



# Sterilizing-Grade Aervent® Filters

## Premium choice for critical sterile gas filtration

Aervent® filters contain sterilizing-grade 0.2 µm Aervent® polytetrafluoroethane (PTFE) hydrophobic membrane designed to provide efficient gas filtration. It is recommended for critical applications requiring a phobic filter with validated bacterial and viral retention capabilities.

Filters with hydrophobic Aervent® membrane are designed, developed, and manufactured in accordance with a Quality Management System approved by an accredited registering body to an ISO® 9001 Quality Systems Standard. Each filter is shipped with a Certificate of Quality. Each Opticap® XL capsule, cartridge, and Optiseal® cartridge filter is integrity tested during manufacturing and is supported with a comprehensive validation package for compliance with regulatory requirements. For traceability and easy identification, each filter is labeled with the product name, lot number and serial number.



### Benefits

- Reliable particulate and microorganism retention
- Unparalleled thermal and hydraulic stress resistance
- Validated to withstand multiple sterilization cycles

### Multiple Formats Available

Hydrophobic Aervent® membranes are available in three device formats, different filtration areas, and multiple configurations that offer end users better flexibility.

### Membrane Types

- Aervent® 0.2 µm sterilizing-grade PTFE membrane

### Filter Formats

- Opticap® XL disposable capsule filters
- Cartridge filters
- Optiseal® cartridge filters
- Optiseal®-M cartridge filters

## **Opticap® XL and XLT Capsules**

### **For Pilot and Production Scale Processing**

Our Opticap® XL and XLT single-use capsule filters are available in multiple filtration areas, are gamma or autoclave compatible, and offer a range of inlet and outlet connections.

## **Cartridge Filters**

### **For Pilot and Production Scale Processing**

Our hydrophobic Aervent® cartridge filters are designed for use in stainless-steel housings and provide high throughput and minimal differential pressure. These cartridges are robust, strong, and resilient and are designed to withstand multiple steam-in-place cycles.

A full range of filtration areas and connection options are available for maximum flexibility.

## **Optiseal® and Optiseal®-M Cartridges**

Optiseal® cartridge filters with Aervent® membranes feature a robust cartridge-to-housing sealing mechanism and are designed for use in stainless steel housings.

## Specifications

Capsule Filters	Opticap® XL 2 Capsule	Opticap® XL 4 Capsule	Opticap® XL 5 Capsule	Opticap® XL 10 Capsule
<b>Nominal Dimensions</b>				
Maximum length:	14.3 cm (5.6 in.)	19.6 cm (7.7 in.)	21.6 cm (8.5 in.)	33.5 cm (13.2 in.)
Body diameter:	8.4 cm (3.3 in.)	8.4 cm (3.3 in.)	10.7 cm (4.2 in.)	10.7 cm (4.2 in.)
Vent to vent diameter:	12.5 cm (4.9 in.)	12.5 cm (4.9 in.)	14.5 cm (5.7 in.)	14.5 cm (5.7 in.)
<b>Filtration Area</b>	0.10 m <sup>2</sup> (1.1 ft <sup>2</sup> )	0.21 m <sup>2</sup> (2.3 ft <sup>2</sup> )	0.32 m <sup>2</sup> (3.5 ft <sup>2</sup> )	0.65 m <sup>2</sup> (7.0 ft <sup>2</sup> )
<b>Materials of Construction</b>				
Filter media:	Hydrophobic PTFE			
Supports:	Polypropylene			
Structural components:	Polypropylene			
Vent O-rings:	Silicone			
<b>Vent/Drain</b>	¼ in. hose barb with double O-ring seal			
<b>Maximum Inlet Pressure</b>	5.5 bar (80 psi) at 23 °C			
	2.8 bar (40 psi) at 60 °C			
	1.0 bar (15 psi) at 80 °C			
<b>Maximum Differential Pressure</b>				
Forward	5.5 bar (80 psid) at ambient temperature, 1.0 bar (15 psid) at 80 °C			
Reverse	4.1 bar (60 psid) intermittent			
<b>Bubble Point at 23 °C</b>	≥ 1100 mbar (16 psig) in 70/30 IPA/water			
<b>Air Diffusion</b>	Through 70/30% IPA/water wet membrane at ambient room temperature and 970 mbar (14 psig) nitrogen:			
	-	≤ 9 cc/min	≤ 12 cc/min	≤ 24 cc/min
<b>HydroCorr™ Test</b>	At 2620 mbar (38 psig)			
	≤ 0.12 mL/min	≤ 0.25 mL/min	≤ 0.38 mL/min	≤ 0.75 mL/min
<b>Gravimetric Extractables</b>	After autoclaving and 24 hr soak in 70/30% IPA/water at controlled room temperature:			
	≤ 15 mg	≤ 15 mg	≤ 28 mg	≤ 45 mg
<b>Bacterial Endotoxin</b>	Aqueous extraction contains < 0.25 EU/mL as determined by the Limulus Amebocyte Lysate (LAL) Test.			
<b>Bacterial Retention</b>	Quantitative retention of 10 <sup>7</sup> CFU/cm <sup>2</sup> <i>Brevundimonas diminuta</i> ATCC® 19146 per ASTM® F838 methodology			
<b>Sterilization</b>	May be autoclaved for 30 cycles of 30 minutes at 135 °C.			
<b>Non-Fiber Releasing</b>	Aervent® membrane meets the criteria for a “non-fiber releasing” filter as defined in 21 CFR 210.3 (b) (6).			
<b>Component Material Toxicity</b>	Component materials meet the criteria of the USP <88> Biological Reactivity <i>in vivo</i> test for Class VI Plastics. This product is non-cytotoxic per ISO® 10993-5 and USP <87> Biological reactivity <i>in vitro</i> tests.			
<b>European Pressure Equipment Directive</b>				We certify that the Opticap® XL10 capsule filter complies with the European Pressure Equipment Directive, 2014/68/EU of 15 May 2014. The Opticap® XL10 capsule filter has been classified under Article 4 § 3 of the Directive 2014/68/EU. It has been designed and manufactured in accordance with sound engineering practice to ensure safe use. In compliance with Article 4 § 3 of the Directive 2014/68/EU, the Opticap® XL10 capsule filter does not bear the CE mark.
<b>Viral Aerosol Retention</b>	Rated for aerosol retention of a total challenge of 10 <sup>8</sup> –10 <sup>10</sup> plaque forming units of φX-174 virus particles at 50 SCFM per 10-inch cartridge.			
<b>Bacterial Aerosol Growth</b>	Retains <i>B. diminuta</i> liquid aerosol for 21 days at a minimum challenge of 10 <sup>7</sup> CFU/cm <sup>2</sup> .			

## Specifications

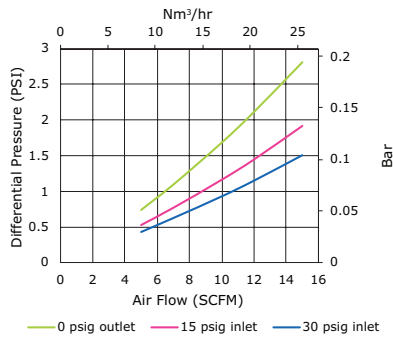
Cartridge Filters	5-inch Cartridge	10-inch Cartridge
<b>Nominal Dimensions</b>		
Maximum length:	12.5 cm (5 in.)	25 cm (10 in.)
Vent to vent diameter:	6.9 cm (2.7 in.)	6.9 cm (2.7 in.)
<b>Filtration Area</b>	0.32 m <sup>2</sup> (3.5 ft <sup>2</sup> )	0.65 m <sup>2</sup> (7.0 ft <sup>2</sup> )
<b>Materials of Construction</b>		
Filter media:	Hydrophobic PTFE	
Supports:	Polypropylene	
Structural components:	Polypropylene	
O-rings:	Silicone	
Vent O-rings:	Stainless Steel	
<b>Maximum Differential Pressure</b>		
Forward	5.5 bar (80 psid) at ambient temperature, 1.8 bar (25 psid) at 80 °C	
Reverse	4.1 bar (60 psid) intermittent	
<b>Bubble Point at 23 °C</b>	≥ 1100 mbar (16 psig) in 70/30 IPA/water	
<b>Air Diffusion</b>	Through 70/30% IPA/water wet membrane at ambient room temperature and 970 mbar (14 psig) nitrogen: ≤ 12 cc/min ≤ 24 cc/min	
<b>HydroCorr™ Test</b>	At 2620 mbar (38 psig) ≤ 0.38 mL/min ≤ 0.75 mL/min	
<b>Gravimetric Extractables</b>	After autoclaving and 24 hr soak in 70/30% IPA/water at controlled room temperature: ≤ 18 mg ≤ 35 mg	
<b>Bacterial Endotoxin</b>	Aqueous extraction contains < 0.25 EU/mL as determined by the Limulus Amebocyte Lysate (LAL) Test.	
<b>Bacterial Retention</b>	Quantitative retention of 10 <sup>7</sup> CFU/cm <sup>2</sup> <i>Brevundimonas diminuta</i> ATCC® 19146 per ASTM® F838 methodology	
<b>Sterilization</b>	May be steam sterilized 100 times (forward) and 50 times (reverse) for 30 minutes at 145 °C.	
<b>Non-Fiber Releasing</b>	Aervent® membrane meets the criteria for a “non-fiber releasing” filter as defined in 21 CFR 210.3 (b) (6).	
<b>Component Material Toxicity</b>	Component materials meet the criteria of the USP <88> Biological Reactivity <i>in vivo</i> test for Class VI Plastics. This product is non-cytotoxic per ISO® 10993-5 and USP <87> Biological reactivity <i>in vitro</i> tests.	
<b>Viral Aerosol Retention</b>	Rated for aerosol retention of a total challenge of 10 <sup>8</sup> –10 <sup>10</sup> plaque forming units of φX-174 virus particles at 50 SCFM per 10-inch cartridge.	
<b>Bacterial Aerosol Growth</b>	Retains <i>B. diminuta</i> liquid aerosol for 21 days at a minimum challenge of 10 <sup>7</sup> CFU/cm <sup>2</sup> .	

## Specifications

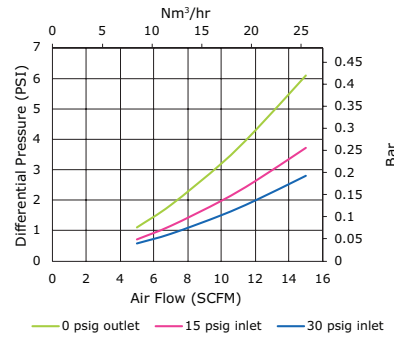
Optiseal® Cartridge Filters	Optiseal® Cartridge	Optiseal®-M Cartridge
<b>Filtration Area</b>	0.18 m <sup>2</sup> (1.9 ft <sup>2</sup> )	0.05 m <sup>2</sup> (0.54 ft <sup>2</sup> )
<b>Materials of Construction</b>		
Filter media:	PTFE membrane	
Outer sleeve, core, end caps, pleat supports:	Polypropylene	
O-rings:	Silicone	
<b>Maximum Differential Pressure</b>		
Forward	5.5 bar (80 psid) at ambient temperature 1.75 bar (25 psid) at 80 °C 0.35 bar (5 psid) at 135 °C	
Reverse	4.1 bar (60 psid) intermittent	
<b>Bubble Point at 23 °C</b>	≥ 1100 mbar (16 psig) in 70/30 IPA/water	
<b>Air Diffusion</b>	Through 70/30% IPA/water wet membrane at ambient room temperature and 970 mbar (14 psig) nitrogen: ≤ 6 cc/min	-
<b>HydroCorr™ Test</b>	At 2.6 bar (38 psig) ≤ 0.2 mL/min	≤ 0.06 mL/min
<b>Gravimetric Extractables</b>	After autoclaving and 24 hr soak in 70/30% IPA/water at controlled room temperature: ≤ 10 mg	≤ 10 mg
<b>Sterilization</b>	May be sterilized 40 times forward and 40 times reverse for 30 minutes at 135 °C	Maintained integrity after 80 steam cycles of 30 minutes at 135°C
<b>Bacterial Endotoxin</b>	Aqueous extraction contains < 0.25 EU/mL as determined by the Limulus Amebocyte Lysate (LAL) Test.	
<b>Bacterial Retention</b>	Quantitative retention of 10 <sup>7</sup> CFU/cm <sup>2</sup> <i>Brevundimonas diminuta</i> ATCC® 19146 per ASTM® F838 methodology	
<b>Component Material Toxicity</b>	Component materials meet the criteria of the USP <88> Biological Reactivity <i>in vivo</i> test for Class VI Plastics. This product is non-cytotoxic per ISO® 10993-5 and USP <87> Biological reactivity <i>in vitro</i> tests.	
<b>Non-Fiber Releasing</b>	Aervent® membrane meets the criteria for a “non-fiber releasing” filter as defined in 21 CFR 210.3 (b) (6).	
<b>Bacterial Aerosol Growth</b>	Retains <i>B. diminuta</i> liquid aerosol for 21 days at a minimum challenge of 10 <sup>7</sup> CFU/cm <sup>2</sup> .	
<b>Viral Aerosol Retention</b>	Rated for aerosol retention of a total challenge of 10 <sup>8</sup> -10 <sup>10</sup> plaque forming units of φX-174 virus particles at 50 SCFM per 10-inch cartridge.	

# Air Flow Rate and Pressure Drop – Opticap® XL Capsule Filters

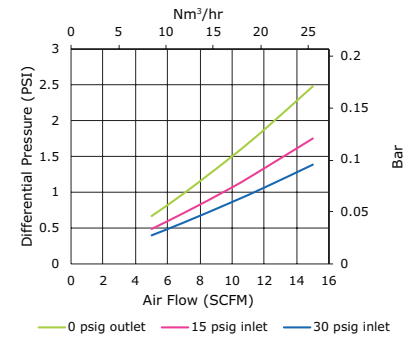
**Opticap® XL 2 Capsule with 0.2 µm Aervent® Membrane – FF Fitting**



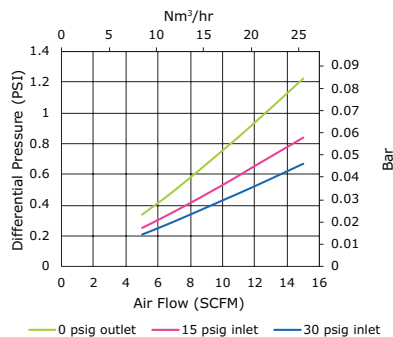
**Opticap® XL 2 Capsule with 0.2 µm Aervent® Membrane – HH Fitting**



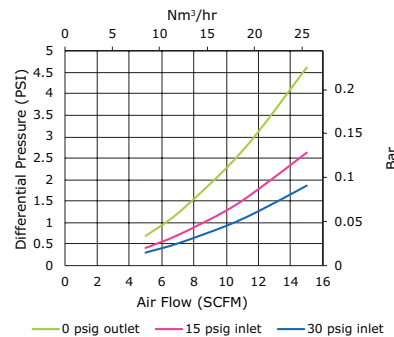
**Opticap® XL 2 Capsule with 0.2 µm Aervent® Membrane – TT Fitting**



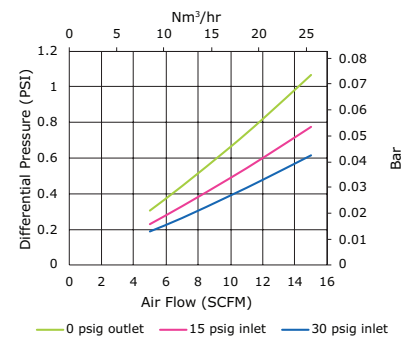
**Opticap® XL 4 Capsule with 0.2 µm Aervent® Membrane – FF Fitting**



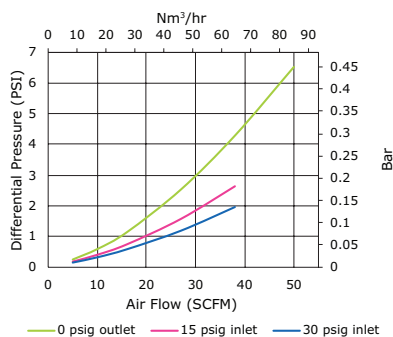
**Opticap® XL 4 Capsule with 0.2 µm Aervent® Membrane – HH Fitting**



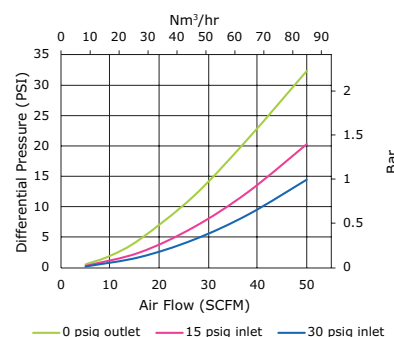
**Opticap® XL 4 Capsule with 0.2 µm Aervent® Membrane – TT Fitting**



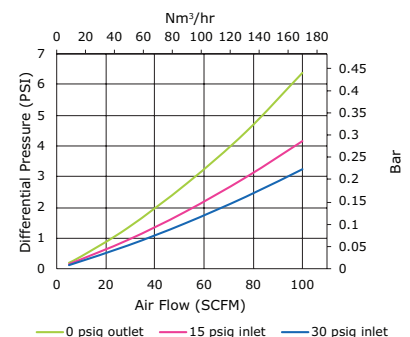
**Opticap® XL 5 Capsule with 0.2 µm Aervent® Membrane – FF Fitting**



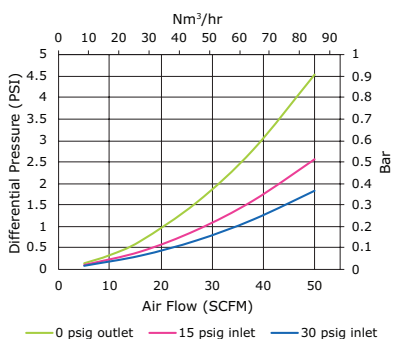
**Opticap® XL 5 Capsule with 0.2 µm Aervent® Membrane – HH Fitting**



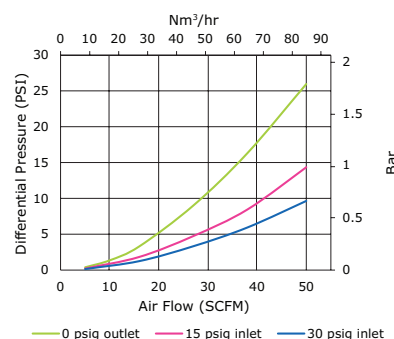
**Opticap® XL 5 Capsule with 0.2 µm Aervent® Membrane – TT Fitting**



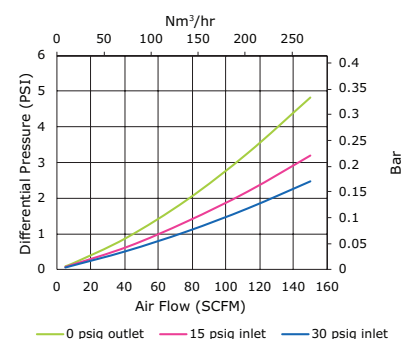
**Opticap® XL 10 Capsule with 0.2 µm Aervent® Membrane – FF Fitting**



**Opticap® XL 10 Capsule with 0.2 µm Aervent® Membrane – HH Fitting**

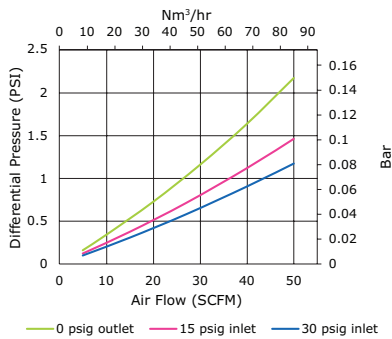


**Opticap® XL 10 Capsule with 0.2 µm Aervent® Membrane – TT Fitting**

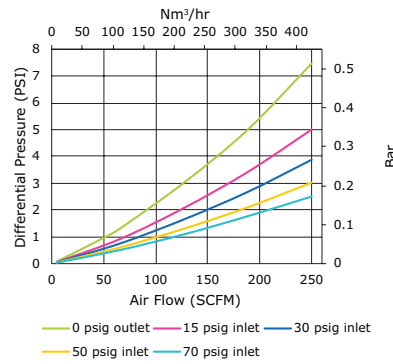


# Air Flow Rate and Pressure Drop – Cartridge Filters

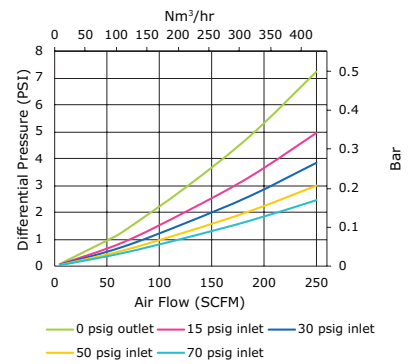
**5-inch Cartridge with 0.2 µm Aervent® Membrane – Code 7**



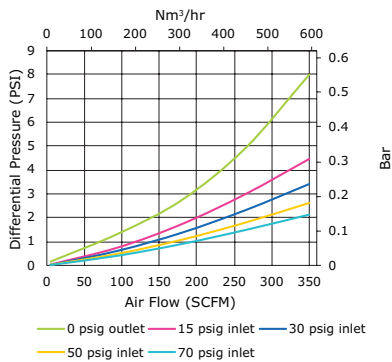
**10-inch Cartridge with 0.2 µm Aervent® Membrane – Code 0 and 5**



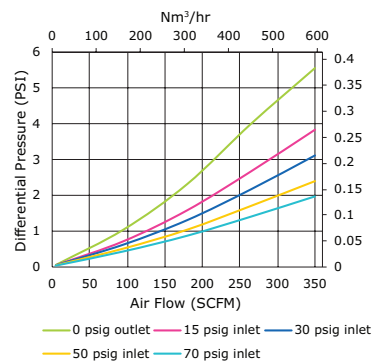
**10-inch Cartridge with 0.2 µm Aervent® Membrane – Code 7**



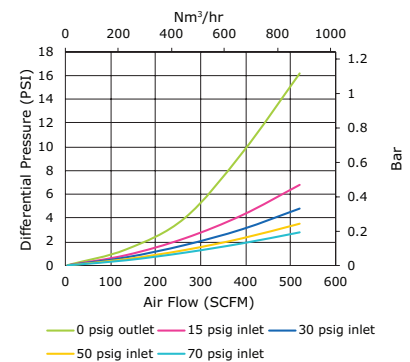
**20-inch Cartridge with 0.2 µm Aervent® Membrane – Code 0 and 5**



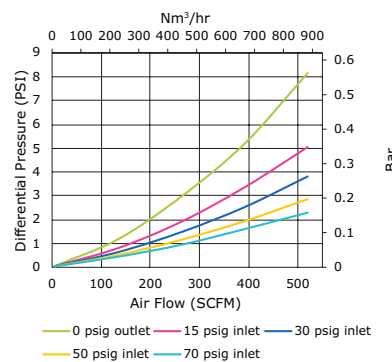
**20-inch Cartridge with 0.2 µm Aervent® Membrane – Code 7**



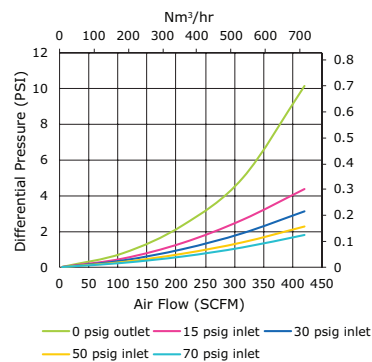
**30-inch Cartridge with 0.2 µm Aervent® Membrane – Code 0 and 5**



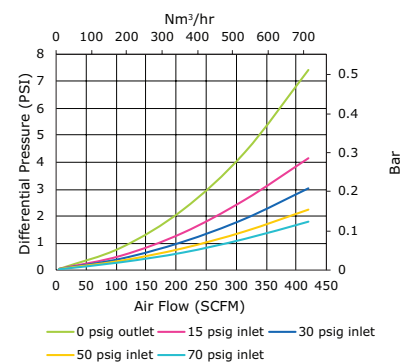
**30-inch Cartridge with 0.2 µm Aervent® Membrane – Code 7**



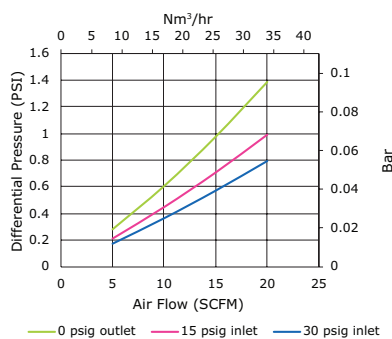
**40-inch Cartridge with 0.2 µm Aervent® Membrane – Code 0 and 5**



**40-inch Cartridge with 0.2 µm Aervent® Membrane – Code 7**

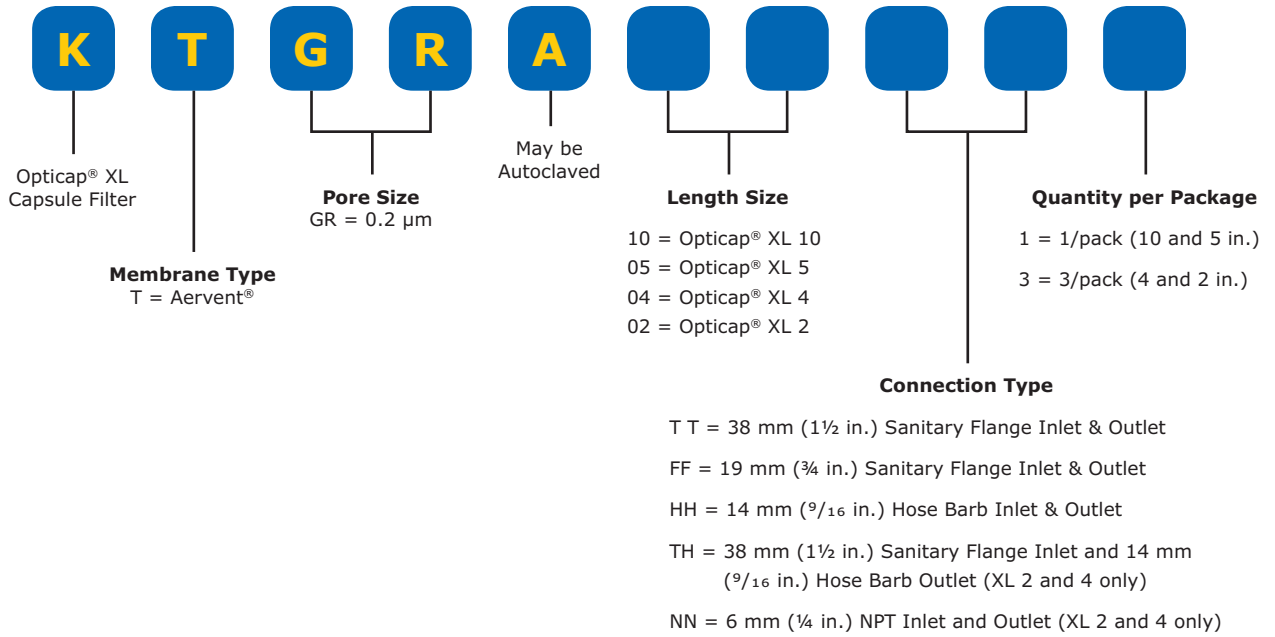


**Optiseal® Cartridge with 0.2 µm Aervent® Membrane**

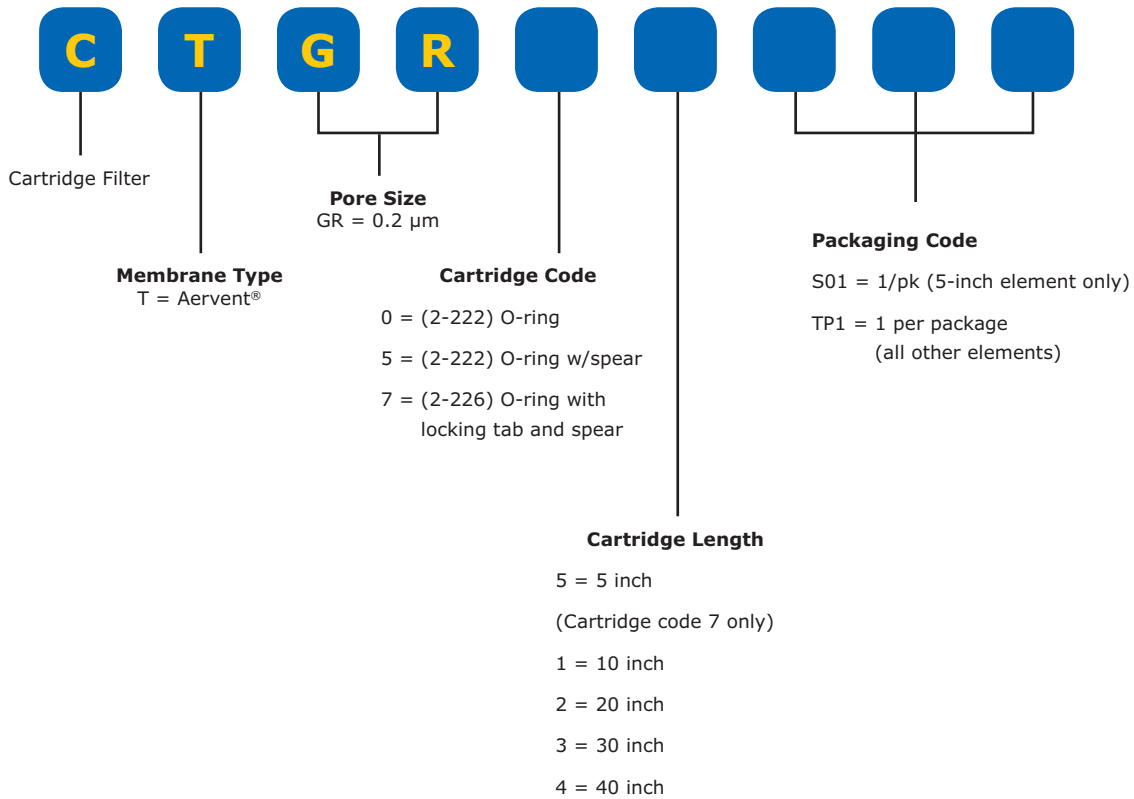


# Ordering Information

## Opticap® XL Capsule Filters



## Cartridge Filters





## Ordering Information

Description	Qty/Pk	Cat. No.
Optiseal® cartridge filter with 0.2 µm Aervent® membrane	1	LAGR04TP1
Optiseal® cartridge filters with 0.2 µm Aervent® membrane	6	LAGR04TP6
Optiseal®-M cartridge filters with 0.2 µm Aervent® membrane	2	LAGRM1S02
Optiseal® housing assembly	1	HP01PPVNO
<b>Housing Accessories</b>		
Housing bowl	1	SPPS00001
Housing base	1	HP01PBVNO
1½ TC clamp, (inlet & outlet)	1	YY2004045
1½ TC gasket, silicone, 10 pk	1	YY2004055
Bowl-to-base clamp	3-piece	SPPS00003
Bowl-to-base O-ring, silicone	1	SPPS00004
Vent/Drain valve	1	SPPS00005
Vent/Drain valve O-ring, silicone	1	SPPS00006
Vent seal plug, EPR	1	P17023X2
Vent seal plug, Silicone	1	P17023X3
Vent seal plug, fluoroelastomer	1	P17023X1

### To Place an Order or Receive Technical Assistance

In the U.S. and Canada, call toll-free  
1(800)-645-5476

For other countries across Europe, call  
+44 (0) 115 943 0840

For additional information, please visit  
[EMDMillipore.com](https://www.EMDMillipore.com)

To place an order or receive technical  
assistance, please visit  
[EMDMillipore.com/contactPS](https://www.EMDMillipore.com/contactPS)

MilliporeSigma  
400 Summit Drive  
Burlington, MA 01803

