



## Introduction

Taking advantage of the latest developments in filter media technology, Microfiltrex Klearfil cartridges provide the optimum solution for depth filter applications. They can be used as final filters in process applications and as prefilters in sub-micron membrane filtration systems. Klearfil cartridges are ideal for applications where the contaminant does not readily build a permeable bed, there is a wide range of particle sizes and a precise cut-off is required at the specified pore size rating.

Klearfil cartridges are based on an advanced melt blown polypropylene filter media, pleated to give a filtration volume superior to most depth filters. Relying on a multi-layer media with a heavy duty prefilter layer, Klearfil cartridges combine the dirt holding capabilities of continuously spun depth filters, with the precise cut-off characteristics common to pleated media cartridges.

## Features and Benefits

- Hybrid pleated/depth construction provides high dirt holding capacity with reduced clean pressure drop from higher surface area of the cut-off media.
- Up to eight graded media layers.
- Optimised for feeds with large particle size distribution.
- Fusion bonded construction for high integrity and minimal extractables.
- FDA approved materials of construction for biosafety.
- Long steaming life.
- Absolute rated to Beta 5000, 99.98% efficient at the rated particle size to ensure process security.



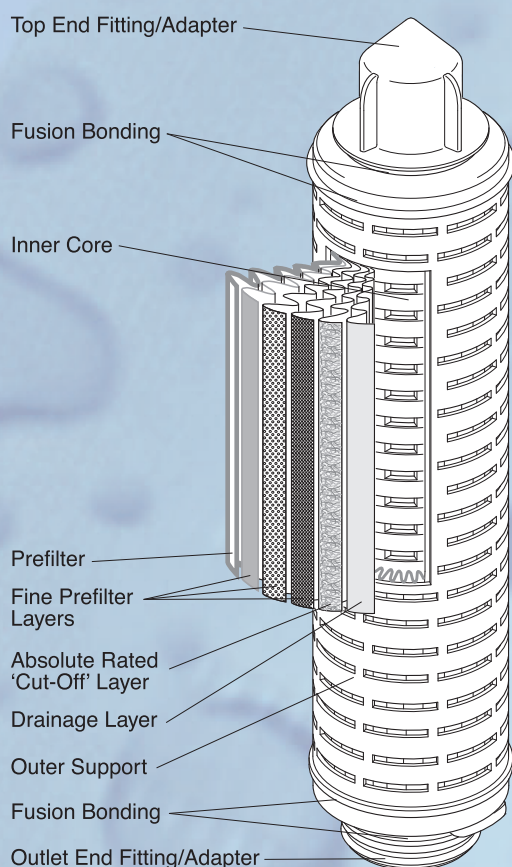
# Klearfil

## Absolute Rated Pleated Depth Polypropylene Cartridge Filters

## Applications

The demand for increasingly high standards of filtration, means that microfiltration performance is now necessary where commercial grade cartridges have hitherto been adequate. Suitable for the filtration of aqueous and many organic liquids, Klearfil cartridges can be used as prefilters or final filters in the following applications:

- **Process Water Systems** - for the filtration of process water in pure water supply systems.
- **Microelectronics** - for the preparation of process water and chemicals used in the manufacture of semiconductors and other electronic components.
- **Cosmetics** - for the clarification and sterilisation of intermediates and final products.
- **Pharmaceuticals and Bioprocessing** - for the batch preparation of intermediates used in the manufacture of pharmaceutical and bioprocessed products.
- **Foods and Beverages** - for the clarification of foods and beverages including syrups, beers, wines and spirits.
- **Fine Chemicals** - for the filtration of high grade chemicals including reagents, photographic emulsions, inks, paints and plating solutions.



### Cartridge Construction

Klearfil cartridges are all FDA approved polypropylene constructions manufactured by the fusion bonding of components, including the filter media to the end fittings. The optimised method of thermal fusion bonding helps to guarantee cartridge integrity, eliminating any extractables derived from bonding agents and minimising the risk of 'by-passing'. This gives a range of cartridges which have excellent chemical compatibility characteristics and are chemically and biologically stable.

To allow them to be steam sterilised or reverse flowed, Klearfil cartridges are supplied with injection moulded polypropylene outer supports. However, where this is not a requirement, lower cost cartridges are available with a polypropylene 'Net Sleeve'.

### Quality Assurance

The manufacture of Klearfil cartridges is subject to rigorous quality assurance procedures and carried out under controlled environmental conditions. Microfiltrex is quality assessed to ISO 9001.

### Range

Klearfil cartridges are available as single or multiple module units of 5, 10, 20, 30 and 40 inches, in a range of ten particle retention ratings between 0.5 and 75 microns absolute - Beta 5000 (0.05 to 40 microns - 98% nominal gravimetric). A complementary range of lower cost 'Net-Sleeve' cartridges is available for applications where the performance characteristics of a cartridge with a polypropylene outer support are not required.

Designed for use in Microfiltrex filter housings and as direct replacements for existing cartridges, Klearfil are available with end fittings to suit most hardware installations without modification. We can also supply 'Net Sleeve' cartridges up to 40" long, based on 10" or 20" modules with moulded DOE 'Knife Edge' end fittings or standard adapters.

### Particle Retention Rating Table

Code	Pore Rating	Absolute Rating 99.98% Beta 5000 (microns)	Nominal Rating 99.90% Beta 1000 (microns)	Nominal Rating 99.00% Beta 100 (microns)	Nominal Rating 98.00% Beta 50 (microns)	Nominal Rating 90.00% Beta 10 (microns)
KP5	0.5	0.5	0.45	0.35	-	-
K01	1	1	0.7	0.5	<0.4	-
K02	2	2	1.5	0.7	0.4	-
K03	3	3	2.0	1.2	0.8	-
K05	5	5	3.0	1.5	-	-
K10	10	10	8.5	7.5	5.5	2
K15	15	15	12.0	9.0	7.0	4
K20	20	17	13.5	10	8	<5
K30	30	30	20.0	15	11.0	7
K40	40	40	27.5	20	17.0	11
K75	75	75	65.0	35	27.0	20

## Specifications

### Materials of Manufacture

Filter Medium	Polypropylene
Irrigation Mesh	Polypropylene
Inner Core	Polypropylene
Outer Support/Net Sleeve	Polypropylene
End fittings	Polypropylene
Sealing	Fusion Bonding

### Cartridge Dimensions (Nominal)

Diameter:	70mm	(2.8")
	65mm	(2.6") OD'Net Sleeve' DOE
Length: 1 Module (short)	125mm	(5")
1 Module	250mm	(10")
2 Modules	510mm	(20")
3 Modules	860mm	(30")
4 Modules	1020mm	(40")

### Effective Filtration Area

<b>Absolute Particle Retention Rating (Beta 5000)</b>	<b>EFA</b> (Each 250mm Module)
0.5, 1, 2, 3, 5, 10, 15, 20, 30, 40, 75 microns	0.14-0.2m <sup>2</sup> (1.5-2.1ft <sup>2</sup> )

### Cartridge Treatment

Standard	Clean, 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 (Rubber), PTFE Encapsulated, Silicone, Viton, Nitrile, or Polypropylene Felt

### Maximum Differential Pressure

<b>Normal Flow Direction at:</b>	
20°C (68°F)	6 bar (87psi)
	5 bar (73psi) (Net Sleeve Types)
80°C (176°F)	4 bar (57psi)
100°C (212°F)	3 bar (43psi)
120°C (248°F)	2 bar (29psi)
125°C (257°F)	1.5 bar (22psi)

### Reverse Flow Direction (Excluding 'Net Sleeve' types) 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

80°C (176°F) maximum continuous

### Sterilisation (Excluding 'Net Sleeve' types)

Autoclave, Chemical, Multiple In-line Steam  
(up to 136°C (277°F))

### Extractables

Minimal total extractables

### Biological Safety

All Polypropylene materials are FDA  
approved 21 CFR 177-1520

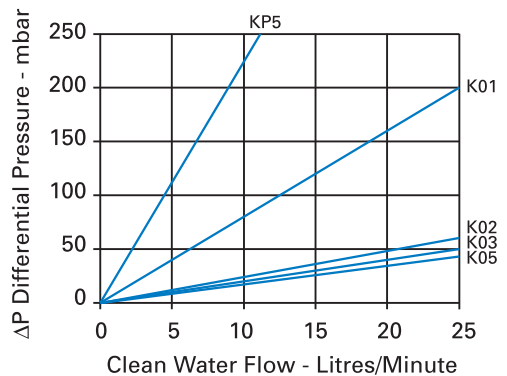
### Test Conditions

Typical Clean Water Flow Rate - Based on a  
250mm (10") single module Microfiltrex  
housing exhibiting the differential pressure  
characteristics indicated below, for  
solutions with a viscosity of 1 centipoise.

Other Solutions - For solutions with a  
viscosity greater than 1 centipoise,  
multiply the indicated differential pressure  
by the fluid viscosity in centipoise.

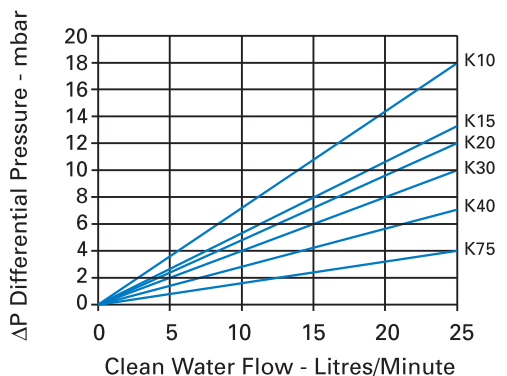
### Clean Water Flow Rates -

Klearfil Cartridges KP5 - KO5

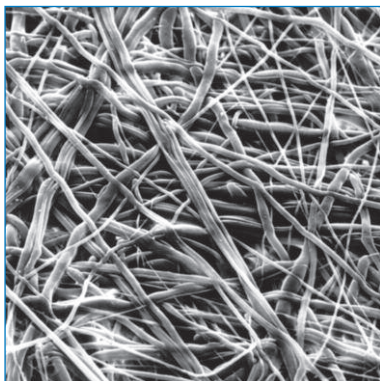


### Clean Water Flow Rates -

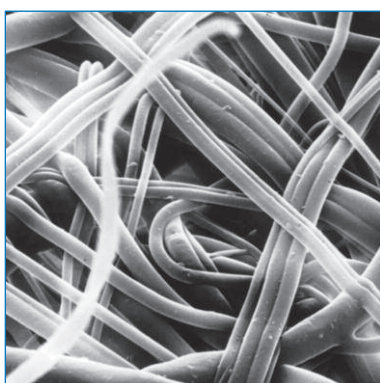
Klearfil Cartridges K10 - K75







*Klearfil Polypropylene Media  
(x250)*



*Klearfil Polypropylene Media  
(x1000)*

## Test Method - OSU F-2 Modified

The particle removal efficiency was determined by challenging 250mm (10") Microfiltrex Klearfil cartridges with a dilute aqueous suspension of ISO Fine or ISO Coarse test dust at a flow of 10 l/min and a temperature of 21°C (70°F). The removal efficiency was determined using an on-line electronic particle counter, giving a value which represents the minimum efficiency obtained.

## Klearfil - Filter media

### A multi-layer media with excellent 'cut-off' characteristics -

The melt-blown polypropylene non-woven media used for Klearfil cartridges has up to eight layers and is graded from the outer prefilter to the inner 'cut-off' layer. This gives controlled particle removal throughout the depth of the cartridge, with an excellent cut-off at the absolute rating. The performance of selected fine grade cartridges is further enhanced by a final absolute layer which is laminated and calendered.

### High flow rates, with low clean differential pressures -

The structure of the polypropylene media gives Klearfil cartridges a high voids volume, resulting in minimal clean differential pressures and high flow rates. These characteristics significantly benefit the economic operation of process systems by extending the life of the cartridges.

**An extended media area with a high dirt holding capacity -** Compared with continuously spun depth filters, the higher dirt holding capacity of Klearfil cartridges is due to the extended media area available with a pleated configuration. They are designed to flow from the outside to the inside, with a thick outer prefilter layer of polypropylene media for the removal of particles larger than the absolute rating. There then follows thinner prefilter layers for the bulk removal of smaller particles and a final absolute 'cut-off' layer which guarantees the specified filtration efficiency.

**High quality cartridge construction ensures consistent performance -** Klearfil cartridges are manufactured using thermally bonded melt-blown polypropylene media to minimise extractables and eliminate the risk of fibre migration. It is a structurally stable media which eliminates the risk of 'channelling' and particle unloading even under impulse conditions. Furthermore, the filter media and drainage materials are carefully pleated and thermally seam-bonded to avoid possible leak paths and ensure an efficient flow through the cartridge.

**High performance filtration helps to reduce operating costs -** The Klearfil range of long life, high dirt holding cartridges has been developed by Microfiltrex to ensure that low differential pressures and high flow rates are maintained over extended periods in service. Capable of meeting the requirements of a wide range of process applications, Klearfil cartridges help to reduce operating costs by consistently providing high standards of filtration combined with optimum cartridge life.



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Freedom from patent restrictions must not be assumed.

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