

# Clarification Portfolio Guide

Single-use and multi-use products for the successful development and implementation of robust clarification processes.



# Single-use



## Millistak+® depth filters

Available in a wide range of media grades and device formats (pod and lenticular) in both single-, and multi-layer configurations for primary and secondary clarification applications including cell culture, yeast, *E. coli* refolds, vaccines and plasma proteins.

[Ordering Information](#)



## Clarisolve® depth filters

Developed to address the needs of challenging high cell density feed streams where pre-treatment methodologies are being implemented.

[Ordering Information](#)



## Polygard® and Clarigard® cartridge filters

Available in a variety of media grades and device formats. Designed for clarification and pre-filtration of liquids and gases in pharmaceutical, biological, food and beverage, fine chemical and industrial applications.

[Ordering Information](#)



## Polysep™ II pre-filters\*

Combining the dirt-holding capacity of a depth filter with the retention efficiency of a membrane filter, Polysep™ II filters provide multiple filtration stages in a single compact configuration for critical pre-filtration applications.

[Ordering Information](#)

# Multi-use



## Prostak™ open-channel modules\*

Tangential flow stacked plate membrane devices with open feed channels for convenient and economical clarification/concentration applications.

[Ordering Information](#)



## Pellicon® 2 cassettes\*

High-performance tangential flow filters for biopharmaceutical process development, scale-up/scale-down and concentration/purification/cell harvesting applications.

[Ordering Information](#)

# Millistak+<sup>®</sup> and Clarisolve<sup>®</sup> depth filters

## Introduction

These depth filters are available in a variety of media grades in single-use format for a broad range of applications and process conditions. This flexibility in media selection results in an optimized process using the minimum amount of surface area required to meet processing needs, while providing optimal protection of downstream sterile filters.

### Millistak+<sup>®</sup> DE series (Diatomaceous Earth)

Composed of select grade cellulose fiber and diatomaceous earth which increases contaminant retention. Available in grades ranging from DE 25-75 in both 16" lenticular disc and modular Pod format. This media series is suitable for primary or secondary clarification.



### Millistak+<sup>®</sup> CE series (Cellulose)

Composed of a single layer media with cellulose fibers that are suitable for coarse filtration applications such as primary clarification. Available in grades ranging from CE 15-50 in both 16" lenticular disc and modular Pod format.

[Ordering Information](#)

### Millistak+<sup>®</sup> HC series (High Capacity)

Improved productivity with enhanced filter capacity and retention. Multiple filtration stages downstream of the bioreactor are compressed into one efficient step by placing multiple media grades into each device. Several grades are available for a variety of applications in both 16" lenticular disc and modular Pod format.

### Millistak+<sup>®</sup> CR series (Carbon)

Formulated with carbon retained in a rigid structure by a cellulose matrix, creating a tortuous flow path that ensures maximum impurity contact with the surface and pores of the activated carbon, for optimum impurity adsorption. Utilized for the removal of color and trace contaminants, as well as in downstream processing to reduce HCP and other impurities present in Protein A elution pools.

[Ordering Information](#)

### Clarisolve<sup>®</sup> depth filters

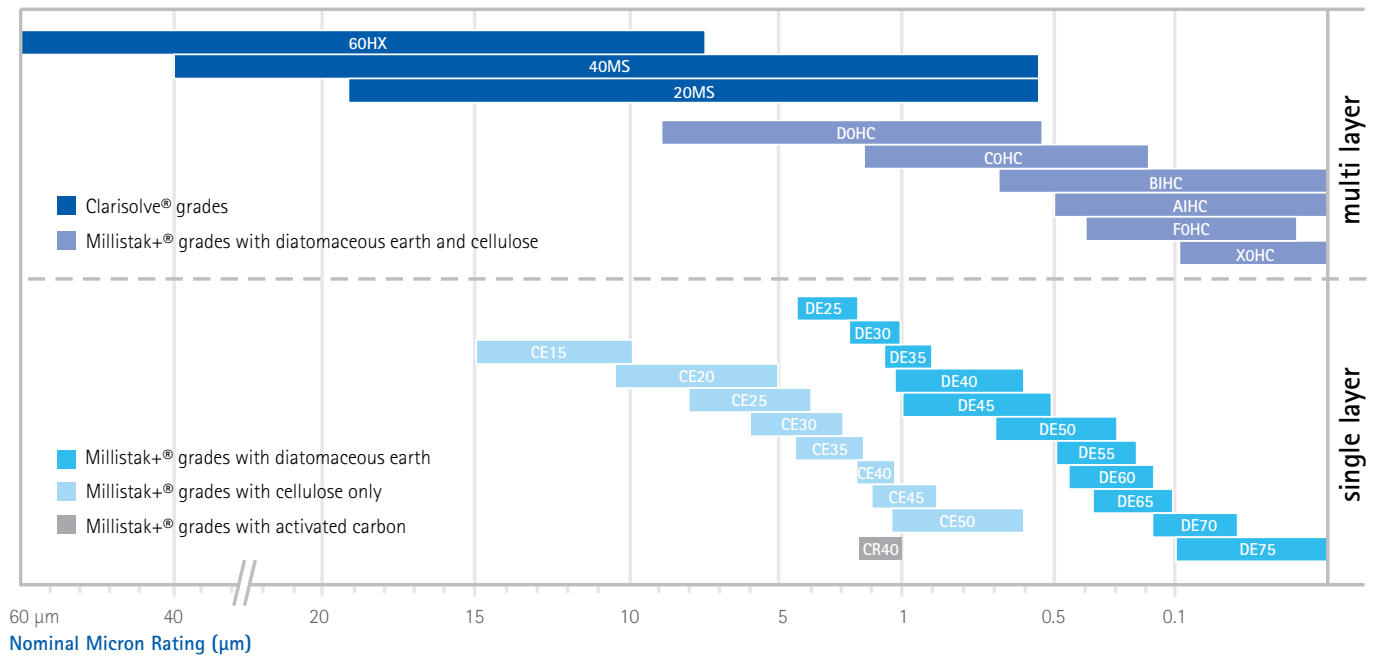
Developed to address the needs of challenging high cell density feed streams where pre-treatment methodologies are being implemented. These filters are designed to the particle size distributions of pre-treated feed streams, and are available in three distinct grades for various pre-treatment methodologies.



[Ordering Information](#)

# Millistak+® and Clarisolve® depth filters

## Media grades



	Target Step	Composition	Media Grade	
Clarisolve®	PRE-TREATED FEED	Clarification of pre-treated feed streams with particle size distribution of 60 µm (Cationic polymer flocculants)	60HX	
	PRE-TREATED	Clarification of pre-treated feed streams with particle size distribution of 40 µm (Cationic polymers such as pDADMAC)	40MS	
	PRE-TREATED	Clarification of pre-treated feed streams with particle size distribution of 20 µm (Acid precipitation)	20MS	
Millistak+®	PRIMARY CLARIFICATION	Primary clarification. In some cases, can be used as a single stage clarification step going directly into a sterile filter	COHC	
	PRIMARY CLARIFICATION	Primary (coarse) clarification	CE	
	PRIMARY CLARIFICATION	Primary clarification	DOHC	
	PRIMARY CLARIFICATION	Primary or secondary clarification	DE	
	SECONDARY CLARIFICATION	Secondary clarification post tangential flow filtration, or depth filtration or centrifugation	A1HC	
	SECONDARY CLARIFICATION	Secondary clarification post tangential flow filtration, or depth filtration or centrifugation	B1HC	
	SECONDARY CLARIFICATION	Secondary clarification post-centrifugation or pre-treated centrate	FOHC	
	SECONDARY CLARIFICATION	Secondary clarification post depth filtration or centrifugation. Can also be utilized in downstream processing steps to protect chromatography columns	XOHC	
	DSP	Removal of color and trace contaminants, as well as in downstream processing to reduce HCP and other impurities present in Protein A elution pools	Activated carbon and cellulose fiber	Carbon (AC) CR40

# Millistak+<sup>®</sup> and Clarisolve<sup>®</sup> depth filters

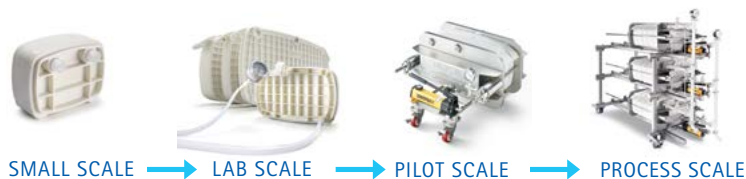
## Device formats

### Pod Filter Systems (Millistak+<sup>®</sup> and Clarisolve<sup>®</sup> media)

The Pod Filter System is a scalable format accommodating applications from lab to pilot to process scale. The Pod format offers flexibility because of its unique modular and 100% disposable design. The same flow path and configuration ensures a linearly scalable solution from bench to process scale.

- Patented, disposable design eliminates need for housing, CIP or cleaning validation
- Self-contained Pod format protects operators from exposure to biohazards
- Enables use of multiple grades in one holder
- Robust construction is easy to use and set up
- Smaller footprint facilitates use in tight spaces

The Pod holder system's modular design makes it easy to configure for a specific application and conveniently reconfigure it as process capacity requirements scale-up or down. The flexible, modular format offers scalability from 5 to 12,000 liters or more.



[Ordering Information](#)

[Virtual Pod Tool](#)



### Lenticular Discs (Millistak+<sup>®</sup> media only)

The Millistak+<sup>®</sup> 16" lenticular format is available in multiple stacked cell configurations. The individual cells of filter media are combined to form a convenient and easy-to-install filtration unit. Each filter cell is independently sealed by an injection molding process to ensure integrity throughout each device. Edge seal bosses provide robustness against cell collapse during prolonged runs, minimizing the risk of by-pass and process deviations.

The Millistak+<sup>®</sup> 316L stainless steel filter housings are designed for high-capacity liquid clarification. The housings' versatile design and a wide offering of accessories allow users to operate the system with as few as one or as many as eight stacked cartridges installed. These options make it easy to configure for a specific application and conveniently reconfigure it as process capacity requirements scale-up or down.

[Ordering Information](#)



# Polygard® and Clarigard® cartridge filters

## Introduction

Polygard® and Clarigard® cartridge filters are available in a broad range of micron ratings to match an array of particle removal applications. These versatile, multi-use filters can be utilized in pharmaceutical, biological, food and beverage, fine chemical and industrial applications.



### Polygard® CR series

Nominally rated filters designed for particle removal applications in liquids and gases. The graded-density depth structure of Polygard® CR filter media provides maximum filtration capacity, and the all-polypropylene construction offers low extractable levels and broad chemical compatibility. Available in pore sizes ranging from 0.1 to 100.0 µm.

[Ordering Information](#)



### Polygard® CN series

Nominally rated filters designed for particle removal applications in liquids and gases. The pleated structure of Polygard® CN filter media minimizes pressure differentials during the filtration process, and the all-polypropylene construction offers low extractable levels and broad chemical compatibility. Downstream filter performance is enhanced due to efficient particle and microorganism reduction. Available in pore sizes ranging from 0.3 to 30.0 µm.

[Ordering Information](#)



### Polygard® CT series

Composed of graded-density polypropylene media designed for a wide range of liquid primary clarification applications. The graded-density format allows media with two distinct nominal pore size cutoffs to be wrapped into one cartridge. This technique maximizes dirt-holding capacity while affording extremely low differential pressures offering a long service life. Available in pore sizes ranging from 1.0 to 150.0 µm.

[Ordering Information](#)



### Clarigard® series

Composed of graded-density polypropylene for clarification and pre-filtration of process fluids. The 99.99% retention characteristic makes them ideal for the protection of critical downstream process steps such as membrane filters or chromatography columns. The graded-density depth structure provides maximum filtration capacity, and the polypropylene construction offers low extractable levels and broad chemical compatibility. Available in pore sizes ranging from 0.2 to 3.0 µm.

[Ordering Information](#)

# Polygard® and Clarigard® depth filters

## Device formats

A wide range of filter formats and sizes are available to fit all of your application needs for easy scale-up of your small volume filtration steps to larger, process-scale filtration processes.



### OptiScale® capsule filters

A convenient small-volume option for process development screening. These "drop in" filters are ideal for evaluating bio-pharmaceuticals. These devices support speed-to-market strategies for efficiently developing compounds and biotherapeutics. OptiScale® capsules are faster and easier to set up than conventional 47 mm discs.

[Use chart below for order info](#)



### Small scale capsule filters

Available as a selection tool when evaluating several media configurations to clarify process fluids. These devices have been developed to minimize hold-up volume when screening these multiple media configurations.

[Use chart below for order info](#)



### Cartridge filters

Robust, strong, resilient cartridge filters designed to withstand multiple steam-in-place cycles. A full range of filter sizes is available to suit your application requirements. A variety of connection options are offered for easy adaptation to existing housings.

[Use chart below for order info](#)



### Opticap® XL capsule filters

Available in multiple filtration sizes providing an optimal choice for every application. The patented Opticap® XL capsule design allows unparalleled thermal and hydraulic stress resistance in a disposable filter, resulting in reliability and high confidence in the sterility process as well as improved cleanliness. The unique capsule design also minimizes hold-up volume and reduces production losses.

[Use chart below for order info](#)

	OptiScale® Capsule Filters	Small Scale Capsule Filters	Cartridge Filters	Opticap® XL Capsule Filters
Polygard® CR		●	●	●
Polygard® CN	●		●	●
Polygard® CT		●	●	
Clarigard®		●	●	●

# Clarification Selection Guide for monoclonal antibodies, recombinant proteins, and fc-fusion proteins

The following decision trees are focused on batch and fed-batch feeding strategies for mammalian cell bioreactors. The selection matrices are created for reference only, based on historical experience and data.

The decision trees cover direct harvest, pre-treatment, and centrifugation at various scales. Studies have shown that direct harvest is more economical vs. centrifuge at scales below 1000L<sup>1</sup>. There is a "grey area" between 1000L and 2000L where either direct harvest or centrifuge may be the best choice depending on cell culture characteristics and facility considerations.

1: Process Cost and Facility Considerations in the Selection of Primary Cell Culture Clarification Technology, Felo et al., Biotechnol. Prog., 2013, Vol. 29, No. 5.

## Direct Harvest decision tree

### Molecule Types: mAb, rProt, Fusion, Other-hydrophobic proteins

Monoclonal antibodies, recombinant proteins, and Fc-fusion proteins behave similarly with respect to capacity. Filters containing diatomaceous earth may not be the ideal solution for Fc-fusion proteins and highly hydrophobic proteins due to recovery challenges. If product yield is an issue, reach out to your local Account Manager or Process Development Specialist.

Two filtration options are included:

1. A single-stage depth filtration train,
2. A two-stage depth filtration train run in series.

The single-stage train is recommended in cases of low titer feeds and/or when there are concerns about product binding.

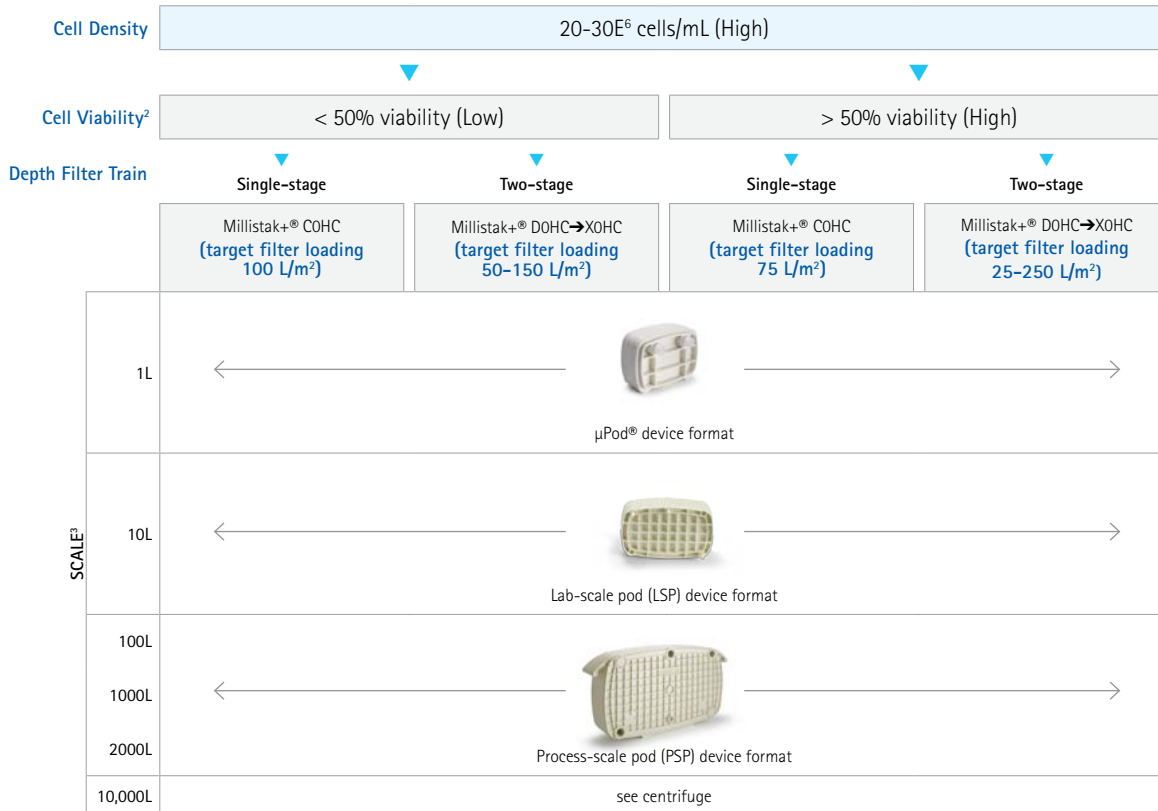
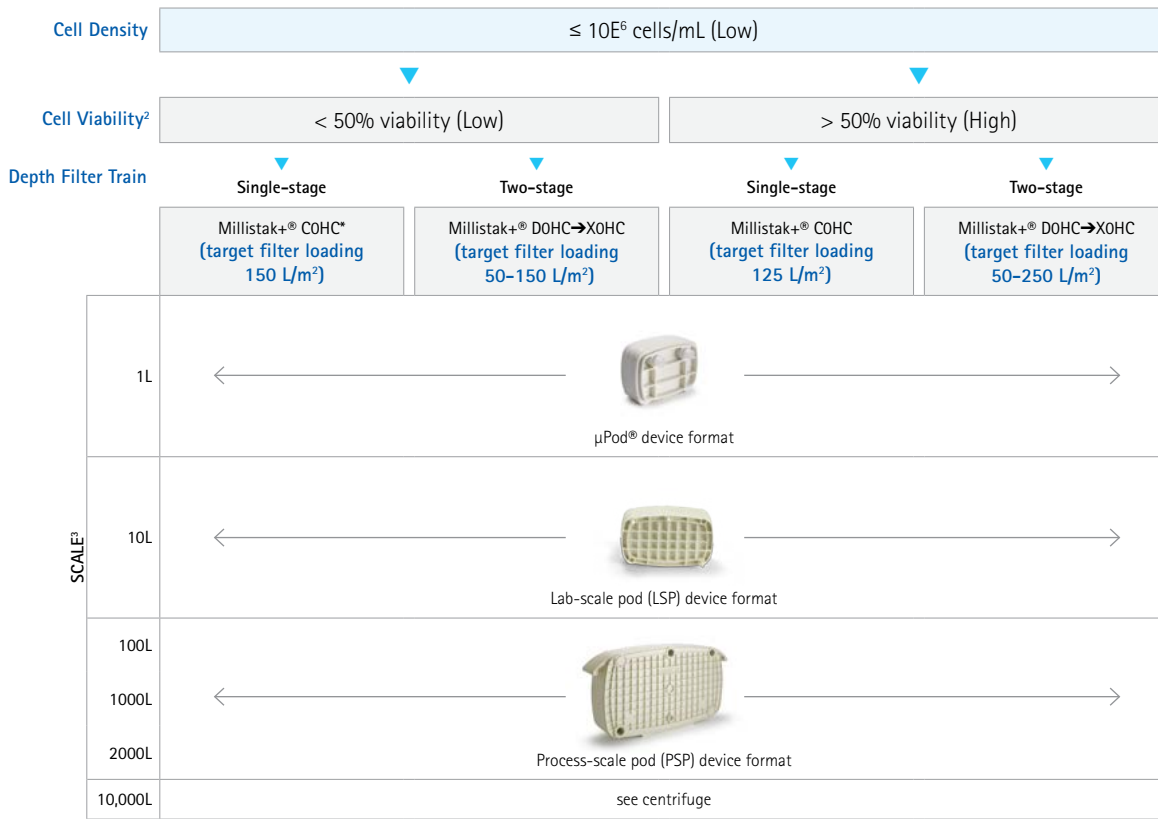
The information in the following tables should be considered as general guidance for performance and preliminary economic assessments. Actual performance should be confirmed prior to large scale implementation.

Please note: the single filter will need to be optimized for both capacity and filtrate turbidity/sterile filter capacity. The second filter in the filter train is tight enough to protect the sterile filter in most cases. Secondary depth filtration is included for additional sterile filter and column protection in most cases.





# Direct Harvest decision tree



1 If turbidity greater than 15–20 NTU or sterile sizing does not meet your target directly after the primary depth filter, consider additional polishing via XOHC

2 Cell density is a critical parameter in the consideration for filter selection and capacity. High cell density cultures contain a high level of cells and with that cell debris, both soluble and insoluble. When the viability is high, most of the cells are intact and the particle size distribution shifts towards larger particles. When the viability is low, the particle size shifts towards the smaller particles and insoluble (unmeasured) particles.

3 Process scales are typically 1L–20,000L. For simplicity, the process scale increases by 10X starting with 1L. Direct harvest is economically practical and feasible for manufacturing, depending on the cell density, up to approximately 2,000L. Centrifuge is recommended at scales ≥2,000L for direct harvest.

4 Protein titer (<1g/L, >1g/L)

Recovery should be considered during the small-scale tests. Low titer feeds historically have slightly lower recovery values. This could be due to low levels of binding, hold-up volume losses during recovery (blow-down or buffer flush), and/or dilution from pre-use flushing and post-use recovery.

## Pre-treatment decision tree

Pre-treatment, via flocculation or precipitation, is recommended at cell densities greater than or equal to  $30E^6$  cells/mL. However, flocculation can be implemented at any cell density if the process requires such a step. The type of pre-treatment and dosing requirements (e.g. pH adjustment, salt addition, polymer addition) depends on the cell culture and molecule characteristics. The Clarisolve® family of filters were developed for high cell density, pre-treated feed streams. The filter selection and sizing recommendations will be based on the type of pre-treatment and the particle size distribution of the pre-treated feed stream.

Cell Density	> $30E^6$ cells/mL (volumes $\leq$ 5000L)		
	acid treatment	salt addition	pDADMAC cationic polymer
Clarisolve® 20MS*	1 <sup>st</sup> choice	2 <sup>nd</sup> choice	2 <sup>nd</sup> choice
Clarisolve® 40MS*	2 <sup>nd</sup> choice	1 <sup>st</sup> choice	1 <sup>st</sup> choice
Clarisolve® 60HX*	-	-	3 <sup>rd</sup> choice

\* If turbidity greater than 15-20 NTU or sterile sizing does not meet your target directly after the primary depth filter, consider additional polishing via X0HC

## Centrifuge decision tree

Centrate may differ depending on the cell density/viability and the centrifuge optimization/operation. Turbidity is a good indicator as to which depth filter will have the highest capacity and best sterile filter protection.

Cell Density	< $30E^6$ cells/mL (Low) untreated		> $30E^6$ cells/mL (High) pre-treated	
	high turbidity (>100 NTU)	low turbidity (<100 NTU)	high turbidity (>100 NTU)	low turbidity (<100 NTU)
<b>1000L</b>				
Millistak+® FOHC (1 <sup>st</sup> choice) B1HC (2 <sup>nd</sup> choice)	Target loading: 200-400L/m <sup>2</sup> Device format: Process-scale pod	-	Target loading: 200-400L/m <sup>2</sup> Device format: Process-scale pod	-
Millistak+® X0HC (1 <sup>st</sup> choice) A1HC (2 <sup>nd</sup> choice)	-	Target loading: 200-400L/m <sup>2</sup> Device format: Process-scale pod	-	Target loading: 200-400L/m <sup>2</sup> Device format: Process-scale pod
<b>2000L</b>				
Millistak+® FOHC (1 <sup>st</sup> choice) B1HC (2 <sup>nd</sup> choice)	Target loading: 200-400L/m <sup>2</sup> Device format: Process-scale pod	-	Target loading: 200-400L/m <sup>2</sup> Device format: Process-scale pod	Target loading: 200-400L/m <sup>2</sup> Device format: Process-scale pod
Millistak+® X0HC (1 <sup>st</sup> choice) A1HC (2 <sup>nd</sup> choice)	-	Target loading: 200-400L/m <sup>2</sup> Device format: Process-scale pod	Target loading: 200-400L/m <sup>2</sup> Device format: Process-scale pod	Target loading: 200-400L/m <sup>2</sup> Device format: Process-scale pod
<b>10,000L</b>				
Millistak+® FOHC (1 <sup>st</sup> choice) B1HC (2 <sup>nd</sup> choice)	Target loading: 200-400L/m <sup>2</sup> Device format: Process-scale pod	Target loading: 200-400L/m <sup>2</sup> Device format: Process-scale pod	Target loading: 200-400L/m <sup>2</sup> Device format: Process-scale pod	-
Millistak+® X0HC (1 <sup>st</sup> choice) A1HC (2 <sup>nd</sup> choice)	-	Target loading: 200-400L/m <sup>2</sup> Device format: Process-scale pod	Target loading: 200-400L/m <sup>2</sup> Device format: Process-scale pod	Target loading: 200-400L/m <sup>2</sup> Device format: Process-scale pod

## Non-mAb Expression Systems decision tree

The following decision tree is focused on non-mAb expression systems at all scales. Non-mAb expression systems typically require more process development due to processing differences. Particle size distribution can vary greatly between molecules/processes. The recommendations are based on historical experience and data.

Expression System	Molecule Type	Application	Batch-type	Pre-treatment Options/ Method of Cell Lysis	Primary Clarification	Secondary Clarification
Mammalian	Enzyme (binds to DE)	Harvest	Perfusion	NONE	Millistak+® CE50	Polysep™ II CGW6
					Polygard® CR 0.5 µm	Polysep™ II CGW6
	Enzyme (does not bind to DE)	Harvest	Perfusion	NONE	Millistak+® COHC	Millistak+® X0HC
					Millistak+® F0HC	-
Microbial: Bacterial	Secreted Protein	Harvest	Batch	NONE	Millistak+® COHC	Millistak+® X0HC
					Prostak™ 0.22 µm or 0.1 µm	-
	Intracellular-Soluble	Lysate Clarification	Batch	Mechanical	Pellicon® 2 1000kD Biomax® V-screen	-
					Clarisolve® 20MS	Millistak+® COHC
				Chemical or Enzymatic	Call Technical Service	
					Mechanical	Prostak™ MF 0.1 µm
	Chemical or Enzymatic	Call Technical Service				
		Intracellular-Inclusion Body	Lysate Clarification/IB Wash	Batch	Mechanical	Pellicon® 2 1000kD Biomax® V-screen
	NONE					Clarisolve® 20MS
			Lysate Clarification/ Refold Pool	Batch	NONE	Clarisolve® 60HX
	Clarisolve® 60HX					Millistak+® COHC
	Microbial: Yeast	Intracellular-Inclusion Body	Lysate Clarification	Batch	Mechanical	Pellicon® 2 1000kD Biomax® V-screen
Vaccines	Egg-based Influenza	Centrate Clarification	Batch	NONE	Polygard® CN 5.0 µm	-
					Polygard® CR 5.0 µm	-
	Cell-based influenza	Centrate Clarification	Batch	NONE	Clarisolve® 20MS	-
					Polygard® CR 5.0 or 3.0 µm	Clarigard® 1.0 or 0.5 µm
	Viral Vector	Lysate Clarification	Batch	Mechanical	Clarigard® 3.0 µm	Polysep™ II CGW6
					Pellicon® 2 0.65 µm Durapore® V-screen	-
	pDNA	Harvest Clarification	Batch	NONE	Pellicon® 2 0.1 µm Durapore® V-screen	-
					Pellicon® 2 1000kD Biomax® V-screen	-
		Precipitate Clarification	Batch	NONE	Clarisolve® 60HX	-
	Virus-like Particle	Lysate Clarification	Batch	Mechanical	Prostak™ 0.65 µm Durapore®	-
					Clarisolve® 20MS	-
					Polygard® CN 5.0 µm	-
	Conjugated Polysaccharide	-	Batch	NONE	Prostak™ 0.1 µm Durapore®	-

# Ordering information

## Millistak+® pod depth filters

### µPod® filter

<div style="border: 1px solid black; width: 40px; height: 40px; display: flex; align-items: center; justify-content: center; margin: 0 auto;">M</div> <p>Millistak+®</p>	<div style="display: flex; justify-content: space-around; margin-bottom: 5px;"> <div style="border: 1px solid black; width: 40px; height: 40px;"></div> <div style="border: 1px solid black; width: 40px; height: 40px;"></div> <div style="border: 1px solid black; width: 40px; height: 40px;"></div> <div style="border: 1px solid black; width: 40px; height: 40px;"></div> </div> <p>Media Type and Grade</p> <table border="0"> <tr><td>A1HC</td><td>CE20</td><td>CR40</td><td>DE55</td></tr> <tr><td>B1HC</td><td>CE25</td><td>DE25</td><td>DE60</td></tr> <tr><td>COHC</td><td>CE30</td><td>DE30</td><td>DE65</td></tr> <tr><td>DOHC</td><td>CE35</td><td>DE35</td><td>DE70</td></tr> <tr><td>FOHC</td><td>CE40</td><td>DE40</td><td>DE75</td></tr> <tr><td>XOHC</td><td>CE45</td><td>DE45</td><td></td></tr> <tr><td>CE15</td><td>CE50</td><td>DE50</td><td></td></tr> </table>	A1HC	CE20	CR40	DE55	B1HC	CE25	DE25	DE60	COHC	CE30	DE30	DE65	DOHC	CE35	DE35	DE70	FOHC	CE40	DE40	DE75	XOHC	CE45	DE45		CE15	CE50	DE50		<div style="display: flex; justify-content: space-around; margin-bottom: 5px;"> <div style="border: 1px solid black; width: 40px; height: 40px; display: flex; align-items: center; justify-content: center;">2</div> <div style="border: 1px solid black; width: 40px; height: 40px; display: flex; align-items: center; justify-content: center;">3</div> <div style="border: 1px solid black; width: 40px; height: 40px; display: flex; align-items: center; justify-content: center;">C</div> </div> <p>Size 23C = 23 cm<sup>2</sup></p>	<div style="border: 1px solid black; width: 40px; height: 40px; display: flex; align-items: center; justify-content: center; margin: 0 auto;">L</div> <p>Connection Type L = Luer Fitting</p>	<div style="border: 1px solid black; width: 40px; height: 40px; display: flex; align-items: center; justify-content: center; margin: 0 auto;">3</div> <p>Quantity per Package 3 = 3/pack</p>
A1HC	CE20	CR40	DE55																													
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FOHC	CE40	DE40	DE75																													
XOHC	CE45	DE45																														
CE15	CE50	DE50																														

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**µPod® Filter Accessories**

µPod® Tubing Kit	MTUBEKITL1
Gauge 0-60 psi and Connection Fittings	XXPXLGAGE

### Lab scale

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A1HC	CE20	CR40	DE55																												
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COHC	CE30	DE30	DE65																												
DOHC	CE35	DE35	DE70																												
FOHC	CE40	DE40	DE75																												
XOHC	CE45	DE45																													
CE15	CE50	DE50																													

### Multi layer Process Scale<sup>1</sup>

<div style="border: 1px solid black; width: 40px; height: 40px; display: flex; align-items: center; justify-content: center; margin: 0 auto;">M</div> <p>Millistak+®</p>	<div style="display: flex; justify-content: space-around; margin-bottom: 5px;"> <div style="border: 1px solid black; width: 40px; height: 40px;"></div> <div style="border: 1px solid black; width: 40px; height: 40px;"></div> <div style="border: 1px solid black; width: 40px; height: 40px;"></div> <div style="border: 1px solid black; width: 40px; height: 40px;"></div> </div> <p>Media Type and Grade</p> <table border="0"> <tr><td>A1HC</td><td>COHC</td><td>XOHC</td></tr> <tr><td>B1HC</td><td>DOHC</td><td>FOHC</td></tr> </table>	A1HC	COHC	XOHC	B1HC	DOHC	FOHC	<div style="display: flex; justify-content: space-around; margin-bottom: 5px;"> <div style="border: 1px solid black; width: 40px; height: 40px;"></div> <div style="border: 1px solid black; width: 40px; height: 40px;"></div> </div> <p>Size 01 = 0.11 m<sup>2</sup> 05 = 0.55 m<sup>2</sup> 10 = 1.1 m<sup>2</sup></p>	<div style="display: flex; justify-content: space-around; margin-bottom: 5px;"> <div style="border: 1px solid black; width: 40px; height: 40px; display: flex; align-items: center; justify-content: center;">F</div> <div style="border: 1px solid black; width: 40px; height: 40px; display: flex; align-items: center; justify-content: center;">S</div> <div style="border: 1px solid black; width: 40px; height: 40px; display: flex; align-items: center; justify-content: center;">1</div> </div> <p>Quantity per Package FS1 = 1/pack</p>
A1HC	COHC	XOHC							
B1HC	DOHC	FOHC							

### Single layer Process Scale<sup>1</sup>

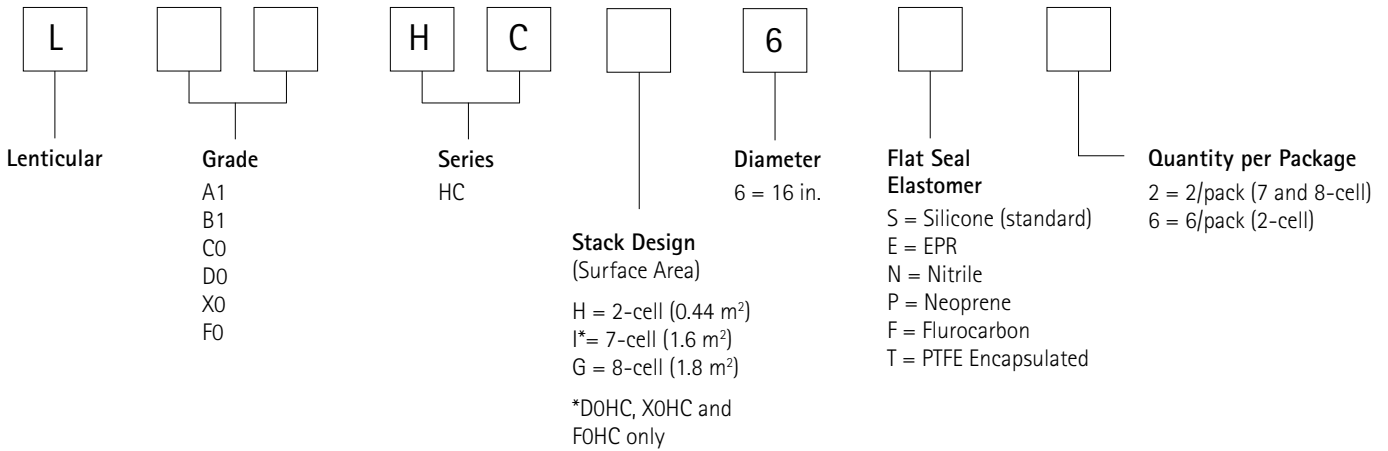
<div style="border: 1px solid black; width: 40px; height: 40px; display: flex; align-items: center; justify-content: center; margin: 0 auto;">M</div> <p>Millistak+®</p>	<div style="display: flex; justify-content: space-around; margin-bottom: 5px;"> <div style="border: 1px solid black; width: 40px; height: 40px;"></div> <div style="border: 1px solid black; width: 40px; height: 40px;"></div> <div style="border: 1px solid black; width: 40px; height: 40px;"></div> <div style="border: 1px solid black; width: 40px; height: 40px;"></div> </div> <p>Media Type and Grade</p> <table border="0"> <tr><td>CE15</td><td>CE40</td><td>DE30</td><td>DE55</td></tr> <tr><td>CE20</td><td>CE45</td><td>DE35</td><td>DE60</td></tr> <tr><td>CE25</td><td>CE50</td><td>DE40</td><td>DE65</td></tr> <tr><td>CE30</td><td>CR40</td><td>DE45</td><td>DE70</td></tr> <tr><td>CE35</td><td>DE25</td><td>DE50</td><td>DE75</td></tr> </table>	CE15	CE40	DE30	DE55	CE20	CE45	DE35	DE60	CE25	CE50	DE40	DE65	CE30	CR40	DE45	DE70	CE35	DE25	DE50	DE75	<div style="display: flex; justify-content: space-around; margin-bottom: 5px;"> <div style="border: 1px solid black; width: 40px; height: 40px;"></div> <div style="border: 1px solid black; width: 40px; height: 40px;"></div> </div> <p>Size 01 = 0.11 m<sup>2</sup> 07 = 0.77 m<sup>2</sup> 13 = 1.4 m<sup>2</sup></p>	<div style="display: flex; justify-content: space-around; margin-bottom: 5px;"> <div style="border: 1px solid black; width: 40px; height: 40px; display: flex; align-items: center; justify-content: center;">F</div> <div style="border: 1px solid black; width: 40px; height: 40px; display: flex; align-items: center; justify-content: center;">S</div> <div style="border: 1px solid black; width: 40px; height: 40px; display: flex; align-items: center; justify-content: center;">1</div> </div> <p>Quantity per Package FS1 = 1/pack</p>
CE15	CE40	DE30	DE55																				
CE20	CE45	DE35	DE60																				
CE25	CE50	DE40	DE65																				
CE30	CR40	DE45	DE70																				
CE35	DE25	DE50	DE75																				

<sup>1</sup> Note: Pod filters require the use of flow adaptors which are sold separately (MPODADAPT or MPODADPTF). See the Millistak+® Pod disposable depth filter hardware data sheet (DS3388EN00) for information on Pod filter holders.

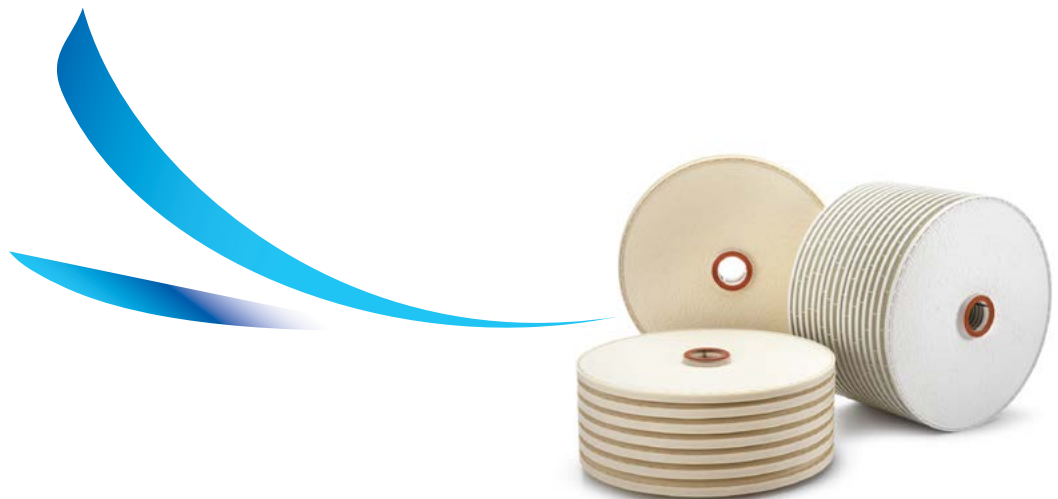
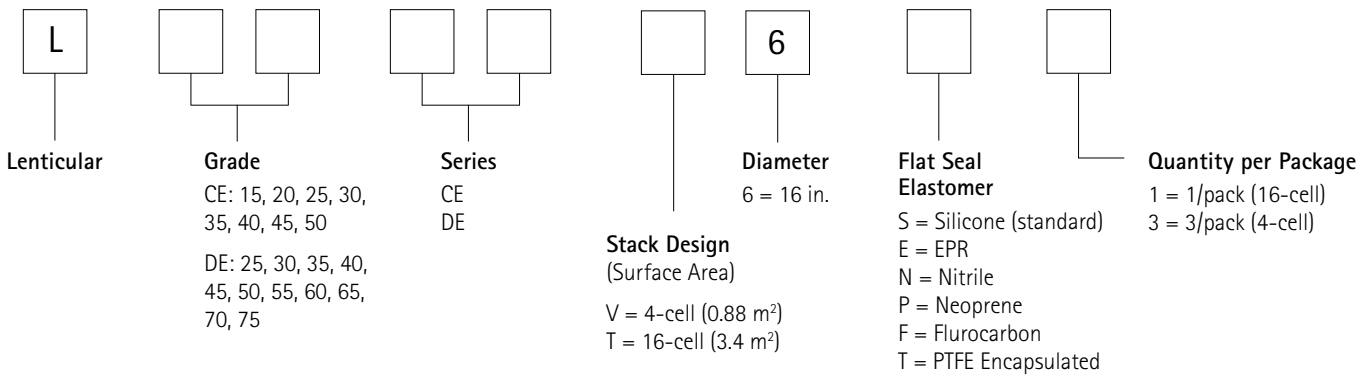
# Ordering information

## Millistak+® lenticular disc filters

### Multi layer

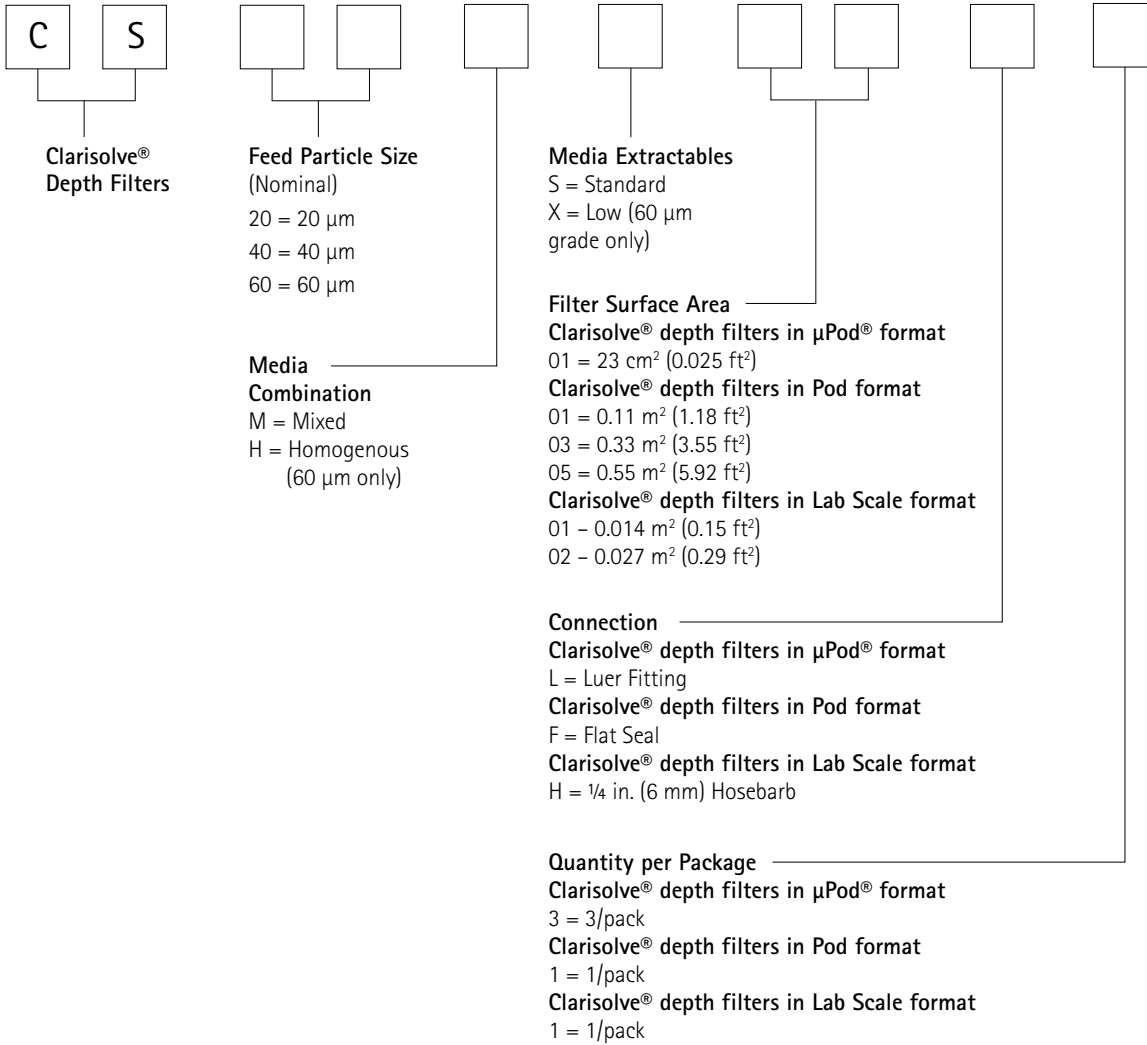


### Single layer



# Ordering information

## Clarisolve® depth filters



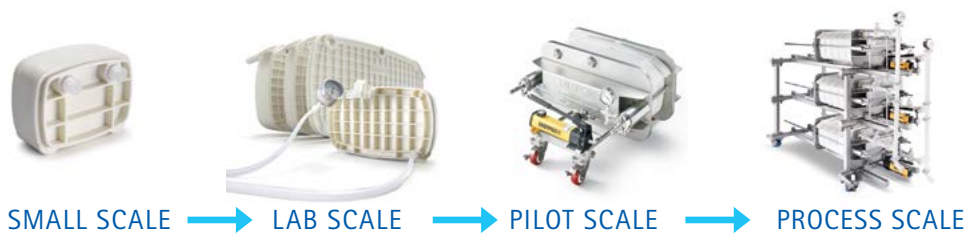
## Flocculation Agents

pDADMAC solution 10% flocculation reagent	100 mL	1.37069.0100
	1 L	1.37069.1000
	10 L	1.37069.9010

# Ordering information

## Pod hardware

Description		Qty/Pk	
Pilot Scale Holder	For Pod configurations from 1 to 2 filters	1	MPODPILOT
	For Pod configurations up to 5 filters	1	MPODPILOTX
Process Scale Holders	1-rack holder; Gemu® valves	1	MPODSYS1A
	1-rack holder; ITT valves	1	MPODSYS1B
	1-rack holder; no valves	1	MPODSYS1N
	1-rack expansion kit; no valves or casters	1	MPODSYS1X
	2-rack holder; Gemu® valves	1	MPODSYS2A
	2-rack holder; ITT valves	1	MPODSYS2B
	2-rack holder; no valves	1	MPODSYS2N
3-rack holder; Gemu® valves	3-rack holder; Gemu® valves	1	MPODSYS3A
	3-rack holder; ITT valves	1	MPODSYS3B
	3-rack holder; no valves	1	MPODSYS3N



## Disposable Adapter Kit<sup>1</sup>

3 through adapters, 3 blind adapters	MPODADAPT
6 through adapters, required if using Disposable Diverter Plate (MPODDIVERTR)	MPODADPTF

<sup>1</sup> Note: Pod filters require the use of flow adaptors which are sold separately (MPODADAPT or MPODADPTF). See the Millistak+® Pod disposable depth filter hardware data sheet (DS3388EN00) for information on Pod filter holders.

A retrofit kit may be required in order to accommodate the new Clarisolve® depth filters in the Pod pilot and process scale holders. Please contact your local sales representative for details.

# Ordering information

## Millistak+® lenticular housings

Number of Cartridges*	Inlet/Outlet Connections	Catalogue No.
<b>CE Marked</b>		
<b>Millistak+® Housings**</b>		
For 12 in. Diameter Millistak+® (DE, CE, A) Cartridges		
1 x 12 in. 13 or 16 cell/6 or 9 cell	1 in. TC, ISO DN32	WM21 SET ET
2 x 12 in. 13 or 16 cell/6 or 9 cell	1 in. TC, ISO DN32	WM22 SET ET
3 x 12 in. 13 or 16 cell (4 x 12 in. 6 or 9 cell)	1 in. TC, ISO DN32	WM23 SET ET
4 x 12 in. 13 or 16 cell (5 x 12 in. 6 or 9 cell)	1 in. TC, ISO DN32	WM24 SET ET
For 16 in. Diameter Millistak+® (DE, CE, A) Cartridges		
1 x 16 in. 16 cell	2 in. TC, ISO DN40	WM61 SFT FT
2 x 16 in. 16 cell (3 x HC 16 in. 8 cell)	2 in. TC, ISO DN40	WM62 SFT FT
3 x 16 in. 16 cell (4 x HC 16 in. 8 cell)	2 in. TC, ISO DN40	WM63 SFT FT
4 x 16 in. 16 cell (6 x HC 16 in. 8 cell)	2 in. TC, ISO DN40	WM64 SFT FT
<b>Millistak+® HC Housings**</b>		
For 16 in. Diameter Millistak+® HC Cartridges		
2 x 16 in. 8 cell (1 x DE, CE, A 16 in. 16 cell)	2 in. TC, ISO DN40	HC62 SFT FT
4 x 16 in. 8 cell (2 x DE, CE, A 16 in. 16 cell)	2 in. TC, ISO DN40	HC64 SFT FT
6 x 16 in. 8 cell (3 x DE, CE, A 16 in. 16 cell)	2 in. TC, ISO DN40	HC66 SFT FT
8 x 16 in. 8 cell (5 x DE, CE, A 16 in. 16 cell)	2 in. TC, ISO DN40	HC68 SFT FT
<b>ASME® Stamped</b>		
<b>Millistak+® Housings**</b>		
For 12 in. Diameter Millistak+® (DE, CE, A) Cartridges		
1 x 12 in. 13 or 16 cell/6 or 9 cell	1 in. TC	UM21 SET ET
2 x 12 in. 13 or 16 cell/6 or 9 cell	1 in. TC	UM22 SET ET
3 x 12 in. 13 or 16 cell/4 x 12 in. 6 or 9 cell	1 in. TC	UM23 SET ET
4 x 12 in. 13 or 16 cell/5 x 12 in. 6 or 9 cell	1 in. TC	UM24 SET ET
For 16 in. Diameter Millistak+® (DE, CE, A) Cartridges		
1 x 16 in. 16 cell	2 in. TC	UM61 SFT FT
2 x 16 in. 16 cell (3 x HC 16 in. 8 cell)	2 in. TC	UM62 SFT FT
3 x 16 in. 16 cell (4 x HC 16 in. 8 cell)	2 in. TC	UM63 SFT FT
4 x 16 in. 16 cell (6 x HC 16 in. 8 cell)	2 in. TC	UM64 SFT FT
<b>Millistak+® HC Housings**</b>		
For 16 in. Diameter Millistak+® HC Cartridges		
2 x 16 in. 8 cell (1 x DE, CE, A 16 in. 16 cell)	2 in. TC	UC62 SFT FT
4 x 16 in. 8 cell (2 x DE, CE, A 16 in. 16 cell)	2 in. TC	UC64 SFT FT
6 x 16 in. 8 cell (3 x DE, CE, A 16 in. 16 cell)	2 in. TC	UC66 SFT FT
8 x 16 in. 8 cell (5 x DE, CE, A 16 in. 16 cell)	2 in. TC	UC68 SFT FT

\* Millistak+® Housings are also compatible with many other commercially available lenticular cartridges.

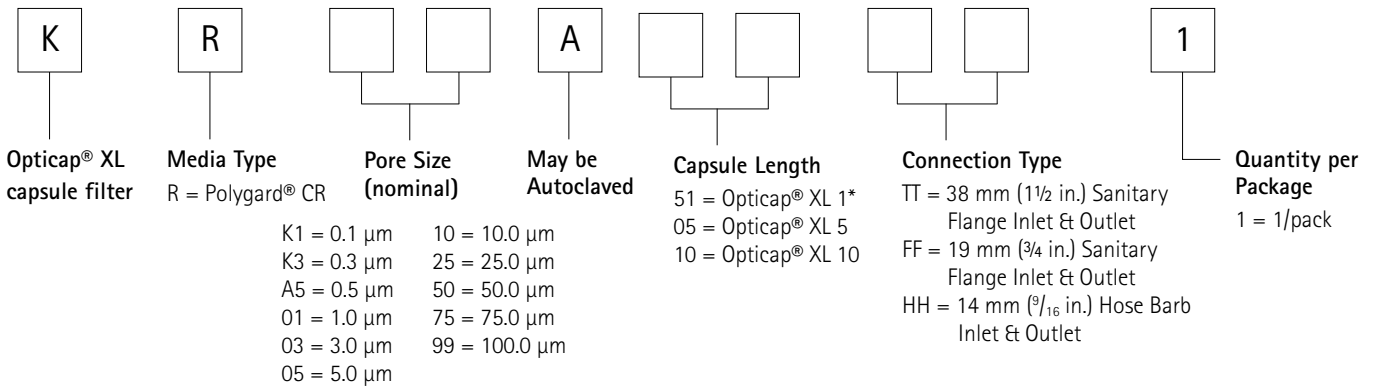
\*\* The compression tool must be ordered separately. (Compression kit assembly, Catalogue No.: 1 WM00 CAK 01)



# Ordering information

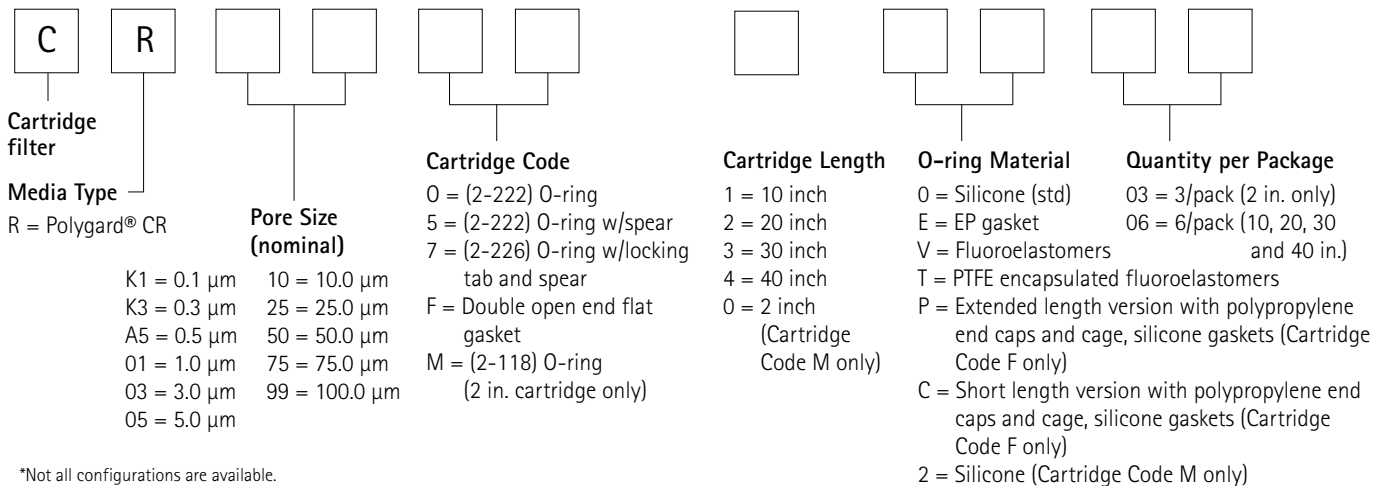
## Polygard® CR filters

### Opticap® XL capsule filters



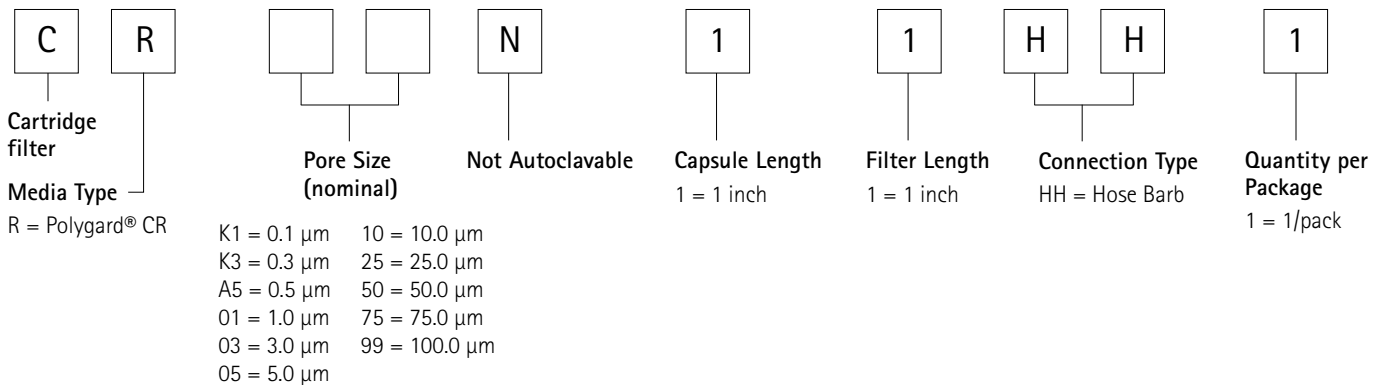
\*1-inch filter element in a 5-inch capsule housing.

### Cartridge filters\*



\*Not all configurations are available.

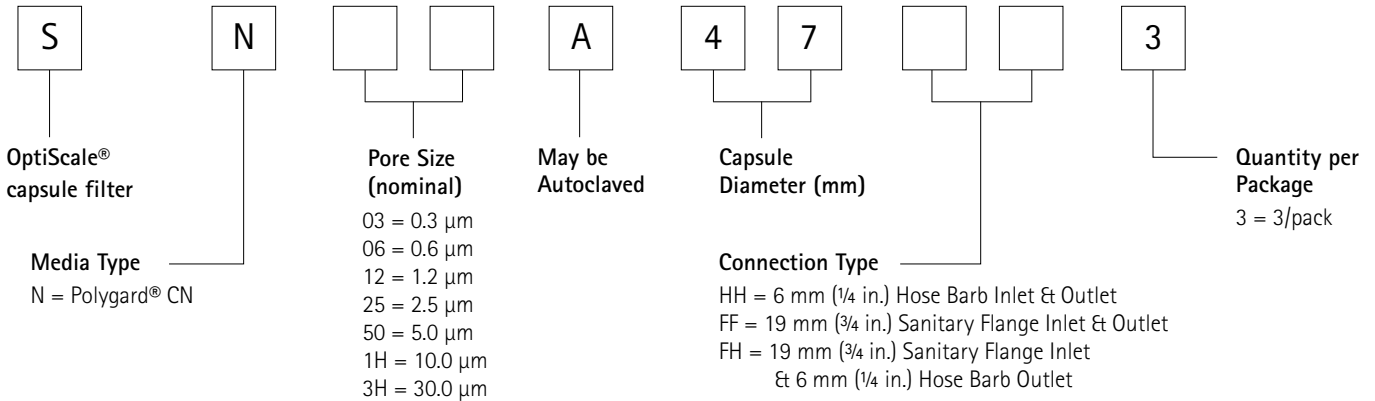
### Small scale capsule filters



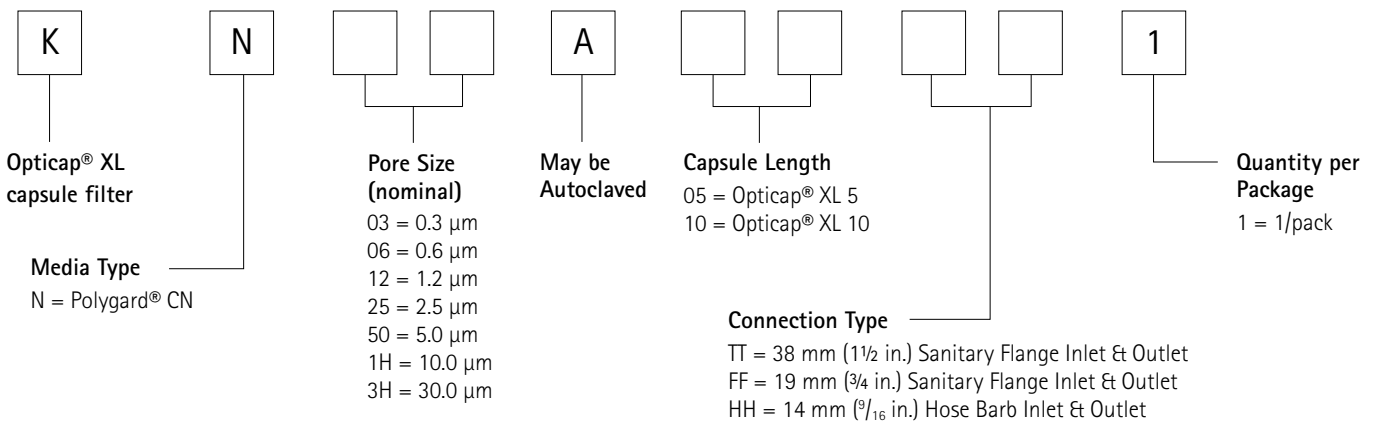
# Ordering information

## Polygard® CN filters

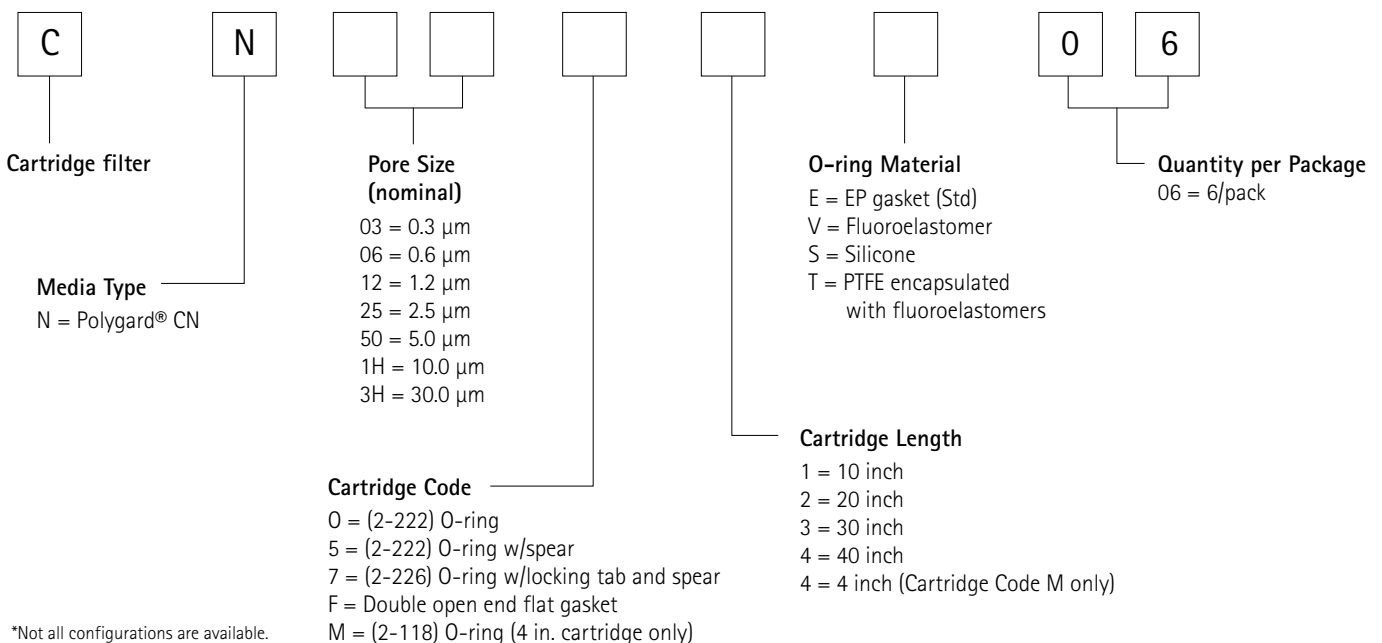
### OptiScale® capsule filters



### Opticap® XL capsule filters



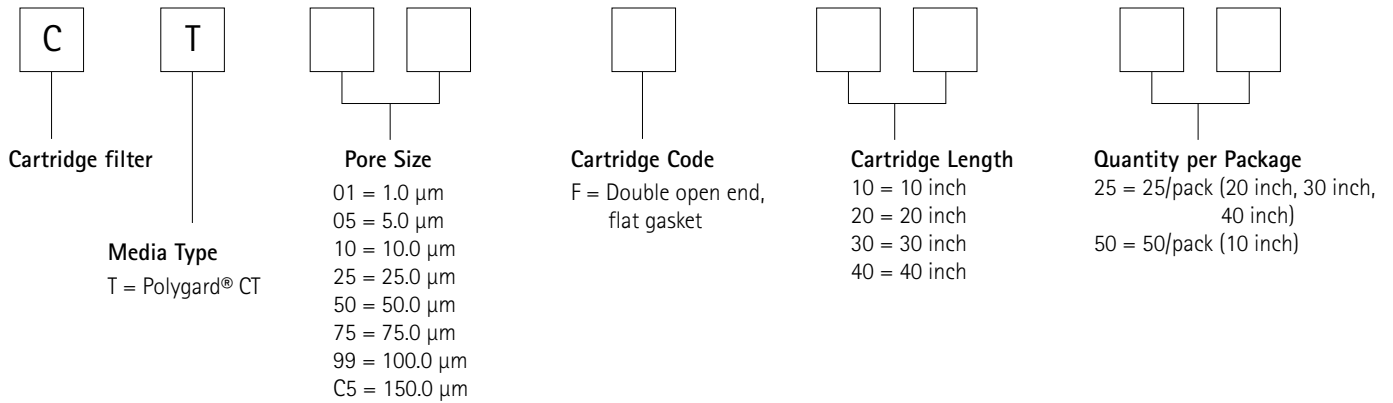
### Cartridge filters\*



# Ordering information

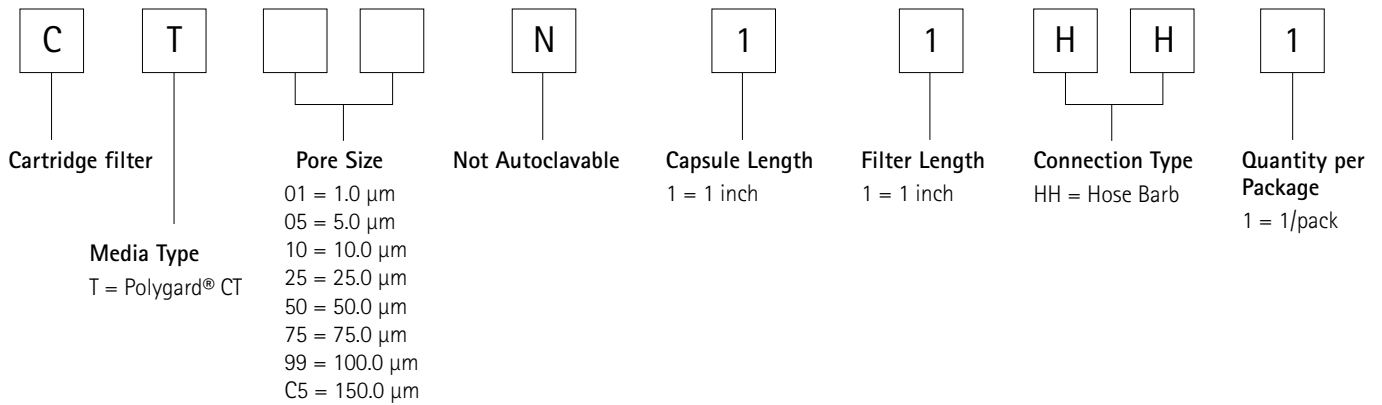
## Polygard® CT filters

### Cartridge filters\*



\*Not all configurations are available.

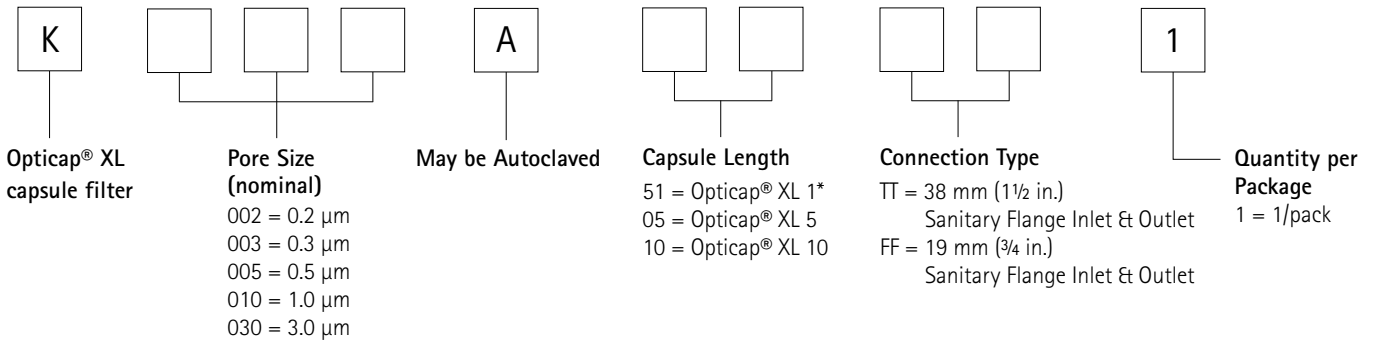
### Small scale capsule filters



# Ordering information

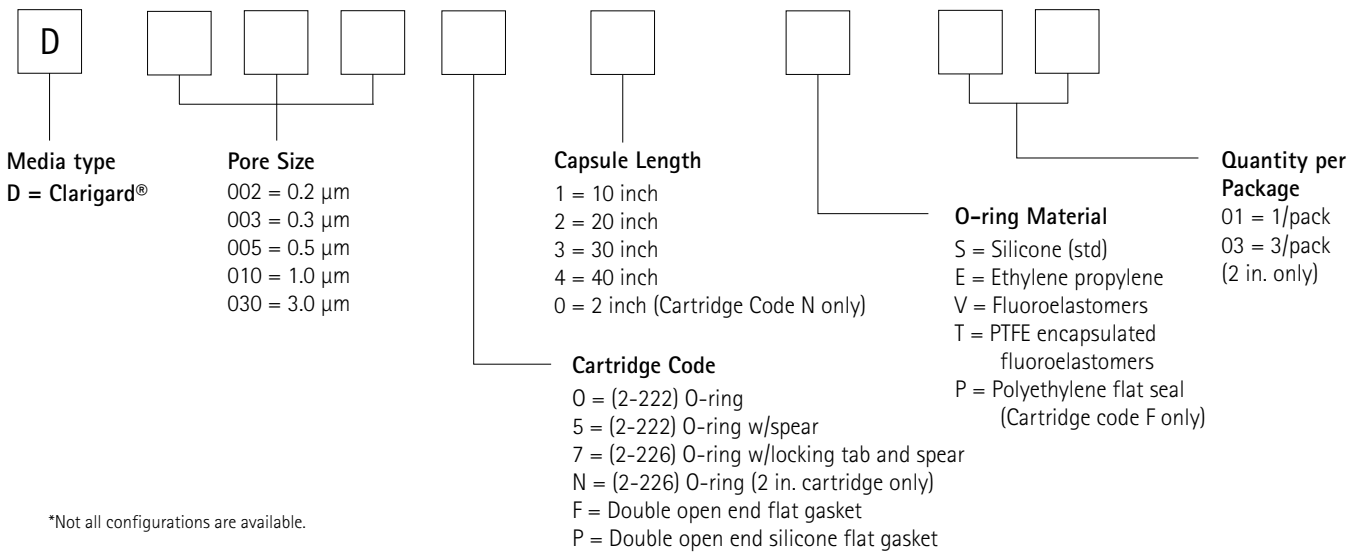
## Clarigard® filters

### Opticap® XL capsule filters



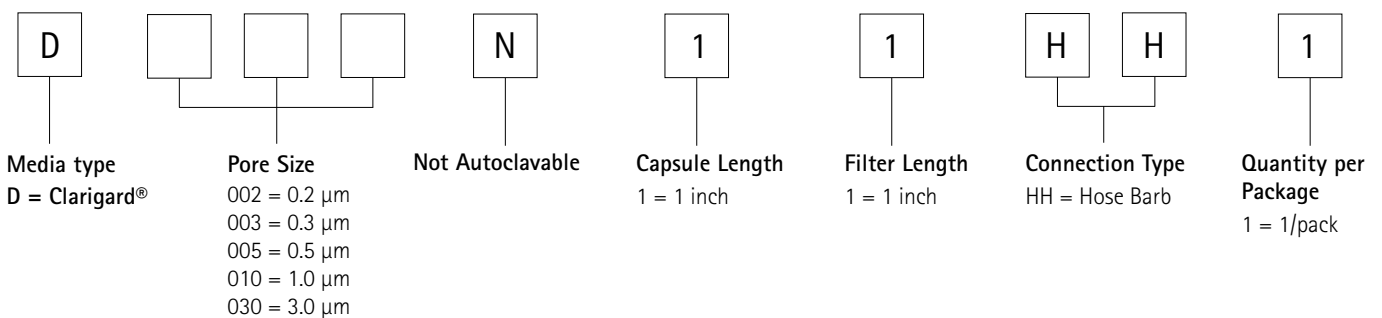
\*1-inch filter element in a 5-inch capsule housing.

### Cartridge filters\*



\*Not all configurations are available.

### Small scale capsule filters



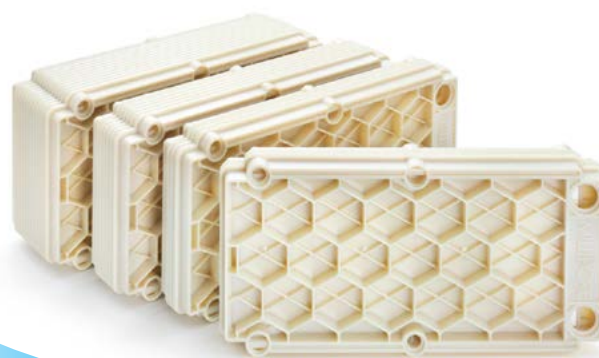
# Ordering information

## Prostak™ micro filtration modules

Packaging: 1/pack

Pore Size (µm)	2 Stak	4 Stak	10 Stak	20 Stak
<b>Microporous Membranes – Hydrophilic PVDF Durapore® Membrane</b>				
0.1	PSW AG0 21	PSW AG0 41	PSW AG1 01	SK2P 127 E1
0.22	PSGV AG0 21	PSGV AG0 41	PSGV AG1 01	SK2P 484 E0
0.45	PSHV AG0 21	PSHV AG0 41	PSHV AG1 01	SK2P 242 E9
0.65	PSDV AG0 21	PSDV AG0 41	PSDV AG1 01	SK2P 446 E0
<b>Microporous Membranes – Hydrophobic PVDF Durapore® Membrane</b>				
0.1	SK2P 015 W6	SK2P 016 W6	SK2P 017 W6	SK2P 018 W6
0.22	SK2P 300 W2	SK2P 384 W2	SK2P 343 W2	SK2P 344 W2
0.45	SK2P 012 W6	SK2P 013 W6	SK2P 014 W6	SK2P 013 W4
0.65	SK2P 009 W5	SK2P 020 W4	SK2P 030 W5	SK2P 010 W5
<b>PZHK Membrane – Hydrophobic PVDF</b>				
200*	SK2P 063 E0	SK2P 064 E0	SK2P 065 E0	SK2R B30 A1

\*Nominal Molecular Weight Limit in kDaltons



# Ordering information

## Pellicon® 2 filters with V screens (loose screen)

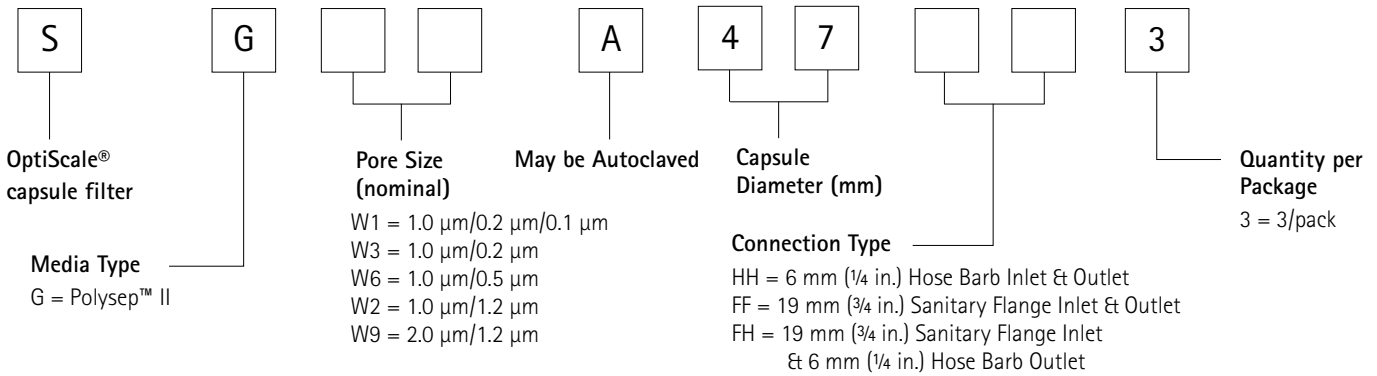
Durapore® Hydrophilic PVDF			
	0.11m <sup>2</sup> /1.1 ft <sup>2</sup>	0.5m <sup>2</sup> /5.4 ft <sup>2</sup>	2.0m <sup>2</sup> /21.5 ft <sup>2</sup>
0.1 µm	P2PV PPC 01	P2PV PPC 05	P2PV PPC 25
0.22 µm	P2GV PPC 01	P2GV PPC 05	P2GV PPC 25
0.45 µm	P2HV MPC 01	P2HV MPC 05	P2HV MPC 25
0.65 µm	P2DV PPC 01	P2DV PPC 05	

Ultracel® PLC series , Regenerate Cellulose, Composite Construction			
	0.11 m <sup>2</sup> /1.1 ft <sup>2</sup>	0.5m <sup>2</sup> /5.4 ft <sup>2</sup>	02.0m <sup>2</sup> /21.5 ft <sup>2</sup>
100 kD	P2C1 00V 01	P2C1 00V 05	P2C1 00V 20
300 kD	P2C3 00V 01	P2C3 00V 05	P2C3 00V 20
1000 kD	P2C0 1MV 01	P2C0 1MV 05	P2C0 1MV 20

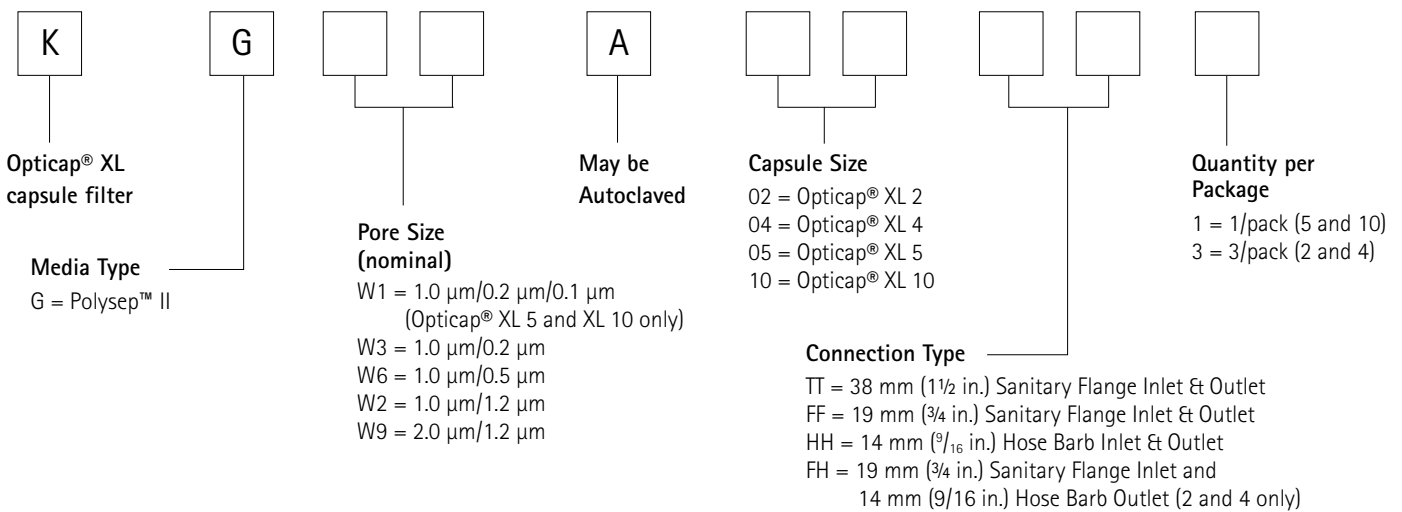
# Ordering information

## Polysep™ II filters

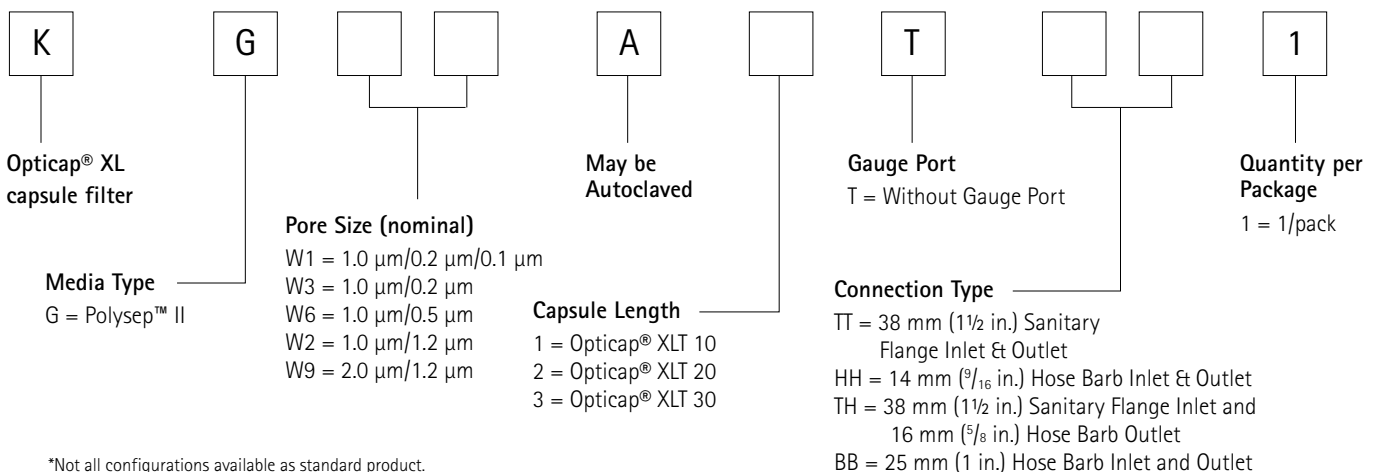
### OptiScale® capsule filters



### Opticap® XL capsule filters



### Opticap® XLT capsule filters\*

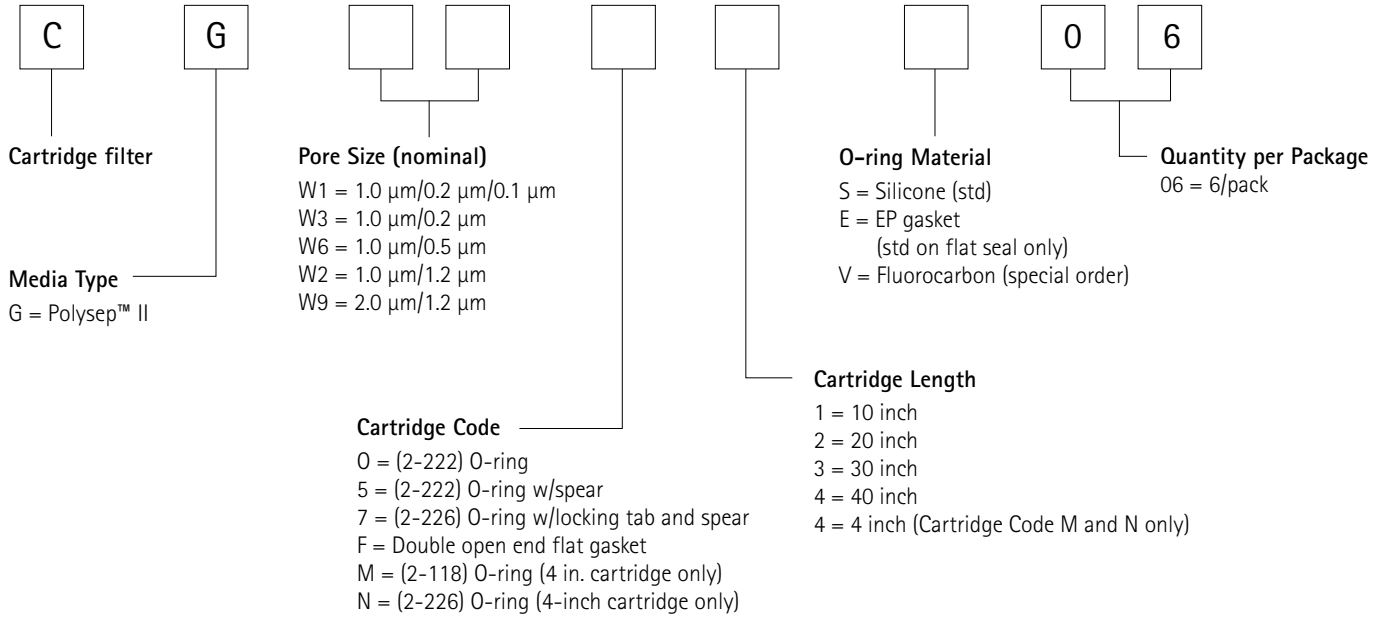


\*Not all configurations available as standard product.

# Ordering information

## Polysep™ II filters

### Cartridge filters





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