

# Fulflo® Poly-Mate™ Filter Cartridges

■ Polypropylene

*Pleated Series*

## Quality, Economical Filtration for Critical Process Applications

Parker's Poly-Mate™ Cartridges incorporate a unique combination of polypropylene melt blown and spunbonded media to provide high surface area, finish-free and non-fiber releasing filtration. All-polypropylene construction maximizes chemical resistance to acids, bases, salts, and most organic solvents.

Poly-Mate Pleated Cartridges are available in 0.5µm, 1µm, 5µm, 10µm, 30µm, and 60µm pore sizes (99% removal;  $\beta = 100$ ).

### Applications

- Food & Beverage
- Photographic
- High-Technology Coatings
- Deionized Water
- R.O. Membrane Prefiltration
- Disposal Wells
- Process Water
- Fine Chemicals
- Wastewater
- Plating Chemicals



### Features and Benefits

- High efficiency rated for critical process applications (99% efficiency).
- High pleated surface area for extended service life, low pressure drop and high flow capacity.
- Poly-Mate Xtra Duty™ (PXD) cartridge features glass-filled polypropylene core for high temperature and high pressure use with rigid outer cage supporting pleated media in backwash applications.
- Optional stainless steel O-ring adapter inserts provide added strength for *in situ* sterilization.
- Poly-Mate Xtra Duty cartridges are available with backwashable construction, reducing replacement maintenance and cartridge disposal costs. See page 4 for procedure.
- All materials of construction are FDA listed as acceptable for potable and edible liquid contact according to CFR Title 21.
- One piece, continuous to 40 in length, integrally sealed pleated filter media.

**Process Filtration Division**



## The Filters of Choice for . . .

### Foods and Beverages

Foods and beverages must be filtered with products made from components complying with FDA regulations for food contact use. Extraction of binders, chemical additives and media fragments into foods and beverages is unacceptable. Poly-Mate™ cartridges are thermally bonded and meet all FDA required standards. In many applications, Poly-Mate™ cartridges are a more cost-effective alternative to melt blown and spunbonded depth cartridges.

### High Technology Coatings

High tech coatings used on magnetic tape, floppy discs, lenses and optical fibers require filtration with products that capture agglomerates and large contaminants with high efficiency while allowing the smaller coating particles to pass. The desired cutoff particle size should not change during filtration of the batch. This requires the high surface area and fixed pore media found in Poly-Mate cartridges.

### Photographic

Photographic gelatins, emulsions, rinses and chemicals benefit from filtration with Poly-Mate cartridges. They are non-photosensitive, do not leach harmful contaminants and provide long service life at low initial pressure drop.

### R.O. Filtration

Prefiltration requirements for reverse osmosis membranes are similar to those for foods and beverages, although FDA acceptability is often not required. The finish-free, thermally bonded media and large surface area of Poly-Mate cartridges make them the perfect choice for this liquid process application.

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## Specifications

### Filtration Ratings:

- 99% at 0.5µm, 1µm, 5µm, 10µm, 30µm, and 60µm pore sizes

### Effective Filtration Area:

- Up to 6.0 ft<sup>2</sup>/10 in (0.6m<sup>2</sup>/254mm)

### Materials of Construction:

- Filter Media and Support Layers: polypropylene
- Bonding Polymer: none, completely fusion-sealed
- Surface Treatment: none (fusion-sealed), chemically inert and neutral
- Media Protection:  
PM - polypropylene netting  
PXD - polypropylene cage
- Support Core:  
PM - polypropylene  
PXD - glass-filled polypropylene
- Pleat Pack Side Seal:  
fused polypropylene

- End Caps: polypropylene
- Seals: Buna-N, EPR, silicone, Viton,\* PFA encapsulated Viton\* O-rings, polyethylene foam gaskets

### Recommended Operating Conditions:

- Poly-Mate Cartridges:  
Change Out ΔP: 35 psid (2.4 bar)  
Maximum Temperature: 200°F (93°C)  
Maximum Temperature @ 35 psid (2.4 bar): 125°F (52°C)  
Maximum ΔP @ 70°F (21°C): 60 psid (4.1 bar)  
Maximum ΔP @ 200°F (93°C): 10 psid (0.7 bar)
- Poly-Mate Xtra-Duty™ Cartridges:  
Change Out ΔP: 35 psid (2.4 bar)  
Maximum Temperature: 200°F (93°C)  
Maximum Temperature @ 35 psid (2.4 bar): 200°F (93°C)  
Maximum ΔP @ 70°F (21°C): 90 psid (6.1 bar)  
Maximum ΔP @ 200°F (93°C): 35 psid (2.4 bar)

### Dimensions:

- Overall Length: See bulletin A-700. SOE fits standard vessels with O-ring receptacles.
- Cartridge Outside Diameter: 2-1/2 in (63.5 mm)
- Cartridge Inside Diameter: DOE - 1-1/16 in (27 mm); SOE - 1 in (25.4 mm)

### Recommended Maximum Flow Rate:

- Maximum 10 gpm per 10 in length

### Designed Flow Rate (in water):

- 2.5 gpm per 10 in length (9.5 lpm per 254 mm)

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\* A trademark of E. I. duPont de Nemours & Co.

## Performance Profile

Parker's Process Filtration Division test procedures address the varying filtration requirements of customers. Selection of media of the Poly-Mate™ product line maximizes performance in terms of efficiency, dirt-holding capacity, flow and other characterization variables. Tests and analyses were conducted using microprocessor technology for accuracy.

## High Filtration Efficiency

Filtration efficiency is affected by media pore size and fluid velocity. The removal efficiency below is based on a design flow rate of 2.5 gpm per 10 in (9.5 lpm per 254 mm cartridge). Lower flow rates yield higher efficiencies. Higher flow rates result in lower efficiencies.

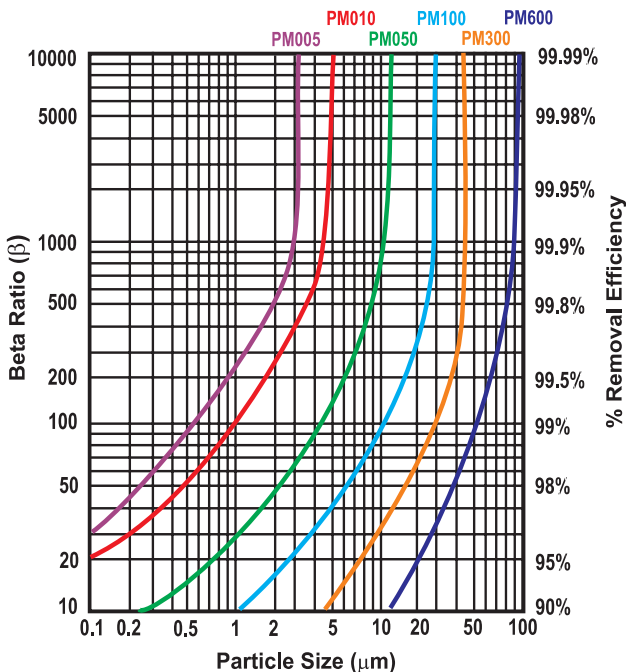
## Higher Throughput

Higher flow rates result in the use of fewer cartridges and smaller housings to achieve system flow rate requirements. In addition, lower ΔP will reduce power requirements and pump wear and tear.

The initial clean water (1 centistoke) ΔP through a 10 in (254 mm) cartridge is very low. The flow rate restriction from the filter vessel is the determining factor when considering the system ΔP. The high dirt-holding capacity of Poly-Mate cartridges provides longer service life and reduces the frequency of filter change out and associated costs. The Poly-Mate Xtra-Duty™ cartridge is designed specifically for backwash applications and can reduce cartridge disposal and labor costs.

Liquid Particle Retention Ratings (μm) @ Removal Efficiencies of:						
Cartridge	β = 5000 Absolute	β = 1000 99.9%	β = 100 99%	β = 50 98%	β = 20 95%	β = 10 90%
PM / PXD005	3	3	0.5	.25	<0.1	<0.1
PM / PXD010	5	4.5	1.0	0.5	0.2	<0.1
PM / PXD050	15	10	4	2.0	0.7	0.25
PM / PXD100	30	28	10	6	3	1.2
PM / PXD300	45	43	30	18	8	4.5
PM / PXD600	95	90	50	40	20	12

■ Poly-Mate / PXD Particle Removal Efficiency Over Life



$$\text{Beta Ratio } (\beta) = \frac{\text{Upstream Particle Count @ Specified Particle Size and Larger}}{\text{Downstream Particle Count @ Specified Particle Size and Larger}}$$

$$\text{Percent Removal Efficiency} = \left( \frac{\beta - 1}{\beta} \right) \times 100$$

Performance determined per ASTM F-795-88. Single-Pass Test using AC test dust in water at a flow rate of 2.5 gpm per 10 in (9.5 lpm per 254 mm).

■ Poly-Mate Length Factors

Length (in)	Length Factor
9	1.0
10	1.0
19	2.0
20	2.0
29	3.0
30	3.0
40	4.0

■ Poly-Mate / PXD Flow Factors (psid/gpm @ 1 cks)

Rating (μm)	Flow Factor
0.5	0.0900
1.0	0.0530
5.0	0.0290
10.0	0.0068
30.0	0.0048
60.0	0.0030

### Flow Rate and Pressure Drop Formulae:

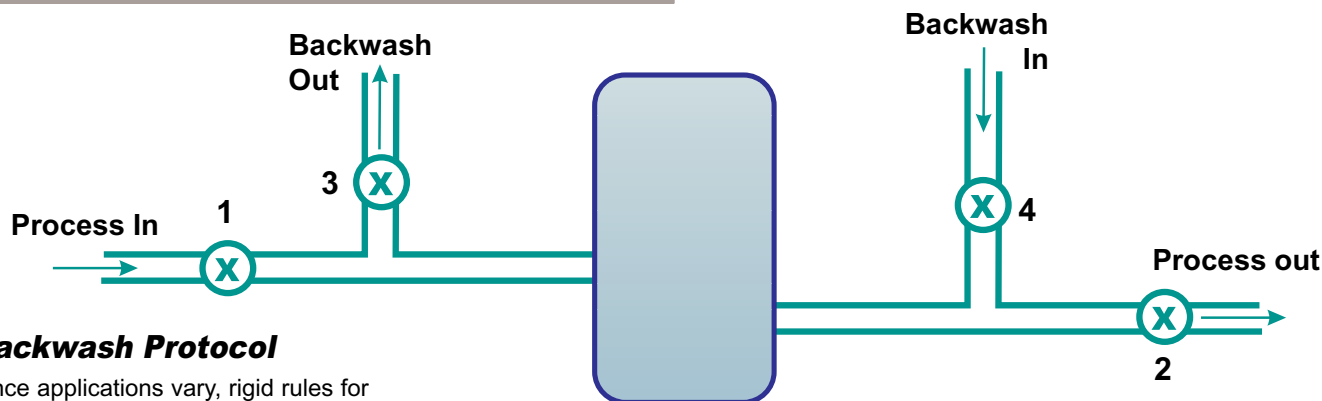
$$\text{Flow Rate (gpm)} = \frac{\text{Clean } \Delta P \times \text{Length Factor}}{\text{Viscosity} \times \text{Flow Factor}}$$

$$\text{Clean } \Delta P = \frac{\text{Flow Rate} \times \text{Viscosity} \times \text{Flow Factor}}{\text{Length Factor}}$$

### Notes:

1. **Clean ΔP** is PSI differential at start.
2. **Viscosity** is centistokes. Use Conversion Tables for other units.
3. **Flow Factor** is ΔP/GPM at 1 cks for 10 in (or single).
4. **Length Factors** convert flow or ΔP from 10 in (single length) to required cartridge length.

# Pleated Series



**Backwash Schematic**

## Backwash Protocol

Since applications vary, rigid rules for backwash operation are impossible. Please use these guidelines:

- Initiate a backwash cycle when the pressure drop rises about 3-4 psid (0.2 to 0.3 bar) above the initial value (1-5 psid [0.1 to 0.4 bar] for most systems) or alternately on a timed cycle, e.g., daily.
- Stop the process flow by closing valves 1 and 2.
- Begin backwash flow by opening valves 3 and 4.
- Backwash pressure should be about 10 psi (0.7 bar) greater than the existing pressure drop.
- A momentary pressure surge is beneficial in breaking particles free.
- Backwash flow rate is critical. It should be 1 to 1-1/2 times the process flow rate. Allow sufficient time to flush the contaminant from the vessel.
- Close valves 3 and 4 and open valves 1 and 2 to resume normal filtration. Vent the vessel. Note the decrease in pressure drop.
- Continue backwash cycles until the pressure drop no longer decreases. Change cartridges at about 35 psid (2.4 bar).
- Note: Valves 3 and 4 could be attached to the vessel's dirty and clean drains, respectively.

## Ordering Information

<b>PM050</b>	<b>10</b>	<b>A</b>	<b>N</b>	<b>TC</b>	<b>R</b>
Cartridge Code (µm)	Nominal Length	Core	Seal Material	End Cap Configurations	Special Options
<b>PM = Standard</b> <b>PXD = Xtra Duty</b>	(code) (in) (mm)	A = Natural Polypropylene (PM core only)	A = Poly Foam (DOE Gasket only)	AR = 020 O-Ring/Recessed (Gelman)	B = Bubble Point Test
PM005 – 0.5	9 9-5/8 244	F = Glass-Filled Polypropylene (PXD core only)	E = EPR	DO = Double Open End (DOE)	R = Rinse with DI water (5 minutes)
PM010 – 1.0	10 9-13/16 249	G = 304 Stainless Steel (Core only)	N = Buna-N	DX = DOE With Core Extender	Z6 = Individual Poly bag only (PXD Only)
PM050 – 5.0	19 19-5/8 498	N = Natural Polypropylene (All support components)	S = Silicone	LL = 120/120 (Filterite LMO)**	Z15 = Individual poly bag 15/ctn. (20", 30", 40") (PXD only)
PM100 – 10.0	20 19-15/16 506	X = Coreless Cartridge	T = PFA Encapsulated Viton* <sup>1</sup> (222,226 O-Ring only)	LR = 120 O-Ring/Recessed** (Nuclepore)	Z30 = Individual poly bag 30/ctn. (10") (PXD only)
PM300 – 30.0	29 29-1/4 743		V = Viton*	OB = Std. Open End/Polypro Spring Closed End	
PM600 – 60.0	30 30-1/16 764		X = No Seal Material	PR = 213 O-Ring/Recessed (Ametek and Parker LT Polymeric Vessels)**	
	40 40 1016			SC = 226 O-Ring/Cap	
				SF = 226 O-Ring/Fin	
				SSC = S.S. Inserted 226 O Ring/Closed	
				SSF = S.S. Inserted 226 O ring/Fin	
				STC = S.S. Inserted 222 O Ring/Closed	
				STF = S.S. Inserted 226 O ring/Fin	
				TC = 222 O-Ring/Cap	
				TF = 222 O-Ring/Fin	
				TX = 222 O Ring/Flex Fin	
				XB = Ext. Core Open End/ Polypro Spring Closed End	

\*\* Available only in 9-5/8" (-9) and 19-5/8" (-19) lengths.

\* A trademark of E. I. duPont de Nemours & Co.

<sup>1</sup> PFA/Viton is O-Ring only; for DOE, T is expanded PTFE gasket.

For pleated cartridge configurations and dimensions, see Bulletin A-700 in the Appendix.

## Process Filtration Division

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