



Fulflo® Honeycomb™ Filter Cartridges

- Acetate
- Cotton
- Food and Drug Grade Rayon
- Glass Fiber
- Polyester
- Food and Drug Grade Polypropylene
- Industrial Grade Polypropylene
- Rayon
- Nylon

Wound Depth Series

Multipurpose Filtration Solutions With Parker's Wound Depth Cartridges

Parker Process Filtration has been a leader in filter media innovation and performance since we first invented the Honeycomb™ Filter Tube over 50 years ago. Parker has one of the world's largest manufacturing plants for wound cartridges, offering superior quality along with technical, engineering and marketing support.

Effective removal ratings at nominal 90% efficiency from 100µm to 0.5µm range.

Applications

- Animal Oils
- Concentrated Alkalies
- Dilute Acids & Alkalies
- Mineral Acids
- Organic Acids & Solvents
- Oxidizing Agents
- Petroleum Oils
- Photo Solutions
- Potable Liquids
- Vegetable Oils
- Water
- Prefilter for Membranes
- Amines



Features and Benefits

- A broad range of media providing excellent compatibility with a variety of organic solvents, animal, petroleum and vegetable oils.
- Optional core covers available on selected cartridges assure fiber migration control.
- Multiple length cartridges minimize change out time, eliminate spacers and are available to fit competitive filter vessels.
- One-piece extended center core option eliminates the need for cartridge guides in all competitive and Fulflo® multicartridge housings.
- Special density and cartridge dimension requirements are available. Consult the Process Filtration Division at 1-765-482-3900 for minimum order requirement.
- Cotton, rayon, polypropylene, polyester and acetate materials are FDA listed as acceptable for potable and edible liquid contact according to CFR Title 21.
- Extended center cores are available in tinned steel, 316 stainless steel and 304 stainless steel.
- A special snap-in extender is available for polypropylene cores.
- Various O-ring and end cap options are available.

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Wound Depth Cartridge Design Function

Wound cartridges offer a gradual pressure increase during cartridge life versus surface-type media that have an abrupt flow cutoff when loaded. All wound cartridges provide true depth filtration utilizing hundreds

of tapered filtering passages of controlled size and shape. As the cartridge is wound, each layer of roving is napped to increase filtration capabilities. The result, each layer of roving contributes to true depth

filtration by trapping its share of particles. In addition, the irregular outer surface reduces surface blinding, assuring both longer cartridge life and full cartridge utilization.

Unique Ultrafine Wound Depth Cartridges for Critical Filtration Applications

Included in the Honeycomb™ wound depth cartridge family is a unique filter cartridge specifically designed for critical filtration applications in the 0.5µm range. Where absolute 0.5µm filtration is required, the Ultrafine cartridge can be used as a prefilter, thereby significantly extending membrane life. Ultrafine cartridges remove

99% of test contaminants with 39% distribution of particles in the 0.5µm range (AC Fine Dust). This type of filtration provides excellent protection for equipment or processes that must be protected from fine particles. Laboratory testing concluded that 90% of micro-organism contamination is removed with ultrafine filtration.

Suggested applications include:

- Prefilter for membranes
- Fine filtration of photoresists for the semiconductor industry
- Rinse water in semiconductor manufacturing
- Fine filtration for ultrasonic parts, washer solvents and other high-purity solvents
- Prefilter for industrial reverse osmosis equipment

Ultrafine cartridges are offered in Cotton (C), Rayon (E), Acetate (W), FDA Grade Polypropylene (M) and Industrial Grade Polypropylene (T). Available core options are 316 Stainless (S) or Polypropylene (A) and are available in 10, 20 and 30 in lengths. Desired combination can be ordered from cartridge symbols shown below:

Length (in)	Core Material	Cotton	Rayon	Acetate	FDA Grade Polypropylene	Industrial Grade Polypropylene
10	(S) 316 Stainless	C10S	E10S	W10S	M10S	T10S
	or (A) Polypropylene	C10A	E10A	W10A	M10A	T10A
20	(S) 316 Stainless	C20S	E20S	W20S	M20S	T20S
	or (A) Polypropylene	C20A	E20A	W20A	M20A	T20A
30	(S) 316 Stainless	C30S	E30S	W30S	M30S	T30S
	or (A) Polypropylene	C30A	E30A	W30A	M30A	T30A

■ **Wound Cartridge Flow Factors for Aqueous (Water Based) Fluids (psid/gpm @ 1 cks)**

Rating (μm)	Polypropylene Polyester Nylon	Cotton Rayon Acetate	Glass
1	0.7463	2.0000	0.5000
3	0.3330	0.6250	0.4211
5	0.2381	0.3636	0.3478
10	0.1429	0.1931	0.1951
20	0.0898	0.1075	0.1096
30	0.0704	0.0855	0.0816
50	0.0595	0.0709	0.0678
75	0.0538	0.0645	0.0611
100	0.0500	0.0624	0.0590

■ **Wound Cartridge Flow Factors for Nonaqueous (Solvent or Oil Based) Fluids (psid/gpm @ 1 cks)**

Rating (μm)	Polypropylene Polyester Nylon	Cotton Rayon Acetate	Glass
1	1.0000	0.7519	0.5000
3	0.5800	0.3003	0.4211
5	0.3003	0.1949	0.3478
10	0.1299	0.1000	0.1951
20	0.0560	0.0350	0.1096
30	0.0200	0.0175	0.0816
50	0.0141	0.0130	0.0678
75	0.0120	0.0100	0.0611
100	0.0080	0.0065	0.0590

■ **Wound Cartridge Length Factors**

Length (in)	Length Factor
4	0.4
10	1.0
20	2.0
30	3.0
40	4.0

Flow Rate and Pressure Drop Formulas:

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

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

Notes:

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

■ **Wound Cartridge Nominal Micrometer Ratings**

Cartridge Designation	Rating (μm)	Compressed Air and Gas Micron Rating
8R, E8R, W8R, N8R, U8R, S8R, M8R, R8R, T8R, WC8R	100	15
10R, E10R, W10R, N10R, U10R, S10R, R10R, T10R, M10R, WC10R	75	13
11R, E11R, W11R, N11R, U11R, S11R, M11R, R11R, T11R, WC11R	50	12
12R, E12R, W12R, N12R, U12R, S12R, M12R, R12R, T12R, WC12R	40	—
13R, E13R, W13R, N13R, U13R, S13R, M13R, R13R, T13R, WC13R	30	10
15R, E15R, W15R, N15R, U15R, S15R, M15R, R15R, T15R, WC15R	20	7
17R, E17R, W17R, N17R, U17R, S17R, M17R, R17R, T17R, WC17R	15	5
19R, E19R, W19R, N19R, U19R, S19R, M19R, R19R, T19R, WC19R	10	3
21R, E21R, W21R, N21R, U21R, S21R, M21R, R21R, T21R, WC21R	7	—
23R, E23R, W23R, N23R, U23R, S23R, M23R, R23R, T23R, WC23R	5	2
27R, E27R, W27R, N27R, U27R, S27R, M27R, R27R, T27R, WC27R	3	1
39R, E39R, W39R, N39R, U39R, S39R, M39R, R39R, T39R, WC39R	1	Less than 1

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Specifications

Nominal Removal Ratings:

- @ 90% efficiency from 100µm to 0.5µm

Recommended Operating Conditions:

- Change Out ΔP: 30 psi (2.1 bar)
- Maximum Operating ΔP @ Ambient Temperature: 60 psi (4.1 bar)

Dimensions:

- 1 in ID x 2-1/2 OD
- 3 in to 50 in lengths

Wound Cartridge Glass Fiber Nominal Micrometer Ratings

Cartridge Designation	Liquids	Compressed Air and Gases
K5B	100-150	100+
K5R	75-100	10
K6R	40	7
K8R	30	5
K10R	20	3
K12R	15	1
K15R	10	<1
K19R	5	<1
K27R	1	<1
K39R	0.5	<1

Maximum Operating Temperature

Cartridge Material	Metal Core	Polypropylene Core	Glass-Filled Polypropylene
Acetate	250°F (121°C)	120°F (49°C)	180°F (82°C)
Cotton	250°F (121°C)	120°F (49°C)	—
Glass	750°F (402°C)	—	—
Nylon	275°F (135°C)	120°F (49°C)	—
Polypropylene	200°F (93°C)	120°F (49°C) [†]	180°F (82°C)
Polyester	275°F (135°C)	120°F (49°C)	—
Rayon	250°F (121°C)	120°F (49°C)	—

[†] 200°F (93°C) if ΔP is limited

Ordering Information

E	13R	10	2	A	V	L	TC	N	
Cartridge Code	Density Number	Micron Rating (µm)	Nominal Cartridge Length (in)	Nominal Cartridge Diameter	Core Material	Core Cover Material	End Treatment	End Cap Options	Seal Options
No Symbol = Cotton (FDA)	8R	100	3 = 3	No Symbol =	No Symbol = Tinned Steel	No Symbol =	No Symbol =	TC = 222 Closed	N = Buna
E = FDA Grade Rayon	10R	75	4 = 4	1 in ID x 2-1/2 in OD	A = Polypropylene	No Cover	No Treatment	TF = 222 Fin	E = EPR
K = Glass Fiber	11R	50	6 = 6	2 = 1 in ID x 2-3/4 in OD	A3 = Glass-Filled	V = Nonwoven	L = Lacquer	SC = 226 Closed	S = Silicone
M = FDA Grade Polypropylene	12R	40	7 = 7	Special Dimensions Available	Polypropylene	W = Nonwoven Paper	E = Acetone	SF = 226 Fin	V = Viton*
N = Nylon	13R	30	8 = 8		G = 304L Stainless Steel	Y = Polypropylene	D = Sodium Silicate	XA = Poly Extender	None = DOE
R = Rayon	15R	20	9-4 = 9-3/4		S = 316 Stainless Steel		M = Singed	XC = Tinned Steel Extender	
S = Polyester (FDA)	17R	15	10 = 10		SR = Passivated 316 SS (Special Order)			GXC = 304L SS Extender	
T = Industrial Grade Polypropylene	19R	10	19-4 = 19-1/2					SXC = 316 SS Extender	
U = Natural Cotton	21R	7	20 = 20					None=DOE	
W = Acetate (FDA)	23R	5	29-4 = 29-1/4						
WC = White Cotton	27R	3	30 = 30						
	39R	1	39-4 = 39						
			40 = 40						
			Special Order						
			50 = 50						

Process Filtration Division

* A trademark of E. I. du Pont de Nemours & Co.

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