

# Millistak+® HC Pro

Fully synthetic depth filters for clarification and downstream filtration applications.

Millistak+® HC Pro (high capacity synthetic media) is a family of synthetic depth filters providing a cleaner and more consistent depth filtration media over current diatomaceous earth (DE) and cellulose (CE) based filter offerings. Multiple media grades are available for primary and secondary clarification as well as downstream filtration applications.



## Features & Benefits

### Synthetic materials of construction

- Reduced TOC extractables and a 50% reduction in the recommended pre-use flush volumes
- No beta glucans to interfere with limulus amoebocyte lysate (LAL) testing for bacterial endotoxins
- Lot to lot consistency for successful development and implementation of robust clarification processes

### Depth filter media formulation & design

- Provide as much as two times the filtration capacity with equivalent filter retention properties over commercial DE-based benchmarks
- Improved HCP impurity clearance

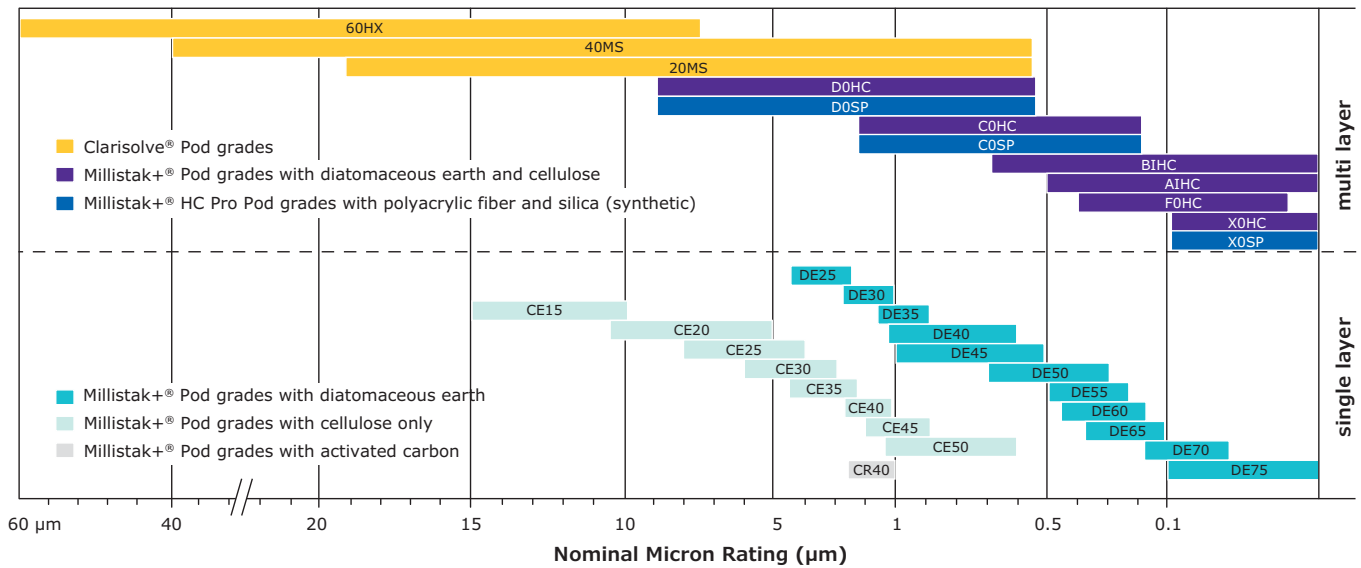
### Disposable Pod device

- Flexible, modular format offers scalability up to 20,000 liters
- Robust device format; easy to use and set up

## Millistak+® HC Pro Pod series

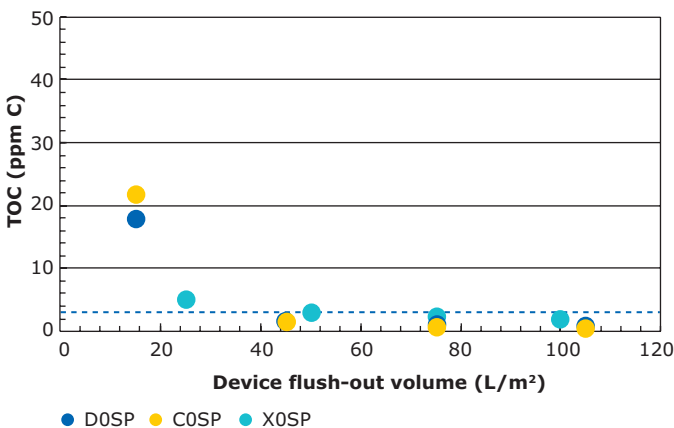
Millistak+® HC Pro synthetic depth filters are available in 3 media grades for primary and secondary clarification and downstream processing steps to protect chromatography columns.

Applications	Media Grade	Media Composition
Primary clarification (direct harvest)	<b>D0SP</b>	Four layer depth filter media composition which includes an upstream non-woven layer to improve filtration capacity.
Primary and secondary clarification (direct harvest, centrate)	<b>C0SP</b>	Four layer depth filter media combination.
Secondary clarification (direct harvest and centrate), and downstream filtration	<b>X0SP</b>	Double layer depth filter media combination.



## Reduced Flushing Recommendations

The synthetic materials of construction used in Millistak+® HC Pro Pods are clean and exhibit a consistent depth filtration performance with reduced TOC extractables. Pre-use flush volume recommendations are reduced by 50%.



## Elimination of beta glucan interference with LAL assay

No extractable beta-glucans to interfere with limulus amoebocyte lysate (LAL) testing for bacterial endotoxins.

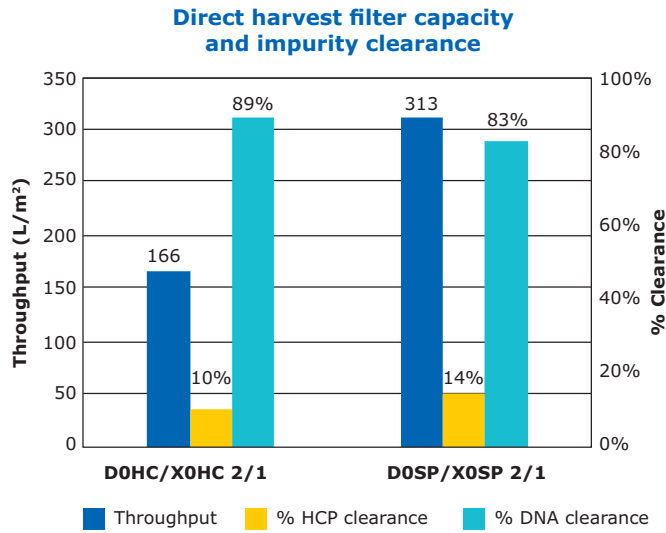
Format	Beta glucan LAL assay (pg/mL) <sup>1</sup>	
	Water	Buffer
X0HC <sup>2</sup>	< 25.3	< 80
X0SP	< LOQ	< LOQ

<sup>1</sup> X0 devices flushed with water/buffer, as indicated (600 LMH, 50 L/m<sup>2</sup> or 25 L/m<sup>2</sup> with buffer)

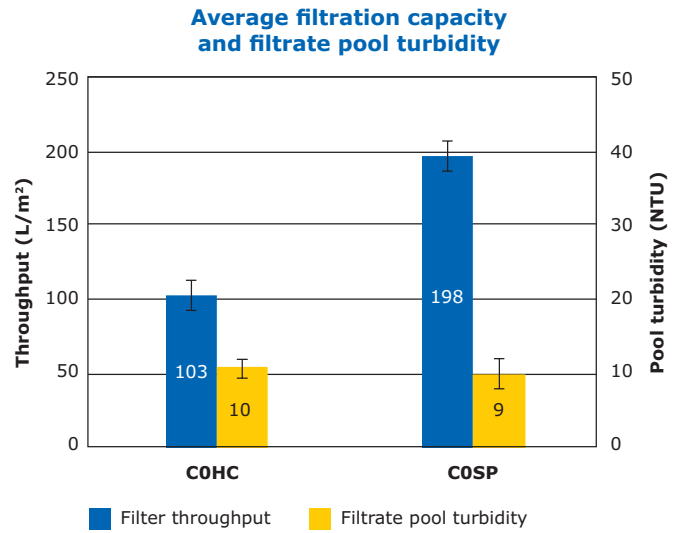
<sup>2</sup> X0HC is Millistak+® HC media (cellulose and diatomaceous earth based)

## Enhanced Filtration Performance

Millistak+® HC Pro synthetic depth filters provide as much as two times the filtration capacity of commercial DE-based benchmarks with equivalent filter retention properties.



mAb02 feed properties: 12.4x10<sup>6</sup> tc/mL (83% viability)

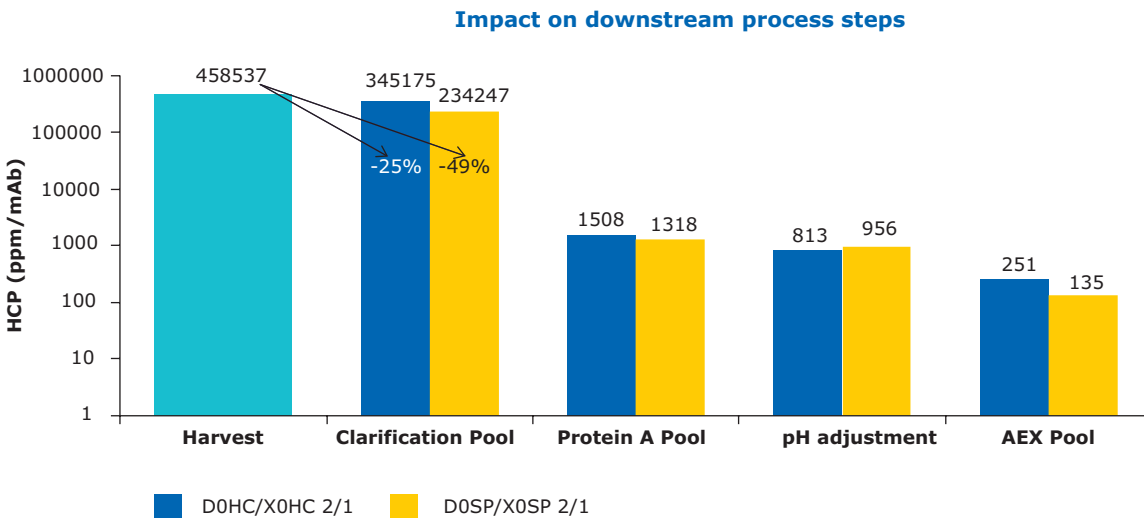


mAb05 feed properties: 9.7x10<sup>6</sup> tc/mL (59% viability)

## Impurity Clearance

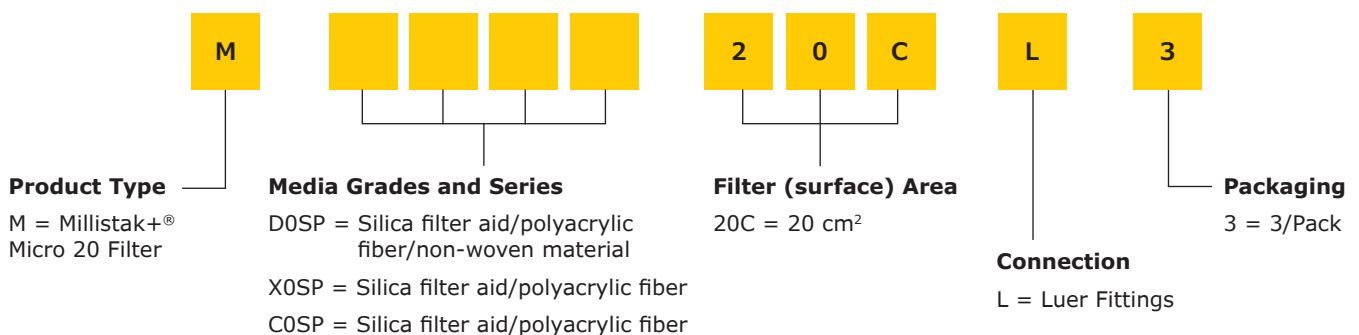
Improved clearance of HCP during clarification may positively impact subsequent downstream process steps.

A slight increase in mAb product purity has been observed in both protein A bind/elute and anion exchange flow-through chromatography (AEX F/T) process steps.

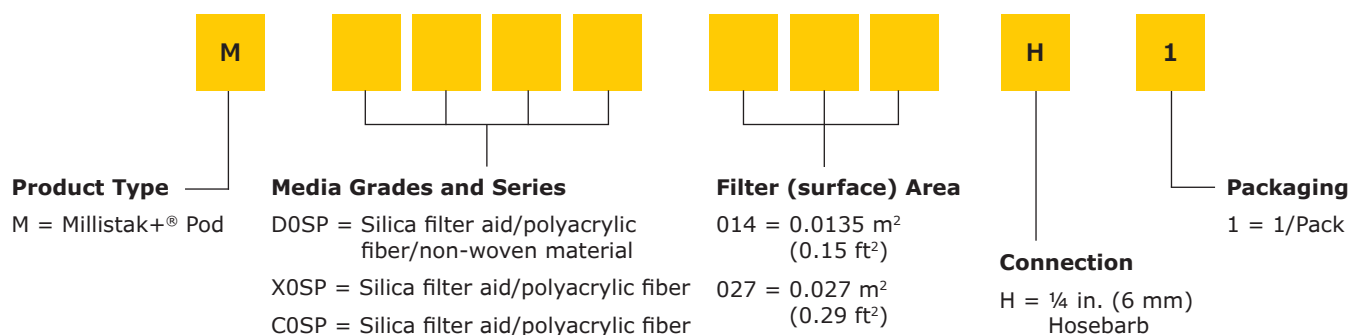


Media Grade	DOSP / COSP / XOSP								
Materials of Construction Depth Filter Media Filter Non-woven (DOSP grade only)	Silica Filter Aid with Polyacrylic Fiber Polypropylene								
Pod Housings	Glass-Filled Polypropylene								
Micro 20 Filter Housing	Polypropylene								
Inlet, Vent and Outlet Connections	Female Luer	¼ in. (6 mm) Hosebarb		Flat seal					
Device Format (for all grades)	Micro 20	Lab-Scale Pod (LSP)		Process-Scale Pod (PSP) (DOSP and COSP)			Process-Scale Pod (PSP) (XOSP)		
Surface Area	20 cm <sup>2</sup>	135 cm <sup>2</sup>	270 cm <sup>2</sup>	0.11 m <sup>2</sup>	0.33 m <sup>2</sup>	0.77 m <sup>2</sup>	0.11 m <sup>2</sup>	0.55 m <sup>2</sup>	1.1 m <sup>2</sup>
Pod (Device) Dimensions									
Length	-	8.6 in.	8.6 in.	24.2 in.	24.2 in.	24.2 in.	24.2 in.	24.2 in.	24.2 in.
Height	-	5.5 in.	5.5 in.	12.5 in.	12.5 in.	12.5 in.	12.5 in.	12.5 in.	12.5 in.
Diameter	2.5 in.	-	-	-	-	-	-	-	-
Thickness	Single Packet: 1.65 in. Two Packet: 2.05 in.	2.5 in.	3.3 in.	1.6 in.	3.2 in.	6.4 in.	1.2 in.	2.8 in.	4.8 in.
Maximum Operating Pressure	30 psig (2.1 bar) at 25°C	30 psid (2.1 bar) at ≤40 °C		50 psid (3.5 bar) at ≤80 °C					
Maximum Differential Pressure									
Forward	30 psid (2.1 bar) at 25 °C	30 psid (2.1 bar) at 40 °C		30 psid (2.1 bar) at 80 °C (forward)					
Reverse	30 psid (2.1 bar) at 25 °C	30 psid (2.1 bar) at 25 °C		30 psid (2.1 bar) at 25 °C (reverse)					
Operating Temperature Range	4 to 40 °C			4 to 80 °C					
Pre-use Sanitization	Integrity is maintained after 2 cycles of 60 minutes at 123 °C, however filtration performance may be impacted post autoclave. Recommended for post-use decontamination only.		Integrity is maintained after 1 autoclave cycle of 60 minutes at 123 °C. Filtration performance may be impacted post autoclave. Recommended for post-use decontamination only.						
Bacterial Endotoxin	USP <85> Bacterial Endotoxins: An aqueous extraction contained less than 0.25 EU/mL as determined using the Limulus Amebocyte Lysate (LAL) clot test technique (on filter media only)								
Toxicity	All component materials meet the requirements of the current USP <88> biological reactivity test for class VI plastics								
Pressure Equipment Directive	Pressure Equipment Directive 2014/68/EU: Process-scale pod devices and associated holders are designed and manufactured in accordance with the sound engineering practices (SEP) cited in Article 4(3) of 2014/68/EU.								

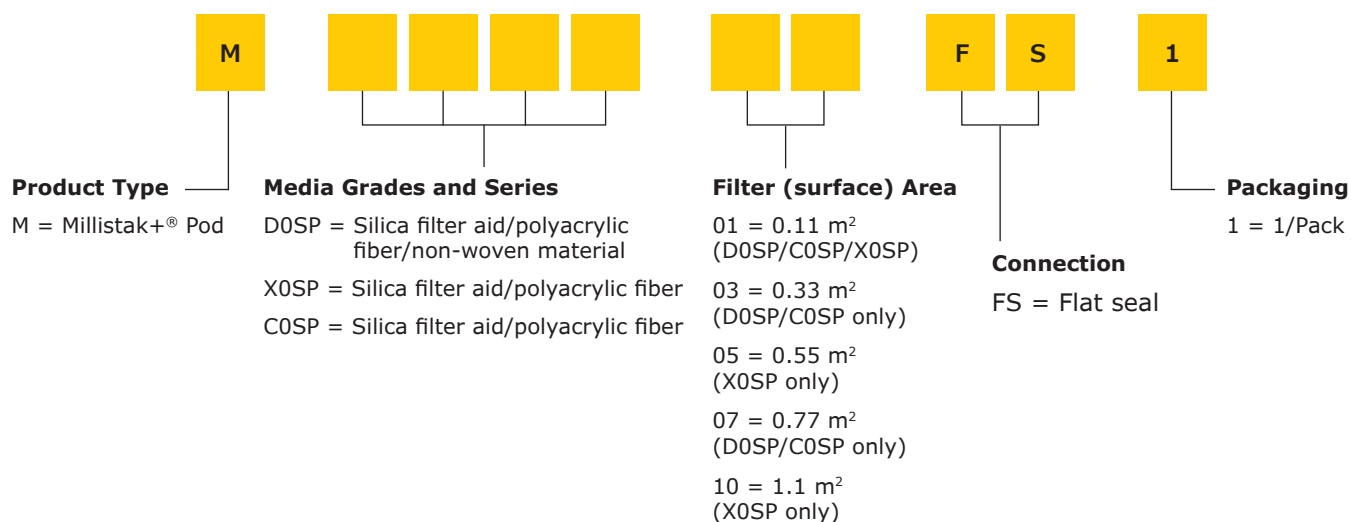
### Catalog Numbering Matrix for Millistak+® HC Pro Micro 20 filter:



## Catalog Numbering Matrix for Millistak+® HC Pro Lab-Scale Pod:



## Catalog Numbering Matrix for Millistak+® HC Pro Process-Scale Pod:



## Catalog Numbering for Disposable Adapters

Connect Millistak+® Process-Scale Pods to process piping, creating a disposable flow path.

MPODADAPT – disposable adapter kit with 3 through adapters and 3 blind adapters

MPODADPTF – disposable adapter kit with 6 through adapters, required if using MPODDIVERTR

## Catalog Numbering for Disposable Diverter Plate

Enable more than one media grade on a single rack

MPODDIVERTR – disposable diverter plate, 10/pk

Merck KGaA  
Frankfurter Strasse 250  
64293 Darmstadt, Germany

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

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

