



## PF-PES

Polyethersulphone Membrane Cartridge Filters

# PF-PES

## PF-PES:

A range of microbially rated cartridge filters from Ultrafilter GmbH, featuring the latest developments in membrane technology, PF-PES Serie cartridges are based on a naturally hydrophilic polyethersulphone (PES) membrane with a mirrored asymmetric pore structure. When combined with quality all-polypropylene cartridge components and high integrity manufacturing techniques common to all Ultrafilter cartridge filters, the polyethersulphone membrane provides a high strength, long life cartridge of consistently precise microbial retention.

PF-PES Serie 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 PF-PES Serie cartridges are also very suited to critical particle control down to 0.04 micron ratings. PF-PES Serie cartridges offer high flux rates and low differential pressures, a feature common to polyethersulphone membranes.

PF-PES Serie cartridges benefit from the low non-specific protein binding characteristics of polyethersulphone membranes. They are also highly resistant to integrity failure caused by steam sterilisation and have excellent chemical compatibility characteristics. Furthermore, since they will not hydrolyse, PF-PES Serie cartridges are ideal for use in ultra pure water supply systems (180 MΩ.cm).

As a consequence PF-PES Serie 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 sterile filtration, bioburden reduction and the clarification of a wide range of process liquids and end products.

## APPLICATIONS:

PF-PES Serie cartridges are suitable for the submicronic filtration of a wide range of process liquids, in applications where the characteristics of a naturally hydrophilic membrane are required. Typical applications include:

### • BIOPHARMACEUTICALS

For the sub-micronic filtration of ingredients, intermediates, make-up waters and final products, including sterilisation, clarification and bioburden reduction.

### • OPHTHALMIC SOLUTIONS

Shelf life assured through the low adsorption of preservatives, such as Benzalkonium Chloride (BAK).

### • ELECTRONICS AND SEMICONDUCTORS

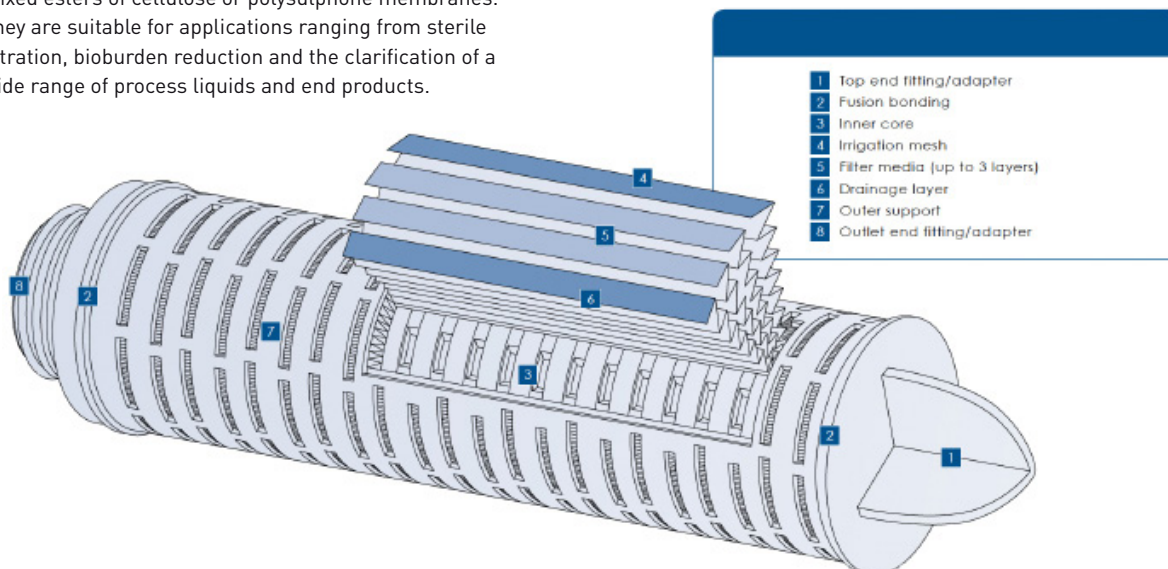
For the sub-micronic filtration of process water and chemicals, including solvents, developers and photoresists. Applications typically include central water plant treatment and critical 'wet bench' point of use filtration.

### • PHOTORESISTS AND DEVELOPERS

The microfiltration of photoresists and developer solvents, susceptible to contamination and precipitation during manufacture, storage and processing.

### • PURE WATER SUPPLY SYSTEMS

For use in de-mineralised and de-ionised water systems, for the supply of ultra-pure water, for example in the semiconductor industry.



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## FEATURES AND BENEFITS:

### ● PF-PES SERIE CARTRIDGES

Careful media selection means that PF-PES Serie cartridges are available to suit a wide range of process critical and general purpose applications.

### ● GUARANTEED MICROBIAL RATINGS

PF-PES Serie cartridges are validated for bacterial removal according to HIMA guidelines and ASTM F838-05, with a log reduction value >7. They are therefore suitable for applications requiring sterilising grade filtration.

### ● LOW PROTEIN BINDING

PF-PES Serie 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 PF-PES Serie 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, PF-PES Serie cartridges are suitable for use in a wide range of process applications.

### ● CARTRIDGE INTEGRITY AND LOW TOC LEVELS

Each PF-PES Serie II module of every cartridge is individually integrity tested. Each complete filter cartridge is flushed with pure water which is inspected daily for pyrogens using the standard LAL test. When required, they can be pulse flushed with 180 MΩ.cm pyrogen-free ultra-clean water.

### ● SUITABLE FOR STEAM STERILISING

PF-PES Serie cartridges incorporating a stainless steel support ring can be subjected to steam sterilisation at 125°C (257°F) without loss of integrity.

### ● FULL TRACEABILITY

All PF-PES Serie cartridges are individually and batch identified with a unique serial number. Each PF-PES Serie cartridge is supplied with a Certificate of Quality and an operating instruction leaflet.

### ● CONTROLLED MANUFACTURING ENVIRONMENT

PF-PES Serie cartridges are manufactured in an ISO Cleanroom environment by fully gowned staff, minimising the risk of contamination.

## CARTRIDGE CONSTRUCTION:

PF-PES Serie cartridges are manufactured from a multi-layer combination of irrigation mesh, filter membrane, membrane support and drainage material. PF-PES Serie 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, PF-PES Serie cartridges are designed with the strength necessary to withstand thermal stresses encountered during steam sterilisation and subsequent cooling. They can be steam sterilised and will retain total integrity following steaming at 125°C (257°F).

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

## OPERATING CONDITIONS

Maximum Operating Pressure	6.9 bar (100 psi) at 25 °C 2.4 bar (35 psi) at 80 °C
Max. Differential Pressure	Forward 6.9 bar (100 psi) at 25 °C 2.4 bar (35 psi) at 80 °C Reverse 3.0 bar (44 psi) at 25 °C 1.0 bar (15 psi) at 80 °C
Bubble Point (PF-PES)	≥3.4 bar (49 psi) , air ,0.22µm ≤ 30 mL/min at 2.5 bar water
Sterilization	Inline Steam Sterilization: 100 cycles for 30min. at 125 °C (< 0.3 bar, 5 psi). Autoclave: 200 cycles for 30min. at 130 °C. Hot water sanitization: 50 cycles for 30 minutes at 85 °C Chemistry sanitization: 50 cycles for 30 min. at 40 °C in a mix solution of sodium hypochlorite (NaClO, 100 ppm) and peroxyacetic acid (100 ppm).
Cleaning Solution	2% NaOH Solution @ ≤65°C
Effective Filtration Area	0.72m <sup>2</sup> -10 inch



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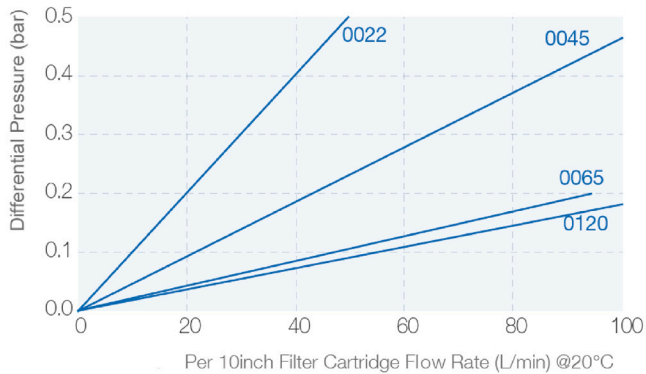
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## Flow Rate Characteristics



## Technical Data:

### MATERIALS OF CONSTRUCTION

Filter Medium	PES Membrane
Cage   Support	Polypropylene
Core   Endcaps	Polypropylene

## ORDERING INFORMATION

### PF-PES-V

	REMOVAL	NOMINAL LENGTH	END CAP	SEAL MATERIAL
	002 = 0.20 µm	05 = 5"	2 = Code 2	A = EPDM
	004 = 0.45 µm	10 = 10"	3 = Code 3	B = Silicone
	006 = 0.65 µm	20 = 20"	7 = Code 7	C = Viton
	012 = 1.20 µm	30 = 30"	8 = Code 8	
		40 = 40"	MF = DOE	
			UF = UF	

Technical Alternations reserved



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