CRITICAL PROCESS FILTRATION, INC.

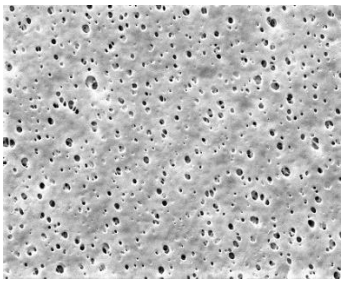
VPS Filters

Dual Layered PES Membrane

For removing unwanted organisms from products with high particle loads, VPS filters offer a wide selection of validated, dual layer Polyethersulfone (PES) cartridge and capsule filters for the filtration of consumable liquids. These filters comply with FDA requirements and EC directives for food and beverage manufacturing and food contact. Pore sizes range from 0.22 to 1.2 µm and the filter sizes scale from laboratory to full production using identical materials to ensure consistent results.

The VPS filter's low protein binding characteristics are well suited for filtering fermented beverages. They retain organisms while allowing valuable flavor components to pass through the filter. VPS filters deliver high flow and throughput with compatibility across a wide pH range. They are flushed with high purity water to remove extractables that may affect the taste of the product. Products are 100% integrity tested. VPS capsules are available pre-sterilized.

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.



VPS is recommended for:

- Wine, Beer
- Juices
- Bottled Water
- Aseptic Packaged Liquids
- Container Wash/Rinse Water
- Process Water

Bacteria/Yeast/Mold Removal

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

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
Liquid Operational Pressure	N/A	80 psi at 68 °F (5.51 bard at 20 °C)
Gases Operational Pressure	N/A	60 psi at 68 °F (4.13 bar at 20 °C)
Operating Temperature (water)	180 °F at 30 psid (82 °C at 2.06 bard)	110 °F at 30 psid (43 °C at 2.06 bard)
Forward Differential Pressure	80 psid at 68 °F (5.51 bard at 20 °C) (Liquid and Gas)	Liquid - 80 psid at 68 °F (5.51 bard at 20 °C) Gas - 60 psi at 68 °F (4.13 bar at 20 °C)
Reverse Differential Pressure	50 psid at 68 °F (3.44 bard at 20 °C)	50 psid at 68 °F (3.44 bard at 20 °C)
Recommended Changeout Pressure	35 psid (2.41 bard)	35 psid (2.41 bard)

Sanitization & Sterilization

Filtered Hot Water*	90 °C (194 °F), 30 minutes, multiple cycles, max 3 psid forward flow	
Inline Steam*	275 °F (135 °C), 30 min, 25+ cycles	
Autoclave*	250 °F (121 °C), 30 min, 25+ cycles	250 °F (121 °C), 30 min, 25+ cycles
Chemical Sanitization	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

	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	0.9 ft^2	2.5 ft^2	5.4 ft^2	10.8 ft^2	16.2 ft^2	21.6 ft^2
	0.08m^2	0.23m^2	0.50m^2	1.00m^2	1.51m^2	2.01m^2

Integrity Testing

PORE SIZE	DIFFUSION TEST PRESSURE*		BUBBLE POINT MINIMUM*	
µm	PSIG	BARG	PSIG	BARG
0.22	35	2.41	50	3.5
0.45	20	1.37	25	1.7
0.65	15	1.03	19	1.3
0.8	12	0.82	15	1.1
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	≤ 14	≤ 30	≤ 60	≤ 90	≤ 120

* For water wetted membrane
** Test pressure exceeds operational limits of capsule filters. Use the Diffusion Test method.

Construction Materials

Filtration Media	High Capacity PES membrane on polyester support prefilter layer and Asymmetric PES membrane final filter layer
Media Support	Polypropylene
End Caps, Center Core, Outer Support Cage, Capsule Housing	Polypropylene
Sealing Method	Thermal Bonding
O-Rings Cartridges only	Buna, Viton® (or FKM), EPDM, Silicone, FEP Encapsulated Silicone, FEP Encapsulated Viton (or FKM)

Validation

VPS 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.

0.22µm: *Brevundimonas diminuta*
0.45µm: *Serratia marcescens*
0.65µm: *Saccharomyces cerevisiae*

Validation Guides available upon request.

Extractables

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

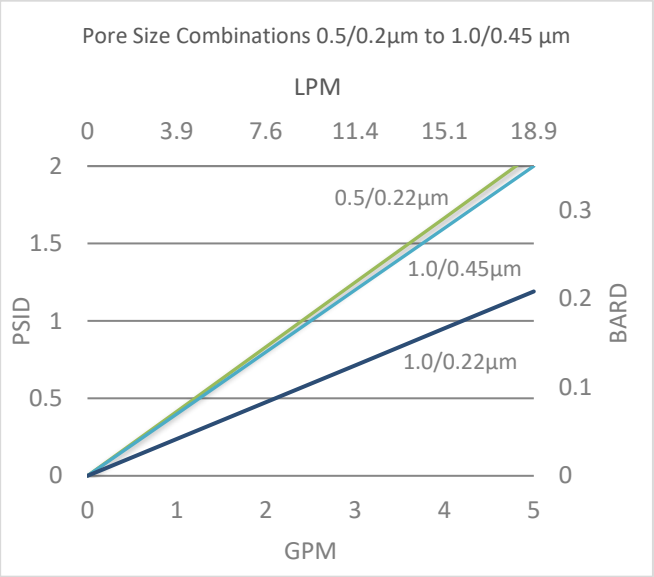
Non-Fiber Releasing

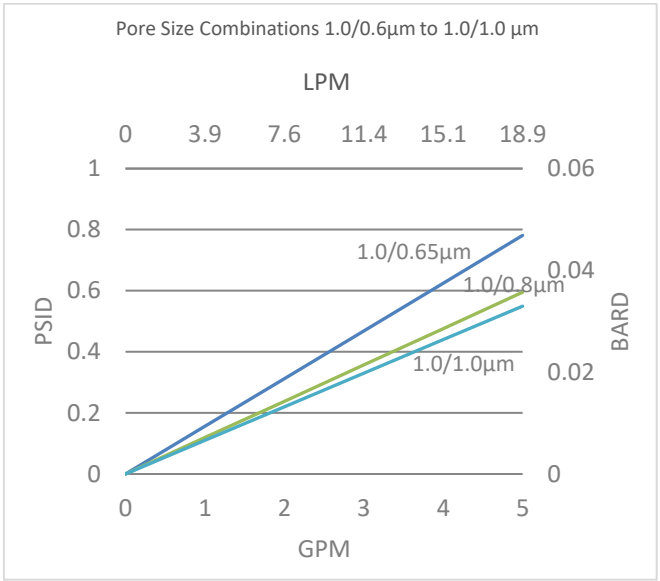
VPS filters comply with Title 21 CFR sections 210.3 (b)(6) and 211.72, for non-fiber releasing filters.

FDA 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.

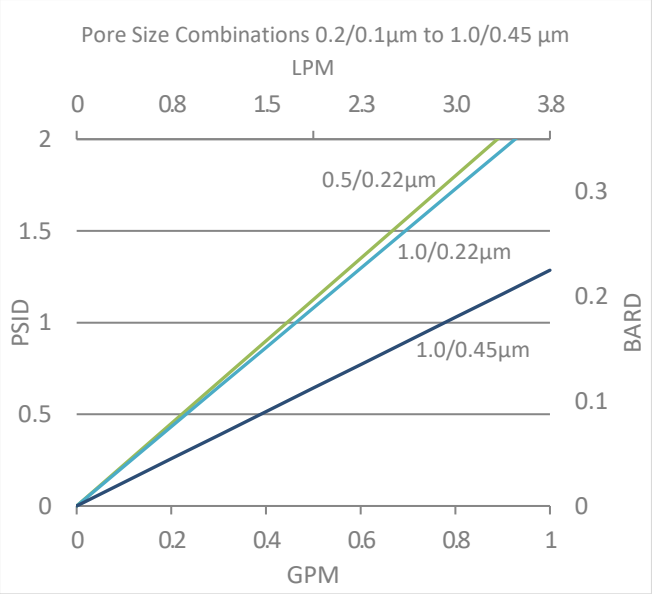
Flow Rates for VPS Cartridges

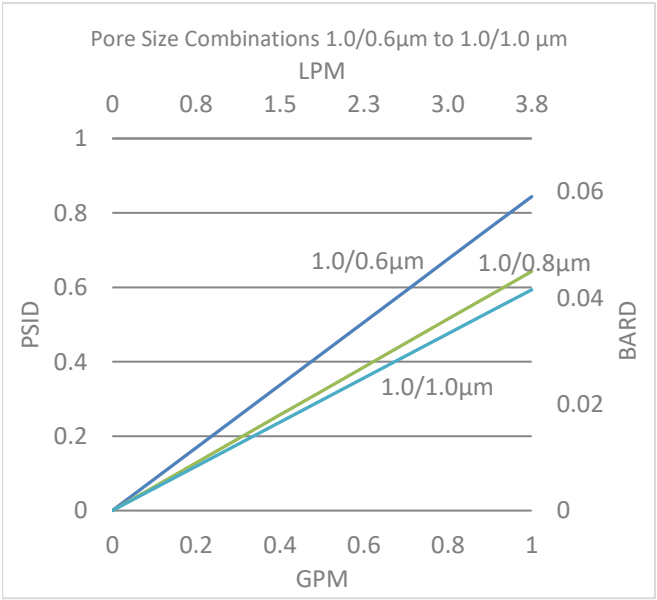




Flow rates for Cartridge filters are per 10-inch length. The test fluid is water at ambient temperature.

Flow Rates for VPS Capsules





Flow rates for Capsule filters are per square foot of membrane area. The test fluid is water at ambient temperature. Flows are tested using a 2" capsule filter with ½" FNPT inlet and outlet ports. Rates will vary based on end configuration of the capsule.

VPS Filters Ordering Information

All Critical Process filters are configurable to meet customer specifications.
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) 880-4220 Ext. 106, or send an email to sales@criticalprocess.com

Cartridge Filters

VPS [ ] [ ] [ ] 000 [ ] [ ] [ ]

Prefilter Pore Size Code
-20 = 0.2 µm
-50 = 0.5 µm
1-0 = 1.0 µm

Final Layer Pore Size Code
-10 = 0.1 µm
-20 = 0.22 µm
-40 = 0.45 µm
-60 = 0.65 µm
-80 = 0.85 µm
1-0 = 1.0 µm

SS Ring
S = Ring
N = No Ring

Length
05 = 4.875 in. (12.4 cm)
97 = 9.75 in. (24.8 cm)
01 = 10 in. (25.4 cm)
19 = 19.5 in. (49.5 cm)
02 = 20 in. (50.8 cm)
29 = 29.25 in. (74.3 cm)
03 = 30 in. (76.2 cm)
04 = 40 in. (101.6 cm)

O-Ring/Gasket Code
S = Silicone
B = Buna
V = Viton (or FKM)
T = FEP Encapsulated Viton (or FKM)
E = EPDM
R = FEP Encapsulated

End Cap Code
0 = Flat Gasket, DOE
1 = Flat Gasket/Plug
2 = 2-222 O-ring/Plug
3 = 213/119 Internal O-ring DOE
4 = 213/119 Internal O-ring/Plug
5 = 2-222 O-ring/Flat
6 = 2-226 O-ring/Flat
7 = 020 O-ring/Plug
8 = 2-222 O-ring/Spear
9 = 2-226 O-ring/Spear
21 = 2-223 O-ring/Flat
22 = 2-223 O-ring/Spear
23 = 2-222 O-ring 3 Tab/Flat
24 = 2-222 O-ring 3 Tab/Spear
25 = Short 2-222/Plug

Capsule Filters

CP VPS [ ] [ ] [ ] 000 [ ] [ ] [ ]

Prefilter Pore Size Code
-20 = 0.2 µm
-50 = 0.5 µm
1-0 = 1.0 µm

Final Layer Pore Size Code
-10 = 0.1 µm
-20 = 0.22 µm
-40 = 0.45 µm
-60 = 0.65 µm
-80 = 0.85 µm
1-0 = 1.0 µm

Length
A = 2”
B = 5”
1 = 10”
2 = 20”
3 = 30”

Pre-Sterilized or Not
S = Pre-Sterilized
N = Not Sterilized

Inlet
A = 1/4” Female NPT
B = 1/4” Male NPT
C = 3/8” Female NPT
D = 1/2” Female NPT
E = 1/2” Male NPT
F = 1”-1½” Sanitary
G = Hose Barb*

Outlet
A = 1/4” Female NPT
B = 1/4” Male NPT
C = 3/8” Female NPT
D = 1/2” Female NPT
E = 1/2” Male NPT
F = 1”-1½” Sanitary
G = Hose Barb*

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

Housings

CPF offers Model CSH sanitary housings in Single-Round (Inline and T-Style) and Multi-Round (3, 6, 8, 12 and 21-round) configurations.

CRITICAL PROCESS FILTRATION, INC.

One Chestnut Street
Nashua, NH 03060
603.880.4420
FAX: 603.880.4536

CriticalProcess.com

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