

Aquafil™

Single Layer Polyethersulphone Membrane Cartridge Filters

A range of cartridge filters from Porvair Filtration Group, featuring the latest developments in membrane technology, Aquafil™ cartridges are based on a naturally hydrophilic polyethersulphone membrane with a mirrored asymmetric pore structure. When combined with quality all-polypropylene cartridge components and high integrity manufacturing techniques common to all Porvair cartridge filters, the polyethersulphone membrane provides a high strength, long life cartridge.

Aquafil™ 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 Aquafil™ cartridges are suited to retention down to 0.2 micron ratings. Aquafil™ cartridges offer high flux rates and low differential pressures, a feature common to polyethersulphone membranes.

Aquafil™ cartridges benefit from the low non-specific protein binding characteristics of polyethersulphone membranes. They are also resistant to steam sterilisation and have excellent chemical compatibility characteristics. Furthermore, since they will not hydrolyse, Aquafil™ cartridges are ideal for use in ultra pure water supply systems (18MΩ.cm).

As a consequence Aquafil™ cartridges provide a combination of features and benefits not hitherto available from cartridges based on PVDF, nylon, mixed esters of cellulose or polysulphone membranes. They are suitable for applications ranging from bioburden reduction and the clarification of a wide range of process liquids and end products.



Applications

Aquafil™ cartridges are suitable for the sub-micronic filtration of a wide range of process liquids, in applications where the characteristics of a naturally hydrophilic membrane are required.

Typical applications include:

- **Pure water supply**
For use in de-mineralised and de-ionised water treatment systems for bioburden reduction in recirculating systems.
- **Biopharmaceuticals**
For the sub-micronic filtration of ingredients, intermediates, make-up waters and final products, including bioburden reduction and clarification.
- **Ophthalmic solutions**
Shelf life assured through the non-removal of preservatives, such as Benzalkonium Chloride (BAK).
- **Electronics and semiconductors**
For the sub-micronic filtration of process water and chemicals, including solvents, developers and photoresists. Applications typically include central water plant treatment.
- **Fine chemicals**
For the bioburden reduction and clarification of a wide range of process chemicals.
- **Beverages**
For the bioburden reduction and clarification of various beverages, including the reduction of yeast and spoilage organisms. Low colour removal is an additional advantage.



Features and Benefits

- Aquafil™ cartridges**
 Careful media selection means that Aquafil™ cartridges are available to suit a wide range of process critical and general purpose applications.
- Removal ratings**
 Aquafil™ cartridges are available in 0.2, 0.45, 0.65 and 1.2 micron.
- Low protein binding**
 Aquafil™ cartridges have excellent low protein binding characteristics, typically 10 times lower than nylon, 2 times lower than polysulphone and similar to PVDF.
- Will not hydrolyse**
 Compared with other membranes such as nylon, the polyethersulphone membrane used in Aquafil™ cartridges is extremely resistant to hydrolysis. Capable of exposure in excess of 2 years, they are ideal for hot deionised water applications.
- Excellent chemical compatibility**
 Resistant to many process chemicals, Aquafil™ cartridges are suitable for use in a wide range of process applications.
- Suitable for steam sterilising**
 Aquafil™ cartridges incorporating a stainless steel support ring can be subjected to steam sterilisation at 125°C (257°F).
- Full traceability**
 All Aquafil™ cartridges are individually and batch identified with a unique serial number. Each Aquafil™ cartridge is supplied with a Certificate of Quality and an operating instruction leaflet.
- Controlled manufacturing environment**
 Aquafil™ cartridges are manufactured in an ISO Cleanroom environment by fully gowned staff, minimising the risk of contamination.

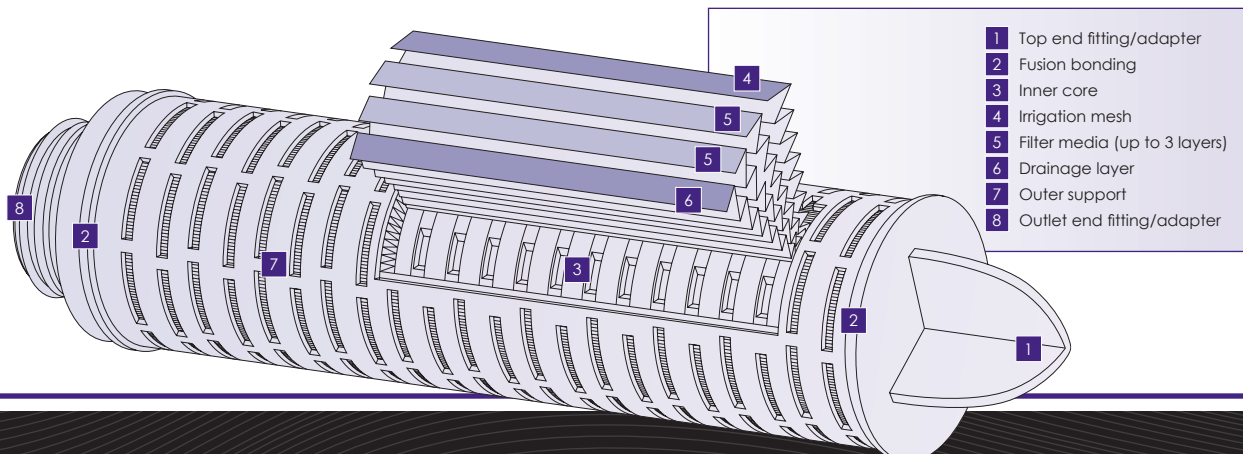
Cartridge Construction

Aquafil™ cartridges are manufactured from a multi-layer combination of irrigation mesh, filter membrane, membrane support and drainage material. Aquafil™ cartridges have optimal pleat geometry to maximise the available filtration area and to ensure an efficient flow through the cartridges.

An all thermal fusion bonded assembly process eliminates the use of resins and binders.

Manufactured as standard with injection moulded polypropylene inner and outer supports, Aquafil™ cartridges are designed with the strength necessary to withstand thermal stresses encountered during steam sterilisation and subsequent cooling.

All components used in the construction of Aquafil™ cartridges are FDA approved to 21CFR and meet or exceed the latest EC Directives for Food Contact.



Specifications

Materials of Manufacture

Filter membrane:	Polyethersulphone
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)

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

Effective Filtration Area

Pore Size Rating	Effective Filtration Area (each 254mm (10") module)
0.2, 0.45, 0.65 and 1.2µm	0.69m ² (7.4ft ²)

Gaskets and O-Rings

FDA approved Ethylene Propylene, PTFE encapsulated, Silicone 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 (43psi)
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

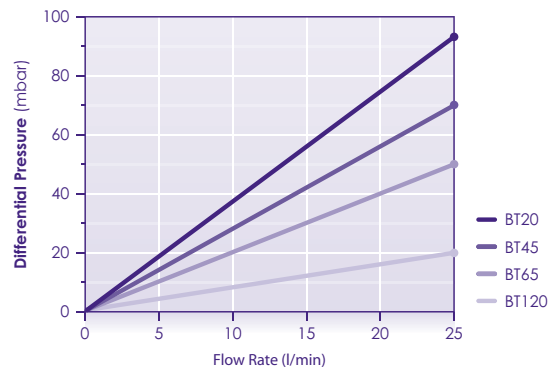
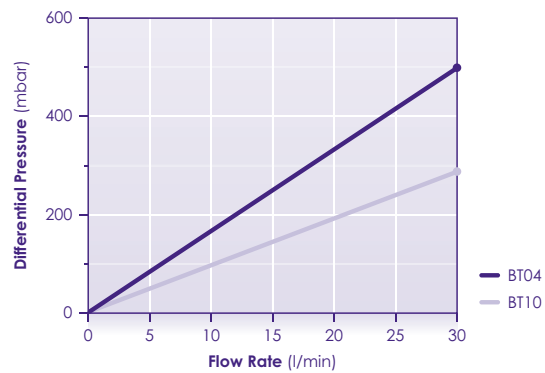
In situ steam 80 x 20 minute cycles at 125°C (257°F).
Hot water 100 x 20 minute cycles at 85-90°C (185-194°F).

Extractables

Minimum total extractables.

Clean Water Flow Rates

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



Additional Information

Range

Suitable for use in **Porvair** filter housings and as direct replacements for existing cartridges, Aquafil™ cartridges can be supplied with end fittings to suit most hardware installations without modification. They are available in single or multiple module units of 10, 20, 30 and 40 inches, and in a choice of four removal ratings: 0.20, 0.45, 0.65 and 1.2 micron. Each cartridge is supplied with all necessary seals or O-rings to ensure chemical compatibility.

Quality Assurance

Aquafil™ cartridges are manufactured in an ISO Cleanroom environment by staff fully gowned to minimise any risk of contamination during production. As a further safeguard, every cartridge is individually and batch identified with a unique serial number, allowing users to maintain their own process records.

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

Material Conformity and Validation

The bio-safety of all materials in the manufacture of Aquafil™ cartridges is assured by FDA approval, USP Class VI and meets or exceeds the latest EC Directives for Food Contact.

Chemical Compatibility

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

Filter Housings

Please contact a **Porvair Filtration Group** representative for further information on our range of filter housings.



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