

## Klearfil™

### Absolute Rated Pleated Depth Filters

A range of absolute rated cartridge filters from Porvair Filtration Group, featuring the latest developments in meltblown polypropylene filter media technology, Klearfil™ cartridges are based on a robust all polypropylene construction, offering removal ratings from 0.5 to 75 micron absolute.

The combination of up to eight separate filtration layers provides true depth filtration, within a pleated cartridge construction. This design will reduce fouling of the filter surface area caused by a broad spectrum of contaminants.

Klearfil™ cartridges are ideally suited for the filtration of process fluids, that contain contaminants with a wide range of particle sizes.

The graded multi-layer polypropylene media provides prefiltration of the process fluid prior to the absolute rated final layer. The unique design of the Klearfil™ cartridges helps to achieve lower running costs and a smaller process footprint.

The Klearfil™ are also highly resistant to integrity failure caused by steam sterilisation and have excellent chemical compatibility characteristics.

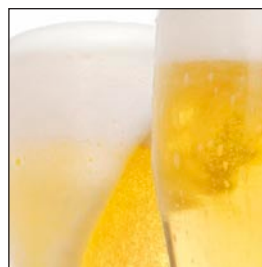
They are suitable for applications ranging from bioburden reduction and the clarification of a wide range of process liquids and end products.



### Applications

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

- **Pharmaceuticals and Bioprocessing**  
The structure of the filter media makes it ideally suited for the filtration of complex biological fluids (e.g. serum).
- **Foods and Beverages**  
The clarification of beers, wines and spirits to a clear and bright finish without affecting taste or colour. Provides an alternative to plate and frame and other sheet formatted depth filters.
- **Process Water Systems**  
The filtration of process water installations for removal of general contamination and resin fines.
- **Fine Chemicals**  
The filtration of high grade chemicals including solvents, reagents, photographic emulsions, inks, paints and plating solutions.
- **Cosmetics**  
The clarification of process water and intermediates for the finished product.



### Features and Benefits

- Klearfil™ cartridges**  
 The combination of up to eight separate filtration layers provides true depth filtration, within a pleated cartridge construction, and resistance to fouling.
- Graded multi-layer media**  
 The multi-layer media structure provides prefiltration of the process fluid prior to the absolute rated final layer. This combination provides economy of use and a smaller process footprint.
- Guaranteed removal ratings**  
 Klearfil™ cartridges are validated using the recognised industry standard modified OSU-F2 single pass test to Beta 5000 (99.98% efficiency).
- Suitable for steam and hot water sanitisation**  
 Klearfil™ cartridges are resistant to repeat steam sterilisation up to 135°C (275°F) and hot water cycles at up to 90°C (194°F).
- Environmentally friendly**  
 Klearfil™ filters are environmentally friendly, all spent cartridges can be readily incinerated to trace ash.
- Full traceability**  
 All Klearfil™ cartridges are identified with a batch serial number. Each Klearfil™ cartridge is supplied with a Certificate of Quality and an operating instruction leaflet.

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

### Cartridge Construction

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

The meltblown polypropylene media provides a bonded matrix thus eliminating fibre migration.

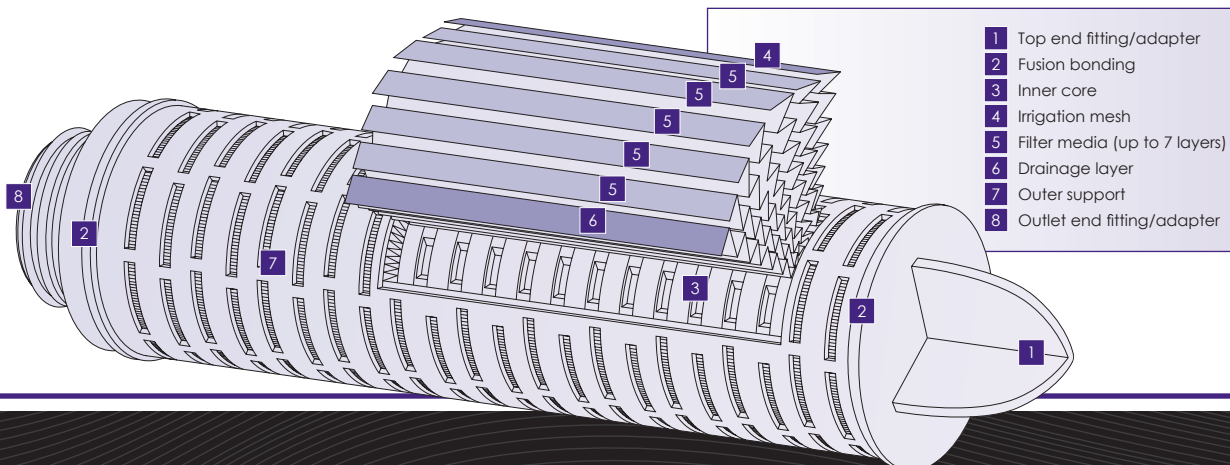
The inherent structural stability of the Klearfil™, prevents 'channelling' and avoids the risk of particle unloading even under impulse conditions.

The multi-layer combination of filter media, irrigation mesh and drainage material carefully pleated and thermally bonded maximises the filtration depth and ensures an efficient flow throughout the cartridge.

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

Table 1 Particle Retention Rating

Code	Pore Rating (microns)	Absolute Rating 99.98% Beta 5000 (microns)	Nominal Rating 99.90% Beta 1000 (microns)	Nominal Rating 90.00% Beta 10 (microns)
KP5	0.5	0.5	0.45	-
K01	1	1	0.7	-
K02	2	2	1.5	-
K03	3	3	2	-
K05	5	5	3	-
K10	10	10	8.5	2
K15	15	15	12	4
K20	20	20	13.5	<5
K30	30	30	20	7
K40	40	40	27.5	11
K75	75	75	65	20



# Specifications

## Materials of Manufacture

Filter media:	Polypropylene
Support layers:	Polypropylene
Inner core:	Polypropylene
Outer support:	Polypropylene
End fittings:	Polypropylene
Support ring:	Stainless steel

## Cartridge Dimensions (Nominal)

Diameter:	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, PTFE encapsulated, Silicone, Nitrile or Polypropylene felt.

## Maximum Differential Pressure

Normal flow direction at:

20°C (68°F):	6.0 bar (87lb/in <sup>2</sup> )
80°C (176°F):	4.0 bar (58lb/in <sup>2</sup> )
100°C (212°F):	3.0 bar (43lb/in <sup>2</sup> )
120°C (248°F):	2.0 bar (29lb/in <sup>2</sup> )
125°C (248°F):	1.5 bar (29lb/in <sup>2</sup> )

Reverse flow direction at:

20°C (68°F):	2.1 bar (30lb/in <sup>2</sup> )
80°C (176°F):	1.0 bar (15lb/in <sup>2</sup> )
100°C (212°F):	0.5 bar (7lb/in <sup>2</sup> )

## 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

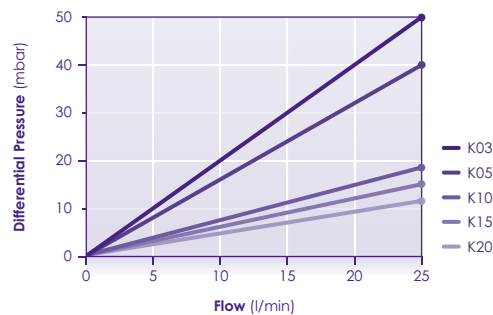
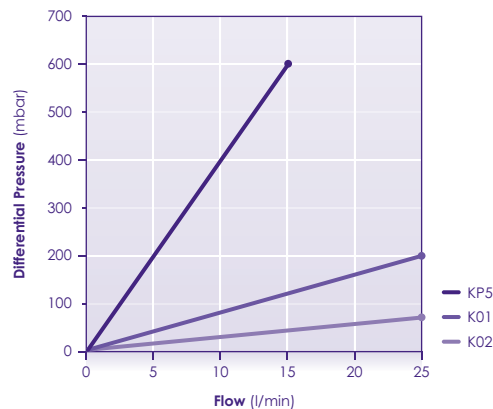
Minimum total extractables. Please refer to the Klearfil™ Validation Guide.

## Integrity Testing

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

## Clean Water Flow Rates

- Typical clean water flow rate:  
A 254mm (10") Klearfil™ single cartridge exhibits the flow- $\Delta P$  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.



## Additional Information

### Range

Suitable for use in **Porvair** filter housings and as direct replacements for existing cartridges, Klearfil™ cartridges can be supplied with end fittings to suit most hardware installations without modification. They are available in single or multiple module units of 5, 10, 20, 30 and 40 inches, and in a choice of removal ratings from 0.5 to 75 micron. Klearfil™ Junior versions are also available. Each cartridge is supplied with all necessary seals or O-rings to ensure chemical compatibility.

### Quality Assurance

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

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

### Material Conformity and Validation

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

A comprehensive validation guide for Klearfil™ cartridges is available on request.

### Chemical Compatibility

The Klearfil™ 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.

**porvair**  
filtration group

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