



## FPS Filters

Single Layer PES Membrane



FPS filters provide a wide selection of validated, single layer Polyethersulfone (PES) cartridge and capsule filters used for removing bacteria, mold and yeast in aqueous liquids. FPS filters have been designed to comply with all FDA requirements for the food industry. Pore sizes range from 0.03 to 1.2  $\mu\text{m}$  and the filter sizes scale from laboratory to full production using identical materials to ensure consistent results.

FPS filters have low protein binding characteristics making them a good choice for fermented beverage filtration. These filters deliver high throughput and handle cleaning and sanitization protocols well.

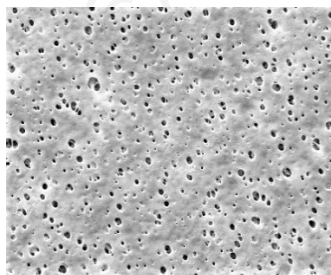
FPS filters are flushed to remove manufacturing debris and reduce extractables. Products are 100% integrity tested.

Critical Process provides unrivaled delivery times, technical consulting before purchasing, and very competitively priced high-performance products. Our comprehensive testing & analysis and validation services support your team whenever they need it. Your process experts partnering with our filtration experts is how we deliver your company's solution right the first time.

### Bacteria/Yeast/Mold Removal



**CARTRIDGES – Nominal Dimensions**  
Length: 5 to 40 in. (12.7 to 101.6 cm)  
Outside Diameter: 2.75 in. (7.0 cm)



FPS filters are recommended for the filtration of:

- Wine
- Beer
- Clear Juices
- Aseptically Packaged Liquids
- Bottled Water
- Process Water
- Clean-in-Place Solutions



**CAPSULES – Nominal Dimensions**  
Length: 2 to 30 in. (5.1 to 76.2 cm)  
Outside Diameter: 3.50 in. (8.9 cm)

## Maximum Operating Parameters

|                                       | CARTRIDGES                                                | CAPSULES                                                                                    |
|---------------------------------------|-----------------------------------------------------------|---------------------------------------------------------------------------------------------|
| <b>Liquid Operational Pressure</b>    | N/A                                                       | 80 psi at 68 °F (5.52 bard at 20 °C)                                                        |
| <b>Gases Operational Pressure</b>     | N/A                                                       | 60 psi at 68 °F (4.14 bar at 20 °C)                                                         |
| <b>Operating Temperature (water)</b>  | 180 °F at 30 psid (82 °C at 2.07 bard)                    | 110 °F at 30 psid (43 °C at 2.07 bard)                                                      |
| <b>Forward Differential Pressure</b>  | 80 psid at 68 °F (5.52 bard at 20 °C)<br>(Liquid and Gas) | Liquid - 80 psid at 68 °F (5.52 bard at 20 °C)<br>Gas - 60 psi at 68 °F (4.14 bar at 20 °C) |
| <b>Reverse Differential Pressure</b>  | 50 psid at 68 °F (3.45 bard at 20 °C)                     | 50 psid at 68 °F (3.45 bard at 20 °C)                                                       |
| <b>Recommended Changeout Pressure</b> | 35 psid (2.41 bard)                                       | 35 psid (2.41 bard)                                                                         |

## Sanitization & Sterilization

|                              |                                                                                                                                          |                                     |
|------------------------------|------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|
| <b>Filtered Hot Water*</b>   | 90 °C (194 °F), 30 minutes, multiple cycles, max 3 psid forward flow                                                                     | N/A                                 |
| <b>Inline Steam*</b>         | 275 °F (135 °C), 30 min, 25+ cycles                                                                                                      | N/A                                 |
| <b>Autoclave*</b>            | 250 °F (121 °C), 30 min, 25+ cycles                                                                                                      | 250 °F (121 °C), 30 min, 25+ cycles |
| <b>Chemical Sanitization</b> | Performed using industry standard concentrations of hydrogen peroxide, peracetic acid, sodium hypochlorite and other selected chemicals. |                                     |

\*Cartridge Filters – For all elevated temperature procedures above, a stainless-steel support ring is required.

## Filtration Area (Nominal)

|        | CAPSULES            | CARTRIDGES AND CAPSULES |                     |                      |                      | CARTRIDGES           |
|--------|---------------------|-------------------------|---------------------|----------------------|----------------------|----------------------|
| Length | 2"                  | 5"                      | 10"                 | 20"                  | 30"                  | 40"                  |
|        | 5.08cm              | 12.7cm                  | 25.4cm              | 50.8cm               | 76.2cm               | 101.6cm              |
| Area   | 1.2 ft <sup>2</sup> | 3.4 ft <sup>2</sup>     | 7.3 ft <sup>2</sup> | 14.6 ft <sup>2</sup> | 21.9 ft <sup>2</sup> | 29.2 ft <sup>2</sup> |
|        | 0.11m <sup>2</sup>  | 0.32m <sup>2</sup>      | 0.68m <sup>2</sup>  | 1.36m <sup>2</sup>   | 2.04m <sup>2</sup>   | 2.72m <sup>2</sup>   |

## Integrity Testing

| PORE SIZE | DIFFUSION TEST PRESSURE* |      | BUBBLE POINT MINIMUM* |      |
|-----------|--------------------------|------|-----------------------|------|
|           | PSIG                     | BARG | PSIG                  | BARG |
| μm        |                          |      |                       |      |
| 0.03      | 60                       | 4.14 | **                    | **   |
| 0.10      | 48                       | 3.31 | **                    | **   |
| 0.22      | 35                       | 2.41 | 50                    | 3.4  |
| 0.45      | 20                       | 1.38 | 25                    | 1.7  |
| 0.65      | 15                       | 1.03 | 19                    | 1.3  |
| 0.80      | 12                       | 0.83 | 15                    | 1.0  |
| 1.0       | 8                        | 0.55 | 10                    | 0.7  |
| 1.2       | 7                        | 0.48 | 9                     | 0.6  |

| DIFFUSION SPECIFICATIONS |       |        |      |      |      |       |
|--------------------------|-------|--------|------|------|------|-------|
| Length                   | 2"    | 5"     | 10"  | 20"  | 30"  | 40"   |
| mL/min                   | ≤ 4.3 | ≤ 12.9 | ≤ 30 | ≤ 60 | ≤ 90 | ≤ 120 |

\* For water wetted membrane

\*\* Test pressure exceeds operational limits of capsule filters. Use the Diffusion Test method.

## Construction Materials

|                                                                           |                                                                                                         |
|---------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------|
| <b>Filtration Media</b>                                                   | Single Layered<br>Polyethersulfone (PES) Membrane                                                       |
| <b>Media Support</b>                                                      | Polypropylene                                                                                           |
| <b>End Caps, Center Core,<br/>Outer Support Cage,<br/>Capsule Housing</b> | Polypropylene                                                                                           |
| <b>Sealing Method</b>                                                     | Thermal Bonding                                                                                         |
| <b>O-Rings/Gaskets<br/>Cartridges only</b>                                | Buna, Viton® (or FKM), EPDM,<br>Silicone, FEP Encapsulated Silicone,<br>FEP Encapsulated Viton (or FKM) |

## Validation

FPS filters are validated using test procedures that comply with ASTM F 838-15(ae1) protocols for the determination of bacterial retention in filters used for liquid filtration. The filters are challenged with the organisms listed below.

0.03µm: *Acholeplasma laidlawii*  
0.10µm: *Brevundimonas diminuta*  
0.22µm: *Brevundimonas diminuta*  
0.45µm: *Serratia marcescens*  
0.65µm: *Saccharomyces cerevisiae*

## Extractables

FPS filters typically exhibit low levels of non-volatile residues.

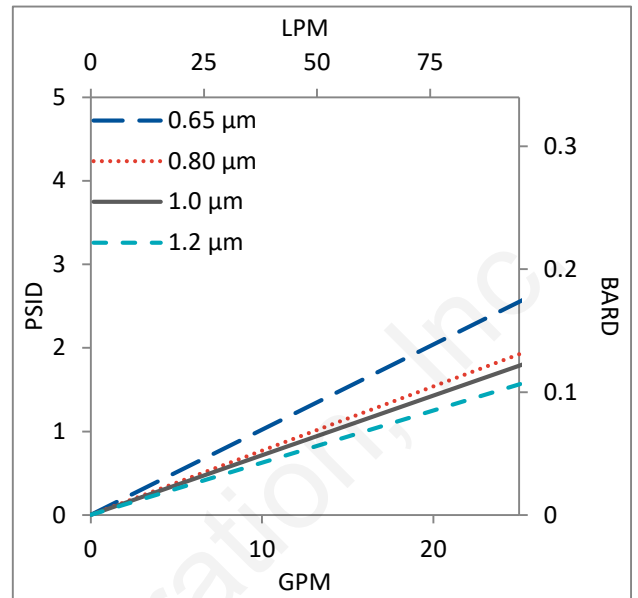
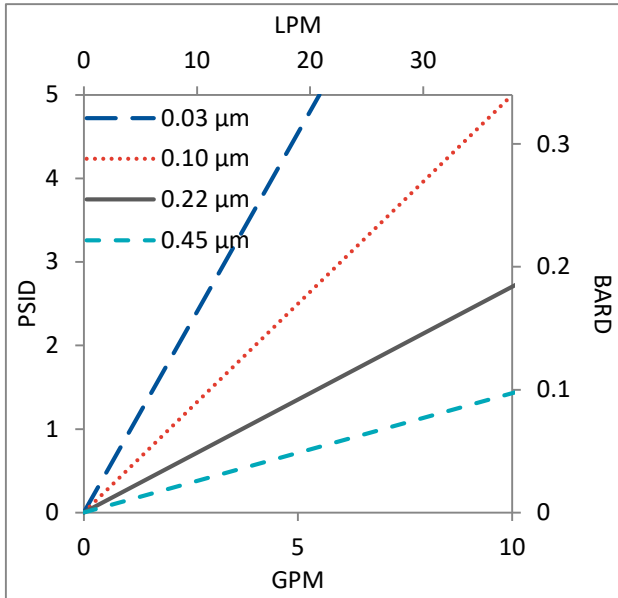
## Non-Fiber Releasing

The FPS filters comply with Title 21 CFR sections 210.3 (b)(6) and 211.72, for non-fiber releasing filters.

## FDA and EC Compliance

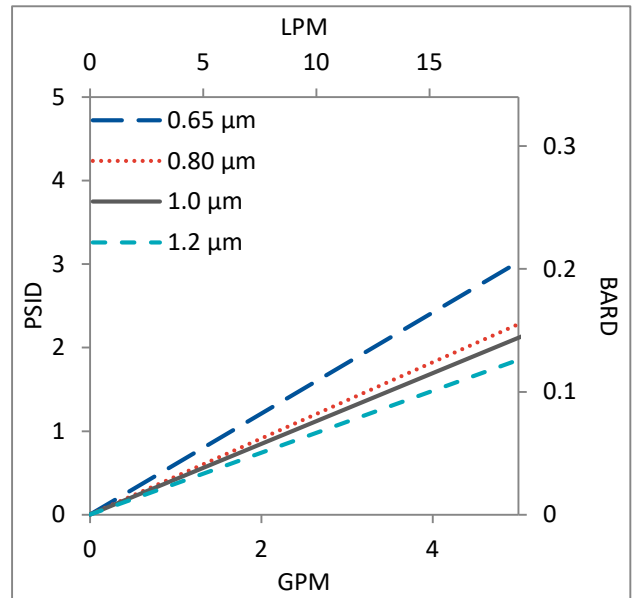
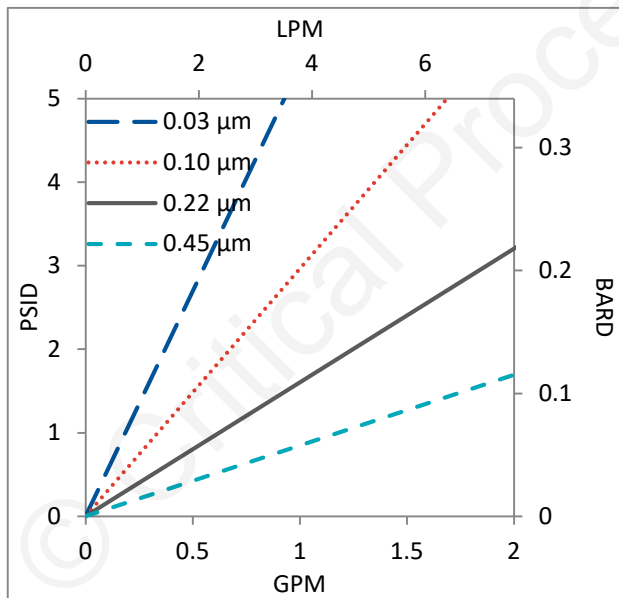
Materials meet the requirements listed by the FDA as appropriate for use in articles intended for repeated food contact as specified in Title 21 CFR sections 174.5, 177.1500, 177.1520, 177.1630, 177.2440, and 177.2600 as applicable. All materials used to make the filters are listed in European Commission Regulation EU/10/2011, Annex 1.

## Flow Rates for FPS Cartridges by Pore Size



Flow rates for Cartridge filters are per 10-inch length. The test fluid is water at ambient temperature.

## Flow Rates for FPS Capsules by Pore Size



Flow rates for Capsule filters are tested using a 2" capsule filter with 1" sanitary inlet and outlet ports. The test fluid is water at ambient temperature. Flow rates for larger capsules will scale with filtration area. Rates will vary based on end configuration of the capsule.

## FPS Filters Ordering Information

Fill in the corresponding codes in the boxes below to build your Part Number.

To consult with one of our technical team members, request a quote or place an order:  
call (603) 880-4420 or [contact us here](#)

### Cartridge Filters

FPS   000

| Pore Size Code                                                                                                                                                                                                             | SS Ring                 | Length                                                                                                                                                          | O-Ring/Gasket Code                                                                                                               | End Cap Code*                                                                                                                                                                                                                                                                                                                                                                                                            |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| -03 = 0.03 $\mu\text{m}$<br>-10 = 0.10 $\mu\text{m}$<br>-20 = 0.22 $\mu\text{m}$<br>-40 = 0.45 $\mu\text{m}$<br>-60 = 0.65 $\mu\text{m}$<br>-80 = 0.80 $\mu\text{m}$<br>1-0 = 1.0 $\mu\text{m}$<br>1-2 = 1.2 $\mu\text{m}$ | S = Ring<br>N = No Ring | 05 = 5 in. (12.7 cm)<br>97 = 9.75 in. (24.8 cm) (DOE only)<br>01 = 10 in. (25.4 cm)<br>02 = 20 in. (50.8 cm)<br>03 = 30 in. (76.2 cm)<br>04 = 40 in. (101.6 cm) | S = Silicone<br>B = Buna<br>V = Viton (or FKM)<br>T = FEP Encapsulated Viton (or FKM)<br>E = EP<br>R = FEP Encapsulated Silicone | 0 = Flat Gasket, DOE<br>1 = Flat Gasket/Plug<br>2 = 2-222 O-ring/Plug<br>3 = 213/119 Internal O-ring DOE<br>4 = 213/119 Internal O-ring/Plug<br>5 = 2-222 O-ring/Flat<br>6 = 2-226 O-ring/Flat<br>7 = 020 O-ring/Plug<br>8 = 2-222 O-ring/Spear<br>9 = 2-226 O-ring/Spear<br>21 = 2-223 O-ring/Flat<br>22 = 2-223 O-ring/Spear<br>23 = 2-222 O-ring 3 Tab/Flat<br>24 = 2-222 O-ring 3 Tab/Spear<br>25 = Short 2-222/Plug |

[\\*Additional End Configurations Available](#)

### Capsule Filters

CP FPS   000    -

| Pore Size Code                                                                                                                                                                                                             | Pre-Sterilized or Not                                        | Length                                            | Inlet                                                                                                                                                                                                                                                                                                                                                                                             | Outlet                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Side Vent Options                                             |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------|---------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------|
| -03 = 0.03 $\mu\text{m}$<br>-10 = 0.10 $\mu\text{m}$<br>-20 = 0.22 $\mu\text{m}$<br>-40 = 0.45 $\mu\text{m}$<br>-60 = 0.65 $\mu\text{m}$<br>-80 = 0.80 $\mu\text{m}$<br>1-0 = 1.0 $\mu\text{m}$<br>1-2 = 1.2 $\mu\text{m}$ | S = Pre-Sterilized<br>G = Gamma Stable<br>N = Not Sterilized | A = 2"<br>B = 5"<br>1 = 10"<br>2 = 20"<br>3 = 30" | A = 1/4" Female NPT<br>B = 1/4" Male NPT<br>C = 3/8" Female NPT<br>D = 1/2" Female NPT<br>E = 1/2" Male NPT<br>F = 1" Sanitary<br>G = Hose Barb*<br>H = 1 1/2" Sanitary with side vent<br>I = 1/2" Single Stepped Barb with side vent<br>J = 3/4" Single Step Barb with Side Vent<br>Y = 3/8" Compression (JACO®) (Top Luer lock vent only)<br>Z = 6mm Quick Disconnect (Top Luer lock vent only) | A = 1/4" Female NPT<br>B = 1/4" Male NPT<br>C = 3/8" Female NPT<br>D = 1/2" Female NPT<br>E = 1/2" Male NPT<br>F = 1" Sanitary<br>G = Hose Barb*<br>H = 1 1/2" Sanitary with side vent<br>I = 1/2" Single Stepped Barb with side vent<br>IB = 1/2" Single Stepped Barb with filling bell and side vent<br>J = 3/4" Single Step Barb with Side Vent<br>Y = 3/8" Compression (JACO®) (Top Luer lock vent only)<br>Z = 6mm Quick Disconnect (Top Luer lock vent only) | 1 = Luer Lock<br>2 = 1/8" Bleed Valve<br>3 = 1/4" Bleed Valve |

| O-Rings (Bleed Valves Only)                                 |
|-------------------------------------------------------------|
| S = Silicone<br>E = EP<br>V = Viton<br>B = Buna<br>K = FFKM |

\*Fits hoses/tubes with inner diameter 11/32 to 9/16 inches



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Data Sheet FPSDS Rev D