

SteriLUX® Filter



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Materials of Construction

The SteriLUX[®] filter is manufactured using high quality components made from non-toxic and biologically inert raw materials. All components of the SteriLUX[®] filter are FDA listed for food contact use in the Code of Federal Regulations (CFR), Title 21 as below:

Components

Media:	Polyvinylidene fluoride	CFR Title 21, 177.2510
Upstream support:	Polypropylene	CFR Title 21, 177.1520
Downstream support:	Polypropylene	CFR Title 21, 177.1520
Outer guard:	Polypropylene	CFR Title 21, 177.1520
Core:	Polypropylene	CFR Title 21, 177.1520
End caps:	Polypropylene	CFR Title 21, 177.1520
Adaptors:	Polypropylene	CFR Title 21, 177.1520
Capsule housing:	Polypropylene	CFR Title 21, 177.1520
O-rings:	Buna	CFR Title 21, 177.2600
	EPR	CFR Title 21, 177.2600
	Silicone	CFR Title 21, 177.2600
	Teflon [®] over Silicone	CFR Title 21, 177.1550
	Teflon [®] over Viton [®]	CFR Title 21, 177.1550
Sealing method:	Thermal bonding	

Dimensions (Nominal Sizes)

Cartridge	Diameter	Length
	2.75" (7 cm)	10" (25 cm)
		20" (50 cm)
		30" (75 cm)
		40" (100 cm)

SFE Cartridge	Diameter	Length
	2.25" (5,7 cm)	2.5" (6,4 cm)
		5" (12,7 cm)

Capsule	Diameter	Length
CL	2.75" (7,0 cm)	6.9" (17,5 cm)
CS	2.75" (7,0 cm)	4.5" (11,4 cm)
CF	2.25" (5,7 cm)	3.3" (8,3 cm)

UltraCap [®]	Diameter *	Cartridge Length (internal)	Capsule Dimension (overall)
T-style	3.25" (8 cm)	10" (25 cm)	12" (30,5 cm)
	<i>*inlet/outlet fittings extend beyond stated diameter</i>	20" (50 cm)	22" (56 cm)
		30" (75 cm)	31.5" (80 cm)
Inline	3.25" (8 cm)	10" (25 cm)	15" (38 cm)
		20" (50 cm)	24.5" (62 cm)
		30" (75 cm)	34" (86 cm)

UltraCap [®] H.D.	Diameter *	Cartridge Length (internal)	Capsule Dimension (overall)
T-style	3.5" (9 cm)	10" (25 cm)	13" (33 cm)
	<i>*inlet/outlet fittings extend beyond stated diameter</i>	20" (50 cm)	23" (58 cm)
		30" (75 cm)	32" (82 cm)
		40" (100 cm)	42" (106 cm)



Operating Characteristics

Cartridges and SFE (Small Flow Elements)

Maximum Operating Temperatures and Pressures

80 psid @ 32°F to 100°F (Δp 5,5 bar @ 0°C to 38°C)	60 psid @ 150°F (Δp 4,1 bar @ 66°C)	30 psid @ 180°F (Δp 2,1 bar @ 82°C)
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Capsules

Maximum Operating Pressure, Liquids

75 psig @ 32°F to 100°F
(5,2 bar @ 0°C to 38°C)

Maximum Operating Pressure, Gas

50 psig @ 32°F to 100°F
(3,4 bar @ 0°C to 38°C)

Maximum Operating Temperature Rating

160°F @ 35 psig
(71°C @ 2,4 bar)

UltraCap®

Maximum Operating Pressure & Temperature, Liquids

75 psig @ 32°F to 100°F
(5,2 bar @ 0°C to 38°C)

Maximum Operating Pressure & Temperature, Gas

50 psig @ 32°F to 100°F
(3,4 bar @ 0°C to 38°C)

45 psig @ 140°F
(3,1 bar @ 60°C)

30 psig @ 140°F
(2,1 bar @ 60°C)

UltraCap® H.D.

Maximum Operating Pressure & Temperature, Liquids

90 psig @ 32°F to 100°F
(6,2 bar @ 0°C to 38°C)

Maximum Operating Pressure & Temperature, Gas

60 psig @ 32°F to 100°F
(4,1 bar @ 0°C to 38°C)

55 psig @ 140°F
(3,8 bar @ 60°C)

35 psig @ 140°F
(2,4 bar @ 60°C)

Cartridge Installation Instructions

Meissner filters are available in a number of different adapter and O-ring configurations designed to fit modern filter housings. The filter should fit snugly in the housing. Improper installation can impair filtration efficiency.

1. Verify that the correct filter part number for the application has been chosen.
2. Keep the filter in its plastic bag to avoid contaminating the cartridge as long a possible. Cut open the bag at the O-ring end. While holding the bagged cartridge, lubricate the O-rings by dipping the O-rings into clean water or other suitable liquid compatible with the process fluid.
3. Line up the open end of the cartridge with the housing seat and install using a slight twisting motion while holding the bagged cartridge near the O-ring adapter. Verify that the O-rings are fully seated and not twisted. If the cartridge has locking tabs, rotate the tabs into place with a clockwise motion until engaged. Caution: always rotate cartridges while firmly grasping the O-ring end of the cartridge to prevent excessive torque damage to the filter.
4. Repeat with additional cartridges. Remove protective bags from the cartridges. If present, install cartridge retainer system (plate or spring). Reassemble housing.



Integrity Tests - Bubble Point, Diffusive Flow (Consult factory for Pressure Hold Procedure)

Wetting

Connect the filter to a clean water source. With the filter vent open and the downstream outlet closed, flow water into the filter housing. When water flows out through the vent, open the downstream outlet, close the vent and allow water to flow through the filter at 1 gpm (4 L min⁻¹) for 6 minutes for capsules or 4 gpm (15 L min⁻¹) per 10" cartridge, UltraCap® or UltraCap® module. Slower flow rates with longer times and recirculated systems may be used. After wetting, disconnect the water supply and drain the housing.

Filter and Housing – Manual Bubble Point Test

The manual bubble point test relies on a wetted, microporous membrane filter, a housing or holder to contain the wetted filter, a calibrated pressure gauge, a regulated gas pressure source—usually compressed air or nitrogen, downstream tubing, and a beaker containing water, in which the tubing is immersed. Pressure is increased gradually, until a steady stream of bubbles is observed to come from the tubing. This pressure is referred to as the bubble point. The following highlights the basic steps required to perform a bubble point test on a filter.

Procedure (Figure 1)

1. Close all valves.
2. Open valves V1 and V3 fill the housing with water or appropriate wetting fluid. Close V3 once fluid escapes. Open V6 to wet the cartridge.
3. Close V1 after the cartridge is wetted.
4. Open V2 and apply regulated air pressure to the inlet side of the system.
5. If necessary, open V4 to drain the downstream volume of water.
6. Close V4.
7. Open V5 and close V6.
8. While observing for continuous bubbling from the bubble point tube, slowly increase the air pressure. When a rapid, steady stream of bubbles is observed, the bubble point pressure has been reached. (Do not confuse the diffusive flow for the bulk gas flow of the bubble point.) Record the pressure where this occurs and compare it to the chart below.

SteriLUX® Integrity Test Values – Room Temperature

Pore size (µm) VMH or VTH	0.6		0.4		0.2		0.1	
	psi	bar	psi	bar	psi	bar	psi	bar
DI wet	14	1,0	28	1,9	50	3,4	70	4,8

9. A bubble point value lower than the specification is an indication of one of the following:
 - Fluid with different surface tension than the recommended test fluid
 - Integral filter, but wrong pore size
 - High temperature
 - Incompletely wetted membrane
 - Non-integral membrane or seal

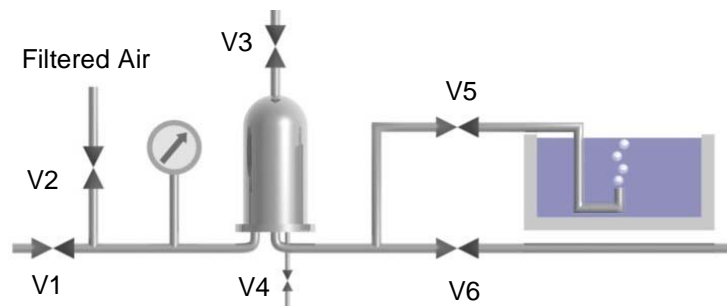


Figure 1



Capsule, UltraCap® and UltraCap® H.D. - Manual Bubble Point Test

1. Wet the filter capsule well. Drain the capsule housing.
2. Connect regulated compressed air and a calibrated gauge to the inlet and a narrow ID hose to the filter outlet and immerse the open hose end in a beaker of water. Alternatively, connect an automated integrity tester to the inlet and follow manufacturer's directions.
3. Apply air pressure to the filter to approximately 10 psi less than the minimum bubble point and observe the hose in the water beaker. The initial pleat pack compression will produce a large amount of bubbling that will decrease rapidly and be replaced by regularly spaced bubbles produced by air diffusing through the filter membrane.
4. Slowly increase the air pressure and observe the steady stream of bubbles in the water. The bubble point is the pressure at which a marked change in the rate of bubbling occurs, accompanied by an increase in sound volume. Record the pressure where this occurs and compare it to the chart below.

SteriLUX® Integrity Test Values – Room Temperature

Pore size (µm) VMH or VTH	0.6		0.4		0.2		0.1	
	psi	bar	psi	bar	psi	bar	psi	bar
DI wet	14	1,0	28	1,9	50	3,4	70	4,8

Quality Awareness - All Integrity Test Methods

1. While increasing the air pressure, do not confuse the additional bubbles produced by a rapid increase in air pressure with the bubble point. Observe the bubbles when the air pressure has stabilized.
2. If the integrity test fails, rewet the filter with additional water and repeat the test. If the filter has been used to filter product, it may take several minutes of high volume flush to remove the product and return to the water integrity test value. It is not appropriate to recirculate the water in this case.
3. To troubleshoot membrane wetting problems, the filter may be rewet with a low surface tension fluid such as 60% IPA and integrity tested in that fluid.



Filter and Housing – Manual Diffusive Flow Test

The diffusion test may be performed on SteriLUX® filter cartridges and capsules. The filter is wetted, drained and a constant air pressure is applied. Diffusional air flow through the membrane is measured.

The manual diffusive flow test relies on a wetted membrane filter of sterilizing grade, a housing or holder to contain the wetted filter, a calibrated pressure gauge, a regulated gas-pressure source, usually compressed air or nitrogen, downstream tubing, and an inverted, water-filled graduated cylinder suspended in a container of water. Test pressure is increased to the manufacturer's recommended test pressure, usually about 80% of the bubble point value for a given filter type. The following highlights the basic steps required to perform a diffusive flow test on a single cartridge filter.

Procedure (Figure 2)

1. Close all valves.
2. Open V₁ and V₆. Thoroughly wet the filter with water, opening vent V₃ to allow trapped air to escape. The complete wetting of the filter is crucial to the accuracy of the test. An incompletely wet filter will fail. Close V₁ and V₃.
3. Open V₂ and apply the specified air pressure to the inlet side of the system. This will push the upstream volume of water through the filter.
4. If necessary, open V₄ to drain the downstream volume of water. Water remaining downstream of the filter may cause an inaccurate diffusion reading by interfering with the air flow in the outlet tube. Close V₄.
5. Open V₅ and close V₆.
6. Verify the test pressure and adjust as necessary.
7. Fill a graduated cylinder with water and place the outlet tube under the inverted opening. Record the volume of air diffused per minute. The recorded flow rate must not exceed the flow rate specified for the filter per the chart below.

SteriLUX® Diffusion Values

Pore size (µm) VMH or VTH	Test pressure		mL/min		
	psi	bar	Per 10" (25 cm)	CL / 5" (12,7 cm)	CS / 2.5" (6,4 cm)
VMH0.2 / VTH0.2	40	2,8	13.5	5.7	2.7
VMH0.4 / VTH0.4	22	1,5	15	6.4	3.0
VMH0.6 / VTH0.6	9	0,6	10	-	-

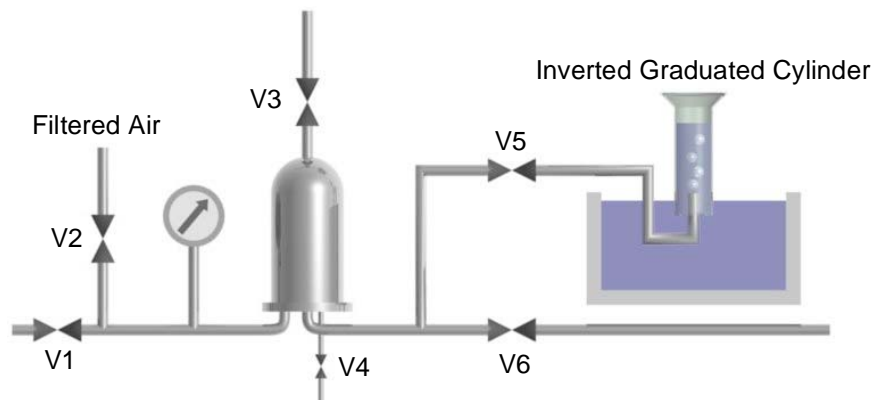


Figure 2

Autoclave Instructions

Meissner filters may be autoclaved repeatedly without loss of integrity.

Capsule, UltraCap[®] and UltraCap[®] H.D. Filters

The following outlines the steps recommended in the autoclave sterilization of Meissner filter capsules. Gamma irradiated filters should not be autoclaved before use due to increased extractables and brittleness after both sterilization methods are employed.

- 1 Loosely cover the capsule inlet and outlet with autoclave wrap. All capsule vents are on the upstream side of the filter and should be loosened or removed to facilitate steam penetration.
- 2 The weight of clamps or fittings attached to the capsule must be supported to avoid damaging the adapters. Sanitary flanges may have clamps and gaskets loosely attached to the filter. If fittings must be attached to flanges, tri-clamps are preferable to bi-clamps and should be tightened after the assembly has cooled.
- 3 Autoclave the capsule at a minimum of 121°C for 60 minutes or 125°C for at least 45 minutes with the capsule in a horizontal position using a slow exhaust or liquid cycle. T-style UltraCap[®] capsules may be autoclaved horizontally or with the outlet oriented downward to facilitate the removal of condensate from the downstream side of the filter. As autoclave systems vary, sterilization cycles should be validated under actual system or autoclave loading conditions. Downstream attachments can significantly increase the time required to sterilize the filter core.
- 4 Allow the capsule to cool. Integrity test if desired. Install filter into system aseptically.

Cartridge and SFE (Small Flow Elements)

The following outlines the steps required to autoclave a Meissner filter cartridge and housing assembly. A stainless steel reinforcement ring is required for filter configurations with 222 or 226 O-rings.

- 1 Install the filter into the housing. Loosely cover the inlet and outlet with autoclave wrap. Vent and drain valves should be fully open.
- 2 Autoclave the cartridge and housing assembly at a minimum of 121°C for 30 minutes with the filter outlets in an outlet down or horizontal position using a slow exhaust or liquid cycle. As autoclave systems vary, sterilization cycles should be validated under actual system or autoclave loading conditions. Assemblies attached to the outlet can increase the required sterilization times.
- 3 Allow the housing assembly to cool. Integrity test if desired.
- 4 Install the sterile filter assembly into the system using aseptic techniques.

Different autoclave temperature and time combinations may be used to sterilize the filters but the combination should be validated to ensure that sterilization occurs under those conditions. Temperatures above 135°C are not recommended.



Inline Steam Sterilization Procedure

Steaming in place (SIP) is frequently used in critical applications where a sterile effluent is desired. To prevent damage to the filter cartridge's O-ring adapter, cartridges with 222 or 226 O-ring adapters must be reinforced with a stainless steel ring. SteriLUX® filter cartridges with reinforced O-ring adapters are capable of repeated sterilization cycles without loss of integrity. The steps required to steam sterilize the SteriLUX® filter cartridge and system using saturated steam are outlined in the procedure, below.

The steam should be free of rust and other particulates. The housing should be clean before the cartridge is installed. If you are steam sterilizing a wetted cartridge, upstream and downstream gauges must be provided to verify that the differential pressure across the membrane does not exceed 5 psi (0,3 bar). To assure sterilization, steam pressure in the assembly must not be allowed to fall below 15 psi (1 bar) or 121°C. Condensate should be drained from the system during sterilization. A typical piping schematic is outlined in Figure 3.

Caution: Capsules, UltraCap® and UltraCap® H.D. are not designed for inline steam sterilization!

Procedure (Figure 3)

1. Close all valves.
2. Open valve V₄.
3. If cartridge is wet, open V₅.
 - a. Slowly open V₂. This will connect both sides of the filter to steam pressure.
 - b. Crack open V₇ to vent trapped air.
 - c. Crack open V₆ allowing steam to flow through the system.
 - d. Slowly close V₅ but do not allow the differential pressure across the cartridge to exceed 5 psi (0,3 bar).
 - e. Leave drain V₈ cracked during sterilization to drain condensate.
4. If sterilizing a dry cartridge, slowly open V₂.
 - a. Crack open V₇ to vent trapped air.
 - b. Crack open V₆ to allow steam to flow through the system. Do not allow the differential pressure across the cartridge to exceed 5 psi (0,3 bar).
 - c. Leave drain V₈ cracked during sterilization to drain condensate.
5. Steam sterilize for 30 to 60 minutes at 15 to 20 psig (1,0 to 1,4 bar), or as long as experience dictates.
6. When sterilization is complete, close V₂.
7. Open V₃ and introduce sterile air or nitrogen regulated to the same pressure as the steam.
8. Close V₈ once steam and condensate flow stops.
9. Allow the system to cool to room temperature. Do not allow the differential pressure across the cartridge to exceed 5 psi (0,3 bar). Then close V₃, V₇ and V₆. Keep the system under pressure until ready for use.
10. Crack vent V₇ and allow the system pressure to equalize. The filtration process may now be started or the filter can be wetted and integrity tested.

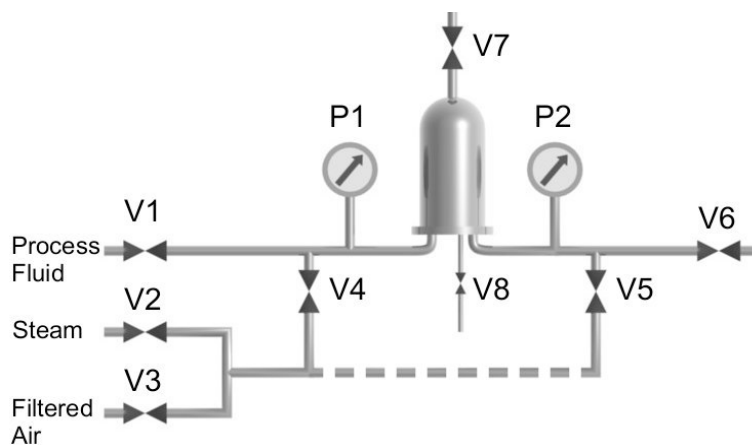


Figure 3

Storage and Shelf Life

Meissner Filtration Products, Inc. manufactures a complete line of filter products including cartridges, capsules and discs. Filters are suitably bagged and boxed for shipping and may be stored in the original packaging in a clean dry area between 0°C to 38°C (32°F to 100°F) for extended periods of time. The following gives the minimum shelf life expectancies for SteriLUX® products.

Five Years

SteriLUX® filters have an expected shelf life greater than five years in the cartridge, small flow, non-irradiated capsule and disc configurations.

Two Years

Gamma irradiated products, which include Capsule, UltraCap® and UltraCap® H.D. filters as well as the entire DPS™ product line have an expected shelf life of greater than two years after irradiation. Gamma irradiated filters are distinguished with part numbers beginning with the letter “G”. Filters that are part of a DPS™ product begin with “C” and are irradiated once with the DPS™ assembly.







Filters may be used beyond their minimum expected shelf life if they were stored in their original packaging and are integrity tested prior to use and found to be within specification. Filter and DPS™ product age can be determined from the date on the original Certificate of Quality or Conformance.



SteriLUX® - Grade Descriptions

- VMH =** This sterilizing grade filter is absolute, microbially rated and 100% integrity tested and flushed with DI water during manufacture. It is suited for critical applications when regulatory documentation requirements are minimal. A Certificate of Conformance is available on a lot basis.
- VTH =** This absolute, microbially rated filter meets full traceability requirements for the pharmaceutical industry. It is 100% integrity tested and flushed with DI water during manufacture. Each VTH grade filter is shipped with a Certificate of Quality stating exact quality control criteria and test performance results. This is a validatable product to meet the stringent requirements of the pharmaceutical industry.
- VLH =** This VMH grade filter is not 100% integrity tested or flushed with DI water during manufacture. It is offered as an economical prefilter or final filter when sterility assurance and validation are not required.
- VPH =** This is an absolute, particulate rated filter. It is 100% integrity tested and DI flushed during manufacture.

CARTRIDGES

VMH	0.1	—	2	C6	R	S
		—				
Filter Grade	Absolute Rating (µm)	—	Cartridge Length	End Cap Configuration	Reinforcement Ring Option	Seal Material (O-ring or Gasket)
VMH	0.1, 0.2, 0.4, 0.6	—	1 = 10"	GS = DOE; flat gaskets (9.75", 19.5", 29.25", 39" length filters)	(Blank) = Standard - no reinforcement ring	<u>O-ring Seal</u> B = Buna
VTH	0.1, 0.2, 0.4, 0.6	—	2 = 20"	GL = DOE; flat gaskets (20", 30", 40" length filters)	R = Reinforcement ring required for autoclave/ SIP applications	E = EPR
VLH	0.1, 0.2, 0.4, 0.6	—	3 = 30"	C1 = SOE; -222 nO-ring®, button cap end		S = Silicone
VPH	0.1, 0.2, 0.4	—	4 = 40"	C2 = SOE; -222 O-rings, button cap end		T = Teflon® over Silicone
				F1 = SOE; -222 nO-ring®, fin end		V = Viton®
				F2 = SOE, -222 O-rings, fin end		X = Teflon® over Viton®
				C5 = SOE; -226 nO-ring®, button cap end		<u>Gasket Seal</u> B = Buna
				F5 = SOE; -226 nO-ring®, fin end		E = EPR
				C6 = SOE; -226 O-rings, button cap end		P = Polyethylene
				F6 = SOE; -226 O-rings, fin end		S = Silicone
						T = Teflon®
						V = Viton®

Small Flow Elements — SFE Configuration

L	VMH	0.2	—	5	6	R	S
<input type="text"/>	<input type="text"/>	<input type="text"/>	—	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Model	Filter Grade	Absolute Rating (µm)	—	Filter Length/(Area) nominal	Adapter Selection	Reinforcement Ring Option	O-ring Material
L	VMH	0.1, 0.2, 0.4, 0.6		2 = 2.5" (1000 cm ²)	P = Standard internal 116 O-ring	(Blank) = Standard - no reinforcement ring	B = Buna E = EPR
	VTH	0.1, 0.2, 0.4, 0.6		5 = 5.0" (2000 cm ²)	6 = -226 O-ring style locking adapter (for autoclave/SIP applications, select "R" under "Reinforcement Ring Option")	R = Reinforcement ring - required only for the -226 adapter when autoclaving or steam sterilizing	S = Silicone T = Teflon® over Silicone V = Viton® X = Teflon® over Viton®
	VPH	0.1, 0.2, 0.4					

Small Flow Elements — SKR Configuration

L	VMH	0.2	—	5	SK
<input type="text"/>	<input type="text"/>	<input type="text"/>	—	<input type="text"/>	<input type="text"/>
Model	Filter Grade	Absolute Rating (µm)	—	Filter Length/(Area) nominal	Adapter Selection
L	VMH	0.1, 0.2, 0.4, 0.6		2 = 2.5" (1000 cm ²)	SK = Skirt-flange
	VTH	0.1, 0.2, 0.4, 0.6		5 = 5.0" (2000 cm ²)	
	VPH	0.1, 0.2, 0.4			

CAPSULE — CS/CL

C	S	VMH	0.2	—	02	2
Sterile Option	Filtration Area (nominal)	Filter Grade	Absolute Rating (µm)	—	Inlet/Outlet	Upstream Vent(s)
C = Standard (non-sterile)	S = 1.0 ft ² (1000 cm ²)	VMH	0.1, 0.2, 0.4, 0.6		00 = 1" sanitary flange	0 = No vent/drain port
G = Gamma irradiated	L = 2.0 ft ² (2000 cm ²)	VTH	0.1, 0.2, 0.4, 0.6		02 = 1" sanitary flange inlet; 3/8" hose barb outlet	1 = 1 Luer-Lok® port with cap, outlet side
		VPH	0.1, 0.2, 0.4		0C = 1" sanitary flange inlet; 1/2" hose barb outlet	2 = Standard - 2 Luer-Lok® ports with caps
					22 = 3/8" hose barb	4 = 2 sanitary valves with hose barb
					2B = 3/8" hose barb with filling bell	5 = 1 sanitary valve with hose barb connection. outlet side
					CC = 1/2" hose barb	
					44 = 1/4" MNPT	
					55 = 3/8" FNPT	
					66 = 3/8" MNPT	
					77 = 3/4" sanitary flange	

UltraCap® — T-Style

CU	VMH	0.2	—	2	T	00	2
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	—	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sterile Option	Filter Grade	Absolute Rating (µm)	—	Cartridge Length	Body Style	Inlet/Outlet	Vent/Drain Ports
CU = Standard (non-sterile)	VMH	0.1, 0.2, 0.4, 0.6	—	1 = 10"	T = T-style	00 = 1" sanitary flange	0 = No vent or drain
GU = Gamma-irradiated	VTH	0.1, 0.2, 0.4, 0.6	—	2 = 20"		02 = 1" sanitary flange inlet; 3/8" hose barb outlet	1 = No vent; 1/4" sanitary drain plug
	VLH	0.1, 0.2, 0.4, 0.6	—	3 = 30"		09 = 1" sanitary flange inlet; 9/16" hose barb outlet	2 = Sanitary vent; 1/4" sanitary drain plug
	VPH	0.1, 0.2, 0.4	—			0C = 1" sanitary flange inlet; 1/2" hose barb outlet	3 = Sanitary vent; 3/4" sanitary flange gauge port; 1/4" sanitary drain plug
			—			22 = 3/8" hose barb	4 = Sanitary vent; no drain
			—			77 = 3/4" sanitary flange	5 = Sanitary vent; 3/4" sanitary flange gauge port; no drain
			—			88 = 3/4" hose barb	
			—			99 = 9/16" hose barb	
			—			AA = 1/2" Flaretek®	
			—			BB = 3/4" Flaretek®	
			—			CC = 1/2" hose barb	

UltraCap® — Inline

CU	VMH	0.2	—	2	N	00	2
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	—	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sterile Option	Filter Grade	Absolute Rating (µm)	—	Cartridge Length	Body Style	Inlet/Outlet	Vent/Drain Ports
CU = Standard (non-sterile)	VMH	0.1, 0.2, 0.4, 0.6	—	1 = 10"	N = Inline	00 = 1" sanitary flange	0 = No vent/drain valves
GU = Gamma-irradiated	VTH	0.1, 0.2, 0.4, 0.6	—	2 = 20"		02 = 1" sanitary flange inlet; 3/8" hose barb outlet	2 = 2 vents/drain valves
	VLH	0.1, 0.2, 0.4, 0.6	—	3 = 30"		09 = 1" sanitary flange inlet; 9/16" hose barb outlet	4 = 1 vent/drain valve at outlet
	VPH	0.1, 0.2, 0.4	—			0C = 1" sanitary flange inlet; 1/2" hose barb outlet	
			—			22 = 3/8" hose barb	
			—			77 = 3/4" sanitary flange	
			—			88 = 3/4" hose barb	
			—			99 = 9/16" hose barb	
			—			AA = 1/2" Flaretek®	
			—			BB = 3/4" Flaretek®	
			—			CC = 1/2" hose barb	

UltraCap® H.D. (Heavy Duty)

CR	VMH	0.2	—	2	T	00	2	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	—	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Sterile Option	Filter Grade	Absolute Rating (µm)	—	Cartridge Length	Body Style	Inlet/Outlet	Vent/Drain Ports	
CR = Standard (non-sterile)	VMH	0.1, 0.2, 0.4, 0.6	—	1 = 10"	T = T-style	00 = 1" sanitary flange	0 = No vent or drain	
GR = Gamma-irradiated	VTH	0.1, 0.2, 0.4, 0.6	—	2 = 20"		02 = 1" sanitary flange inlet; 3/8" hose barb outlet	1 = No vent; 1/4" sanitary drain plug	
	VLH	0.1, 0.2, 0.4, 0.6	—	3 = 30"		09 = 1" sanitary flange inlet; 9/16" hose barb outlet	2 = Sanitary vent; 1/4" sanitary drain plug	
	VPH	0.1, 0.2, 0.4	—	4 = 40"			0C = 1" sanitary flange inlet; 1/2" hose barb outlet	3 = Sanitary vent; 3/4" sanitary flange gauge port; 1/4" sanitary drain plug
							22 = 3/8" hose barb	4 = Sanitary vent; no drain
						77 = 3/4" sanitary flange	5 = Sanitary vent; 3/4" sanitary flange ga	
						88 = 3/4" hose barb		
						99 = 9/16" hose barb		
						AA = 1/2" Flaretek®		
						BB = 3/4" Flaretek®		
						CC = 1/2" hose barb		

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