Data Sheet

Millistak+® Depth Filters

Lenticular Depth filter media to optimize your process

The needs of the pharmaceutical and biotech industries are changing rapidly. With increasing titers and cell densities, pressure to decrease production costs, and rapid scale-up from bench top to production scale, having reliable tools is critical.

Depth filters that contain Millistak+® media can help you meet these challenges. With a wide range of media grades available in single and multi-layer configurations, we can assist you with fully optimizing your clarification process so you don't have excess installed capacity with a sub-optimal process design. Additionally, the use of multi-layer Millistak+® HC media grades combines multiple clarification steps into one device, saving time, money and reducing maintenance.

The Millistak+® Depth Filter media grades are available in small-scale µPod® devices for media screening and selection up to multiple stacked cell configurations. Every design feature in the stacks was implemented to help you increase your process speed and minimize your risk during production. 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 bypass and process deviations.

Benefits

- Small-scale devices for rapid screening of Millistak+® Depth Filter media
- Reduce operating costs
- Compress your process with multi-layer HC media solutions
- Save time and money

EMD Millipore Corp. is a subsidiary of Merck KGaA, Darmstadt, Germany

Grade Selections

Available in three distinct media series, the proven filtration performance of Millistak+® Depth Filter media provides greater flexibility to choose the optimum solution for your application. 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+® DE Series

Composed of select grade cellulose fiber and diatomaceous earth, the Millstak+® DE series not only improves the manufacturing process but also increases contaminant retention. This media series is suitable for primary or secondary clarification.

Millistak+® CE Series

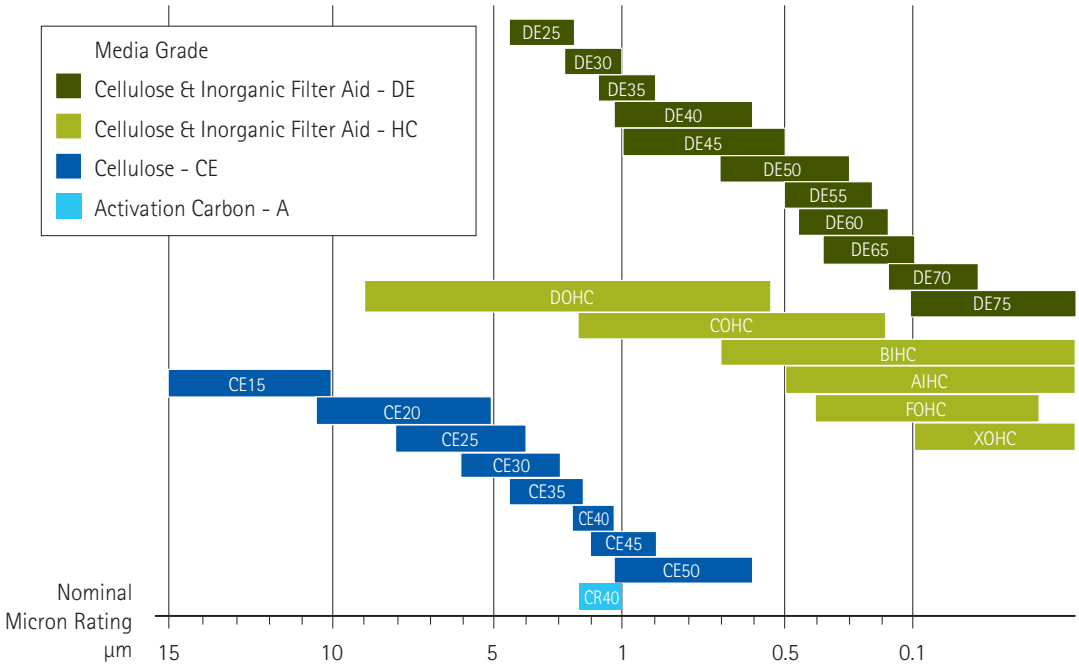
The Millistak+® CE series consists of a single layer media with cellulose fibers that are suitable for coarse filtration applications such as primary clarification.

Millistak+® HC Series

The Millistak+® HC series is dedicated to improving productivity by combining two distinct technologies that enhance filter capacity and retention. Multiple filtration stages downstream of the bioreactor are compressed into one efficient step by placing multiple media grades into each lenticular stack.

Millistak+® Media Coupled with EMD Millipore Support

Not all feed streams are created equal, so shouldn't you use the depth filter line which has the diversity to meet all of your processing needs? With the support of your local Process Development Specialist, we can fine tune the media and surface area required for your feed stream, saving you time and money.



Millistak+® Lenticular Disc Filters Specifications

Property	Millistak+® CE Media	Millistak+® DE Media	Millistak+® HC Media	
NVR	43.2–59.2 mg/ft² after a 24-hour static soak in pure water post autoclave (1 cycle of 30 minutes at 123 °C) and pure water flush of 5 liters per square foot (50 L/m²) of media surface area	39.3–64.3 mg/ft² after a 24-hour static soak in pure water post autoclave (1 cycle of 30 minutes at 123 °C) and pure water flush of 5 liters per square foot (50 L/m²) of media surface area	14.4–19.4 mg/ft² after a 24-hour static soak in pure water post autoclave (1 cycle of 60 minutes at 123 °C) and pure water flush of 10 liters per square foot (100 L/m²) of media surface area.	
TOC	1370–2120 ppb post autoclave (1 cycle of 30 minutes at 123 °C) and pure water flush of 5 liters per square foot (50 L/m²) of media surface area	753–1567 ppb post autoclave (1 cycle of 30 minutes at 123 °C) and pure water flush of 5 liters per square foot (50 L/m²) of media surface area	565–1037 ppb post autoclave (1 cycle of 60 minutes at 123 °C) and pure water flush of 10 liters per square foot (100 L/m²) of media surface area	
Metals (all units mg/ft² media)	After a 24-hour static soak in 10 liters pure water post autoclave (1 cycle of 30 minutes at 123 °C) and pure water flush of 5 liters per square foot (50 L/m²) of media surface area		After a 24-hour static soak in 19 liters pure water post autoclave (1 cycle of 30 minutes at 123 °C) and pure water flush of 10 liters per square foot (100 L/m²) of media surface area	
	CE	**DE**	**HC**	**FOHC**
Sodium	2.35 - 2.91	1.52 - 3.20	0.09 - 0.61	2.66 – 2.99
Calcium	1.37 - 1.61	1.84 - 3.79	0.07 - 0.64	2.30 – 3.42
Potassium	0.13	0.35 - 0.71	0.08 - 0.19	0.38 – 0.41
Magnesium	0.57 - 0.89	0.37 - 0.75	0.01 - 0.25	1.11 – 1.20
Iron	<0.01	<0.01	<0.01	<0.01
Lead	<0.01	<0.01	<0.01	<0.01
Aluminum	<0.01	<0.01	<0.01	0.002 – 0.008
Titanium	<0.01	<0.01	<0.01	<0.01
Chromium	<0.01	<0.01	<0.01	<0.01
Manganese	<0.01	<0.01	<0.01	0.02 – 0.07
Cobalt	<0.01	<0.01	<0.01	<0.01
Nickel	<0.01	<0.01	<0.01	0.003 – 0.004
Copper	<0.01	<0.01	<0.01	0.001 – 0.003
Zinc	<0.01	<0.01	0.04 - 0.75	0.007 – 0.019
Bacterial Endotoxin	<0.25 EU/mL utilizing LAL clot test technique (on filter media only)			
USP Toxicity	All component materials meet the requirements of the current USP <88> biological reactivity test for class VI plastics			
USP Oxidizable Substantaces	The effluent of an autoclaved stacked device (1 cycle of 30 minutes at 123 °C) is negative after a WFI flush of 5 liters per square foot (50 L/m²) for DE series and 10 liters per square foot (100 L/m²) for CE and HC series.			
Certification for 21 CFR	All component materials meet the FDA Indirect Food Additive requirements cited in 21 CFR 177-182. Supporting documentation is on file.			
Regulatory Compliance	Millistak+® filters were designed, developed, and manufactured in accordance with a Quality Management System approved by an accredited registering body to an ISO® 9000 Quality Systems Standard. For traceability and easy identification, each filter is labeled with the product name and identifying characteristics and shipped with a Certificate of Quality. All lenticular stacks are supported by a Validation Guide for compliance with regulatory requirements.			
Conductivity	Toxicity (Mouse Safety) USP <88> Safety Test			
Steam Sterilization	May be steam sterilized for 3 steam-in-place cycles of 30 minutes at 123 °C			
Hot Water Sanitization	May be hot water sanitized for 20 cycles using purified water at 80 °C for 30 minutes at a minimum recommended differential pressure of 15 psid (1.03 bar) in the forward flow direction.			
Materials of Construction				
Media	Cellulose fiber combined with resin binder	Cellulose fiber combined with inorganic filter aid and resin binder		
Membrane	N/A	N/A	Mixed esters of cellulose	
Structural Components	Polypropylene			
Bands	301 stainless steel			
Flat Seals	Silicone flat seal elastomer standard, optional EPR, Nitrile, Neoprene, or fluorocarbon flat seal elastomer			

Millistak+® Lenticular 16-cell, 2-cell and 7-cell Disc Filters

Choose the Right Media

Media Grade	Application	Characteristics	Media Construction
Single-layer CE*		Cellulose	CE15 to 50
Single-layer DE*		Cellulose + inorganic filter aid	DE25 to 75
Triple-layer A1HC	Post-TFF (Prostak™) clarification fluids	Tightest media combination with an additional membrane layer to protect downstream membrane filters	DE60 + DE75 + RW01
Triple-layer B1HC	Post-centrifuge or settled permeate containing cellular particulate	A more open first layer with an additional membrane layer to protect downstream membrane filters	DE50 + DE75 + RW01
Double-layer C0HC	Perfusion bioreactor fluid	Two layers of a more open DE media	DE30 + DE60
Double-layer D0HC	Primary clarification directly out of the bioreactor	A more open CE layer and DE media combination	CE25 + DE40
Double-layer X0HC	Secondary clarification of bioreactor harvests, primarily for cell cultures	Two DE layers. Provides sterile filter protection without a RW01 membrane	IM75 + IM83
Double-layer F0HC	Secondary clarification of pretreated harvest by acid precipitation or flocculation, *E. coli* and yeast	Two DE layers. Provides sterile filter protection without a RW01 membrane	DE60 and IM75

*For clarification of serum, plasma, vaccines, cell culture or other fluids, choice of media grade should be based on small-scale trials.

Water Flow Rates

Millistak+® CE Series

Media Type/Grade	Water Flow Rate L/min/m² at 10 psid, 23° C
CE15	3054.9 - 5611.5
CE20	2082.6 - 3825.5
CE25	1425.8 - 2619.1
CE30	974.1 - 1789.3
CE35	665.5 - 1222.4
CE40	454.6 - 835.1
CE45	310.6 - 570.5
CE50	212.2 - 389.8

Millistak+® HC Series

Media Type/Grade		Water Flow Rate L/min/m² at 10 psid, 23° C
A1HC	DE60	99.0 - 181.9
	DE75	31.6 - 58.0
B1HC	DE50	212.2 - 389.8
	DE75	31.6 - 58.0
C0HC	DE30	974.1 - 1789.3
	DE60	99.0 - 181.9
D0HC	CE25	1425.8 - 2619.1
	DE40	454.6 - 835.1
F0HC	DE60	99.0 - 181.9
	IM75	39.1 - 54.6
X0HC	IM75	39.1 - 54.6
	IM83	21.2 - 27.7

Millistak+® DE Series

Media Type/Grade	Water Flow Rate L/min/m² at 10 psid, 23° C
DE25	1425.8 - 2619.1
DE30	974.1 - 1789.3
DE35	665.5 - 1222.4
DE40	454.6 - 835.1
DE45	310.6 - 570.50
DE50	212.2 - 389.8
DE55	145.0 - 266.3
DE60	99.0 - 181.9
DE65	67.7 - 124.3
DE70	46.2 - 84.9
DE75	31.6 - 58.0

Ordering Information

µPod® Filter

M	□	□	□	□	2	3	C	L	3
Millistak+®	Media type and grade				Size			Connection	Package Quantity

Media type and grade

A1HC	CE15	CE45	DE45
B1HC	CE20	CE50	DE50
C0HC	CE25	DE25	DE55
D0HC	CE30	DE30	DE60
F0HC	CE35	DE35	DE65
X0HC	CE40	DE40	DE70
			DE75

Size
23C = 23 cm^2

Connection
L = Luer Fitting

Package Quantity
3 = 3/pack

µPod® Filter Accessories

µPod® Tubing Kit Catalogue No. MTUBEKITL1
Gauge 0-60 psi and Connection Fittings Catalogue No. XXPXLGAGE

Millistak+® Lenticular Disc Filters

Multi Layer

L	□	□	H	C	□	6	□	□
Lenticular	Media type and grade		Series		Stack Design (Surface Area)	Diameter	Flat Seal Elastomer	Package Quantity

Media type and grade
A1
B1
C0
D0
X0

Series
HC

Stack Design (Surface Area)
F0
H = 2-cell (0.45 m^2)
I*= 7-cell (1.6 m^2)
G**= 8-cell (1.8 m^2)

*D0HC, X0HC and F0HC only.
**A1HC, B1HC, C0HC only.

Diameter
6 = 16 in.

Flat Seal Elastomer
S = Silicone (standard)
E = EPR
N = Nitrile
P = Neoprene
F = Fluorocarbon

Package Quantity
2 = 2/pack (7 and 8-cell)
6 = 6/pack (2-cell)

Single Layer

L	□	□	□	□	□	6	□	□
Lenticular	Media type and grade				Stack Design (Surface Area)	Diameter	Flat Seal Elastomer	Package Quantity

Media type and grade

CE15	CE50	DE50
CE20	DE25	DE55
CE25	DE30	DE60
CE30	DE35	DE65
CE35	DE40	DE70
CE40	DE45	DE75
CE45		

Stack Design (Surface Area)
T = 16-cell (3.5 m^2)

Diameter
6 = 16 in.

Flat Seal Elastomer
S = Silicone (standard)
E = EPR
N = Nitrile
P = Neoprene
F = Fluorocarbon

Package Quantity
1 = 1/pack (16-cell)

EMD MILLIPORE

www.emdmillipore.com/clarification

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 and the world, please visit: **www.emdmillipore.com/offices**

For Technical Service, please visit:
www.emdmillipore.com/techservice