for procedural details.

Clean Water Flow Rates

- Typical clean water flow rate:
  A 254mm (10") Polyfil™ II single cartridge exhibits the flow-**Δ**P 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.







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Polyfil™WF

Pleated Depth Filter or Final Polishing Filter

Polyfil™ wide format (WF) filter cartridges are designed for applications requiring a very high flow rate. They are equally suitable for use as pre-filters or final polishing filters in applications that do not require membrane filtration. The use of a spacer mesh as an upstream pleat support means that fluid flow is uniform across the entire surface of the filter medium. The mesh holds the flow channels open thereby maximising dirt holding capacity and minimising pressure drop across the filter.

Our filter cartridges are absolute rated, tested to Beta 5000 using the industry standard single pass OSU-F2 test procedure with ISO 12103 part 1 A2 Fine and A4 Coarse test dust as appropriate. Manufactured in the UK from all polypropylene media and hardware, these filter cartridges have excellent chemical compatibility.

Thermal bonded construction eliminates the requirement for adhesives, maintaining product integrity in demanding applications and minimising the level of extractables in the filtrate. All the materials conform to the relevant requirements of FDA CFR21 part 177 and cartridges using polypropylene filter media meet the requirements for food contact as detailed in European Regulation 1935/2004.

Typical Applications

- Foods and beverages
- Inks and coatings
- Fine chemicals
- Cosmetics
- Process water systems

Ordering Information

Product Code: 1 2 3 PP 4

1: Pre-Filter	
WF	Polyfil™ WF

2: Pore rating	
P45	0.45µm
01	1µm
05	5µm
10	10µm
25	25µm
50	50µm
100	100µm

3: Length (Nominal)	
20	20" (508mm)
40	40" (1016mm)
60	60" (1524mm)

4: Seals	
E	EPDM
N	Nitrile
S	Silicone
V	Viton

**Other micron ratings available upon request*

Features and Benefits

- Available with 304 stainless steel outer cage for high temperature and differential pressure applications.
- Absolute micron ratings to ensure consistent, repeatable performance
- Inside to out flow ensures that contamination is collected inside the filter cartridge, for easy disposal
- Our Polyfil™ WF filters meet the requirements for food contact as detailed in EC 1935/2004
- Manufactured in the UK
- Large surface area, typically 5 metres per 40", and pleat spacing mesh on the inner layer ensures low initial pressure drops and high dirt holding capacity, for extended service life
- 100% Polypropylene construction (PP only) and thermal bonding mean wide chemical compatibility and a minimum level of extractables
- Suitable for steam sterilisation, autoclaving and hot water sanitisation
- Available in 20", 40" and 60" lengths to retrofit into most existing installations

Specifications

Materials of Manufacture

Filter medium	Polypropylene
Drainage layers:	Polypropylene
Support mesh:	Polypropylene
Outer core:	Polypropylene
End caps:	Polypropylene

Cartridge Dimensions (Nominal)

Effective Filtration Area:

5m² (53.8ft²) per 40" module.

Outside Diameter:	154mm (6")
Inside Diameter:	75mm (3")
Length:	508mm (20") 1016mm (40") 1524mm (60")

Gaskets and O-Rings

EPDM, FEP encapsulated, Silicone, Viton® and Nitrile

Maximum Differential Pressure

Normal flow direction at:

20°C (68°F):	3.5 bar (51psi)
65°C (149°F):	1.8 bar (26psi)
80°C (176°F):	1.0 bar (15psi)

Reverse flow is not recommended.

Recommended Changeout Differential Pressure

20°C (68°F):	1.5bar (22psi)

Sanitation

Steam or autoclave:	121°C (250°F) for 15 minutes
Hot water sanitation:	90°C (194°F) for 30 minutes repeatedly

Clean Water Flow Rates

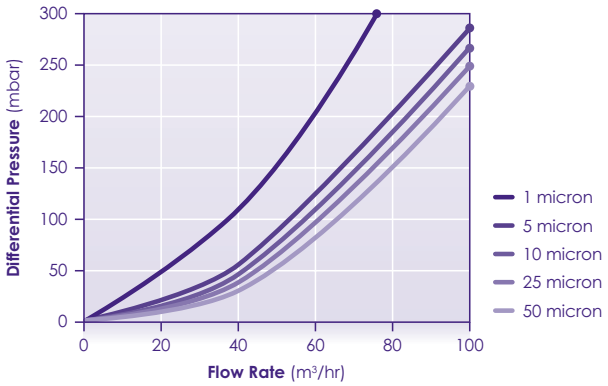
- Typical clean water flow rate:

  A 1016mm (40") Polyfil™ WF cartridge exhibits the flow-ΔP characteristics indicated below, for solutions with a viscosity of 1 centipoise.

- Other solutions:

  For solutions with a different viscosity, multiply the indicated differential pressure by the viscosity in centipoise.

Polypropylene Media:



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Tekfil™ A

Absolute Rated Polypropylene Depth Cartridge Filters

Tekfil™ A is a high flow, graded depth filter with high contaminant capacity for long life. Constructed from FDA approved polypropylene with excellent performance characteristics, it is an economic choice for a wide range of applications.

Tekfil™ A is available in a range of industrial standard lengths and is also available in Nylon construction for solvent filtration. Polyethylene foam gasket

Typical Applications

- Food and beverage
- Fine chemicals and solvents
- Coatings
- Photographic chemicals
- Metal finishing electroplating
- Water treatment prior to reverse osmosis
- Cosmetics product filling

Ordering Information

Product Code: 1 2 3 4 5 6

1: Pre-Filter	
TA	Tekfil™
TAY	Tekfil™ Nylon

2: Pore rating	
P5	0.5µm
01	1µm
03	3µm
05	5µm
10	10µm
25	25µm
50	50µm
75	75µm
100	100µm

3: Version	
S	Standard

4: Length (Nominal)	
1	10" (254mm)
2	20" (508mm)
3	30" (762mm)
4	40" (1016mm)

5: End Fitting	
A	Code 3
B	Code 7
C	Code 8
G	G DOE (short)
M	DOE

6: Seals	
A	Ethylene Propylene
B	Silicone
C	Viton®
D	Nitrile
E	FEP Encap. Viton®
G	FEP Encap. Silicone
H	Polyethylene foam gasket
J	DOE PTFE
N	None

Features and Benefits

- **Graded depth media**
  The graded structure of the media 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 degree of chemical compatibility**
  Constructed entirely of polypropylene and/or nylon.
- **Absolute removal ratings**
  Tekfil™ A cartridges are validated using recognised industry standard test methods.
- **Suitable for steam and hot water sanitisation**
  Tekfil™ A cartridges are resistant to repeat steam sterilisation and hot water cycles.

Specifications

Materials of Manufacture

Filter media:	Polypropylene/nylon
End fittings:	Polypropylene/nylon
Seals (if specified):	Silicon or EPDM

Cartridge Dimensions

Diameter: 63mm (2.5")

Length: 254mm (10")
508mm (20")
762mm (30")
1016mm (40")

Gaskets and O-Rings

Ethylene Propylene, FEP encapsulated, Silicone, Viton®, Nitrile or Polypropylene felt available for non crush-fit end adaptors.

Maximum Differential Pressure

Normal flow direction at:

20°C (68°F):	3.5 bar (50psi)
60°C (140°F):	1.0 bar (15psi)
80°C (176°F):	0.5 bar (7psi)

Operating Temperature

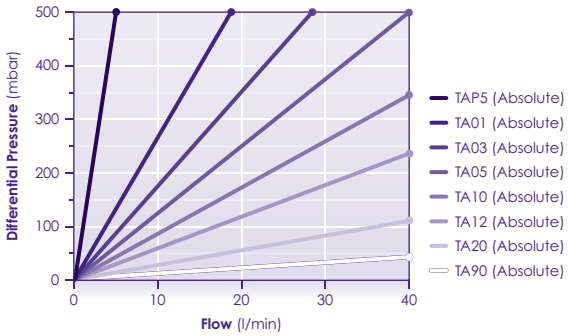
Maximum continuous: 80°C (176°F)

Extractables

Minimum total extractables.

Clean Water Flow Rates

- Typical clean water flow rate:
  A 254mm (10") Tekfil™ single cartridge exhibits the flow-**Δ**P 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.



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Microfil™ Junior

Absolute Rated Pleated Glass Fibre Cartridge Filters for Small-Scale Applications

A range of absolute rated cartridge filters are designed for retrofitting into existing junior-style housings. Featuring the latest developments in borosilicate glass fibre filter media technology, Microfil™ Junior cartridges are constructed from robust glass fibre and polypropylene filtration layers, offering removal ratings from 0.5 to 5 micron absolute.

Microfil™ Junior cartridges are suitable for absolute removal of unwanted particulates and for pre-filtration to membrane filters. Microfil™ Junior cartridges incorporate a polypropylene pre-filtration layer, combined with a high dirt capacity glass fibre media, resulting in longer service life, improved operating costs and smaller process footprint. The Microfil™ Junior filter cartridges are highly resistant to integrity failure caused by steam sterilisation and have excellent chemical compatibility characteristics.

They are suitable for applications ranging from bioburden reduction to 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.

Typical Applications

- Small-scale pharmaceuticals and bio-processing
- Pilot-scale studies
- Batch processing

Ordering Information

Product Code: 1 **M** 2 3 4

1: Configuration	
J	J-Style
S	S-Style
L	L-Style

2: Pore Rating	
P5	0.5µm
P8	0.8µm
01	1µm
02	2µm
05	5µm

3: Length	
25	77.5mm (2.5")
50	136mm (5")

4: Seals (J/L Style)	
A	Ethylene Propylene
B	Silicone
C	Viton®
D	Nitrile
E	FEP Encap. Viton®
G	FEP Encap. Silicone

Features and Benefits

- Zeta potential
- High filtration area
- Guaranteed removal ratings
- Suitable for steam and hot water sanitisation
- Full traceability
- Controlled manufacturing environment

Specifications

Materials of Manufacture

Filter media:	Glass fibre
Pre-filtration layer:	Polypropylene
Support layers:	Polypropylene
Inner core:	Polypropylene
Outer support:	Polypropylene
End fittings:	Polypropylene
Support ring:	Stainless steel

Cartridge Dimensions (Nominal)

Effective Filtration Area:
0.15m² (1.6ft²) per 5" length.

Diameter:	56mm (2.2")
Length:	77.5mm (2.5") 136mm (5")

Cartridge Treatment

Standard:	Cleaned without further treatment
Flushed:	Flushed with pyrogen-free water

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)

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 20 x 30 minute cycles at 125°C (257°F)
S-style:	Autoclave 20 x 30 minute cycles at 125°C (257°F)
L-style:	*In situ* steam 20 x 30 minute cycles at 125°C (257°F)

Extractables

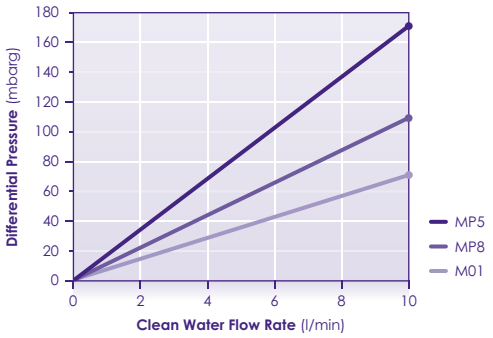
Minimum total extractables. Please refer to the Microfil™ Validation Guide.

Integrity Testing

Microfil™ Junior filter cartridges are batch tested for integrity using the Bubble Point Test. Please contact us for procedural details.

Clean Water Flow Rates

- Typical clean water flow rate:
  A 136mm (5") Microfil™ Junior cartridge exhibits the flow-**Δ**P 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.



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porvair filtration group

Polyfil™ Junior

Absolute Rated Pleated Polypropylene Cartridge Filters Small-Scale Applications

A range of absolute rated cartridge filters are 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 pre-filtration to membrane filters. The graded multi-layer polypropylene media provide pre-filtration 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. Polyfil™ Junior cartridges are resistant to integrity failure caused by steam sterilisation and have excellent chemical compatibility characteristics.

Typical Applications

- Small-scale pharmaceuticals
- Ophthalmic solutions
- Electronics and semiconductors
- Small-scale fine chemicals
- Pilot-scale studies
- Inks and coatings

Ordering Information

Product Code: 1 P 2 3 4

1: Configuration	
J	J-Style
S	S-Style
L	L-Style

2: Pore rating	
P5	0.5µm
P8	0.8µm
01	1µm

3: Length	
25	77.5mm (2.5")
50	136mm (5")

4: Seals (J/L Style)	
A	Ethylene Propylene
B	Silicone
C	Viton®
D	Nitrile
E	FEP Encap. Viton®
G	FEP Encap. Silicone

Features and Benefits

- Graded multi-layer media
- High filtration area
- Guaranteed removal ratings
- Suitable for steam and hot water sanitisation
- Full traceability
- Controlled manufacturing environment

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)

Effective Filtration Area:

Up to 0.15m² (1.6ft²) per 136mm module (depending on pore rating)

Diameter: 56mm (2.2")

Length: 77.5mm (2.5")
136mm (5")

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 125°C (257°F)

Extractables

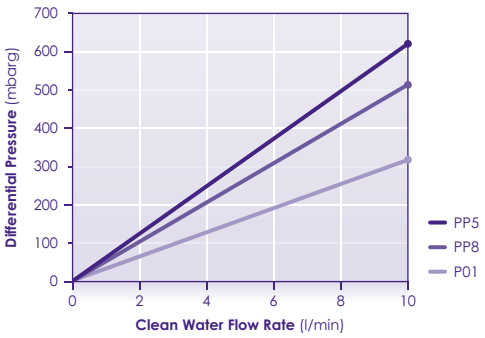
Minimum total extractables. Please refer to the Polyfil™ II Validation Guide.

Integrity Testing

Polyfil™ Junior filter cartridges are batch tested for integrity using the Bubble Point Test. Please contact us for procedural details.

Clean Water Flow Rates

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



PFG727/Rev2:Oct22

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porvair filtration group

Biofil™2

Polyethersulfone Membrane Cartridge Filters

Biofil™ 2 cartridges are based on a naturally hydrophilic polyethersulfone (PES) membrane with a mirrored asymmetric pore structure. When combined with quality all-polypropylene cartridge components and high integrity manufacturing techniques, the polyethersulfone membrane provides a high strength, long life cartridge of consistently precise microbial retention.

Biofil™ 2 cartridges exploit the narrow pore size distribution and high void volume of the media to provide a choice of cartridges capable of meeting the requirements of most applications. Biofil™ 2 cartridges offer high flux rates and low differential pressures, a feature common to polyethersulfone membranes.

Biofil™ 2 cartridges benefit from the low non-specific protein binding characteristics of polyethersulfone membranes. They are highly resistant to integrity failure caused by steam sterilisation and have excellent chemical compatibility characteristics. As they have excellent stability to hydrolysis, Biofil™ 2 cartridges are ideal for use in ultra pure water supply systems (18MΩ. cm).

Typical Applications

- Biopharmaceuticals
- Ophthalmic solutions
- Electronics and semiconductors
- Fine chemicals
- Beverages
- Pure water supply

Ordering Information

Product Code: 1 2 3 4 5 6 7

1: Membrane	
BT	Biofil™ 2

2: Pore rating	
10	0.1µm
20	0.2µm
45	0.45µm
65	0.65µm
120	1.2µm

3: Version	
R	Rinsed
S	Standard

4: Length (Nominal)	
1	10" (254mm)
2	20" (508mm)
3	30" (762mm)
4	40" (1016mm)
5	5" (125mm)

5: End Fitting	
A	Code 3
B	Code 7
C	Code 8
F	N SOE
G	G DOE (short)
H	G SOE
J	216 (218), fin
K	Code 2
L	223, fin (no lugs)
M	DOE
S	Code 28, fin (3 lugs)
T	223, flat (no lugs)
U	224, fin
V	226, fin
W	F20 +Code 7 (SS Core)
X	F20 +Code 2 (SS Core)
Y	BS832, flat
Z	F20 +Code Y (SS Core)

6: Seals	
A	Ethylene Propylene
B	Silicone
C	Viton®
D	Nitrile
E	FEP Encap. Viton®
G	FEP Encap. Silicone
J	DOE PTFE

7: Additional	
A	N+U
N	Non-steamable (no insert)
P	Pharma Grade
U	Unbranded

Features and Benefits

- Guaranteed microbial ratings
- Low protein binding
- Excellent hydrolysis resistance
- Excellent chemical compatibility
- Suitable for steam sterilising
- Full traceability
- Controlled manufacturing environment

Specifications

Materials of Manufacture

Filter membrane:	Polyethersulfone
Membrane support:	Polypropylene
Irrigation mesh (support):	Polypropylene
Drainage layer:	Polypropylene
Inner core:	Polypropylene
Outer support:	Polypropylene
End fittings:	Polypropylene
Support ring:	Stainless steel

Cartridge Dimensions (Nominal)

Effective Filtration Area:		0.69m² (7.4ft²) (per 10" module)
Diameter:		70mm (2.8")
Length:	1 module:	254mm (10")
	2 modules:	508mm (20")
	3 modules:	762mm (30")
	4 modules:	1016mm (40")

Cartridge Treatment

Standard:	Cleaned and flushed with pyrogen-free water
Rinsed:	Ultra-clean, pulse flushed to give a system resistivity of 18MΩ.cm

Gaskets and O-Rings

FDA approved Ethylene Propylene, FEP encapsulated, Silicone, Viton® or Nitrile.

Maximum Differential Pressure

Normal flow direction at:	
20°C (68°F):	6.0bar (87psi)
80°C (176°F):	4.0bar (58psi)
100°C (212°F):	3.0bar (44psi)
120°C (248°F):	2.0bar (29psi)
Reverse flow direction at:	
20°C (68°F):	2.1bar (30psi)
80°C (176°F):	1.0bar (15psi)
100°C (212°F):	0.5bar (7psi)

Operating Temperature

Maximum continuous: 85-90°C (185-194°F)

Sterilisation

In situ steam 80 x 30 minute cycles at 135°C (275°F)
Hot water 100 x 20 minute cycles at 90°C (194°F)

Extractables

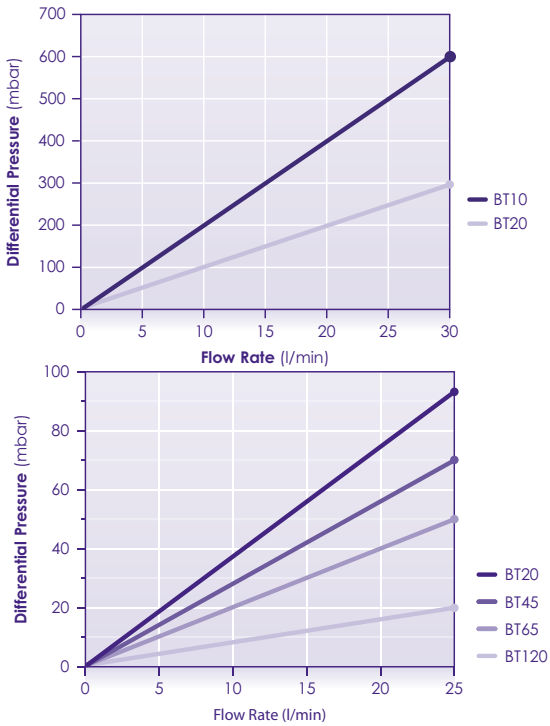
Minimum total extractables. Please refer to the Biofil™ 2 Validation Guide.

Integrity Testing

Each Biofil™ 2 module of every cartridge is individually integrity tested using the Diffusive Flow Test, which correlates to the HIMA and ASTM F838-05 bacterial challenge tests. Non-destructive integrity tests, such as Pressure Hold, Diffusive Flow and Bubble Point, can be performed by customers. Please contact us for procedural detail.

Clean Water Flow Rates

- Typical clean water flow rate:
  A 254mm (10") Biofil™ 2 single cartridge exhibits the flow-**Δ**P 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.



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porvair filtration group

Biofil™ 2 Plus

Double Layer Polyethersulfone Membrane Cartridge Filters

A Biofil™ 2 Plus microbial rated cartridge has been developed and manufactured for the filtration of liquids within pharmaceutical, biotechnology and other critical applications.

Biofil™ 2 Plus utilises a naturally hydrophilic polyethersulfone (PES) membrane with a mirrored asymmetric pore structure. The cartridge's unique built in pre-filtration membrane layer provides longer life and higher throughput. When combined with quality all-polypropylene components and high integrity manufacturing techniques, the Biofil™ 2 Plus filter cartridge is ideally suited to the most demanding process conditions.

Quality and consistency of product are assured by the quality control and manufacturing procedures which are in place throughout all stages of manufacture. Biofil™ 2 Plus membrane cartridges are 100% integrity tested during manufacture by the forward flow diffusion test method.

Typical Applications

- Biopharmaceuticals
- Fermentation
- Ophthalmic solutions
- APIs
- LVPs
- Beverages
- Pure water supply

Ordering Information

Product Code: 1 2 3 4 5 6 7

1: Membrane	
BTP	Biofil™ 2 Plus

2: Pore rating	
20	0.2µm
45	0.45µm

3: Version	
R	Rinsed
S	Standard

4: Length (Nominal)	
1	10" (254mm)
2	20" (508mm)
3	30" (762mm)
4	40" (1016mm)
5	5" (125mm)

5: End Fitting	
A	Code 3
B	Code 7
C	Code 8
F	N SOE
G	G DOE (short)
H	G SOE
J	216 (218), fin
K	Code 2
L	223, fin (no lugs)
M	DOE
S	Code 28, fin (3 lugs)
T	223, flat (no lugs)
U	224, fin
V	226, fin
W	F20 +Code 7 (SS Core)
X	F20 +Code 2 (SS Core)
Y	BS832, flat
Z	F20 +Code Y (SS Core)

6: Seals	
A	Ethylene Propylene
B	Silicone
C	Viton®
D	Nitrile
E	FEP Encap. Viton®
G	FEP Encap. Silicone
J	DOE PTFE

7: Additional	
A	N+U
N	Non-steamable (no insert)
P	Pharma Grade
U	Unbranded

Features and Benefits

- Guaranteed microbial ratings
- Low protein binding
- Will not hydrolyse
- Excellent chemical compatibility
- Suitable for steam sterilising
- Full traceability
- Controlled manufacturing environment

Specifications

Materials of Manufacture

Pre-filter membrane:	Polyethersulfone
Final membrane:	Polyethersulfone
Membrane support:	Polypropylene
Irrigation mesh (support):	Polypropylene
Drainage layer:	Polypropylene
Inner core:	Polypropylene
Outer support:	Polypropylene
End fittings:	Polypropylene
Support ring:	Stainless steel

Cartridge Dimensions (Nominal)

Effective Filtration Area:		0.48m² (5.2ft²) (per 10" module)
Diameter:		70mm (2.8")
Length:	1 module:	254mm (10")
	2 modules:	508mm (20")
	3 modules:	762mm (30")
	4 modules:	1016mm (40")

Other size formats (including juniors) are available upon request.

Cartridge Treatment

Standard:	Cleaned and flushed with pyrogen-free water
Rinsed:	Ultra-clean, pulse flushed to give a system resistivity of 18MΩ.cm

Gaskets and O-Rings

FDA approved Ethylene Propylene, FEP encapsulated, Silicone, Viton® or Nitrile

Maximum Differential Pressure

Normal flow direction at:

20°C (68°F):	6.0bar (87psi)
80°C (176°F):	4.0bar (58psi)
100°C (212°F):	3.0bar (44psi)
120°C (248°F):	2.0bar (29psi)

Reverse flow direction at:

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

Operating Temperature

Maximum continuous: 85-90°C (185-194°F)

Sterilisation

In situ steam 112 x 20 minute cycles at 125°C (257°F)
Hot water 100 x 20 minute cycles at 85-90°C (185-194°F)

Extractables

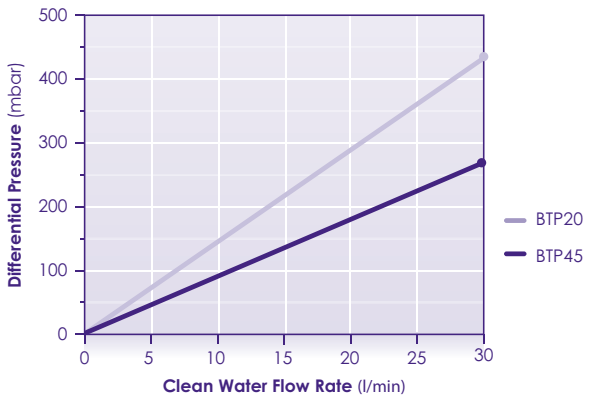
Minimum total extractables. Please refer to the Biofil™ 2 Plus Validation Guide.

Integrity Testing

Each Biofil™ 2 Plus module of every cartridge is individually integrity tested using the Diffusive Flow Test, which correlates to the HIMA and ASTM F838-05 bacterial challenge tests. Non-destructive integrity tests, such as Pressure Hold, Diffusive Flow and Bubble Point, can be performed by customers. Please contact us for procedural details.

Clean Water Flow Rates

- Typical clean water flow rate:
  A 254mm (10") Biofil™ 2 Plus single cartridge exhibits the flow-**Δ**P 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.



PFG724/Rev10:Nov23

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porvair filtration group

Biofil™ 3

Polyethersulfone Membrane Cartridge Filters

Porvair Biofil™ 3 cartridges utilise a single layer of polyethersulfone (PES) membrane, providing a filter with effective bioburden reduction properties (LRV ≥ 7) to support the manufacture of pharmaceutical, food & beverage and other life science products. The inherently hydrophilic and highly asymmetric nature of the PES membrane facilitates high flux rates and enhances the wettability characteristics of the cartridges. By combining this membrane with quality all-polypropylene support components and high integrity manufacturing techniques, Biofil™ 3 filter cartridges are ideally suited to the most demanding process conditions.

Typical Applications

- Biopharmaceuticals
- Opthalmic solutions
- Electronics and semiconductors
- Fine chemicals
- Beverages
- Pure water supply

Ordering Information

Product Code: 1 2 3 4 5 6 7

1: Membrane	
BW	Biofil™ 3

2: Pore rating	
20	0.2µm
45	0.45µm

3: Version	
R	Rinsed
S	Standard

4: Length (Nominal)	
1	10" (254mm)
2	20" (508mm)
3	30" (762mm)
4	40" (1016mm)
5	5" (125mm)

5: End Fitting	
A	Code 3
B	Code 7
C	Code 8
F	N SOE
G	G DOE (short)
H	G SOE
J	216 (218), fin
K	Code 2
L	223, fin (no lugs)
M	DOE
S	Code 28, fin (3 lugs)
T	223, flat (no lugs)
U	224, fin
V	226, fin
Y	BS832, flat

6: Seals	
A	Ethylene Propylene
B	Silicone
C	Viton®
D	Nitrile
E	FEP Encap. Viton®
G	FEP Encap. Silicone
J	DOE PTFE

7: Additional	
A	N+U
N	Non-steamable (no insert)
P	Pharma Grade
U	Unbranded

Features and Benefits

- Guaranteed microbial ratings
- Low protein binding
- Excellent hydrolysis resistance
- Excellent chemical compatibility
- Suitable for steam sterilising
- Full traceability
- Controlled manufacturing environment

Specifications

Materials of Manufacture

Filter membrane:	Polyethersulfone
Membrane support:	Polypropylene
Irrigation mesh (support):	Polypropylene
Drainage layer:	Polypropylene
Inner core:	Polypropylene
Outer support:	Polypropylene
End fittings:	Polypropylene
Support ring:	Stainless steel

All polymeric materials used in the manufacture of Biofil™ 3 are USP Class VI-121, FDA CFR 21 & EC 10/2011 compliant. The finished device has also been tested and proven to show compliance with USP Class VI-121.

Cartridge Dimensions (Nominal)

Effective Filtration Area:		0.69m² (7.4ft²) (per 10" module)
Diameter:		70mm (2.8")
Length:	1 module:	254mm (10")
	2 modules:	508mm (20")
	3 modules:	762mm (30")
	4 modules:	1016mm (40")

Cartridge Treatment

Standard:	Cleaned and flushed with pyrogen-free water
Rinsed:	Ultra-clean, pulse flushed to give a system resistivity of 18MΩ.cm

Gaskets and O-Rings

FDA approved Ethylene Propylene, FEP encapsulated, Silicone, Viton® or Nitrile.

Maximum Differential Pressure

Normal flow direction at:	
20°C (68°F):	6.0bar (87psi)
80°C (176°F):	4.0bar (58psi)
Reverse flow direction at:	
20°C (68°F):	2.1bar (30psi)
80°C (176°F):	1.0bar (15psi)

Operating Temperature

Maximum continuous: 80°C (176°F)

Sterilisation

In situ steam 20 x 30 minute cycles at 135°C (275°F)
Hot water 100 x 30 minute cycles at 90°C (194°F)

Integrity Testing

Each Biofil™ 3 module of every cartridge is individually integrity tested using the Diffusive Flow Test, which correlates to the HIMA and ASTM F838-20 bacterial challenge tests. Non-destructive integrity tests, such as Pressure Hold, Diffusive Flow and Bubble Point, can be performed by customers. Please contact us for procedural detail.

Filtrate Quality

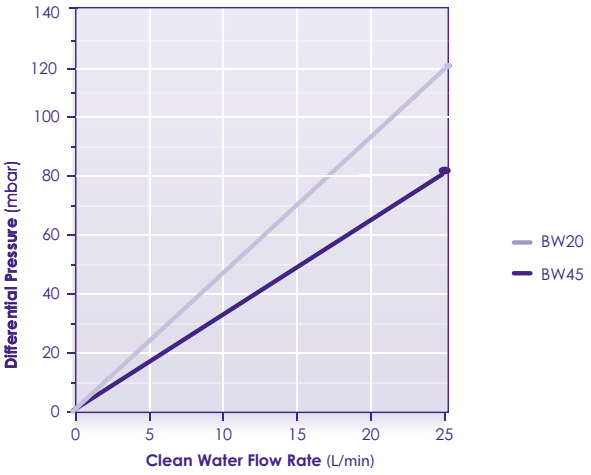
Cartridges have been validated to give high levels of effluent cleanliness, in accordance with USP guidance for:

- Extractables
- TOC & Conductivity
- Particulates & Non-Fibre Release
- Bacterial Endotoxins

Please refer to the Biofil™ 3 Validation Guide for full supporting data.

Clean Water Flow Rates

- A 254mm (10") Biofil™ 3 single cartridge exhibits the flow-**Δ**P characteristics indicated below, for solutions with a viscosity of 1 centipoise.



PFG795/Rev2:Oct22

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porvair filtration group

Biofil™ 3 Plus

Sterilising-Grade Polyethersulfone Membrane Cartridge Filters

Biofil™ 3 Plus 0.2micron are sterilising grade filters designed for filtration of a broad range of liquids in pharmaceutical, biotechnology and other critical applications.

Biofil™ 3 Plus cartridges feature a unique hydrophilic and highly asymmetric double layer polyethersulfone membrane with broad chemical compatibility, high thermal resistance, fast flow rates, enhanced wettability and reliable sterilising filtration performance. When combined with quality all-polypropylene components and high integrity manufacturing techniques, the Biofil™ 3 Plus filter cartridge is ideally suited to the most demanding process conditions.

Typical Applications

- Final 0.2µm sterilising filtration
- Biopharmaceuticals
- Fermentation
- Ophthalmic solutions
- Vaccines
- Parenteral drugs (SVP, LVP)
- High purity DI water and WFI systems

Ordering Information

Product Code: 1 2 3 4 5 6 7

1: Membrane	
BWP	Biofil™ 3 Plus

2: Pore rating	
20	0.2µm

3: Version	
R	Rinsed
S	Standard

4: Length (Nominal)	
1	10" (254mm)
2	20" (508mm)
3	30" (762mm)
4	40" (1016mm)
5	5" (125mm)

5: End Fitting	
A	Code 3
B	Code 7
C	Code 8
F	N SOE
G	G DOE (short)
H	G SOE
J	216 (218), fin
K	Code 2
L	223, fin (no lugs)
M	DOE
S	Code 28, fin (3 lugs)
T	223, flat (no lugs)
U	224, fin
V	226, fin
Y	BS832, flat

6: Seals	
A	Ethylene Propylene
B	Silicone
C	Viton®
D	Nitrile
E	FEP Encap. Viton®
G	FEP Encap. Silicone
J	DOE PTFE

7: Additional	
A	N+U
N	Non-steamable (no insert)
P	Pharma Grade
U	Unbranded

Features and Benefits

- Validated 0.2µm absolute-rated membrane
- Reliable sterilising filtration
- Hidrophilic asymmetric polyethersulfone membrane
- Low protein binding
- Excellent hydrolysis resistance
- Excellent chemical compatibility
- Suitable for steam sterilising
- Full traceability
- Controlled manufacturing environment

Specifications

Materials of Manufacture

Filter membrane:	Dual-layer Polyethersulfone Membrane
Support/Drainage layer:	Polypropylene/ Polypropylene
Inner core:	Polypropylene
Shroud:	Polypropylene
End fittings:	Polypropylene
Support ring:	Stainless steel

All polymeric materials used in the manufacture of Biofil™ 3 Plus are USP Class VI-121°C, FDA CFR 21 & EU 10/2011 compliant. The finished device has also been tested and proven to show compliance with USP Class VI-121°C plastics.

Cartridge Dimensions (Nominal)

Effective Filtration Area:		0.53m² (5.7ft²) (per 10" module)
Diameter:		70mm (2.8")
Length:	1 module:	254mm (10")
	2 modules:	508mm (20")
	3 modules:	762mm (30")
	4 modules:	1016mm (40")

Cartridge Treatment

Standard:	Cleaned and flushed with pyrogen-free water
Rinsed:	Ultra-clean, pulse flushed to give a system resistivity of 18MΩ.cm

Gaskets and O-Rings

FDA approved Ethylene Propylene, FEP encapsulated, Silicone, Viton® or Nitrile

Maximum Differential Pressure

Normal flow direction at:		
	20°C (68°F):	6.0bar (87psi)
	80°C (176°F):	4.0bar (58psi)
Reverse flow direction at:		
	20°C (68°F):	2.1bar (30psi)
	80°C (176°F):	1.0bar (15psi)

Operating Temperature

Maximum continuous: 80°C (176°F)

Sterilisation

In situ steam 40 x 30 minute cycles at 135°C (275°F)
Hot water 100 x 30 minute cycles at 90°C (194°F)

Extractables

Minimum total extractables. Please refer to the Biofil™ 3 Plus Validation Guide.

Integrity Testing

Each Biofil™ 3 Plus module of every cartridge is individually integrity tested using the Diffusive Flow Test, which correlates to the HIMA and ASTM F838-20 bacterial challenge tests. Non-destructive integrity tests, such as Pressure Hold, Diffusive Flow and Bubble Point, can be performed by customers. Please contact us for procedural detail.

Filtrate Quality

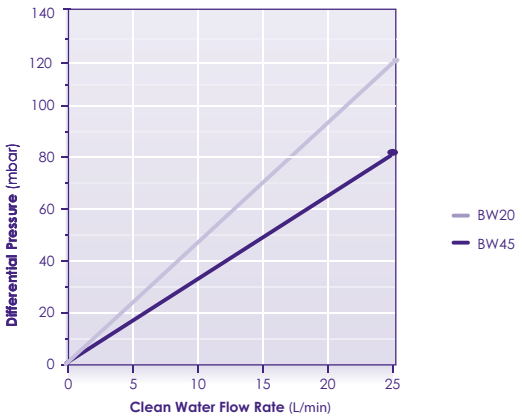
Cartridges have been validated to give high levels of effluent cleanliness, in accordance with USP guidance for:

- Extractables
- TOC & Conductivity
- Particulates & Non-Fibre Release
- Bacterial Endotoxins

Please refer to the Biofil™ 3 Plus Validation Guide for full supporting data.

Clean Water Flow Rates

- Typical clean water flow rate:
  A 254mm (10") Biofil™ Plus single cartridge exhibits the flow-**Δ**P 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.



PFG797/Jan2023

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porvair filtration group

Fluorofil™

ePTFE Membrane Cartridge Filters

Fluorofil™ cartridges are manufactured using a highly hydrophobic ePTFE membrane offering exceptionally high gas flow rates at low pressure differentials.

Fluorofil™ cartridges are recommended for sterile gas filtration and venting applications. The hydrophobic characteristics of the ePTFE membrane makes the Fluorofil™ filter cartridge particularly suitable for wet gas sterilising applications, such as fermenter air feed. For solvent and aggressive chemical filtration applications, these cartridges offer a wide range of chemical compatibility with high thermal stability.

Typical Applications

- Sterile process gases
- Sterile vents
- Fine chemicals and solvents
- Photoresists and developers
- Pure water supply systems

Features and Benefits

- Guaranteed microbial ratings
- Bacterial spores and viruses
- Steam sterilisation
- Cartridge integrity and low TOC levels
- Solvents and aggressive chemicals
- Full traceability
- Controlled manufacturing environment

Ordering Information

Product Code: 1 2 3 4 5 6 7

1: Membrane	
F	Fluorofil™

2: Pore rating	
20	0.2µm
45	0.45µm

3: Version	
R	Rinsed
S	Standard

4: Length (Nominal)	
1	10" (254mm)
2	20" (508mm)
3	30" (762mm)
4	40" (1016mm)
5	5" (125mm)

5: End Fitting	
A	Code 3
B	Code 7
C	Code 8
F	N SOE
G	G DOE (short)
H	G SOE
J	216 (218), fin
K	Code 2
L	223, fin (no lugs)
M	DOE
S	Code 28, fin (3 lugs)
T	223, flat (no lugs)
U	224, fin
V	226, fin
Y	BS832, flat

6: Seals	
A	Ethylene Propylene
B	Silicone
C	Viton®
D	Nitrile
E	FEP Encap. Viton®
G	FEP Encap. Silicone
J	DOE PTFE

7: Additional	
A	N+U
N	Non-steamable (no insert)
P	Pharma Grade
U	Unbranded

Specifications

Materials of Manufacture

Filter membrane:	ePTFE
Membrane support:	Polypropylene
Irrigation mesh (support):	Polypropylene
Drainage layer:	Polypropylene
Inner core:	Polypropylene
Outer support:	Polypropylene
End fittings:	Polypropylene
Sealing:	Fusion bonding

Cartridge Dimensions (Nominal)

Effective Filtration Area:

Up to 0.73m² (7.8ft²) per 10" module

Diameter: 70mm (2.8")

Length:		
	1 module:	Fluorofil™ Junior
	1 module:	254mm (10")
	2 modules:	508mm (20")
	3 modules:	762mm (30")
	4 modules:	1016mm (40")

Cartridge Treatment

Standard:	Cleaned and flushed, without further treatment
Rinsed:	Ultra-clean, pulse flushed to give a system resistivity of 18MΩ.cm

Gaskets and O-Rings

Ethylene Propylene, FEP encapsulated, Silicone, Viton® or Nitrile

Maximum Differential Pressure

Normal flow direction at:

20°C (68°F):	6.0bar (87psi)
80°C (176°F):	4.0bar (58psi)
100°C (212°F):	3.0bar (44psi)
120°C (248°F):	2.0bar (29psi)
125°C (257°F):	1.5bar (22psi)

Reverse flow direction at:

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

Operating Temperature

Maximum continuous:	80°C (176°F)

Sterilisation

In situ steam 100 x 20 minute cycles at 135°C (275°F) to 150 x 20 minute cycles at 125°C (257°F).

Extractables

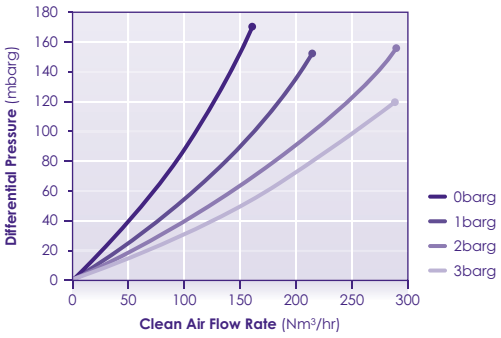
Minimum total extractables. Please refer to the Fluorofil™ Validation Guide.

Integrity Testing

Each Fluorofil™ module of every cartridge is individually integrity tested using the Diffusive Flow Test, which correlates to the HIMA and ASTM F838-05 bacterial challenge tests. Non-destructive integrity tests, such as Diffusive Flow, Water Intrusion, Pressure Hold and Bubble Point, can be performed by customers. Please contact us for procedural details.

Gas Flow Rates

- Typical clean air flow rate:
  A 254mm (10") Fluorofil™, 0.2µm single cartridge exhibits the flow-ΔP characteristics indicated below.

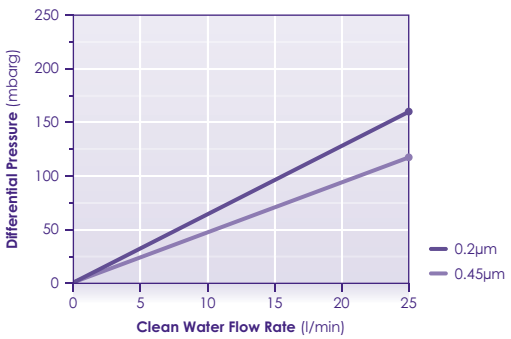


Clean Water Flow Rates

(after Solvent Pre-wet and Water Flush)

- Typical clean water flow rate:
  A 254mm (10") Fluorofil™ single cartridge with 0.2µm microbial rating exhibits the flow-**Δ**P characteristics indicated below, for solutions with a viscosity of 1 centipoise.

- Other solutions:
  For solutions with a viscosity other than 1 centipoise, multiply the indicated differential pressure by the viscosity in centipoise.



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porvair filtration group

Fluorofil™Plus

High Flow Sterile Gas Filters with ePTFE Membrane

Fluorofil™ Plus cartridges are manufactured using a highly hydrophobic ePTFE membrane. The enhanced ePTFE membrane offers exceptionally high gas flow rates at low pressure differentials.

Fluorofil™ Plus cartridges are recommended for sterile gas filtration and venting applications. The hydrophobic characteristics of the ePTFE membrane makes the Fluorofil™ Plus filter cartridge particularly suitable for wet gas sterilising applications, such as fermenter air feed.

The construction of the Fluorofil™ Plus cartridge has design features that allow higher membrane surface area, lower pressure drops and incorporates a stainless steel core for greater mechanical strength when operated at higher temperatures.

Typical Applications

- Sterile process gases
- Sterile vents
- Biotechnology
- Powder handling and tabletting

Ordering Information

Product Code: 1 2 3 4 5 6 7

1: Membrane	
F	Fluorofil™

2: Pore rating	
10	0.1µm
20	0.2µm

3: Version	
S	Standard

4: Length (Nominal)	
1	10" (254mm)
2	20" (508mm)
3	30" (762mm)
4	40" (1016mm)
5	5" (125mm)

5: End Fitting	
W	F20 +Code 7 (SS Core)
X	F20 +Code 2 (SS Core)
Z	F20 +Code Y (SS Core)

6: Seals	
A	Ethylene Propylene
B	Silicone
C	Viton®
D	Nitrile
E	FEP Encap. Viton®
G	FEP Encap. Silicone
J	DOE PTFE

7: Additional	
A	N+U
P	Pharma Grade
U	Unbranded

Features and Benefits

- Guaranteed microbial ratings
- Bacterial spores and viruses
- Mechanical strength
- Steam sterilisation
- Cartridge integrity and low TOC levels
- Full traceability
- Controlled manufacturing environment

Specifications

Materials of Manufacture

Filter membrane:	ePTFE
Membrane support:	Polypropylene
Irrigation mesh (support):	Polypropylene
Drainage layer:	Polypropylene
Inner core:	316/316L stainless steel
Outer support:	Polypropylene
End fittings:	Polypropylene
Sealing:	Fusion bonding

Cartridge Dimensions (Nominal)

Effective Filtration Area:
0.8m² (8.6ft²) per 10" module

Diameter:	70mm (2.8")	
Length:	1 module:	127mm (5")
	1 module:	254mm (10")
	2 modules:	508mm (20")
	3 modules:	762mm (30")
	4 modules:	1016mm (40")

Cartridge Treatment

Standard: Cleaned and flushed, without further treatment

Gaskets and O-Rings

Ethylene Propylene, FEP encapsulated, Silicone, Viton® or Nitrile

Maximum Differential Pressure

Normal flow direction at:

20°C (68°F):	6.0bar (87psi)
80°C (176°F):	4.0bar (58psi)
100°C (212°F):	3.0bar (44psi)
120°C (248°F):	2.0bar (29psi)
125°C (257°F):	1.5bar (22psi)

Reverse flow direction at:

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

Operating Temperature

Maximum continuous: 80°C (176°F)

Sterilisation

In situ steam 500 x 30 minute cycles at 135°C (275°F).
In situ steam cycles for 200 hours at 142°C (286°F).

Extractables

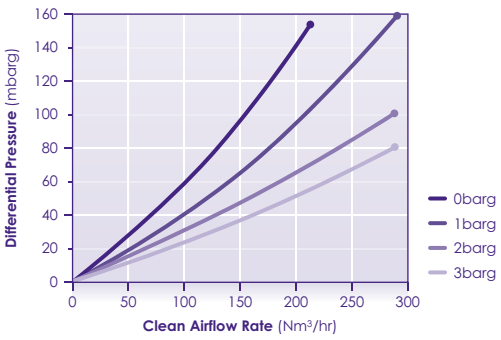
Minimum total extractables. Please refer to the Fluorofil™ Plus Validation Guide.

Integrity Testing

Each Fluorofil™ Plus module of every cartridge is individually integrity tested using the Diffusive Flow Test, which correlates to the HIMA and ASTM F838-05 bacterial challenge tests. Non-destructive integrity tests, such as Diffusive Flow, Water Intrusion, Pressure Hold and Bubble Point, can be performed by customers. Please contact us for procedural details.

Gas Flow Rates

- Typical clean air flow rate:
  A 254mm (10") Fluorofil™ Plus single cartridge exhibits the flow-**Δ**P characteristics indicated below.



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porvair filtration group

Fluorofil™ F100

PTFE Membrane Cartridges for Solvent Filtration

Fluorofil™ F100 cartridges are manufactured using a highly hydrophobic 1 micron PTFE membrane. The enhanced PTFE membrane offers exceptionally high liquid flow rates at low pressure differentials, making Fluorofil™ F100 cartridges ideally suited to solvent filtration.

For solvent and aggressive chemical filtration applications, Fluorofil™ F100 cartridges offer a wide range of chemical compatibility with high thermal stability. Suitable for the most demanding microfiltration applications, the cartridges can be used for the filtration of aggressive chemical solutions including acids, alkalis, solvents and etchants.

Typical Applications

- Carbon fines removal
- Fine chemical and solvents
- Photoresists and developers

Features and Benefits

- Guaranteed particle retention in a liquid challenge
- Cartridge integrity and low TOC levels
- Solvents and aggressive chemicals
- Full traceability
- Controlled manufacturing environment

Ordering Information

Product Code: 1 2 3 4 5 6 7

1: Membrane	
F	Fluorofil™

2: Pore rating	
100	1.0µm

3: Version	
R	Rinsed
S	Standard

4: Length (Nominal)	
1	10" (254mm)
2	20" (508mm)
3	30" (762mm)
4	40" (1016mm)
5	5" (125mm)

5: End Fitting	
A	Code 3
B	Code 7
C	Code 8
F	N SOE
G	G DOE (short)
H	G SOE
J	216 (218), fin
K	Code 2
L	223, fin (no lugs)
M	DOE
S	Code 28, fin (3 lugs)
T	223, flat (no lugs)
U	224, fin
V	226, fin
W	F20 +Code 7 (SS Core)
X	F20 +Code 2 (SS Core)
Y	BS832, flat
Z	F20 +Code Y (SS Core)

6: Seals	
A	Ethylene Propylene
B	Silicone
C	Viton®
D	Nitrile
E	FEP Encap. Viton®
G	FEP Encap. Silicone
J	DOE PTFE

7: Additional	
A	N+U
N	Non-steamable (no insert)
P	Pharma Grade
U	Unbranded

Specifications

Materials of Manufacture

Filter membrane:	PTFE
Membrane support:	Polypropylene
Irrigation mesh (support):	Polypropylene
Drainage layer:	Polypropylene
Inner core:	Polypropylene
Outer support:	Polypropylene
End fittings:	Polypropylene
Sealing:	Fusion bonding

Cartridge Dimensions (Nominal)

Effective Filtration Area:
0.68m^2 (7.3ft^2) per 10" module Diameter: 70mm (2.8")

Length:	1 module:	254mm (10")
	2 modules:	508mm (20")
	3 modules:	762mm (30")
	4 modules:	1016mm (40")

Cartridge Treatment

Standard:	Cleaned and flushed, without further treatment
Rinsed:	Ultra-clean, pulse flushed to give a system resistivity of 18MΩ.cm

Gaskets and O-Rings

FEP encapsulated, Viton®, Ethylene Propylene, Nitrile or Silicone

Maximum Differential Pressure

Normal flow direction at:

20°C (68°F):	6.0bar (87psi)
80°C (176°F):	4.0bar (58psi)
100°C (212°F):	3.0bar (44psi)

Reverse flow direction at:

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

Operating Temperature (in water)

Maximum continuous:	80°C (176°F)

Extractables

Minimum total extractables. Please refer to the Fluorofil™ F100 Validation Guide.

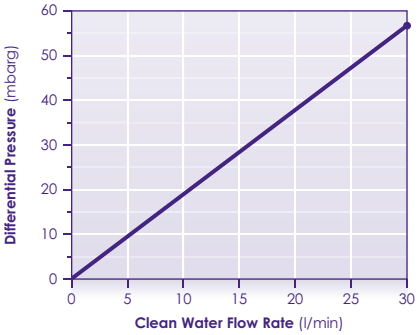
Integrity Testing

Each Fluorofil™ F100 module of every cartridge is individually integrity tested using the Reverse Bubble Point Test, which correlates to the particle retention rating determined by the modified OSU F-2 Single Pass Challenge Test. Non-destructive integrity testing, using the Reverse Bubble Point Test, can be performed by the end user. Please contact us for procedural details.

Clean Water Flow Rates

(after Solvent Pre-wet and Water Flush)

- Typical clean water flow rate:
  A 254mm (10") Fluorofil™ F100 single cartridge with 1.0µm particle retention rating exhibits the flow-**Δ**P characteristics indicated below, for solutions with a viscosity of 1 centipoise.
- Other solutions:
  For solutions with a viscosity other than 1 centipoise, multiply the indicated differential pressure by the viscosity in centipoise.



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porvair filtration group

Hydrofil™

Nylon 6.6 Membrane Cartridge Filters

Microbially rated cartridge filters featuring the latest developments in membrane technology, Hydrofil™ cartridges, are based on a naturally hydrophilic nylon membrane.

Hydrofil™ cartridges exploit the narrow pore size distribution and high void volume of the media to provide a choice of cartridges capable of meeting the requirements of most applications. Careful media selection ensures that Hydrofil™ cartridges are very suited to critical particle control down to 0.01 micron ratings. These cartridges offer high flux rates and low differential pressures, a feature common to nylon membranes.

Hydrofil™ cartridges benefit from high protein binding characteristics of nylon membranes and have excellent chemical compatibility characteristics. Hydrofil™ cartridges provide a combination of features and benefits previously unavailable from cartridges based on PVDF, mixed esters of cellulose or polysulphone membranes.

Typical Applications

- Biopharmaceuticals: Bioburden reduction and clarification
- Electronics and semiconductors
- Fine chemicals
- Beverages
- Pure water supply (18MΩ.cm)

Ordering Information

Product Code: 1 2 3 4 5 6 7

1: Membrane	
HT	Hydrofil™

2: Pore rating	
10	0.1µm
20	0.2µm
45	0.45µm

3: Version	
R	Rinsed
S	Standard

4: Length (Nominal)	
1	10" (254mm)
2	20" (508mm)
3	30" (762mm)
4	40" (1016mm)
5	5" (125mm)

5: End Fitting	
A	Code 3
B	Code 7
C	Code 8
F	N SOE
G	G DOE (short)
H	G SOE
J	216 (218), fin
K	Code 2
L	223, fin (no lugs)
M	DOE
S	Code 28, fin (3 lugs)
T	223, flat (no lugs)
U	224, fin
V	226, fin
W	F20 +Code 7 (SS Core)
X	F20 +Code 2 (SS Core)
Y	BS832, flat
Z	F20 +Code Y (SS Core)

6: Seals	
A	Ethylene Propylene
B	Silicone
C	Viton®
D	Nitrile
E	FEP Encap. Viton®
G	FEP Encap. Silicone
J	DOE PTFE

7: Additional	
A	N+U
N	Non-steamable (no insert)
P	Pharma Grade
U	Unbranded

Features and Benefits

- Guaranteed microbial ratings
- Excellent chemical compatibility
- Cartridge integrity and low TOC levels
- Suitable for steam sterilising
- Full traceability
- Controlled manufacturing environment

Specifications

Materials of Manufacture

Filter membrane:	Nylon 6,6
Membrane support:	Polypropylene
Irrigation mesh (support):	Polypropylene
Drainage layer:	Polypropylene
Inner core:	Polypropylene
Outer support:	Polypropylene
End fittings:	Polypropylene
Support ring:	Stainless steel

Cartridge Dimensions (Nominal)

Effective Filtration Area:
0.63m² (6.8ft²) per 10" module

Diameter:	70mm (2.8")	
Length:	1 module:	254mm (10")
	2 modules:	508mm (20")
	3 modules:	762mm (30")
	4 modules:	1016mm (40")

Other size formats (including juniors) are available upon request.

Cartridge Treatment

Standard:	Cleaned and flushed with pyrogen-free water
Rinsed:	Ultra-clean, pulse flushed to give a system resistivity of 18MΩ.cm

Gaskets and O-Rings

FDA approved Ethylene Propylene, FEP encapsulated, Silicone, Viton® or Nitrile

Maximum Differential Pressure

Normal flow direction at:

20°C (68°F):	6.0bar (87psi)
80°C (176°F):	4.0bar (58psi)
100°C (212°F):	3.0bar (44psi)
120°C (248°F):	2.0bar (29psi)

Reverse flow direction at:

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

Operating Temperature

Maximum continuous: 60°C (140°F)

Sterilisation

In situ steam up to 40 x 25 min cycles at 121°C (250°F).

Extractables

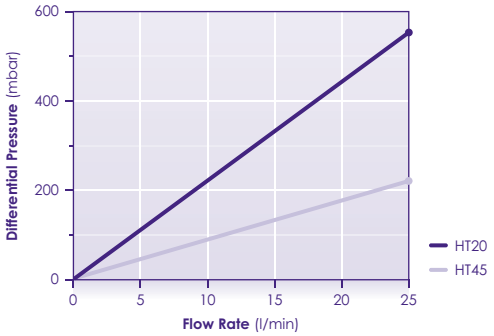
Minimum total extractables. Please refer to the Hydrofil™ Validation Guide.

Integrity Testing

Each Hydrofil™ module of every cartridge is individually integrity tested using the Diffusive Flow Test, which correlates to the HIMA and ASTM F838-05 bacterial challenge tests. Non-destructive integrity tests, such as Pressure Hold, Diffusive Flow and Bubble Point, can be performed by customers. Please contact us for procedural details.

Clean Water Flow Rates

- Typical clean water flow rate:
  A 254mm (10") Hydrofil™ single cartridge exhibits the flow-**Δ**P characteristics indicated below, for solutions with a viscosity of 1 centipoise.
- Other solutions:
  For solutions with a viscosity other than 1 centipoise, multiply the indicated differential pressure by the viscosity in centipoise.



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porvair filtration group

Hydrofil™Plus

Dual Nylon 6.6 Layer Membrane Cartridge Filters

Hydrofil™ Plus microbial rated cartridges have been developed and manufactured for the filtration of liquids in the pharmaceutical, biotechnology and other critical applications. Hydrofil™ Plus utilises a naturally hydrophilic Nylon 6.6 membrane with a mirrored asymmetric pore structure. The cartridge's unique built in pre-filtration membrane layer provides longer life and higher throughput.

When combined with quality all-polypropylene components and high integrity manufacturing techniques, the Hydrofil™ Plus filter cartridge is ideally suited to the most demanding process conditions.

Hydrofil™ Plus membrane cartridges are 100% integrity tested during manufacture by the forward flow diffusion test method.

Typical Applications

- Biopharmaceuticals
- Fermentation
- APIs / LVPs
- Beverages
- Pure water supply

Ordering Information

Product Code: 1 2 3 4 5 6 7

1: Membrane	
HTP	Hydrofil™ Plus

2: Pore rating	
10	0.1µm
20	0.2µm

3: Version	
R	Rinsed
S	Standard

4: Length (Nominal)	
1	10" (254mm)
2	20" (508mm)
3	30" (762mm)
4	40" (1016mm)
5	5" (125mm)

5: End Fitting	
A	Code 3
B	Code 7
C	Code 8
F	N SOE
G	G DOE (short)
H	G SOE
J	216 (218), fin
K	Code 2
L	223, fin (no lugs)
M	DOE
S	Code 28, fin (3 lugs)
T	223, flat (no lugs)
U	224, fin
V	226, fin
W	F20 +Code 7 (SS Core)
X	F20 +Code 2 (SS Core)
Y	BS832, flat
Z	F20 +Code Y (SS Core)

6: Seals	
A	Ethylene Propylene
B	Silicone
C	Viton®
D	Nitrile
E	FEP Encap. Viton®
G	FEP Encap. Silicone
J	DOE PTFE

7: Additional	
A	N+U
N	Non-steamable (no insert)
P	Pharma Grade
U	Unbranded

Features and Benefits

- Guaranteed microbial ratings
- Excellent chemical compatibility
- Cartridge integrity and low TOC levels
- Suitable for steam sterilising
- Full traceability
- Controlled manufacturing environment

Specifications

Materials of Manufacture

Pre-filter membrane:	Nylon
Final membrane:	Nylon
Filter membrane:	Nylon
Membrane support:	Polypropylene
Irrigation mesh (support):	Polypropylene
Drainage layer:	Polypropylene
Inner core:	Polypropylene
Outer support:	Polypropylene
End fittings:	Polypropylene
Support ring:	Stainless steel

Cartridge Dimensions (Nominal)

Effective Filtration Area:
0.63m² (6.8ft²) per 10" module

Diameter:	70mm (2.8")	
Length:	1 module:	254mm (10")
	2 modules:	508mm (20")
	3 modules:	762mm (30")
	4 modules:	1016mm (40")

Other size formats (including juniors) are available upon request.

Cartridge Treatment

Standard:	Cleaned and flushed with pyrogen-free water
Rinsed:	Ultra-clean, pulse flushed to give a system resistivity of 18MΩ.cm

Gaskets and O-Rings

FDA approved Ethylene Propylene, FEP encapsulated, Silicone, Viton® or Nitrile

Maximum Differential Pressure

Normal flow direction at:

20°C (68°F):	6.0bar (87psi)
80°C (176°F):	4.0bar (58psi)
100°C (212°F):	3.0bar (44psi)
120°C (248°F):	2.0bar (29psi)

Reverse flow direction at:

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

Operating Temperature

Maximum continuous: 60°C (140°F)

Sterilisation

In situ steam up to 40 x 25 min cycles at 121°C (250°F).

Extractables

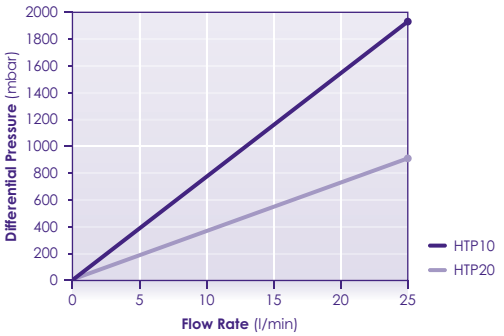
Minimum total extractables. Please refer to the Hydrofil™ Validation Guide.

Integrity Testing

Each Hydrofil™ Plus module of every cartridge is individually integrity tested using the Diffusive Flow Test, which correlates to the HIMA and ASTM F838-05 bacterial challenge tests. Non-destructive integrity tests, such as Pressure Hold, Diffusive Flow and Bubble Point, can be performed by customers. Please contact us for procedural details.

Clean Water Flow Rates

- Typical clean water flow rate:
  A 254mm (10") Hydrofil™ Plus single cartridge exhibits the flow-**Δ**P characteristics indicated below, for solutions with a viscosity of 1 centipoise.
- Other solutions:
  For solutions with a viscosity other than 1 centipoise, multiply the indicated differential pressure by the viscosity in centipoise.



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porvair filtration group

Biofil™ 2 Junior

Polyethersulfone Membrane Cartridge Filters for Small-Scale Applications

Biofil™ 2 Junior cartridges are based on a naturally hydrophilic polyethersulfone membrane with a mirrored asymmetric pore structure. When combined with quality all-polypropylene cartridge components and high integrity manufacturing techniques, the polyethersulfone membrane provides a high strength, long life cartridge of consistently precise microbial retention.

Biofil™ 2 Junior cartridges exploit the narrow pore size distribution and high void volume of the media to provide a choice of cartridges capable of meeting the requirements of most applications. Careful media selection ensures that Biofil™ 2 Junior cartridges are suited to critical particle control down to 0.1 micron ratings. These cartridges offer high flux rates and low differential pressures, a feature common to polyethersulfone membranes.

Ordering Information

Product Code: 1 **B** 2 3 4

1: Configuration	
J	J-Style
S	S-Style
L	L-Style

2: Pore rating	
10	0.1µm
20	0.2µm
45	0.45µm
65	0.65µm
120	1.2µm

3: Length	
25	77.5mm (2.5")
50	136mm (5")

4: Seals (J/L Style)	
A	Ethylene Propylene
B	Silicone
C	Viton®
D	Nitrile
E	FEP Encap. Viton®
G	FEP Encap. Silicone

Typical Applications

- Small-scale biopharmaceuticals
- Ophthalmic solutions
- Electronics and semiconductors
- Small-scale fine chemicals
- Pilot-scale studies
- Point-of-use water supply
- Ultra pure water supply systems (18MΩ.cm).

Features and Benefits

- Guaranteed removal ratings
- Low protein binding
- Will not hydrolyse
- Excellent chemical compatibility
- Suitable for steam sterilising
- Full traceability
- Controlled manufacturing environment

Specifications

Materials of Manufacture

Filter membrane:	Polyethersulfone
Membrane support:	Polypropylene
Irrigation mesh (support):	Polypropylene
Drainage layer:	Polypropylene
Inner core:	Polypropylene
Outer support:	Polypropylene
End fittings:	Polypropylene
Support ring:	Stainless steel

Cartridge Dimensions (Nominal)

Effective Filtration Area:	0.19m² (2.05ft²) per 5" length
Diameter:	56mm (2.2")
Length:	77.5mm (2.5") 136mm (5")

Cartridge Treatment

Standard:	Cleaned and 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):	6.0bar (87psi)
80°C (176°F):	4.0bar (58psi)
100°C (212°F):	3.0bar (44psi)
120°C (248°F):	2.0bar (29psi)

Reverse flow direction at:

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

Operating Temperature

Maximum continuous:	85-90°C (185-194°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 125°C (257°F)

Extractables

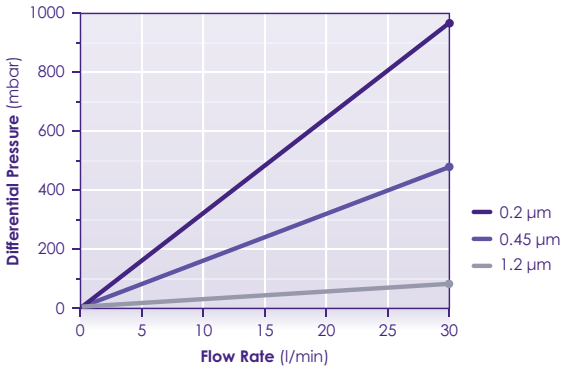
Minimum total extractables. Please refer to the Biofil™ 2 Validation Guide.

Integrity Testing

Each Biofil™ 2 Junior module of every cartridge is individually integrity tested using the Diffusive Flow Test, which correlates to the HIMA and ASTM F838-05 bacterial challenge tests. Non-destructive integrity tests, such as Pressure Hold, Diffusive Flow and Bubble Point, can be performed by customers. Please contact us for procedural details.

Clean Water Flow Rates

- Typical clean water flow rate:
  A 136mm (5") Biofil™ 2 Junior cartridge exhibits the flow-**Δ**P characteristics indicated below, for solutions with a viscosity of 1 centipoise.
- Other solutions:
  For solutions with a viscosity other than 1 centipoise, multiply the indicated differential pressure by the viscosity in centipoise.



Biopharmaceutical

Our disposable polymeric cartridge filters are constructed from FDA approved materials carrying the CFR 21 number for biological safety and our materials of construction meet USP Class VI-121°C plastics.

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porvair filtration group

Hydrofil™ Junior

Nylon 6.6 Membrane Cartridge Filters

Microbially rated cartridge filters featuring the latest developments in membrane technology, Hydrofil™ Junior cartridges, are based on a naturally hydrophilic nylon membrane.

Hydrofil™ Junior cartridges exploit the narrow pore size distribution and high void volume of the media to provide a choice of cartridges capable of meeting the requirements of most applications. Careful media selection ensures that Hydrofil™ Junior cartridges are very suited to critical particle control down to 0.01 micron ratings. These cartridges offer high flux rates and low differential pressures, a feature common to nylon membranes.

Hydrofil™ Junior cartridges benefit from high protein binding characteristics of nylon membranes and have excellent chemical compatibility characteristics. Hydrofil™ Junior cartridges provide a combination of features and benefits previously unavailable from cartridges based on PVDF, mixed esters of cellulose or polysulphone membranes.

Ordering Information

Product Code: 1 **H** 2 3 4

1: Configuration	
J	J-Style
S	S-Style
L	L-Style

2: Pore rating	
10	0.1µm
20	0.2µm
45	0.45µm

3: Length	
25	77.5mm (2.5")
50	136mm (5")

4: Seals (J/L Style)	
A	Ethylene Propylene
B	Silicone
C	Viton®
D	Nitrile
E	FEP Encap. Viton®
G	FEP Encap. Silicone

Typical Applications

- Small-scale biopharmaceuticals: Bioburden reduction and clarification
- Electronics and semiconductors
- Small-scale fine chemicals
- Pilot-scale studies
- Beverages
- Point-of-use water supply
- Pure water supply (18MΩ.cm)

Specifications

Materials of Manufacture

Filter membrane:	Nylon 6,6
Membrane support:	Polypropylene
Irrigation mesh (support):	Polypropylene
Drainage layer:	Polypropylene
Inner core:	Polypropylene
Outer support:	Polypropylene
End fittings:	Polypropylene
Support ring:	Stainless steel

Cartridge Dimensions (Nominal)

Effective Filtration Area:
0.20m² (2.15ft²) per 5" length

Diameter:	56mm (2.2")
Length:	77.5mm (2.5") 136mm (5")

Cartridge Treatment

Standard:	Cleaned and 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):	6.0bar (87psi)
80°C (176°F):	4.0bar (58psi)
100°C (212°F):	3.0bar (44psi)
120°C (248°F):	2.0bar (29psi)

Reverse flow direction at:

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

Operating Temperature

Maximum continuous: 60°C (140°F)

Sterilisation

J-style:	In situ steam up to 40 x 25 minute cycles at 121°C (250°F)
S-style:	Autoclave up to 40 x 25 minute cycles at 121°C (250°F)
L-style:	In situ steam up to 40 x 25 minute cycles at 121°C (250°F)

Filtrate Quality

Cartridges have been validated to give high levels of effluent cleanliness, in accordance with USP guidance for:

- Total Extractables
- TOC & Conductivity
- Particulates & Non-Fibre Release
- Bacterial Endotoxins

Please refer to the Hydrofil™ Validation Guide for full supporting data.

Integrity Testing

Each Hydrofil™ Junior module of every cartridge is individually integrity tested using the Diffusive FlowTest, which correlates to the HIMA and ASTM F838-05 bacterial challenge tests. Non-destructive integrity tests, such as Pressure Hold, Diffusive Flow and Bubble Point, can be performed by customers. Please contact us for procedural details.

PFG730/March2023

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porvair filtration group

Fluorofil™ Junior

ePTFE Membrane Cartridge Filters for Small-Scale Applications

Fluorofil™ Junior cartridges are manufactured using a highly hydrophobic ePTFE membrane and are designed for retrofitting into existing Junior-style housings. The enhanced ePTFE membrane offers exceptionally high gas flow rates at low pressure differentials.

Fluorofil™ Junior cartridges are recommended for small-scale sterile gas filtration and venting applications. The hydrophobic characteristics of the ePTFE membrane makes the Fluorofil™ Junior filter cartridge particularly suitable for wet gas sterilising applications, such as small-scale fermenter air feed.

For small-scale solvent and aggressive chemical filtration applications, Fluorofil™ Junior cartridges offer a wide range of chemical compatibility with high thermal stability.

Typical Applications

- Sterile vents
- Small-scale sterile process gases
- Small-scale fine chemicals and solvents
- Small-scale photoresists and developers
- Aggressive chemical solutions including acids, alkalis, solvents and etchants.

Features and Benefits

- Zeta potential
- High filtration area
- Guaranteed removal ratings
- Suitable for steam and hot water sanitisation
- Full traceability
- Controlled manufacturing environment

Ordering Information

Product Code: 1 **F** 2 3 4

1: Configuration	
J	J-Style
S	S-Style
L	L-Style

2: Pore rating	
20	0.2µm
45	0.45µm
65	0.65µm

3: Length	
25	77.5mm (2.5")
50	136mm (5")

4: Seals (J/L Style)	
A	Ethylene Propylene
B	Silicone
C	Viton®
D	Nitrile
E	FEP Encap. Viton®
G	FEP Encap. Silicone

Specifications

Materials of Manufacture

Filter membrane:	ePTFE
Membrane support:	Polypropylene
Irrigation mesh (support):	Polypropylene
Drainage layer:	Polypropylene
Inner core:	Polypropylene
Outer support:	Polypropylene
End fittings:	Polypropylene
Sealing:	Fusion bonding
Internal adaptor support ring:	Stainless steel

Cartridge Dimensions (Nominal)

Effective Filtration Area:
0.19m² (2.05ft²) per 5" length.

Diameter:	56mm (2.2")
Lengths:	77.5mm (2.5") 136mm (5")

Cartridge Treatment

Standard:	Cleaned and flushed, without further treatment
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):	6.0bar (87psi)
80°C (176°F):	4.0bar (58psi)
100°C (212°F):	3.0bar (44psi)
120°C (248°F):	2.0bar (29psi)
125°C (257°F):	1.5bar (22psi)

Operating Temperature

Maximum continuous:	80°C (176°F)

Sterilisation

Autoclave 70 x 25 minute cycles at 135°C (275°F)

Extractables

Minimum total extractables. Please refer to the Fluorofil™ Validation Guide.

Integrity Testing

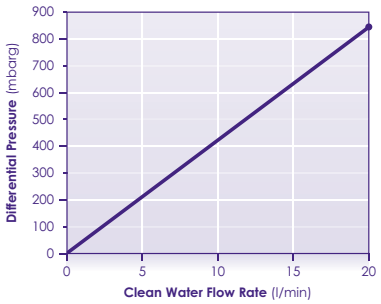
Each Fluorofil™ Junior cartridge is individually integrity tested using the Diffusive Flow Test, which correlates to the HIMA and ASTM F838-05 bacterial challenge tests. Non-destructive integrity tests, such as Diffusive Flow, Water Intrusion, Pressure Hold and Bubble Point, can be performed by customers. Procedural details are available from **Porvair**.

Gas Flow Rates

- Typical clean air flow rate:
  A 136mm (5") Fluorofil™ Junior cartridge exhibits the flow-**Δ**P characteristics indicated below.

Clean Water Flow Rates (after Solvent Pre-wet and Water Flush)

- Typical clean water flow rate:
  A 136mm (5") Fluorofil™ Junior cartridge (J-style) with 0.2µm microbial rating exhibits the flow-**Δ**P characteristics indicated below, for solutions with a viscosity of 1 centipoise.
- Other solutions:
  For solutions with a viscosity other than 1 centipoise, multiply the indicated differential pressure by the viscosity in centipoise.



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porvair filtration group

Ventafil™

ePTFE Membrane Cartridge Filters for Autoclave Venting

Ventafil™ cartridges are manufactured using a highly hydrophobic ePTFE membrane and are designed for autoclave venting. The enhanced ePTFE membrane offers exceptionally high gas flow rates at low pressure differentials.

Ventafil™ cartridges are designed with either a ¼" or ½" BSP male thread for autoclave and small tank venting applications. The hydrophobic characteristics of the ePTFE membrane makes the Ventafil™ filter cartridge particularly suitable for rapid vacuum break in autoclaves.

Ordering Information

Product Code: 1 2 3

1: J-Style	
F20VENT	Ventafil™

2: Length	
25	77.5mm (2.5")
50	136mm (5")

2: Options Threaded	
B	1/2" BSP
X	1/4" BSP

Typical Applications

- Autoclave vents
- Sterile product storage vessels

Features and Benefits

- Guaranteed microbial ratings in a liquid challenge
- Bacterial spores and viruses
- Steam sterilisation
- Cartridge integrity and low TOC levels
- Full traceability
- Controlled manufacturing environment

Specifications

Materials of Manufacture

Filter membrane:	ePTFE
Membrane support:	Polypropylene
Irrigation mesh (support):	Polypropylene
Drainage layer:	Polypropylene
Inner core:	Polypropylene
Outer support:	Polypropylene
End fittings:	Polypropylene
Sealing:	Fusion bonding

Cartridge Dimensions (Nominal)

Effective Filtration Area:
0.37m² (4.0ft²) per 5" module.

Diameter: 70mm (2.8")

Length: 64mm (2.5")
136mm (5")

Cartridge Treatment

Standard: Cleaned and flushed, without further treatment

Rinsed: Ultra-clean, pulse flushed to give a system resistivity of 18MΩ.cm

Adaptor and O-Ring

Silicone (other materials are available on request)
¼" and ½" BSP male thread.

Maximum Differential Pressure

Normal flow direction at:

20°C (68°F):	6.0bar (87psi)
80°C (176°F):	4.0bar (58psi)
100°C (212°F):	3.0bar (44psi)
120°C (248°F):	2.0bar (29psi)
125°C (257°F):	1.5bar (22psi)

Sterilisation

In situ steam 70 x 25 minute cycles at 135°C (275°F)

Extractables

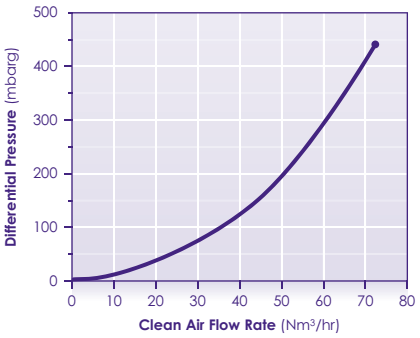
Minimum total extractables. Please refer to the Fluorofil™ Validation Guide.

Integrity Testing

Each Ventafil™ cartridge is individually integrity tested using the Diffusive Flow Test, which correlates to the HIMA and ASTM F838-05 bacterial challenge tests. Non-destructive integrity tests, such as Diffusive Flow, Water Intrusion, Pressure Hold and Bubble Point, can be performed by customers. Procedural details are available from **Porvair**.

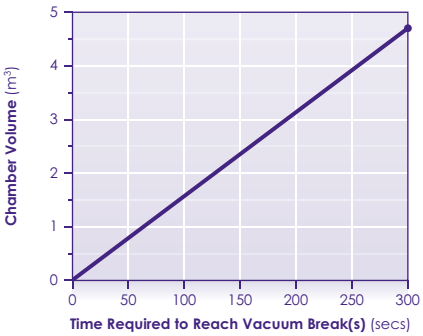
Clean Air Flow Rates

- Typical clean air flow rate:
  A 136mm (5") Ventafil™ cartridge exhibits the flow-**Δ**P characteristics indicated below.



Filter Selection

- Vacuum break application:
  If the initial vacuum is at -980 mbarg, the time required before the vacuum break conditions required to safely open the autoclave door (at -20mbarg) are achieved, is indicated below.



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porvair filtration group

Stainless Steel Filter Housings

Sanitary and Industrial

For details on our complete range of stainless steel filter housings, please view our Housings Catalogue.

A full range of stainless steel industrial and sanitary housings are available from 10 to 20bar (145-290psi), with both single and multi-element housings to suit every application. The housings have in-line BSP port connections for ease of installation. Tri-clover and weld connections are available.

Our current range of filter housings are available in rounds from 1-30.

A special range of high-pressure 350bar (5,076psi) rated housings are available on request.

Housings manufactured from other alloys and made to other design codes are available on request. Please contact us for further details.

Features and Benefits

- Resistant to high temperatures and corrosive environments
- Suitable for aggressive air and liquid filtration applications
- Inherent strength for long service life in arduous applications
- Controlled pore size, ensures optimum repeat performance

Optional Material and Surface Treatments

- Stainless steel 316/316L
- Hastelloy®
- Internal welds ground flush and smooth
- Electro polished
- Mirror finished
- Surface finish 240 grit
- Various coatings

Control Systems

Some of the control options available are:

- Solenoid operated valve
- Control timer

Coded Vessels

Vessels can be supplied to BS5500, ASME VIII U'Stamp, ADM-TÜV. Other standards are available upon request.

The systems are designed and built to individual customer's specifications and needs. A tailored pulsed jet supply system is vital to a good performance of the filter assembly.

porvair filtration group

Microcap™ PPP

Pharmaceutical Grade Pleated Polypropylene Capsules

Microcap™ PPP capsules are used for the pre-filtration of bulk pharmaceutical chemicals, water, buffers, solvents, alcohols and other liquids. They are also designed to protect membrane filters in filling applications for SVPs, LVPs, diagnostics, ophthalmics, biologicals and other products.

Made with polypropylene microfibre media, and designed with the optimal filtration area, these filters remove large amounts of particulate and other contaminants.

Microcap™ PPP capsules protect critical membrane filters downstream by removing 99.9% (β ratio = 1000) of contaminants at the rated pore size.

Polypropylene exhibits broad chemical compatibility, so it is particularly suited for the filtration of chemicals and solvents used in the drug making processes.

Microcap™ PPP capsules are integrity tested during manufacture and are flushed to ensure cleanliness in critical process applications.

Typical Applications

- Bulk pharmaceutical chemicals
- Buffers and other media
- LVPs and SVPs
- Biologicals
- Water
- Ophthalmics
- Diagnostics

Features and Benefits

- Protect's critical membrane filters downstream.
- Wide range of high efficiency retention ratings
- High capacity for long life.
- USP Class VI approved.
- Uses FDA compliant materials.

Ordering Information

Product Code: 7018- 1- xxx - x - xx - x x

Micron Rating (µm)	
P10	0.1
P22	0.22
P45	0.45
P65	0.65
001	1
003	3.0
005	5.0
010	10
020	20
030	30
040	40
060	60
100	100

Pre-sterilised	
N	Non-sterile
S	Sterile

Length (in)	
02	2
05	5
10	10
20	20
30	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" - 1 1/2" Sanitary
G	Hose Barb

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" - 1 1/2" Sanitary
G	Hose Barb

Specifications

Materials of Manufacture

Housing:	Polypropylene
Filtration media:	Pleated polypropylene depth media
Media support:	Polypropylene
End caps:	Polypropylene
Centre core:	Polypropylene
Outer support cage:	Polypropylene
Sealing method:	Thermal bonding

Sanitisation/Sterilisation

Autoclave:	120°C (250°F), 30 min, 5+ cycles
Chemical sanitisation:	Industry standard concentrations of hydrogen peroxide, peracetic acid, sodium hypochlorite and other selected chemicals.
Note:	Microcap™ PPP capsules are not to be used in steam.

Flow Rate

The following table represents typical water flow at a one psi (69mbar) pressure differential across a single 2 inch capsule with 1.0 ft² (0.093 m²) of media with 1/2" FNPT ports. The liquid test fluid is water at ambient temperature. Higher pressure drops are acceptable, but as flows increase the pressure drop of the housing becomes more apparent.

Pore size (µm)	0.10	0.22	0.45	0.65	1.0	3.0	5.0	10	20	30	40	60	100
GPM	0.20	0.60	1.0	1.2	1.6	2.4	3.2	3.6	4.0	>4.0	>4.0	>4.0	>4.0
LPM	0.76	2.27	3.78	4.54	6.05	9.08	12.11	13.62	15.14	>15.14	>15.14	>15.14	>15.14

For approximate flow rates for 5" through 30" capsules, refer to the appropriate cartridge data sheet.

Maximum Operating Parameters

Liquid operational pressure:	5.5bar (80psi) at 20°C (68°F)
Gases operational pressure:	60psi (4.1bar) at 20°C (68°F)
Operating temperature:	43°C (110°F) at 2.1bar (30psi) in water
Forward differential pressure:	3.4bar (50psi) at 20°C (68°F)
Reverse differential pressure:	2.7bar (40psi) at 20°C (68°F)
Outer support cage:	Polypropylene
Recommended changeout pressure:	2.4bar (35psi)

Filtration Area

Media	Capsule length				
	2"	5"	10"	20"	30"
Pleated polypropylene depth	1.0ft² (0.09m²)	2.8ft² (0.26m²)	5.8ft² (0.54m²)	11.6ft² (1.08m²)	17.4ft² (1.62m²)

Average – Filtration area varies with media thickness and porosity.

Integrity Test Information

Each capsule assembly is integrity tested before release. Field duplication of these tests is not practical because of the absence of commercial portable testing equipment.

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porvair filtration group

Microcap™ PPTFE

PTFE Pleated Membrane Capsules

Microcap™ PPTFE capsules are manufactured for the critical needs of the pharmaceutical industry.

Made with highly hydrophobic polytetrafluoroethylene (PTFE) membrane, these capsules are used for the filtration of non-aqueous liquids, aggressive solvents, compressed gases and as vent filters. Each module is individually tested using the water intrusion method before it is released from manufacture.

The capsule media surface area, filter core design, pleat configuration and pleat packing density have been optimised to provide increased life resulting in lower filtration operating costs.

Typical Applications

- Solvent filtration
- Fermentation air
- Tank vent filters
- Process gas
- Compressed air filtration

Features and Benefits

- Optimised for maximum filter life.
- Guaranteed microbial ratings.
- Maximized bio-burden reduction.
- Integrity at low TOC levels.

Ordering Information

Product Code: 7018- 3- xxx - x - xx - x x

Micron Rating (µm)	
P10	0.1
P22	0.22
P45	0.45
001	1
003	3
005	5

Pre-sterilised	
N	Non-sterile

Length (in)	
02	2
05	5
10	10
20	20
30	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" - 1 1/2" Sanitary
G	Hose Barb

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" - 1 1/2" Sanitary
G	Hose Barb

Specifications

Materials of Manufacture

Housing:	Polypropylene
Filtration media:	PTFE membane (absolute rated)
Media support:	Polypropylene
End caps:	Polypropylene
Centre core:	Polypropylene
Outer support cage:	Polypropylene
Sealing method:	Thermal bonding

Sanitisation/Sterilisation

Autoclave:	120°C (250°F), 30 min, 5+ cycles.
Chemical sanitisation:	Industry standard concentrations of hydrogen peroxide, peracetic acid, sodium hypochlorite and other selected chemicals.
Note:	Microcap™ PPTFE capsules are not to be used in steam.

Flow Rate

The following tables represent typical water flow at a one psi (69bar) pressure differential across a single 2 inch capsule with 1.0 ft² (0.093 m²) of media with 1/2" FNPT ports. The liquid test fluid is water at ambient temperature. The gas test fluid is compressed air at ambient temperature. Higher pressure drops are acceptable, but as flows increase the pressure drop of the housing becomes more apparent.

Air/Gas flow rates						
µm rating	0.10	0.22	0.45	1.0	3.0	5.0
SCFM	3.0	4.9	9	11	>11	>11

Liquid flow rates						
µm rating	0.10	0.22	0.45	1.0	3.0	5.0
GPM	0.15	0.24	0.76	1.2	1.4	1.6
LPM	0.57	0.91	2.87	4.54	5.30	6.06

Maximum Operating Parameters

Liquid operational pressure:	5.5bar (80psi) at 20°C (68°F)
Gases operational pressure:	4.1bar (60psi) at 20°C (68°F)
Operating temperature:	43°C (110°F) at 2.1bar (30psi) in water
Forward differential pressure:	3.4bar (50psi) at 20°C (68°F)
Reverse differential pressure:	2.7bar (40psi) at 20°C (68°F)
Recommended changeout pressure:	2.4bar (35psi)

Filtration Area

Media	Capsule length				
	2"	5"	10"	20"	30"
PTFE membrane	1.0ft² (0.09m²)	3.0ft² (0.28m²)	8.2ft² (0.76m²)	16.4ft² (1.53m²)	24.6ft² (2.29m²)

Integrity Test Specifications

(per 1.0 ft2 (930 cm2) 60/40 IPA/water wetted membrane)

Pore size (µm)	Bubble point
0.10	1.52bar (22psi)
0.22	1.2bar (18psi)
0.45	621bar (9psi)
1.0	414bar (6psi)
3.0	138bar (2psi)
5.0	69bar (1psi)

Validation

Our biopharmaceutical grade capsules are validated using test procedures based on ASTM Method F838-05 and HIMA protocols.

The challenge level is 107 organisms per cm2 of filter media: 0.22 µm challenged with Brevundimonas diminuta;

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porvair filtration group

Microcap™ PPES

Pharmaceutical Grade Polyethersulfone Pleated Membrane Capsules

Microcap™ PPES capsules are used for sterile filtration in the most critical pharmaceutical applications, such as: sterilising filtration of USP Water for Injection (WFI), diagnostic solutions, vaccines, ophthalmics, SVPs, LVPs and biological products.

Our hydrophilic, double-layered polyethersulfone membrane filters exhibit excellent flow rates with high throughput, thereby ensuring optimum protection.

Polyethersulfone (PES) is particularly suited for the filtration of products which contain elements that can adsorb to the media, such as preservatives and proteins. The lower binding characteristics of PES make it a good choice for the filtration of valuable protein solutions such as vaccines and biologicals as well as ophthalmic solutions.

Microcap™ PPES capsule elements are 100% integrity tested during production.

Typical Applications

- Diagnostics
- Vaccines
- LVPs and SVPs
- Biologicals
- WFI water
- Ophthalmics

Features and Benefits

- Validated for use in multiple pharmaceutical applications.
- Excellent flow rates with high throughput.
- Integrity testable.
- Designed for minimal leachables and extractables.
- Low adsorption of proteins and preservatives.
- USP Class VI approved.
- Uses FDA compliant materials.

Ordering Information

Product Code: 7018- 4- [xxx] - [x] - [xx] - [x] [x]

Micron Rating (µm)	
P03	0.03
P10	0.1
P22	0.22
P45	0.45
P65	0.65
P80	0.8
001	1

Pre-sterilised	
N	Non-sterile
S	Sterile

Length (in)	
02	2
05	5
10	10
20	20
30	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" - 1 1/2" Sanitary
G	Hose Barb

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" - 1 1/2" Sanitary
G	Hose Barb

Specifications

Materials of Manufacture

Housing:	Polypropylene
Filtration media:	Double layered polyethersulfone (PES) membrane
Media support:	Polypropylene
End caps:	Polypropylene
Centre core:	Polypropylene
Outer support cage:	Polypropylene
Sealing method:	Thermal bonding

Sanitisation/Sterilisation

Autoclave:	120°C (250°F), 30 min, 5+ cycles.
Chemical sanitisation:	Industry standard concentrations of hydrogen peroxide, peracetic acid, sodium hypochlorite and other selected chemicals.
Note:	PPES capsules are not to be used in steam.
Pre-Sterilised:	PPES capsules are offered in both non- and pre-sterilised forms.

Filtration Area

Media	Capsule length				
	2"	5"	10"	20"	30"
PPES Membrane	1.0ft² (0.09m²)	3.0ft² (0.29m²)	6.2ft² (0.58m²)	12.4ft² (1.16m²)	18.6ft² (1.74m²)

Integrity Test Specifications - Diffusion

Pore size (µm)	Test pressure (psi)	Max Diffusion Rate (cc/min - water wetted membrane)				
		2"	5"	10"	20"	30"
0.03	60	2.1	6.3	15	30	45
0.10	48	2.1	6.3	15	30	45
0.22	35	2.1	6.3	15	30	45
0.45	20	2.1	6.3	15	30	45
0.65	15	2.1	6.3	15	30	45
0.8	12	2.1	6.3	15	30	45
1.0	8	2.1	6.3	15	30	45

Maximum Operating Parameters

Liquid operational pressure:	5.5bar (80psi) at 20°C (68°F)
Gases operational pressure:	4.1bar (60psi) at 20°C (68°F)
Operating temperature:	43°C (110°F) at 2.1bar (30psi) in water
Forward differential pressure:	3.4bar (50psi) at 20°C (68 °F)
Reverse differential pressure:	2.7bar (40 psi) at 20°C (68 °F)
Recommended changeout pressure:	2.4bar (35psi)

Flow Rate

The following table represents typical water flow at a 69mbar (one psi) pressure differential across a single 2 inch capsule with 1.0ft² (0.09m²) of media with 1/2" FNPT ports. The test fluid is water at ambient temperature. Higher pressure drops are acceptable, but as flows increase the pressure drop of the housing becomes more apparent.

Pore size (µm)	0.03	0.10	0.22	0.45	0.65	0.8	1.0
GPM	0.16	0.26	0.46	0.71	0.86	0.91	0.97
LPM	0.61	0.98	1.74	2.69	3.26	3.44	3.67

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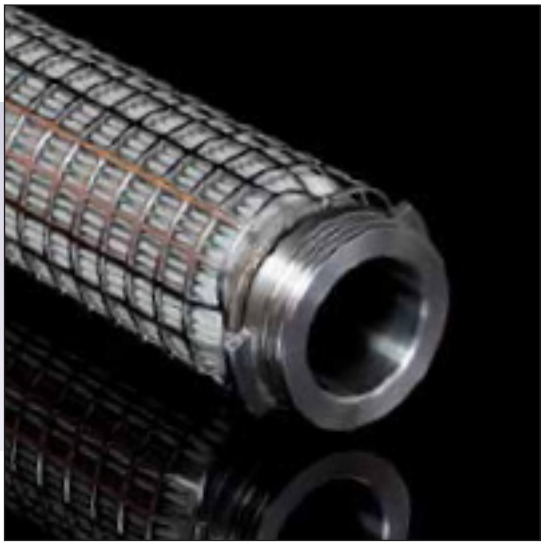
Sinterflo® F

Pleated Sintered Metal Fibre Filter Cartridges



Manufactured from randomly laid metal fibres and sinter-bonded to form a uniform high porosity filter medium, Sinterflo® F demonstrates a significantly low pressure drop, high permeability and excellent dirt holding capacity.

With the feasibility to formulate metal fibres to meet specific application requirements combined with inherent durability, sintered metal fibre filters can be cleaned in situ without interrupting process flow. This will provide the ultimate in process economics by reducing downtime to a minimum.

Available in 316/316L as standard with other alloys such as Inconel® 601, Hastelloy® X, NiCrMo Alloy 59 and Fecralloy® on request.

Typical Applications

- Catalyst recovery and retention
- Gasification and chemical production
- Vent filters
- Agrochemical
- Steam filtration (culinary and process)
- Pharmaceutical powder recovery

Features and Benefits

- Resistant to high temperatures and corrosive environments
- Fully welded construction with no adhesives or fillers
- High void volume
- Excellent cleanability and dirt holding capacity
- Minimal maintenance costs
- Pleatable structure, offering higher filtration area per cartridge

Ordering Information

Sinterflo Table 1 - Table 2 Table 3 - Table 4 - Table 5 - Table 6 Table 7 Table 8

Table 1 Media Type

F	Sinterflo® F (fibre)

Table 2 End Fitting

226	226 fitting
222	222 fitting
DOE	Double open ended fitting
NP1	1" NPT
NP5	1.5" NPT
NP2	2" NPT
BS1	1" BSP taper
BS4	1.25" BSP taper
BS5	1.5" BSP taper
BS2	2" BSP taper

Table 3 Cartridge Type

P	Pleated

Table 4 Micron Rating

0003	3µm
0005	5µm
0010	10µm
0015	15µm
0020	20µm
0030	30µm
0040	40µm
0060	60µm

Table 5 Cartridge Length

05	5" (125mm)
10	10" (250mm)
20	20" (498mm)
30	30" (745mm)
40	40" (1012mm)

Note: Other non-standard lengths, ratings and end pin options are available on request.

Table 6 Seal Material

E	EPDM
N	Nitrile
S	Silicone
P	PTFE (DOE only)
V	Viton®
F	FEP encap. Viton® (222/226 only)
T	FEP encap. Silicone (222/226 only)
Y	FEP encap. EPDM (222/226 only)
C	Chemraz
X	No seal supplied

Table 7 Guard/Support Option

G	Guard
N	None

Table 8 Fin Option

F	Fin (226/222 only)
N	No fin

Specifications

Materials of Manufacture

316/316L stainless steel standard. Inconel®, Hastelloy®, NiCrMo Alloy 59 and Fecralloy® available on request or by process selection. Additional alloys are available on request.

Cartridge Dimensions*

Diameter:	66mm (2.6") standard	
Length:	05:	125mm (5")
	10:	250mm (10")
	20:	498mm (20")
	30:	745mm (30")
	40:	1012mm (40")

** Other diameters and lengths available on request.*

Effective Filtration Area

0.13m² (1.40ft²) per 250mm (10") cartridge

Gaskets and O-Rings*

EPDM as standard. Chemraz®, nitrile, PTFE, silicone, Viton®, FEP coated EPDM, FEP coated silicone, FEP coated Viton® available on request or by process selection.

** FDA approved and USP Class VI.*

Typical Maximum Differential Pressure (all lengths)

Normal flow direction (out to in):	25bar (363psi)
Reverse flow direction (with guard):	3bar (44psi)

Operating Temperature

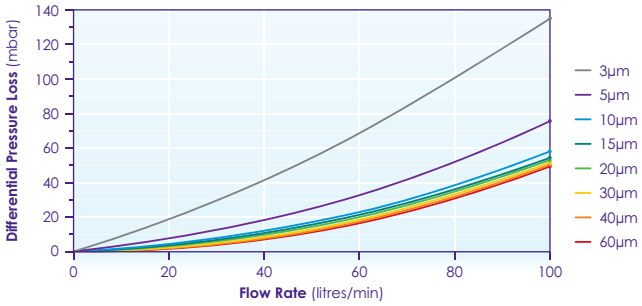
Maximum continuous:	From -195°C (-319°F) to 340°C (644°F) seal limiting From -269°C (-452°F) to 1000°C (1832°F) alloy limiting

Sinterflo® F Stainless Steel Media Grades

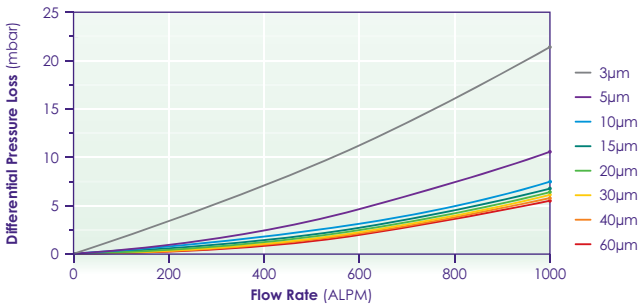
Micron Rating (µm) (micron code)	Liquids (µm)* (99.9% efficiency)	Gases (µm) (99.9% efficiency)
3 (0003)	3	1
5 (0005)	5	1.5
10 (0010)	10	3
15 (0015)	15	4
20 (0020)	20	6
30 (0030)	30	8
40 (0040)	40	11
60 (0060)	60	16

** Single Pass Efficiency Test in accordance with ASTM795 ACFTD.*

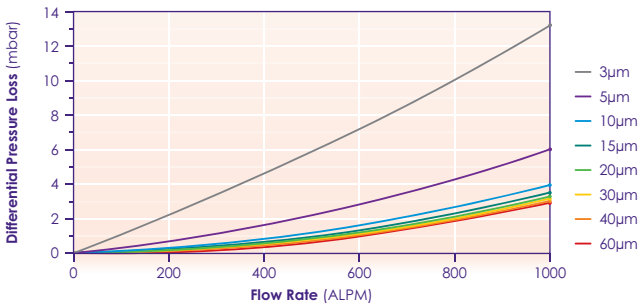
Typical Flow Rates in Water*



Typical Flow Rates in Air*



Typical Flow Rates in Steam*



** Using a 10" element. Water and air at ambient temperature and 1 bar (A). Steam is dry saturated steam at 1bar (A).*

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Sinterflo® M

Pleated Metal Mesh Filter Cartridges

Pleated metal mesh filter cartridges demonstrate good permeability, high tensile strength and are available from single wrap designs through to complex multi-layered structures in pleated constructions to optimise the area available. These meshes can be manufactured in diffusion bonded versions to increase performance security of pore shape and size and have the broadest range of pore sizes of any filter media type.

Sinterflo® M precision woven meshes are manufactured in various types of weaves. Plain square weave is available for simple sieving duties through various weave patterns (Reverse Plain Dutch, Broad Mesh Twill and Single Plain Weave). Dutch Twill Weave is provided for the most comprehensive selection of surface filtration duties.Sinterflo® M is available in 316/316L stainless steel as standard with other alloys such as 304L stainless steel, Inconel® and Monel® on request.

Typical Applications

- Catalyst recovery and retention
- Gasification and chemical production
- Vent filters
- Agrochemical
- Steam filtration (culinary and process)
- Pharmaceutical powder recovery

Features and Benefits

- Precise aperture in size and shape
- Good permeability
- Fully welded construction with no adhesives or fillers
- Available in the broadest range of pore sizes of any filter media type

Ordering Information

Sinterflo Table 1 - Table 2 Table 3 - Table 4 - Table 5 - Table 6 Table 7 Table 8

Table 1 Media Type

M	Sinterflo® M (mesh)

Table 2 End Fitting

226	226 fitting
222	222 fitting
DOE	Double open ended fitting
NP1	1" NPT
NP5	1.5" NPT
NP2	2" NPT
BS1	1" BSP taper
BS4	1.25" BSP taper
BS5	1.5" BSP taper
BS2	2" BSP taper

Table 3 Cartridge Type

P	Pleated

Note: Other non-standard lengths, ratings and end pin options are available on request.

Table 4 Micron Rating

0003	3µm
0005	5µm
0010	10µm
0015	15µm
0025	25µm
0030	30µm
0035	35µm
0040	40µm
0050	50µm
0070	70µm
0100	100µm
0150	150µm
0250	250µm

Table 5 Cartridge Length

05	5" (125mm)
10	10" (250mm)
20	20" (498mm)
30	30" (745mm)
40	40" (1012mm)

Table 6 Seal Material

E	EPDM
N	Nitrile
S	Silicone
P	PTFE (DOE only)
V	Viton®
F	FEP encap. Viton® (222/226 only)
T	FEP encap. Silicone (222/226 only)
Y	FEP encap. EPDM (222/226 only)
C	Chemraz
X	No seal supplied

Table 7 Guard/Support Option

G	Guard
N	None

Table 8 Fin Option

F	Fin (226/222 only)
N	No fin

Specifications

Materials of Manufacture

316/316L stainless steel standard. 304L stainless steel, Inconel®, Hastelloy® and Monel® available on request or by process selection.

Cartridge Dimensions*

Diameter: 66mm (2.6") standard

Length:

05:	125mm (5")
10:	250mm (10")
20:	498mm (20")
30:	745mm (30")
40:	1012mm (40")

** Other diameters and lengths available on request.*

Effective Filtration Area

0.13m² (1.40ft²) per 250mm (10") cartridge

Gaskets and O-Rings*

EPDM as standard. Chemraz®, nitrile, PTFE, silicone, Viton®, FEP coated EPDM, FEP coated silicone, FEP coated Viton® available on request or by process selection.

** FDA approved and USP Class VI.*

Typical Maximum Differential Pressure (all lengths)

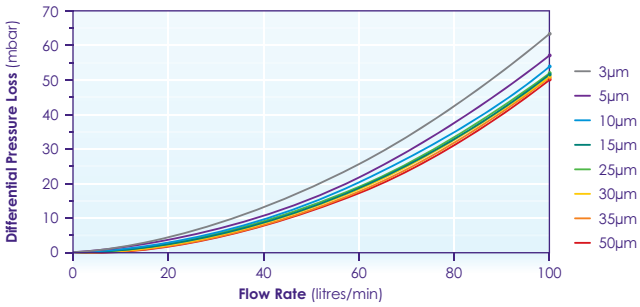
Normal flow direction (out to in): Up to 25bar (363psi)

Reverse flow direction (with guard): 3bar (44psi)

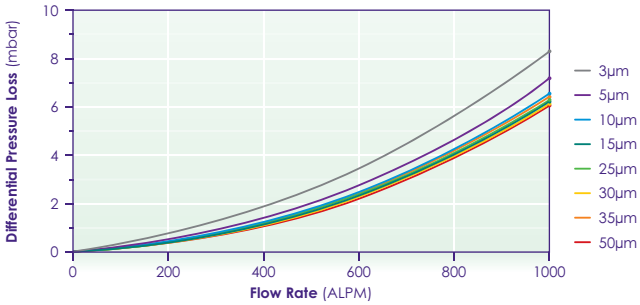
Operating Temperature

Maximum continuous: From -195°C (-319°F) to 340°C (644°F) seal limiting
From -269°C (-452°F) to 1000°C (1832°F) alloy limiting

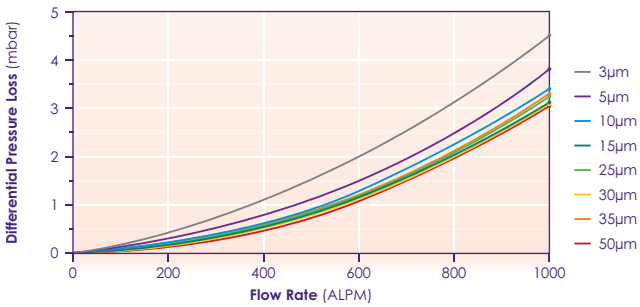
Typical Flow Rates in Water*



Typical Flow Rates in Air*



Typical Flow Rates in Steam*



** Using a 10" element. Water and air at ambient temperature and 1 bar (A). Steam is dry saturated steam at 1bar (A).*

Sinterflo® M Stainless Steel Media Grades

Micron Rating (micron code)	Liquid Rating* (µm) (98.00% efficiency)	(99.90% efficiency)	Gas Rating (µm) (99.9% Efficiency)
3 (0003)	3	10	2
5 (0005)	5	18	13
10 (0010)	10	25	18
15 (0015)	15	35	25
25 (0025)	25	36	30
30 (0030)	30	40	30
35 (0035)	35	50	45
40 (0040)	40	60	55
50 (0050)	50	70	65
70 (0070)	70	110	100
100 (0100)	100	140	130
150 (0150)	150	200	190
250 (0250)	250	260	350

** Hard spherical particle maximum passed.*

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Validation Services

Porvair Filtration Group's polymeric and disposable cartridge filters meet international standards for safe application into pharmaceutical processes.

In addition, many pharmaceutical processes also require specific validation in order to guarantee the sterile filtration of a final product.

Porvair ensures that all validation studies are performed taking into account the critical parameters and worst-case conditions of these processes.

Our studies adhere to the standards and guidelines established by regulatory authorities (Food and Drug Administration (FDA) and EU) and the recommendations of the Parenteral Drug Association's Technical Report N° 26 'Sterilizing Filtration of Liquids'.

Our validation experience encompasses a broad range of injectable products and their manufacturing processes, these include:

- antibiotics
- vitamins
- aggressive-solvent and oil-based formulations
- high viscosities and pressure differentials
- exposure time of up to 80 hours.

Validation Services

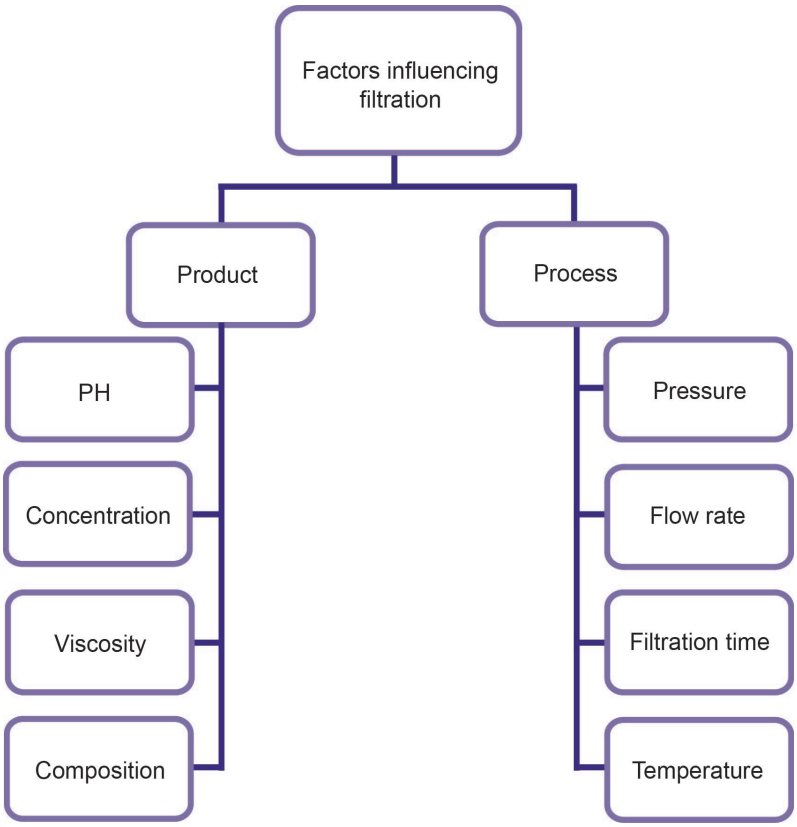
Validation requirements

Depending on the process requirements the following validation options are available:

- filter compatibility assessment
- bacterial challenge testing
- extractables analysis
- adsorption studies
- product wetted integrity test studies.

During validation, our philosophy is to mimic the process as closely as feasible:

- We employ pleated filters, recognising that flat membrane-based testing will not replicate the pleated product under flow conditions (e.g. pleat movement and degradation at peaks and troughs).
- Exposure to the product with the maximum contact time and temperature of the process to ensure the integrity of the membrane is not compromised.
- Chemical compatibility of O-rings.
- Analysis of extractables in worst-case process conditions (maximum circulation time, temperature, pH) at an independent laboratory.
- Conditioning of filters under worst-case process conditions before bacterial challenge testing.



Validation Processes

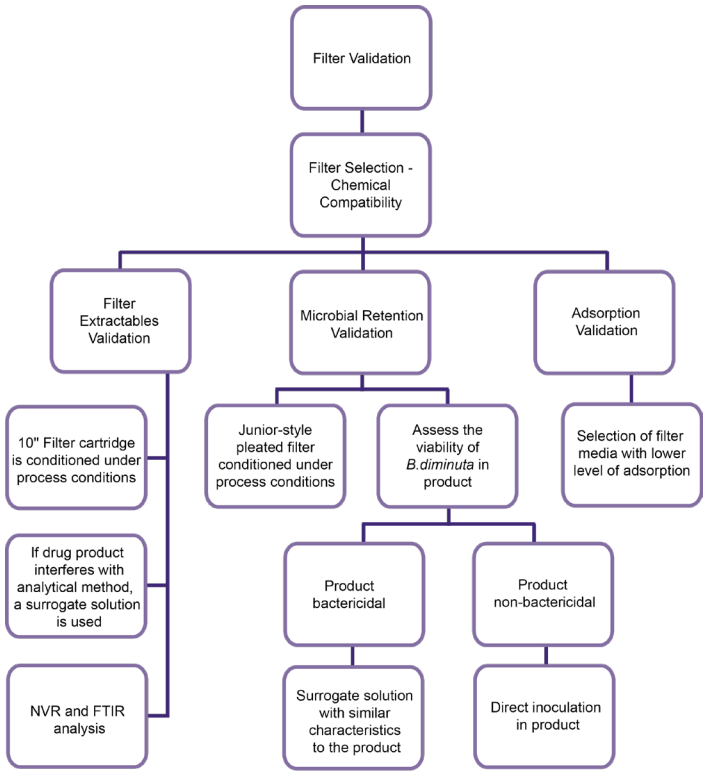
Filter compatibility assessment

Filter compatibility assessment is the first phase of a validation study. This test evaluates the integrity of the filter media and seals after exposure to the product under the worst-case process conditions.

The membrane filters are tested for bubble point, tensile strength and porometry before and after exposure to the product.

The bubble point is correlated to the integrity of membrane since it can detect any large pores caused by the degradation of the membrane, following contact with the product.

Tensile strength can be indicative of whether the product adversely affects the physical properties of the membrane, by a significant decrease in strength or ductility. The O-ring's incompatibility is indicated by a change in its colour, deformation and weight. Porometry measures the pore size distribution and can give an indication of any potential compatibility issues.



Bacterial challenge testing

Bacterial challenge testing is performed at an independent, FDA approved laboratory. The objective of bacterial retention is to demonstrate the ability of a filter to produce sterile product in a specific pharmaceutical process.

At least three filters cartridges, from different batches, are required to be preconditioned with the product under actual processing conditions including: flow rate, pressure, temperature and time.

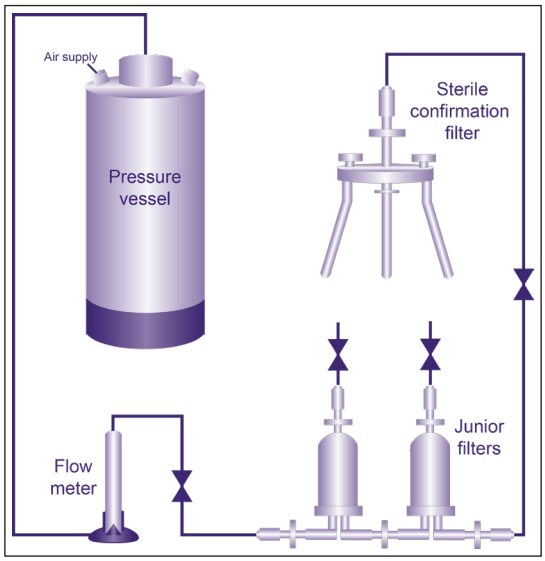
One of these filters has an integrity test result close to the specification of a filter as a worst case scenario. The challenge organism *Brevundimonas diminuta*, is grown in accordance with the ASTM standard F838, in order to reach a small size and produce mono dispersed cells.

A positive control filter cartridge, with a 0.45µm pore rating, is run in parallel with the test filters in order to ensure the organism's viability and size, and that there is no aggregation of cells.

The bactericidal properties of the product need to be assessed; the viability is verified by direct inoculation into the product and should mimic the actual process time and temperature.

Where the product is found to be toxic to the challenge bacteria, a non-bactericidal surrogate is selected. The test is performed with a concentration > 1 x 10^7 colony forming units (CFU)/cm^2 of filter area, with an acceptance criterion of zero colonies in the filtrate.

Set-up for bacterial challenge testing



Extractables analysis

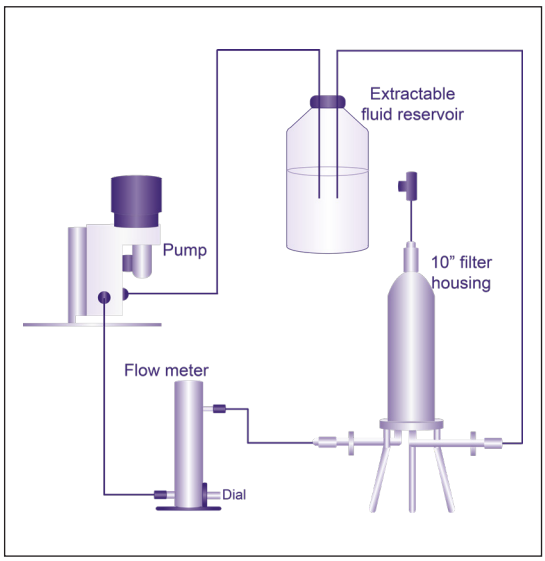
Extractables are physical or chemical compounds that can be released by the filter and seals within a specific system, under extreme conditions (e.g. aggressive solvents, temperature, long filtration runs).

Typically, the extractable study cannot be performed in the actual product since it would interfere with the analytical method. Therefore a surrogate (model solvent) with similar fluid properties should be used.

The extraction study is designed to replicate a worst-case scenario of the actual process conditions, with respect to key factors such as temperature, time and pH.

The non-volatile residue (NVR) analysis is performed in accordance with USP <661> in order to quantify the amount of extractables released by the filter system. If there are sufficient extractables, following NVR analysis, these are analysed by FTIR spectroscopy.

Set-up for extractables analysis



Adsorption studies

The level of adsorption by the filter should be minimised to ensure that after filtration, the product contains all of the ingredients within specification.

Filter media can bind preservatives used within the manufacture of solutions for ophthalmic applications (e.g. benzalkonium chloride), and this can lead to an unpredictable shelf-life.

The surface characteristics of the membrane and the process conditions (flow rate, contact time and batch size) have a significant impact on preservative binding.

Porvair has developed an in-house capability, to test the level of adsorption of these preservatives with different filter membranes (under the specific process conditions).

The test results ensure the selection of the correct filter media to guarantee the lowest level of binding, for a specific product, in order to enable an adequate shelf-life and minimise product loss.

Product-wetted integrity testing studies

Integrity testing of sterilizing grade filters pre- and post-use is essential to guarantee the sterility of a product. In some cases, it is more convenient to use the product instead of the reference liquid (usually water or IPA water) as a wetting fluid for integrity testing.

The product-wetted integrity studies are performed by comparing the integrity test results using the product as the wetting agent and the reference wetting fluid on the same filters.

The product-wetted parameters can be determined as: minimum bubble point, test pressure and maximum allowable diffusive flow. The study is performed using at least three filter samples from different batch numbers. The integrity test parameters are influenced by the surface tension and temperature of the product.

Please note: The protocol and test methodology need to be discussed and approved with the test laboratory. A final validation document is provided to the customer, incorporating both **Porvair Filtration Group's** *findings and the independent test laboratory's reports.*

Quality

Quality is at the forefront of everything we do. It extends beyond product quality to cover all areas of our business to enable us to provide the best possible level of customer satisfaction.

Our policy is to provide quality products and services that consistently satisfy the commitments made to our customers by complying with their requirements, working together as a team and by achieving continual improvement in our skills, systems, processes and performance.

We have a dedicated team of quality professionals with many years experience in definition, implementation and maintenance of quality management systems meeting multiple industry requirements. This extends across the workforce through a strong quality culture and a philosophy of 'getting it right first time' driven from the top of the organisation.

Our quality management systems are regularly audited internally by customers and regulatory bodies.

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