

**User Guide** 

# Pod Depth Filters

The life science business of Merck KGaA, Darmstadt, Germany operates as MilliporeSigma in the US and Canada.

## **Millipore**®

## Set-Up

NOTE The process scale (filtration area 0.11, 0.33, 0.55, 0.77, 1.1 and 1.4 m<sup>2</sup>) pod filters must be installed in a pod holder as described in the Holder User Guide.

### **Single Stage Depth Filtration**

- 1. Connect the inlet port of the filter to the feed line.
- 2. Connect the outlet port of the filter to the collection line.
- 3. Connect the vent port of the filter to the vent line.
- 4. Install a pressure gauge on the inlet or vent line.
- 5. Attach a vent valve or clamp at the end of the vent tubing.



### **Two Stage Depth Filtration**

In this example, a pod holder is configured for two stage depth filtration using two different grades of depth filter and a diverter plate.

- 1. Install the required filter area for Pod Filter A into the left side of the pod holder. Position pod adaptor (MPODADAPT) fittings at the inlet, vent, and outlet positions through the left pod holder plate.
- 2. Install the required filter area for Pod Filter B into the right side of the pod holder. Position pod adaptor (MPODADAPT) fittings at the inlet, vent, and outlet positions through the right pod holder plate.
- 3. Install the diverter plate (MPODDIVERTR) between Pod Filters A and B in the pod holder.
- 4. Clamp the pod holder to the recommended compression pressure.
- 5. Connect the inlet port for Pod Filter A to the feed line.
- 6. Connect the outlet port for Pod Filter A to the inlet port of Pod Filter B.
- 7. Connect the outlet port for Pod Filter B to the collection line.
- 8. Install pressure gauges onto each of the vent ports.



## Flushing

Flush devices with buffer or purified water prior to use. To fully wet the media, flush the filter as listed in the following tables:

#### **Clarisolve® Depth Filters**

Clarisolve media is application dependent and can be run at a flux of 100, 300 or 600 LMH.

	Flux	Lab Sca (n	ale Pod 1 <sup>2</sup> )	Process Scale Pod (m <sup>2</sup> )			
Media	(LMH)	0.014	0.027 0.11 0.33	0.55			
			Flow	rate (mL/	0.33 0.5 nL/min) 3300 550		
20MS	600	140	270	1100	3300	5500	
40MS	300	70	135	550	1650	2750	
60HX	100	23	45	183	550	917	

#### Millistak+® Depth Filters

	Flux	Lab S Pod	Scale (m <sup>2</sup> )	Ρ	rocess	Scale I	Pod (m	<sup>2</sup> )		
Media	(LMH)	0.027	0.054	0.11	0.55	0.77	1.1	1.4		
			Flow rate (mL/min)							
CR	600	270	540	1100	5500		11000			
HC	600	270	540	1100	5500		11000			
CE, DE	600	270	540	1100		7700		14000		

#### Millistak+® HC Pro Depth Filters

	Flux	Lab Pod	Scale (m²)	Ρ	rocess	Scale F	Pod (m	<sup>2</sup> )	
Media	(LMH)	0.014	0.027	0.11	0.33	0.55	0.77	1.1	
			Flow rate (mL/min)						
D0SP	300	70	135	550	1650		3850		
COSP	300	70	135	550	1650		3850		
X0SP	300	70	135	550		2750		5500	

#### **Single Filter Flushing Procedure**

- 1. Install new tubing on the inlet, outlet and vent lines of the filter.
- 2. Attach a pressure gauge to the vent or inlet port to monitor inlet pressure.
- 3. Attach a vent valve or clamp at the end of the vent tubing.
- 4. Start flushing the filter at the flow rate listed in the tables.
- 5. Open the vent to purge any air from the filter. Air purge may be assisted by temporarily clamping the outlet line closed.
- 6. Close the vent and open the outlet line to allow flow through the filter. For 100 and 300 LMH flow rates, back pressure is recommended to wet the device. To create the back pressure, partially close the outlet valve and completely close the vent valve. Increase the pressure in the device up to 10 psig by partially closing the outlet valve slowly, then vent slowly by opening the outlet to purge any air.
- 7. Flush until the desired target volume or the desired TOC level is reached (see <u>Conductivity and TOC Test Results</u>).
- 8. For optimal performance with a Pod filter, run the filtration process with product at a flux of 100 to 300 LMH and a max differential pressure of 2 bar (30 psi).
- NOTE It is normal to observe an increase in the hydraulic pressure on the process scale pod holder during operation. Hydraulic pressure should never exceed 124 bar (1800 psi).

Optimal flux for CR media is application dependent. Flux should be optimized through testing.

9. When filtration is complete, perform a blow down to recover product held up in the device by connecting air supply tubing to the vent port.

Media		Blow Down Pressure bar (psi)	Time min
Clarisolve®		0.3 (4.4)	10
	CR CE DE	0.3 (4.4)	10
Millistak+®	HC	0.3 (4.4) increase pressure at a rate of 0.1 bar/min (2 psi/min) until 1 bar (15 psi) is reached	up to 5
Millistak+® HC Pro	D0SP C0SP X0SP	0.3 (4.4) increase pressure at a rate of 0.1 bar/min (2 psi/min) until 1 bar (15 psi) is reached	10

#### **Two Filter Flushing Procedure**

In this example, the two stage depth filter assembly is filled with water and the recommended pre-use flush is performed.

- 1. Clamp the tubing leading to the inlet port for Pod Filter B.
- 2. Open the vent port for Pod Filter A.
- 3. Fill Pod Filter A with water using a pump connected to the feed line. Continue filling Pod Filter A until a steady stream of water exits the vent port for Pod Filter A.
- 4. Close the vent port for Pod Filter A and stop the pump.
- 5. Remove the clamp on the tubing leading to the inlet port for Pod Filter B.
- 6. Clamp the collection line connected to the outlet port for Pod Filter B.
- 7. Open the vent port for Pod Filter B.
- 8. Fill Pod Filter B with water using a pump connected to the feed line. Continue filling Pod Filter B until a steady stream of water exits the vent port for Pod Filter B.
- 9. Close the vent port for Pod Filter B and stop the pump.

- 10. Remove the clamp on the collection line connected to the outlet port for Pod Filter B.
- 11. Flush the two-stage depth filtration devices at the recommended flow rate and pre-use flush volume.

### **Conductivity and TOC**

#### **Conductivity and TOC Test Results**

Millistak+<sup>®</sup> HC and Clarisolve<sup>®</sup> filters were autoclaved for 60 minutes at 123 °C, then flushed with purified water at a flow rate of 600 LMH to a throughput of 100 L/m<sup>2</sup>. The filter effluent was then tested for conductivity and TOC.

Millistak+  $^{\otimes}$  HC Pro devices were not autoclaved and were flushed at a flow rate of 300 LMH to a throughput of 50 L/m².

			Test Results		
Media	Catalog Number (Lot Number)	Flux (LMH)	Conductivity (µS/cm)	TOC Value (ppm)	
Clariso	lve® Depth Filters				
	CS20MS01F1-X (Lot A)	600	2.38	1.12	
20MS	CS20MS01F1-X (Lot B)	600	3.24	1.42	
	CS40MS01F1-X (Lot C)	S01F1-X (Lot A)   600     S01F1-X (Lot B)   600     S01F1-X (Lot C)   600     S01F1-X (Lot A)   600     S01F1-X (Lot A)   600	3.52	1.49	
	CS40MS01F1-X (Lot A)	600	5.28	1.89	
40MS	CS40MS01F1-X (Lot B)	600	2.48	0.61	
	CS40MS01F1-X (Lot C)	600	3.08	1.72	
	CS60HX01F1-X (Lot A)	600	1.18	0.96	
60HX	CS60HX01F1-X (Lot B)	600	1.10	0.79	
	CS60HX01F1-X (Lot C)	600	1.36	0.13	

			Test Re	sults
Media	Catalog Number (Lot Number)	Flux (LMH)     Test Result       Conductivity (µS/cm)     T V (µS/cm)       23NA24863)     600     1.75     0       23NA24864)     600     2.22     0       23NA24864)     600     2.48     1       23NA24866)     600     1.33     0       23NA24866)     600     1.33     0       23NA24867)     600     1.85     0       23NA24868)     600     2.06     1       23NA24879)     600     31.4     0       23NA24861)     600     21.9     0       23NA24861)     600     21.9     0       23NA24861)     600     21.4     0       23NA24861)     600     21.4     0       23NA24861)     600     4.36     1       29JN7588	TOC Value (ppm)	
Millista	k+® Depth Filters			
	MD0HC01FS1 (CP3NA24863)	600	1.75	0.80
D0HC	MD0HC01FS1 (CP3NA24864)	600	2.22	0.90
	MD0HC01FS1 (CP3NA24864)	Imber nber     Test Results       Flux (LMH)     Conductivity (µS/cm)     To Val (µP       5     5       CP3NA24863)     600     1.75     0.8       CP3NA24864)     600     2.22     0.9       CP3NA24864)     600     2.48     1.2       CP3NA24864)     600     2.48     1.2       CP3NA24866)     600     1.33     0.8       CP3NA24867)     600     1.85     0.9       CP3NA24867)     600     1.85     0.9       CP3NA24868)     600     2.06     1.0       CP3NA24868)     600     2.06     1.0       CP3NA24879)     600     31.4     0.8       CP3NA24861)     600     21.9     0.6       CP3NA24861)     600     14.8     0.6       CP3NA24861)     600     21.9     0.6       CP3NA24861)     600     21.4     0.4       CP3NA24861)     600     4.36     1.2       CP3NA24861)     600     4.36     1.2  <	1.20	
	MC0HC01FS1 (CP3NA24866)	600	1.33	0.80
C0HC	MC0HC01FS1 (CP3NA24867)	600	1.85	0.90
	MC0HC01FS1 (CP3NA24868)	600	2.06	1.00
	MX0HC01FS1 (CP3NA24878)	600	43.9	0.90
ХОНС	MX0HC01FS1 (CP3NA24879)	600	31.4	0.80
	MX0HC01FS1 (CP3NA24880)	600	52.3	0.90
	MA1HC01FS1 (CP3NA24860)	600	14.8	0.60
A1HC	MA1HC01FS1 (CP3NA24861)	600	21.9	0.60
	MA1HC01FS1 (CP3NA24861)	600	19.4	0.70
FOLIC	MF0HC01FS1 (CP9JN75883)	erFux (LMH)Conductivity ( $\mu$ S/cm)IA24863)6001.75IA24864)6002.22IA24864)6002.48IA24864)6002.48IA24866)6001.33IA24867)6001.85IA24868)6002.06IA24878)60043.9IA24879)60031.4IA24860)60052.3IA24861)60021.9IA24861)60021.9IA24861)60021.4N75883)60040.3N75884)60021.471165-3)6004.5771165-12)6004.5671167-11)6004.2471168-25)6004.51	1.20	
FUHC	MF0HC01FS1 (CP9JN75884)	600	21.4	0.46
	MCR4001FS1 (CP8SN71164-13)	600	4.36	1.70
	MCR4001FS1 (CP8SN71165-3)	600	4.57	1.80
CR40	MCR4001FS1 (CP8SN71166-12)	600	4.56	1.60
Media Millista DOHC COHC XOHC A1HC FOHC CR40	MCR4001FS1 (CP8SN71167-11)	600	4.24	1.40
	MCR4001FS1 (CP8SN71168-25)	600	4.51	1.30

			Test Re	sults
Media	Catalog Number (Lot Number)	Imber ober     Test Rest (LMH)       Flux (LMH)     Test Rest Conductivity (µS/cm)       n Filters       (W167597)     300     41.5       (W167612)     300     27.5       (W167613)     300     24.4       177017-005)     300     9.0       177016-011)     300     15.0       177016-012)     300     16.7       177016-013)     300     11.1       177015-005)     300     8.9       W167602)     300     18.9       W167603)     300     23.4       W167604)     300     37.2       177025-005)     300     19.2       177024-011)     300     17.5       177024-013)     300     14.2       177023-005)     300     11.3       (W167608)     300     32.8       (W167609)     300     24.1       177032-014)     300     10.4*       177032-015)     300     10.5*       177032-016)     300     10.6*	TOC Value (ppm)	
Millista	k+® HC Pro Depth Filters			
	MD0SP23CL3 (W167597)	300	41.5	0.95
	MD0SP23CL3 (W167612)	300	27.5	1.09
	MD0SP23CL3 (W167597)     300     41.5       MD0SP23CL3 (W167612)     300     27.5       MD0SP23CL3 (W167613)     300     24.4       MD0SP01FS1 (W177017-005)     300     9.0       MD0SP01FS1 (W177016-011)     300     15.0       MD0SP01FS1 (W177016-012)     300     16.7       MD0SP01FS1 (W177016-013)     300     11.1       MD0SP01FS1 (W177015-005)     300     8.9       MC0SP01FS1 (W167602)     300     18.9       MC0SP23CL3 (W167603)     300     23.4       MC0SP23CL3 (W167604)     300     37.2       MC0SP01FS1 (W177025-005)     300     19.2       MC0SP01FS1 (W177024-011)     300     17.5       MC0SP01FS1 (W177024-012)     300     14.2       MC0SP01FS1 (W177024-013)     300     14.2       MC0SP01FS1 (W177024-013)     300     16.4	0.61		
MD0SP23CL3 (W167613)     300     24.4       MD0SP01FS1 (W177017-005)     300     9.0       MD0SP01FS1 (W177016-011)     300     15.0       MD0SP01FS1 (W177016-012)     300     16.7       MD0SP01FS1 (W177016-013)     300     11.1       MD0SP01FS1 (W177015-005)     300     8.9       MC0SP01FS1 (W167602)     300     18.9       MC0SP23CL3 (W167603)     300     23.4       MC0SP23CL3 (W167604)     300     37.2       MC0SP01FS1 (W177025-005)     300     19.2	9.0	0.47		
DUSP	Iia     Catalog Number (Lot Number)     Flux (LMH)     Test Rest Conductivity (LS/cm)       istak+*     HC Pro Depth Filters     0       istak+*     MD0SP23CL3 (W167597)     300     41.5       MD0SP23CL3 (W167612)     300     27.5       MD0SP01FS1 (W177017-005)     300     24.4       MD0SP01FS1 (W177016-011)     300     15.0       MD0SP01FS1 (W177016-012)     300     16.7       MD0SP01FS1 (W177016-013)     300     11.1       MD0SP01FS1 (W177016-013)     300     11.1       MD0SP01FS1 (W177016-005)     300     8.9       MC0SP01FS1 (W177016-013)     300     18.9       MC0SP23CL3 (W167602)     300     18.9       MC0SP23CL3 (W167604)     300     37.2       MC0SP01FS1 (W177024-011)     300     17.5       MC0SP01FS1 (W177024-013)     300     16.4       MC0SP01FS1 (W177023-005)     300     11.3       MX0SP01FS1 (W177032-014)     300     10.4*       MX0SP1FS1 (W177032-014)     300     10.4*       MX0SP01FS1 (W177032-015)     300     11.1*	15.0	0.77	
		0.69		
MediaCatalog Nur (Lot Number)Millista +* HC Pro DepthMD0SP23CL3 (N MD0SP23CL3 (N MD0SP01FS1 (N1 MD0SP01FS1 (N1 MD0SP01FS1 (N1 MD0SP01FS1 (N1 MD0SP01FS1 (N1 MC0SP01FS1 (N1 MX0SP01FS1 (N1)	MD0SP01FS1 (W177016-013)	300	11.1	0.70
	MD0SP01FS1 (W177015-005)	300	8.9	0.78
	MC0SP23CL3 (W167602)	300	18.9	1.15
MD0SP01FS1 (W177016-012)     30       MD0SP01FS1 (W177016-013)     30       MD0SP01FS1 (W177015-005)     30       MC0SP23CL3 (W167602)     30       MC0SP23CL3 (W167603)     30       MC0SP23CL3 (W167604)     30       MC0SP01FS1 (W177025-005)     30       MC0SP01FS1 (W177024-011)     30       MC0SP01FS1 (W177024-011)     30       MC0SP01FS1 (W177024-012)     30	MC0SP23CL3 (W167603)	300	23.4	2.01
	300	37.2	3.18	
COCD	Ia     Catalog Number (Lot Number)     Fux (LMH)     Test Re Conductivity (LMH)       stak+*     HC Pro Depth Filters     0005P23CL3 (W167597)     300     41.5       MD0SP23CL3 (W167612)     300     27.5     0005P23CL3 (W167613)     300     24.4       MD0SP01FS1 (W177017-005)     300     9.0     005P01FS1 (W177016-011)     300     15.0       MD0SP01FS1 (W177016-012)     300     16.7     005P01FS1 (W177016-013)     300     11.1       MD0SP01FS1 (W177015-005)     300     8.9     005P01FS1 (W177015-005)     300     8.9       MC0SP01FS1 (W177015-005)     300     18.9     005P01FS1 (W177025-005)     300     18.9       MC0SP01FS1 (W177025-005)     300     19.2     005P01FS1 (W177024-011)     300     17.5       MC0SP01FS1 (W177024-011)     300     14.2     005P01FS1 (W177024-013)     300     14.2       MC0SP01FS1 (W177024-013)     300     14.2     005P01FS1 (W177023-005)     300     11.3       MX0SP01FS1 (W177032-015)     300     11.3     005P01FS1 (W177032-014)     00     10.4*       MX0SP01FS1 (W177032-015)	1.24		
CUSP		300	17.5	1.0
		14.2	0.88	
		0.74		
	MC0SP01FS1 (W177023-005)	300	Test Result       Conductivity (µS/cm)     To Ya (p)       41.5     0.       27.5     1.       24.4     0.       9.0     0.       15.0     0.       16.7     0.       18.9     1.       23.4     2.       37.2     3.       19.2     1.       14.2     0.       11.3     0.       25.0     2.       32.8     2.       24.1     3.       10.4*     4.       10.5*     2.9       11.1*     2.9       32.8     2.9       32.8     2.9       34.1*     1.	0.71
	MX0SP23CL3 (W167607)	300	Test Results       Conductivity (µ\$/cm)     TC Val (pp       41.5     0.9       27.5     1.0       24.4     0.6       9.0     0.4       15.0     0.7       16.7     0.6       11.1     0.7       23.4     2.0       37.2     3.7       19.2     1.7       14.2     0.8       16.4     0.7       17.5     1.       14.2     0.8       16.4     0.7       17.5     1.       14.2     0.8       16.4     0.7       11.3     0.7       25.0     2.7       32.8     2.9       11.1*     2.9       10.5*     2.9       11.1*     2.9       10.6*     3.3       8.1*     1.6	2.20
COSP -	MX0SP23CL3 (W167608)	300	32.8	2.90
	MX0SP23CL3 (W167609)	300	24.1	3.00
VOCD	MX0SP01FS1 (W177033-005)	300	10.4*	4.9*
Millista DOSP COSP	MX0SP01FS1 (W177032-014)	300	10.5*	2.95*
	MX0SP01FS1 (W177032-015)	300	11.1*	2.95*
	MX0SP01FS1 (W177032-016)	300	10.6*	3.39*
	MX0SP01FS1 (W177031-005)	300	8.1*	1.6*

\*TOC and conductivity testing was performed after a 30 minute hold with pure water, followed by a 50 L/m<sup>2</sup> pure water flush at 300 LMH with 5 psi back pressure for these units.

## **Process Optimization**

Measure inlet and outlet pressure, original process fluid turbidity, and filtrate turbidity over time to provide data to verify performance and calculate sizing estimates.

## **Specifications**

### **Materials of Construction**

Component			Material			
Clarisolve® Depth	Filte	rs				
Housing	Glas	Glass-filled polypropylene				
Adapters	Glas	s-filled polyprop	ylene			
Gaskets and Plugs	The	hermoplastic elastomer (TPE)				
Filter Media	20M	S, 40MS	Polypropylene and cellulose fibers combined with an inorganic filter aid			
	60H	Х	Polypropylene			
Millistak+® Depth	Filte	rs				
Housing	Glas	s-filled polyprop	ylene			
Adapters	Glas	s-filled polyprop	ylene			
Gaskets and Plugs	The	moplastic elasto	omer (TPE)			
	CR		Activated carbon and cellulose fibers			
	CE		Cellulose fibers			
	DE		Cellulose fibers and inorganic filter aid			
Filter Media		A0, C0, D0, F0, X0	Multiple layers of cellulose fibers, diatamaceuous earth and inorganic filter aid			
	НС	A1, B1	Multiple layers of cellulose fibers, diatamaceuous earth, inorganic filter aid, and 0.1 micron mixed esters of cellulose membrane			
Millistak+® HC Pro	o Dep	oth Filters				
Housing	Glas	s-filled polyprop	ylene			
Adapters	Glas	s-filled polyprop	ylene			
Gaskets and Plugs	The	moplastic elasto	mer (TPE)			
	D0S	P	Nonwoven, Silica filter aid/Polyacrylic fiber pulp			
Filter Media	C0S	Р	Silica filter aid/Polyacrylic fiber pulp			
	X0S	P	Silica filter aid/Polyacrylic fiber pulp			

## **Operating Parameters**

Param	eter	Lab Scale Pod	Process Scale Pod		
Clarisolve <sup>®</sup> Dept	th Filters				
Effective Surface	Area	0.014, 0.027 m <sup>2</sup>	0.11, 0.33, 0.55 m <sup>2</sup>		
Inlet, Outlet and Connections	Vent	¼ in. (6 mm) Hose barb	Flat seal		
Operating Temper	ature Range	4 to 37 °C	4 to 37 °C		
Sterilization		Autoclave for two cycles of 60 minutes at 123 °C	Autoclave for one cycle of 60 minutes at 123 °C		
Typical Flush/Proc	ess Flux	1	00 to 600 LMH		
Maximum Differential	Forward	2.1 bar (30 psid) at $\leq$ 37 °C	2.1 bar (30 psid) at $\leq$ 25 °C 1.0 bar (15 psid) at $\leq$ 80 °C		
Pressure	Reverse	2.1 bar (30 psid) at ≤ 37 °C	2.1 bar (30 psid) at $\leq$ 25 °C		
Housing Operatin	a Pressure	2.1 har (30 psig) at $< 37.0$	3.5 bar (50 psid) at <u>&lt;</u> 25 ℃		
		2.1 bar (50 psig) at $\leq$ 57 °C	1.0 bar (15 psid) at ≤ 80 °C		
Millistak+® Dept	th Filters				
Effective Surface	HC Media	0.027	0.11, 0.55, 1.1 m <sup>2</sup>		
Area	DE, CE Media	0.027 m², 0.054 m²	0.11, 0.77, 1.4 m <sup>2</sup>		
Inlet, Outlet and Connections	Vent	¼ in. (6 mm) Hose barb	Flat Seal		
Operating Temper	ature Range	4 to 37 °C	4 to 37 °C		
Sterilization		2 cycles of 60 minutes at 123° C	1 cycle of 60 minutes at 123° C		
Typical Flush/Proc	ess Flux	1	00 to 600 LMH		
Maximum Differential	Forward	2.1 bar (30 psid) at 4-37 °C	2.1 bar (30 psid) at 25° C; 1.0 bar (15 psid) at 80° C		
Pressure	Reverse	2.1 bar (30 psid) at 37 °C	2.1 bar (30 psid) at 25° C		
Housing Operatin	g Pressure	2.1 bar (30 psid) at 37 °C	3.5 bar (50 psig) at 25 °C 1.0 bar (15 psid) at 80° C		

Parameter		Lab Scale Pod	Process Scale Pod		
Millistak+ <sup>®</sup> HC Pro Depth Filters					
		0.0135 m <sup>2</sup>	0.11.0.22.0.77m <sup>2</sup>		
Effective Surface	D03P, C03P	0.027 m <sup>2</sup>	0.11, 0.33, 0.77 11-		
Area	VOCD	0.0135 m <sup>2</sup>	$0.11.0 EE 1.1 m^2$		
	AUSP	0.027 m <sup>2</sup>	0.11, 0.33, 1.1 11-		
Inlet, Outlet and Connections	nlet, Outlet and Vent 1/4 in (6 n		Flat seal		
Operating Tempera	ture Range	4 to 40 °C	4 to 40 °C		
Sterilization		Integrity is maintained after Recommended for post-use of the second sec	1 cycle of 60 minutes at 123 °C. decontamination only.		
Typical Flush/Proc	ess Flux	1	00 to 600 LMH		
Maximum	Forward	2.1 bar (30 psid) at ≤ 40 °C	2.1 bar (30 psid) at ≤ 80 °C		
Differential Pressure	Reverse	2.1 bar (30 psid) at ≤ 25 °C	2.1 bar (30 psid) at ≤ 25 °C		
Housing Operating	g Pressure	2.1 bar (30 psid) at 40 °C	3.5 bar (50 psid) at 80 °C		

Pressure must be monitored at inlet or vent connections.

### **Typical Hold-up and Void Volumes**

#### **Clarisolve® Depth Filters**

Parameter		Lab Scale	Pod (m <sup>2</sup> )	Process Scale Pod (m <sup>2</sup> )			
P	drameter	0.014	0.027	0.11 0.33		0.55	
20MS Med	ia						
Internal voi	d volume (L)	0.302	0.549	3.20	8.44	13.6	
Hold-up	after gravity drain	0.22	0.32	0.86	2.74	4.66	
volume (L)	after blow down	0.16	0.32	0.61	2.29	3.87	
40MS Med	ia		·				
Internal voi	d volume (L)	0.294	0.556	3.22	8.87	14.1	
Hold-up	after gravity drain	0.20	0.33	0.66	2.27	3.99	
volume (L)	after blow down	0.16	0.33	0.54	8.44   2.74   2.29   8.87   2.27   1.81   7.80   3.67	3.43	
60HX Medi	ia						
Internal voi	d volume (L)	0.324	0.577	3.36	7.80	13.0	
Hold-up	after gravity drain	0.16	0.35	0.70	3.67	6.83	
volume (L)	after blow down	0.14	0.29	0.36	1.23	3.11	

#### Millistak+® Depth Filters

Parameter		Lab Scale Pod (m <sup>2</sup> )		Process Scale Pod (m <sup>2</sup> )				
		0.027	0.054	0.11	0.55	0.77	1.1	1.4
A1HC, B1HC, C0HC and D0HC Media								
Internal voi	d volume (L)	0.31	0.54	1.5	5.3	-	10.3	-
Hold-up	after gravity drain	-	0.41	0.5	2.5	-	5.7	-
volume (L)	after blow down	0.1	0.18	0.4	1.7	-	3.8	-
X0HC Medi	a							
Internal voi	d volume (L)	0.34	0.61	1.3	5.1	-	9.8	-
Hold-up	after gravity drain	0.26	0.52	1.1	4.1	-	7.8	-
volume (L)	after blow down	0.12	0.23	0.5	2.1	-	4.2	-
F0HC Medi	a	<u>.</u>			<u>.</u>	•		
Internal voi	d volume (L)	0.36	0.59	1.36	5.39	-	10.02	-
Hold-up	after gravity drain	0.25	0.44	0.76	3.15	-	5.90	-
volume (L)	after blow down	0.13	0.26	0.40	2.21	-	4.01	-
CR Media								
Internal voi	d volume (L)	0.37	0.67	1.44	5.75	-	11.14	-
Hold-up	after gravity drain	0.23	0.43	0.72	3.27	-	6.45	-
volume (L)	after blow down	0.13	0.23	0.47	2.38	-	4.76	-
CE and DE	Media	<u>.</u>			<u>.</u>	<u>.</u>		
Internal voi	d volume (L)	0.34	0.62	1.22	-	7.41	-	12.95
Hold-up	after gravity drain	_	0.26	0.41	-	2.56	-	4.58
volume (L)	after blow down	0.07	0.13	0.23	-	1.59	-	2.94

#### Millistak+<sup>®</sup> HC Pro Depth Filters

Parameter		Lab Scale Pod (m <sup>2</sup> )		Process scale Pod (m <sup>2</sup> )				
		0.0135	0.027	0.11	0.33	0.55	0.77	1.1
D0SP Media								
Internal void volume (L)		0.275	0.541	2.12	5.50		12.9	
Hold-up volume (L)	after gravity drain	0.198	0.397	1.00	2.50		6.30	
	after blow down	0.094	0.139	0.643	1.99		5.04	
COSP Media								
Internal void volume (L)		0.259	0.618	2.04	5.81		12.8	
Hold-up volume (L)	after gravity drain	0.188	0.506	1.13	2.81		6.62	
	after blow down	0.119	0.185	0.711	2.22		5.44	
X0SP Media								
Internal void volume (L)		0.347	0.676	1.25		4.94		9.47
Hold-up volume (L)	after gravity drain	0.188	0.395	0.801		3.32		6.72
	after blow down	0.09	0.175	0.635		2.92		5.85

#### **Pod Depth Filters User Guide**

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For technical assistance please visit: www.sigma-aldrich.com

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