

# Fulflo® Honeycomb™ Filter Cartridges

Multi-purpose Filtration Solutions with  
Wound Depth Cartridges

Parker has been a leader in filter media innovation and performance since we first invented the Honeycomb™ Filter Tube over 65 years ago. Parker has the world's largest manufacturing capacity for wound cartridges, offering superior quality along with technical, engineering and marketing support.

Effective removal ratings at nominal 90% efficiency from 0.5µm to 150µm.



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## Benefits

- A broad range of media provide excellent compatibility with a variety of organic solvents, animal, petroleum and vegetable oils
- Optional core covers and end treatments assure fiber migration control
- Multiple length cartridges minimize change-out time, eliminate spacers and are available to fit competitive filter vessels
- FDA grade polypropylene (DOE only) cartridges certified to ANSI/NSF61 standard for contact with drinking water components
- Continuous strand winding geometry provides performance consistency
- One-piece metal extended center core option eliminates the need for cartridge guides in all competitive and Fulflo® multi-cartridge vessels
- A special snap-in extender is available for polypropylene cores
- Cotton, rayon, polypropylene, nylon and polyester materials are FDA listed as acceptable for potable and edible liquid contact according to CFR Title 21
- Various O-ring and end cap options are available

## Applications

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



ENGINEERING YOUR SUCCESS.

# Fulflo® Honeycomb™ Cartridges

## Wound Depth Cartridge Design and Function

Wound cartridges provide true depth filtration utilizing hundreds of tapered filtering passages of controlled size and shape. Each layer of roving

contributes to true depth filtration by trapping its share of particles. Wound cartridges offer a gradual pressure increase during cartridge life versus surface-type media that have

an abrupt flow cutoff when loaded. In addition, the irregular outer layer reduces surface blinding, assuring both longer cartridge life and full cartridge utilization.

## Ultrafine Wound Depth Cartridges for Critical Filtration Applications

Ultrafine cartridges are a unique member of the Honeycomb™ wound depth cartridge family. They are specifically designed for critical filtration applications in the 0.5µm range. When absolute 0.5µm filtration is required, the nominal Ultrafine

cartridge can be used as a prefilter, thereby significantly extending membrane life. Ultrafine cartridges remove 90% of particles larger than 0.5µm in size. This type of filtration provides excellent protection for equipment or processes that must be protected from fine particles.

- Applications include:
- Prefilter for membranes
  - Rinse water in semiconductor manufacturing
  - Fine filtration for ultrasonic parts, washer solvents and other high-purity solvents
  - Prefilter for industrial reverse osmosis equipment

## Ultrafine Ordering Information

| Filter Medium |                                | Nominal Length |               | Core Material |                            | Core Cover Material |                     | End Cap Configuration |  | Seal Material |          |
|---------------|--------------------------------|----------------|---------------|---------------|----------------------------|---------------------|---------------------|-----------------------|--|---------------|----------|
| CODE          | Description                    | CODE           | Size (Inches) | CODE          | Description                | CODE                | Description         | CODE                  | Description  | CODE          | Material |
| C             | FDA Grade Cotton               | 9-4            | 9-7/8         | None          | Tinned Steel               | None                | No Cover            | None                  | DOE (w/o gaskets)                                      | None          | Std. DOE |
| E             | FDA Grade Rayon                | 10             | 10            | A             | Polypropylene              | B                   | Nylon               | DO                    | DOE (w/ gaskets)                                       | A             | Polyfoam |
| M             | FDA Grade Polypropylene        | 19-4           | 19-1/2        | A3            | Glass-filled Polypropylene | V                   | Non-woven Polyester | TC                    | 222/Closed   | E             | EPR      |
| T             | Industrial Grade Polypropylene | 20             | 20            | G             | 304 Stainless Steel        | W                   | Cellulosic Paper    | OB                    | Std. Open End/<br>Polypro Spring<br>Closed End         | N             | Buna-N   |
| WC            | Industrial Grade White Cotton  | 29-4           | 29-1/4        | S             | 316 Stainless Steel        | Y                   | Polypropylene       | TF                    | 222/Fin  | S             | Silicone |
|               |                                | 30             | 30-3/16       |               |                            |                     |                     | SC                    | 226/Closed   | V             | Viton®   |
|               |                                | 39             | 39            |               |                            |                     |                     | SF                    | 226/Fin  |               |          |
|               |                                | 40             | 40-3/16       |               |                            |                     |                     | XA                    | Polypro Extender                                       |               |          |
|               |                                |                |               |               |                            |                     |                     | XB                    | Extended Core<br>Open End/Polypro<br>Spring Closed End |               |          |
|               |                                |                |               |               |                            |                     |                     | XC                    | Extended Metal   |               |          |

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# Fulflo® Honeycomb™ Cartridges

## Wound Cartridge Flow Factors for Aqueous (Water-based) Fluids (psid/gpm @ 1cks)

| Rating (µm) | Polypropylene Polyester Nylon | Cotton Rayon | Glass  |
|-------------|-------------------------------|--------------|--------|
| 0.5         | 0.9924                        | 2.6590       | 0.5000 |
| 1           | 0.7463                        | 2.0000       | 0.4211 |
| 3           | 0.3330                        | 0.6250       | 0.3478 |
| 5           | 0.2381                        | 0.3636       | 0.1951 |
| 10          | 0.1429                        | 0.1931       | 0.1430 |
| 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 Non-Aqueous (Solvent or Oil based) Fluids (psid/gpm @ 1cks)

| Rating (µm) | Polypropylene Polyester Nylon | Cotton Rayon | Glass  |
|-------------|-------------------------------|--------------|--------|
| 0.5         | 1.8350                        | 1.3800       | 0.5000 |
| 1           | 1.0000                        | 0.7519       | 0.4211 |
| 3           | 0.5800                        | 0.3003       | 0.3478 |
| 5           | 0.3003                        | 0.1949       | 0.1951 |
| 10          | 0.1299                        | 0.1000       | 0.1430 |
| 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 Nominal Micrometer Ratings

| Cartridge Designation      |      |      |      |      |      |      |      |       | Micron Rating | Compressed Air & Gas Micron Rating |
|----------------------------|------|------|------|------|------|------|------|-------|---------------|------------------------------------|
| 8R                         | E8R  | N8R  | U8R  | S8R  | M8R  | R8R  | T8R  | WC8R  | 100           | 15                                 |
| 10R                        | E10R | N10R | U10R | S10R | M10R | R10R | T10R | WC10R | 75            | 13                                 |
| 11R                        | E11R | N11R | U11R | S11R | M11R | R11R | T11R | WC11R | 50            | 12                                 |
| 12R                        | E12R | N12R | U12R | S12R | M12R | R12R | T12R | WC12R | 40            | -                                  |
| 13R                        | E13R | N13R | U13R | S13R | M13R | R13R | T13R | WC13R | 30            | 10                                 |
| 15R                        | E15R | N15R | U15R | S15R | M15R | R15R | T15R | WC15R | 20            | 7                                  |
| 17R                        | E17R | N17R | U17R | S17R | M17R | R17R | T17R | WC17R | 15            | 5                                  |
| 19R                        | E19R | N19R | U19R | S19R | M19R | R19R | T19R | WC19R | 10            | 3                                  |
| 21R                        | E21R | N21R | U21R | S21R | M21R | R21R | T21R | WC21R | 7             | -                                  |
| 23R                        | E23R | N23R | U23R | S23R | M23R | R23R | T23R | WC23R | 5             | 2                                  |
| 27R                        | E27R | N27R | U27R | S27R | M27R | R27R | T27R | WC27R | 3             | 1                                  |
| 39R                        | E39R | N39R | U39R | S39R | M39R | R39R | T39R | WC39R | 1             | Less than 1                        |
| Ultrafine (C, E, M, T, WC) |      |      |      |      |      |      |      |       | 0.5           | Less than 0.5                      |

## Wound Cartridge Length Factors

| Length (in) | Length Factor |
|-------------|---------------|
| 10          | 1.0           |
| 20          | 2.0           |
| 30          | 3.0           |
| 40          | 4.0           |
| 50          | 5.0           |

### 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:

- Clean  $\Delta P$  is psi differential at start.
- Viscosity is centistokes. Use Conversion Tables for other units.
- Flow Factor is  $\Delta P/\text{GPM}$  at 1cks for 10 in (or single).
- Length Factors convert flow or  $\Delta P$  from 10 in (single length) to required cartridge length.

### Nominal Removal Ratings:

- @ 90% efficiency from 0.5µm to 150µm

### Maximum Recommended Operating Conditions:

- Change Out  $\Delta P$ : 30psi (2.1bar)
- $\Delta P$  @ Ambient Temperature: 60psi (4.1bar)
- Flow Rate: 10gpm (38 lpm) per 10 in. length
- Temperature (See table below)

### Dimensions:

- 1 in. ID x 2-7/16 OD
- 3 in. to 50 in. lengths

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# Fulflo® Honeycomb™ Cartridges

## Wound Cartridge Baked Glass Fiber Nominal Micrometer Ratings

| Cartridge Designation | Liquids   | Compressed Air & 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                     |
| K23R                  | 3         | <1                     |
| K27R                  | 1         | <1                     |
| K39R                  | 0.5       | <1                     |

Note: All glass cartridges have standard glass core cover.

## Maximum Operating Temp. @ 35psid

| Cartridge Material | Metal Core    | Polypropylene Core | Glass-Filled Polypropylene |
|--------------------|---------------|--------------------|----------------------------|
| 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)†      | 200°F (93°C)               |
| Polyester          | 275°F (135°C) | 120°F (49°C)       | —                          |
| Rayon              | 250°F (121°C) | 120°F (49°C)       | —                          |

Note: Refer to Materials Selection Guide for additional compatibility information.

## Ordering Information

| Filter Medium |                                | Density |        | Nominal Length |               | Core Material |  | Core Cover Material |                     | End Cap Configuration |  | Seal Material |          |
|---------------|--------------------------------|---------|--------|----------------|---------------|---------------|--|---------------------|---------------------|-----------------------|--|---------------|----------|
| CODE          | Description                    | CODE    | Micron | CODE           | Size (Inches) | CODE          | Description                                    | CODE                | Description         | CODE                  | Description                                      | CODE          | Material |
| None          | Cotton (FDA)                   | 6R      | 150    | 3              | 3"            | None          | Tinned Steel                                   | None                | No Cover            | None                  | DOE (w/o gaskets)                                | None          | Std. DOE |
| E             | FDA Grade Rayon                | 8R      | 100    | 4              | 4"            | A             | Polypropylene                                  | B                   | Nylon               | DO                    | DOE (w/ gaskets)                                 | A             | Polyfoam |
| K             | Baked Glass Fiber              | 10R     | 75     | 5              | 5"            | A3            | Glass-filled Polypropylene                     | V                   | Non-woven Polyester | TC                    | 222/Closed                                       | E             | EPR      |
| M             | FDA Grade Polypropylene        | 11R     | 50     | 6              | 6"            | G             | 304 Stainless Steel                            | W                   | Cellulosic Paper    | OB                    | Std. Open End / Polypro Spring Closed End        | N             | Buna-N   |
| N             | Nylon (FDA)                    | 12R     | 40     | 7              | 7"            | S             | 316 Stainless Steel                            | Y                   | Polypropylene       | TF                    | 222/Fin  | S             | Silicone |
| R             | Rayon                          | 13R     | 30     | 8              | 8"            | SR            | Passivated 316 Stainless Steel (Special Order) |                     |                     | TX                    | 222/Flex fin                                     | V             | Viton®   |
| S             | Polyester (FDA)                | 14R     | 25     | 9-4            | 9-7/8"        |               |  |                     |                     | SC                    | 226/Closed                                       |               |          |
| T             | Industrial Grade Polypropylene | 15R     | 20     | 10             | 10"           |               |  |                     |                     | SF                    | 226/Fin  |               |          |
| U             | Natural Cotton                 | 17R     | 15     | 19-4           | 19-1/2"       |               |  |                     |                     | XA                    | Polypro Extender                                 |               |          |
| UK            | Unbaked Glass Fiber            | 19R     | 10     | 20             | 20"           |               |  |                     |                     | XB                    | Extended Core Open End/Polypro Spring Closed End |               |          |
| WC            | White Cotton                   | 21R     | 7      | 29-4           | 29-1/4"       |               |  |                     |                     | XC                    | Extended Metal                                   |               |          |
|               |                                | 23R     | 5      | 30             | 30-3/16"      |               |  |                     |                     |                       |  |               |          |
|               |                                | 27R     | 3      | 39-4           | 39"           |               |  |                     |                     |                       |  |               |          |
|               |                                | 39R     | 1      | 40             | 40-3/16"      |               |  |                     |                     |                       |  |               |          |
|               |                                |         |        | 50             | 50"           |               |  |                     |                     |                       |  |               |          |

  

| End Treatment |                 |
|---------------|-----------------|
| CODE          | Description     |
| None          | No Treatment    |
| D             | Sodium Silicate |
| L             | Laquer          |
| M             | Singed          |

  

| Packaging Options |                     |
|-------------------|---------------------|
| CODE              | Description         |
| Z                 | Individual Poly Bag |
| TIS               | Tissue Wrap         |

  

| Nominal Cartridge Diameter |   |
|----------------------------|---|
| CODE                       | Description   |
| None                       | 1" ID x 2-7/16" OD  |
| -2                         | 1" ID x 2-11/16" OD   |
| -45                        | 1" ID x 4-1/2" OD (9-7/8" and 20" length only) for Fulflo LTG and Ametek Big Blue Vessels |

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