

# Reusable hollow fiber cartridges

## FOR TANGENTIAL FLOW FILTRATION

Reusable hollow fiber filter cartridges are suitable for a range of ultrafiltration (UF), dialfiltration, and microfiltration (MF) processes. Each cartridge is engineered with polysulfone membranes, polysulfone housings, and polypropylene (PP) support netting. All components are animal origin free, CFR Title 21, and USP XXVII Class VI compliant.

We provide membrane surface areas from 16 cm<sup>2</sup> to 28 m<sup>2</sup> through a combination of three nominal path lengths and different cartridge outer diameters, enabling application across a range of processing scales and fluid volumes. Consistent flow paths established across laboratory, pilot, and production scales enable straightforward linear scale-up.

The features and benefits of reusable hollow fiber cartridges include:

- Three nominal flow path lengths of 30, 60, and 110 cm to facilitate optimization of process conditions.
- Wide range of pore sizes for MF and UF applications.
- Membrane areas from 16 cm<sup>2</sup> to 28 m<sup>2</sup> to suit specific processing needs and with straightforward linear scale-up.
- Polysulfone membrane to minimize nonspecific protein binding and provide high product recovery.
- Various lumen sizes available to accommodate specific fluidic properties.
- Self-contained housings with translucent polysulfone shells to allow ease of installation.
- Cartridges available in clean-in-place (CIP), autoclavable, and steam-in-place (SIP) formats to suit all processes.
- Alternating tangential flow (ATF) compatibility for perfusion applications.

The nominal pore sizes for microfiltration membranes range from 0.1 to 0.6 µm, while UF membranes span from 3000 to 750 000 Da nominal molecular weight cutoff (NMWC). Both MF and UF membranes are available with two distinct lumen inner diameters.



**Fig 1.** Hollow fiber cartridges from development scale to process scale.

All of our reusable hollow fiber products can be cleaned, sanitized, and reused to achieve cost-efficient cross flow filtration operations. These reusable hollow fiber cartridges can be sanitized chemically, regardless of their dimensions and formats. Some configurations are compatible with thermal sanitizations like autoclave or live steam.

## Product families

Hollow fiber cartridges are available from design-in scale to process scale, as summarized below in Table 1. The surface areas corresponding to various lumen internal diameters and cartridge housing sizes are listed in Table 2.

**Table 1.** Cartridge nominal path lengths, outer diameters (o.d.), and suitable process volume

Product family	Cartridge o.d. (cm)	Nominal flow path length (cm)									Recommended process volume
		30			60			110			
		Chemically sanitizable only	Autoclavable	SIP options	Chemically sanitizable only	Autoclavable	SIP options	Chemically sanitizable only	Autoclavable	SIP options	
Design-in scale (MidGee™ cartridges, MidGee Hoop cartridges, AXH/AXM)	0.3	–	x	–	x	x	–	–	x	–	< 200 mL
	0.6	x	–	–	–	–	–	–	–	–	
Laboratory scale (Xampler™ cartridges)	0.9	–	x	–	–	x	–	–	–	–	< 10 L
	1.9	–	x	–	–	x	–	–	–	–	
Pilot scale	3.2	–	x	–	–	x	–	–	–	–	10–100+ L
	5.1	–	x	–	–	x	–	–	–	–	
Process scale	7.6 (3 in.)	x	x	x	x	x	x	x	–	–	100–1000+ L
MaxCell™ cartridges	10.2–10.8 (4 in.)	x	–	x	x	x	x	x	x	x	
ProCell™ cartridges	15 (6 in.)	–	–	–	x	x	–	x	–	–	

**Table 2.** Summary of cartridge surface areas corresponding to various lumen internal diameters (i.d.) and cartridge

Product family	Cartridge o.d. (cm)	Nominal flow path length (cm)								Recommended process volume
		30			60			110		
		Lumen C 0.5 mm i.d.	Lumen D 0.75 mm i.d.	Lumen E 0.5 mm i.d.	Lumen C 0.5 mm i.d.	Lumen D 0.75 mm i.d.	Lumen E 0.5 mm i.d.	Lumen C 0.5 mm i.d.	Lumen E 0.5 mm i.d.	
Design-in scale (MidGee cartridges, MidGee Hoop cartridges, AXH/AXM)	0.3	0.0026	0.0024	0.0016	0.004	0.003	0.004	0.0041	0.0041	< 200 mL
	0.6	0.0050	0.0050	0.0050	–	–	–	–	–	
Laboratory scale (Xampler cartridges)	0.9	0.014	0.012	0.011	0.029	0.026	0.023	–	–	< 10 L
	1.9	0.065	0.046	0.04	0.14	0.10	0.09	–	–	
Pilot scale	3.2	0.20	–	0.12	0.48	0.37	0.28	–	–	10–100+ L
	5.1	0.53	0.41	0.36	1.15	0.93	0.84	–	–	
Process scale	7.6 (3 in.)	1.4	1.0	0.9	3.3	2.5	2.1	6.0	3.70	100–1000+ L
MaxCell cartridges	10.2 (4 in.)	3.5	–	2.3	4.2	–	4.2	11.6	–	
	10.8 (4 in.)	3.5	2.7	2.5	4.4	4.9	4.4	13.0	9.00	
ProCell cartridges	15 (6 in.)	–	–	–	8.3	–	8.3	28.0	19.00	

## Steam-in-place (SIP) compatible hollow fiber cartridges and housing

SIP cartridges are engineered for use in pharmaceutical manufacturing processes. These cartridges are installed within stainless steel housings to facilitate efficient operation throughout the steaming cycle for sanitization. They are offered in three standard configurations: SMO, STM, and MSM (Figure 1).

All SIP cartridges have open face configurations at both ends to facilitate membrane steam penetration. The SMO and STM models have an outer diameter of 7.6 cm (3 in.). MSM cartridges feature a nominal outer diameter of 10 cm (4 in.). For secure and sanitary closure within the housing, SMO and MSM cartridges employ a single O-ring seal at each end, while STM cartridges utilize double O-ring seals on each end cap. The configuration at both ends of every cartridge is uniform.

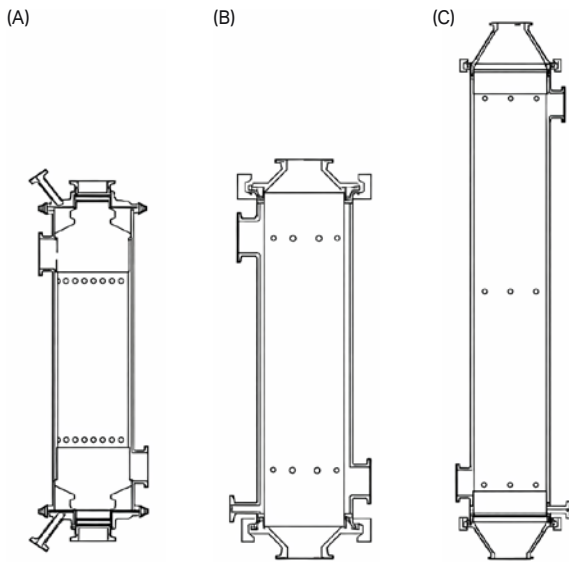
SIP cartridges are offered in both UF and MF pore sizes. All cartridge components are constructed in accordance with USP XXIV Biological Reactivity Tests, Class VI standards for plastics.

## Stainless housing assembly for SIP hollow fiber cartridges

All SIP cartridges must use a stainless housing assembly. We provide compatible stainless housings and accessories for every SIP cartridge configuration. All housing assemblies use 316L stainless steel and are constructed to meet sanitary standards. The standard O-ring material is silicone. Both end fittings and permeate ports feature a 1.5 in. sanitary clamp configuration, facilitating connection to steam and process piping.

For optimal performance, the housing must be installed with vertical piping. It is advisable to steam the entire unit and housing assembly for 30 minutes at a temperature between 121°C to 123°C, and a pressure of 1 barg (15 psig). Steam should be delivered to both sides of the membrane for full steam penetration and to minimize the pressure differential, delta P, across the membrane during the steam sterilization cycle. A 0.5 in. sanitary clamp port is positioned on the low point of the housing shell to enable complete removal of condensate.

We offer a SIP protocol that outlines procedures designed to support comprehensive validation and extend cartridge lifespan.



**Fig 2.** Cross sections of (A) an STM cartridge, (B) an SMO cartridge, and (C) an MSM cartridge stainless steel housing.

## Autoclavable cartridges

In addition to SIP compatible cartridges, we provide autoclavable hollow fiber cartridge option for thermal sanitization across different process scales. These autoclavable cartridges feature a broad surface area, ranging from 16 cm<sup>2</sup> to 28 m<sup>2</sup>, suitable for wide-ranged process volumes. All of our autoclavable products are designated with an "A" suffix in their product numbers.

### Autoclavable cartridges: surface areas and connection types

	Lumen C 0.5 mm i.d.	Lumen D 0.75 mm i.d.	Lumen E 1.0 mm i.d.	End fitting connections	Permeate connections
<b>MidGee and MidGee Hoop cartridges</b>					
	<b>Surface area (cm<sup>2</sup>)</b>				
MM01A	26	24	16	Male luer connection	Male luer connection
H22LA	-	29	38	Male luer connection	Male luer connection
H42LA	41	-	73	Male luer connection	Male luer connection
H24LA	42	-	-	Male luer connection	Male luer connection
<b>Laboratory scale (Xampler cartridges)</b>					
	<b>Surface area (cm<sup>2</sup>)</b>				
3MA	140	120	110	0.5 in. sanitary clamp	0.25 in. tubing nipples
4MA	650	460	420	0.5 in. sanitary clamp	0.375 in. tubing nipple
3X2MA	290	260	230	0.5 in. sanitary clamp	0.25 in. tubing nipples
4X2MA	1400	950	850	0.5 in. sanitary clamp	0.375 in. tubing nipple
<b>Pilot scale</b>					
	<b>Surface area (m<sup>2</sup>)</b>				
5A	0.20	0.16	0.12	1.5 in. sanitary clamp	0.5 in. tubing nipples
6A	0.48	0.37	0.28	1.5 in. sanitary clamp	0.5 in. tubing nipples
8A	0.53	0.41	0.36	1.5 in. sanitary clamp	0.5 in. tubing nipples
9A	1.15	0.93	0.84	1.5 in. sanitary clamp	0.5 in. tubing nipples
<b>Process scale, MaxCell, and ProCell cartridges</b>					
	<b>Surface area (m<sup>2</sup>)</b>				
35A	1.35	1.00	0.92	1.5 in. sanitary clamp	1.5 in. sanitary clamp
55A	3.25	2.50	2.10	1.5 in. sanitary clamp	1.5 in. sanitary clamp
65A	6.10	4.90	4.40	2.0 in. sanitary clamp	1.5 in. sanitary clamp
85A	13.00	-	9.00	2.0 in. sanitary clamp	1.5 in. sanitary clamp
152SB	14.00	-	8.30	2.0 in. sanitary clamp	1.5 in. sanitary clamp

## Chemical sanitization only cartridges

All thermally stable hollow fiber cartridges suitable for autoclaving or SIP processes are also compatible with chemical sanitization. We provide a selection of hollow fiber products specifically engineered for chemical sanitization and capable of accommodating a broad spectrum of processing volumes.

## ATF compatible cartridges

We provide ATF system-compatible hollow fiber cartridges designed to meet your process requirements within existing setups. All ATF-compatible cartridges are suitable for autoclaving.

## Technical specifications

### Materials of construction

Components	Material
Hollow fibers	Polysulfone
Housing	Polysulfone
Shell	Polysulfone
Potting	Epoxy
<i>Fitting caps:</i>	
Midgee and Midgee Hoop cartridges	Polycarbonate
All other cartridges	Vinyl

## Chemical sanitization only cartridges: surface area and connection type

	Lumen C 0.5 mm i.d.	Lumen D 0.75 mm i.d.	Lumen E 1.0 mm i.d.	Surface area (cm <sup>2</sup> )	End fitting connections	Permeate connections
<b>Start AXM</b>	<b>Fiber number</b>					
2U	12	8	6	50	Integrated UNF fittings	Integrated UNF fittings

Fiber type	Lumen C 0.5 mm i.d.	Lumen D 0.75 mm i.d.	Lumen E 1.0 mm i.d.	End fitting connections	Permeate connections
<b>Laboratory scale (Xampler cartridges)</b>	<b>Surface area (cm<sup>2</sup>)</b>				
3M	140	120	110	0.5 in. sanitary clamp	0.25 in. tubing nipples
4X2M	1400	950	850	0.5 in. sanitary clamp	0.375 in. tubing nipples

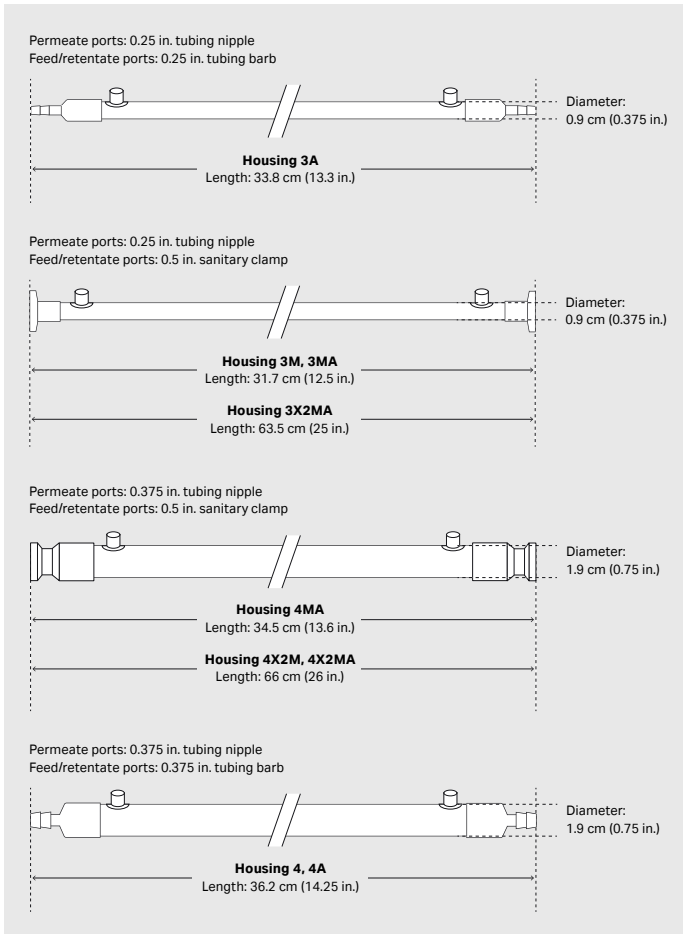
<b>Process scale, MaxCell, and Procell cartridges</b>	<b>Surface area (m<sup>2</sup>)</b>				
35	1.35	1.00	0.92	1.5 in. sanitary clamp	1.5 in. sanitary clamp
55	3.25	2.50	2.10	1.5 in. sanitary clamp	1.5 in. sanitary clamp
55R	3.25	2.50	2.10	Retrofit	1.5 in. sanitary clamp
75	6.00	–	3.70	1.5 in. sanitary clamp	1.5 in. sanitary clamp
75R	6.00	–	3.70	Retrofit	1.5 in. sanitary clamp
45	3.50	2.65	2.50	2.0 in. sanitary clamp	1.5 in. sanitary clamp
65	6.10	4.90	4.40	2.0 in. sanitary clamp	1.5 in. sanitary clamp
85	13.00	–	9.00	2.0 in. sanitary clamp	1.5 in. sanitary clamp
152M	14.00	–	8.30	2.0 in. sanitary clamp	1.5 in. sanitary clamp
154M	28.00	–	16.60	2.0 in. sanitary clamp	1.5 in. sanitary clamp

## SIP compatible cartridge: configurations and surface

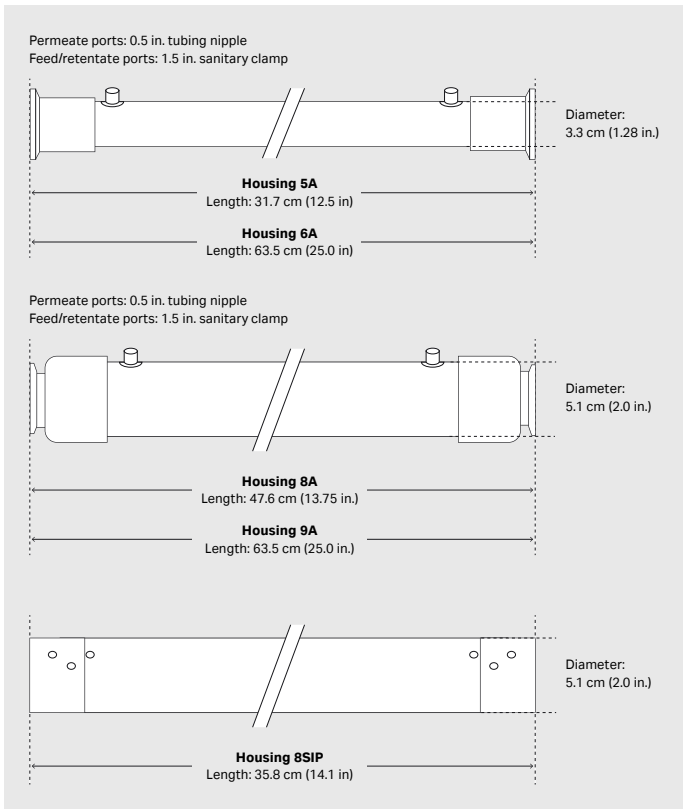
Cartridge size	Cartridge o.d.	End cap O-ring	Nominal flow path	Lumen i.d. 0.5 mm		Lumen i.d. 0.75 mm		Lumen i.d. 1.0 mm	
	cm			m <sup>2</sup>	ft <sup>2</sup>	m <sup>2</sup>	cm <sup>2</sup>	m <sup>2</sup>	cm <sup>2</sup>
35STM	7.6 (3 in.)	Double	30	1.35	14.53	–	–	0.92	9.90
55STM			60	3.25	34.98	2.50	26.91	2.10	22.60
35SMO	10.8 (4 in.)	Single	30	1.35	14.53	–	–	0.92	9.90
55SMO			60	3.25	34.98	–	–	2.10	22.60
45MSM			30	3.50	37.67	–	–	2.30	24.76
65MSM			60	5.60	60.28	–	–	4.20	45.21
86MSM			110	11.60	124.86	–	–	9.00	96.88

## ATF compatible cartridge: configuration and surface area

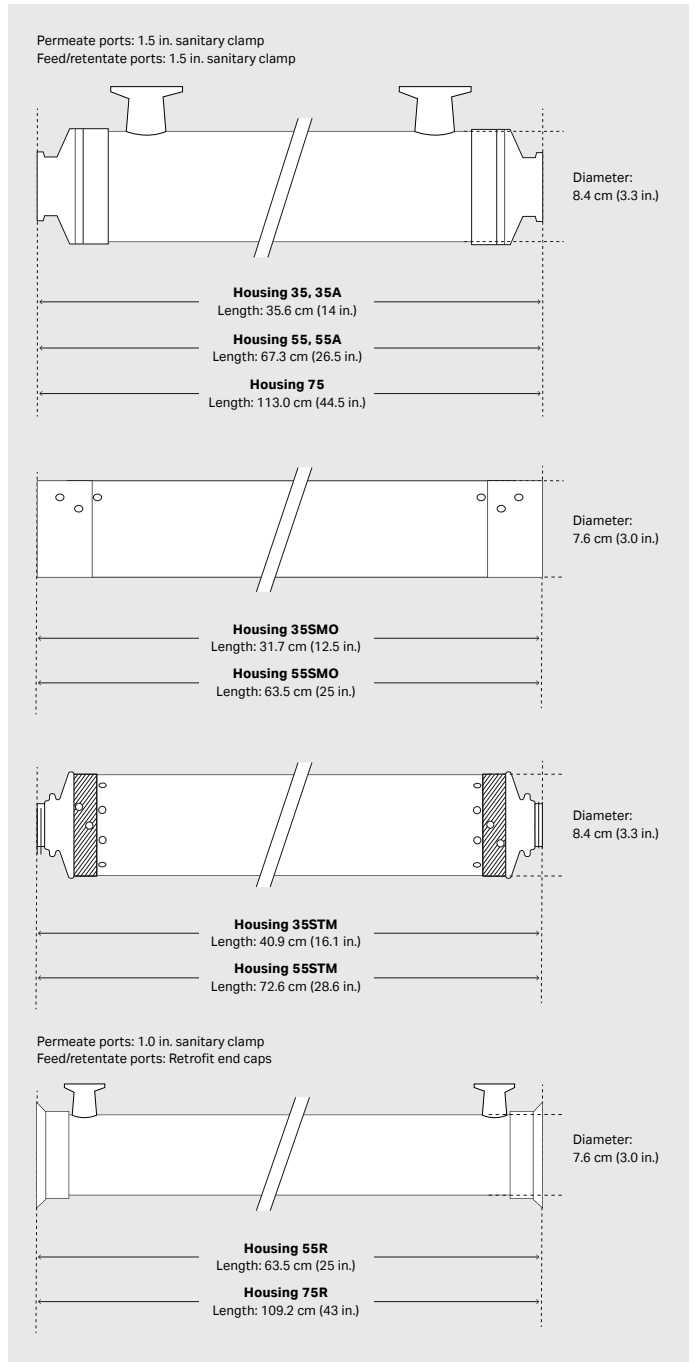
ATF model	Cartridge size code	Nominal flow path (cm)	Cartridge o.d. (cm)	Membrane surface area (m <sup>2</sup> ) lumen E (1.0 μm)	Bioreactor volume (L)
ATF 2	4X2MA	60	1.9	0.085	1–10
ATF 4	8SIP	30	5.1	0.46	7–25
ATF 6	55SMO	60	7.6	2.1	20–200
ATF 8	65MSM	60	10.2	4.2	50–500
ATF 10	152SB	60	15	8.3	200–2000



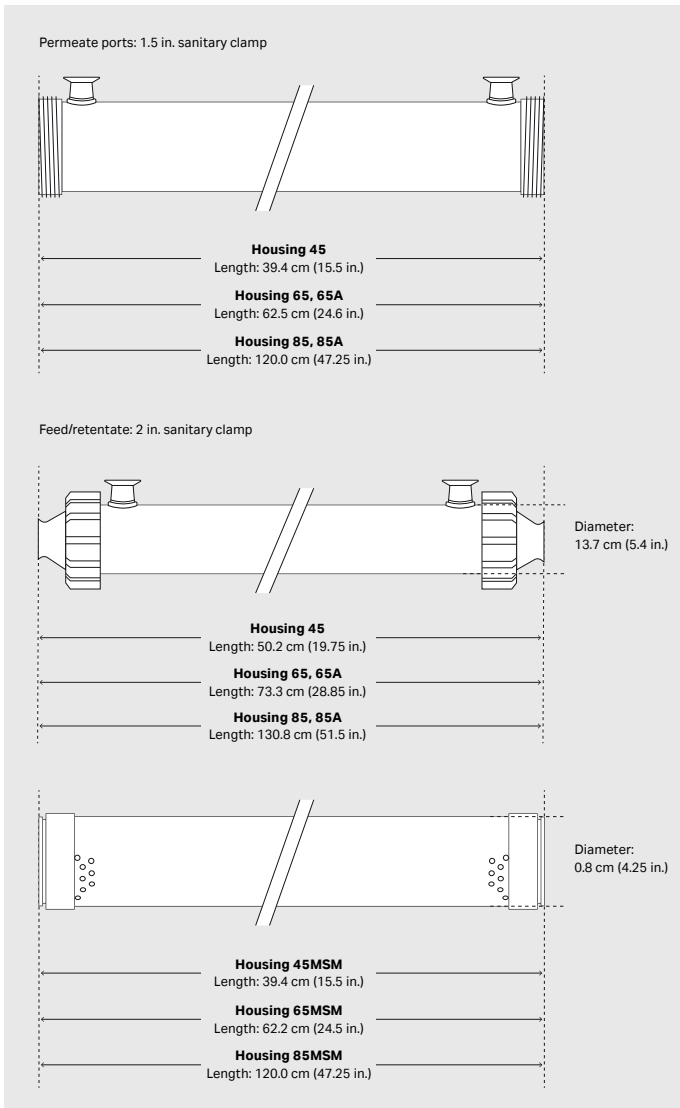
**Fig 3.** Reference drawings of laboratory-scale Xampler cartridges (sizes 3, 4, 3X2, and 4X2).



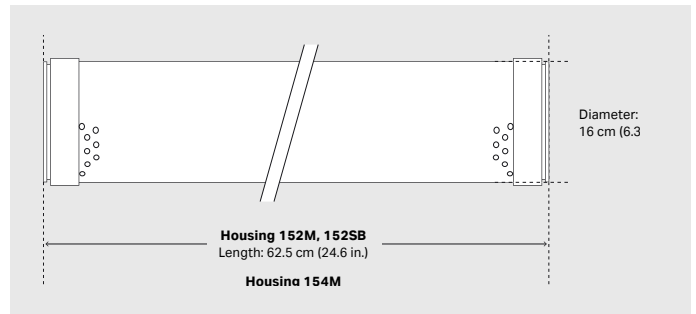
**Fig 4.** Reference drawings of pilot-scale cartridge (sizes 5, 6, 8, and 9).



**Fig 5.** Reference drawings of process-scale cartridges (sizes 35, 55, and 75).



**Fig 6.** Reference drawings of MaxCell cartridges (sizes 45, 65, and 85).



**Fig 7.** Reference drawings of ProCell cartridges (sizes 152 and 154).

# Ordering information

Our hollow fiber cartridge part numbers contain identifiers for their configurations, such as membrane pore size, lumen i.d., and housing size (Table 2).

**Table 3.** Part number naming conventions

<b>XFP</b>	<b>n</b>	<b>Y</b>	<b>m</b>	<b>Z</b>
<b>Fiber type</b>	<b>Pore or NMWC rating</b>	<b>Lumen ID</b>	<b>Housing size</b>	<b>Additional information</b>
CFP: Microfiltration	1: 0.1 µm 2: 0.2 µm 4: 0.45 µm 6: 0.65 µm	D: 0.75 µm E: 1.0 µm	See Table 4	A: Autoclavable U: UNF fitting L: Luer connection STM, SMO, MSM: Steamable R: Retrofit SB: Single bundle M: Micro sanitary clamp UFP: Ultrafiltration
UFP: Ultrafiltration	3: 3000 Da 5: 5000 Da 10: 10 000 Da 30: 30 000 Da 50: 50 000 Da 100: 100 000 Da 300: 300 000 Da 500: 500 000 Da 750: 750 000 Da	C: 0.5 µm E: 1.0 µm	See Table 4	A: Autoclavable U: UNF fitting L: Luer connection STM, SMO, MSM: Steamable R: Retrofit SB: Single bundle M: Micro sanitary clamp

**Table 4.** Product housing size chart

<b>Cartridge o.d. (cm)</b>	<b>Nominal flow path lengths (cm)</b>			<b>Product Scale</b>
	<b>30</b>	<b>60</b>	<b>110</b>	
0.3	MM01	H22, H24	H42, H42	Design-in scale (MidGee cartridges, MidGee Hoop cartridges, and AXM/AXH)
0.6	2	–	–	
0.9	3M	3X2M	–	Laboratory (Xampler cartridges)
1.9	4M	4x2M	–	
3.2	5	6	–	Pilot scale
5.1	8	9	–	
7.6 (3 in.)	35	55	75	Process scale
10.2–10.8 (4 in.)	45	65	85	
15 (6 in.)	–	152	154	

## SIP microfiltration products

### STM cartridges (process scale)

<b>Pore size (µm)</b>	<b>Lumen i.d. (mm)</b>	<b>Cartridge o.d. (cm)</b>	<b>Nominal flow path (cm)</b>	<b>Surface area (m<sup>2</sup>)</b>	<b>Product code</b>
0.1	1.0	7.6 (3 in.)	60	2.10	CFP-1-E-55STM
0.2	1.0	7.6 (3 in.)	30	0.92	CFP-2-E-35STM
			60	2.10	CFP-2-E-55STM
0.45	1.0	7.6 (3 in.)	60	2.10	CFP-4-E-55STM

**SMO cartridges (process scale)**

Pore size (µm)	Lumen i.d. (mm)	Cartridge o.d. (cm)	Nominal flow path (cm)	Surface area (m <sup>2</sup> )	Product code
0.1	1.0	7.6 (3 in.)	30	0.92	CFP-1-E-35SMO
			60	2.10	CFP-1-E-55SMO
0.2	1.0	7.6 (3 in.)	30	0.92	CFP-2-E-35SMO
			60	2.10	CFP-2-E-55SMO
0.45	1.0	7.6 (3 in.)	60	2.10	CFP-4-E-55SMO

**MSM cartridges (large volume process scale)**

Pore size (µm)	Lumen i.d. (mm)	Cartridge o.d. (cm)	Nominal flow path (cm)	Surface area (m <sup>2</sup> )	Product code
0.1	1.0	10.8 (4 in.)	30	2.3	CFP-1-E-45MSM
			60	4.2	CFP-1-E-65MSM
0.2	1.0	10.8 (4 in.)	30	2.3	CFP-2-E-45MSM
			60	4.2	CFP-2-E-65MSM
0.4	1.0	10.8 (4 in.)	60	4.2	CFP-4-E-65MSM

**SIP ultrafiltration products****STM cartridges (process scale)**

NMWC (Da)	Lumen i.d. (mm)	Cartridge o.d. (cm)	Nominal flow path (cm)	Surface area (m <sup>2</sup> )	Product code
10 000	0.5	7.6 (3 in.)	60	3.25	UFP-10-C-55STM
	1.0	7.6 (3 in.)	60	2.10	UFP-10-E-55STM
30 000	0.5	7.6 (3 in.)	60	3.25	UFP-30-C-55STM
	1.0	7.6 (3 in.)	30	0.92	UFP-30-E-35STM
50 000	0.5	7.6 (3 in.)	60	3.25	UFP-50-C-55STM
100 000	0.5	7.6 (3 in.)	60	3.25	UFP-100-C-55STM
			30	0.92	UFP-100-E-35STM
			60	2.10	UFP-100-E-55STM
300 000	1.0	7.6 (3 in.)	60	2.10	UFP-300-E-55STM
500 000	0.5	7.6 (3 in.)	60	3.25	UFP-500-C-55STM
	1.0	7.6 (3 in.)	60	2.10	UFP-500-E-55STM
750 000	0.5	7.6 (3 in.)	30	1.35	UFP-750-C-35STM
			60	3.25	UFP-750-C-55STM

**SMO cartridges (process scale)**

Pore size (µm)	Lumen i.d. (mm)	Cartridge o.d. (cm)	Nominal flow path (cm)	Surface area (m <sup>2</sup> )	Product code
10 000	1.0	7.6 (3 in.)	60	2.10	UFP-10-E-55SMO
30 000	1.0	7.6 (3 in.)	60	2.10	UFP-30-E-55SMO
50 000	1.0	7.6 (3 in.)	60	2.10	UFP-50-E-55SMO
100 000	1.0	7.6 (3 in.)	60	2.10	UFP-100-E-55SMO
300 000	1.0	7.6 (3 in.)	60	2.10	UFP-300-E-55SMO
500 000	1.0	7.6 (3 in.)	60	2.10	UFP-500-E-55SMO
750 000	0.5	7.6 (3 in.)	30	1.35	UFP-750-C-35SMO
			60	3.25	UFP-750-C-55SMO
			60	2.10	UFP-750-E-55SMO

**MSM cartridges (large volume process scale)**

NMWC (Da)	Lumen i.d. (mm)	Cartridge o.d. (cm)	Nominal flow path (cm)	Surface area (m <sup>2</sup> )	Product code
10 000	0.5	10.8 (4 in.)	60	5.6	UFP-10-C-65MSM
	1.0	10.8 (4 in.)	60	4.2	UFP-10-E-65MSM
30 000	0.5	10.8 (4 in.)	110	9	UFP-10-E-85MSM
			60	5.6	UFP-30-C-65MSM
	1.0	10.8 (4 in.)	110	11.6	UFP-30-C-85MSM
			60	4.2	UFP-30-E-65MSM
100 000	0.5	10.8 (4 in.)	110	9	UFP-30-E-85MSM
			60	5.6	UFP-100-C-65MSM
	1.0	10.8 (4 in.)	110	11.6	UFP-100-C-85MSM
			60	4.2	UFP-100-E-65MSM
300 000	0.5	10.8 (4 in.)	110	9	UFP-100-E-85MSM
			60	5.6	UFP-300-C-85MSM
	1.0	10.8 (4 in.)	110	11.6	UFP-300-C-85MSM
			60	4.2	UFP-300-E-65MSM
500 000	0.5	10.8 (4 in.)	110	9	UFP-300-E-85MSM
			60	5.6	UFP-500-C-65MSM
	1.0	10.8 (4 in.)	110	11.6	UFP-500-C-85MSM
			30	2.3	UFP-500-E-45MSM
750 000	0.5	10.8 (4 in.)	60	4.2	UFP-500-E-65MSM
			110	9	UFP-500-E-85MSM
	1.0	10.8 (4 in.)	60	5.6	UFP-750-C-65MSM
			110	11.6	UFP-750-C-85MSM
750 000	1.0	10.8 (4 in.)	60	4.2	UFP-750-E-65MSM

**Autoclavable microfiltration products**

Pore size (µm)	Fiber lumen i.d. (mm)	Nominal flow path (cm)	Cartridge o.d. (cm)	Surface area (m <sup>2</sup> )	Product code
0.1	0.75	30	0.9	0.012	CFP-1-D-3MA
			1.9	0.046	CFP-1-D-4A
			1.9	0.046	CFP-1-D-4MA
			3.2	0.16	CFP-1-D-5A
			5.1	0.41	CFP-1-D-8A
		60	1.9	0.095	CFP-1-D-4X2MA
			3.2	0.37	CFP-1-D-6A
			5.1	0.93	CFP-1-D-9A
			7.6	2.50	CFP-1-D-55A
			0.3	0.0016	CFP-1-E-MM01A
	1.0	30	0.9	0.011	CFP-1-E-3MA
			1.9	0.042	CFP-1-E-4A
			1.9	0.042	CFP-1-E-4MA
			3.2	0.12	CFP-1-E-5A
			5.1	0.36	CFP-1-E-8A
		60	7.6	0.92	CFP-1-E-35A
			0.3	0.0038	CFP-1-E-H22LA
			0.9	0.023	CFP-1-E-3X2MA
			1.9	0.085	CFP-1-E-4X2MA
			3.2	0.28	CFP-1-E-6A
1.0	5.1	7.6	0.84	CFP-1-E-9A	
			2.10	CFP-1-E-55A	
	15	8.30	8.30	CFP-1-E-152SB	

NMWC (Da)	Lumen i.d. (mm)	Cartridge o.d. (cm)	Nominal flow path (cm)	Surface area (m <sup>2</sup> )	Product code
0.2	1.0	30	0.3	0.0016	CFP-2-E-MM01A
			0.9	0.011	CFP-2-E-3A
			0.9	0.011	CFP-2-E-3MA
			1.9	0.042	CFP-2-E-4A
			1.9	0.042	CFP-2-E-4MA
			3.2	0.12	CFP-2-E-5A
			5.1	0.36	CFP-2-E-8A
		60	7.6	0.92	CFP-2-E-35A
			0.3	0.0038	CFP-2-E-H22LA
			0.9	0.023	CFP-2-E-3X2MA
			1.9	0.085	CFP-2-E-4X2MA
			3.2	0.28	CFP-2-E-6A
			5.1	0.84	CFP-2-E-9A
			7.6	2.10	CFP-2-E-55A
			15	8.30	CFP-2-E-152SB
0.45	1.0	30	0.3	0.0016	CFP-4-E-MM01A
			0.9	0.011	CFP-4-E-3MA
			1.9	0.042	CFP-4-E-4A
			1.9	0.042	CFP-4-E-4MA
			3.2	0.12	CFP-4-E-5A
			5.1	0.36	CFP-4-E-8A
			7.6	0.92	CFP-4-E-35A
		60	0.3	0.0038	CFP-4-E-H22LA
			0.9	0.023	CFP-4-E-3X2MA
			1.9	0.085	CFP-4-E-4X2MA
			3.2	0.28	CFP-4-E-6A
			5.1	0.84	CFP-4-E-9A
			7.6	2.10	CFP-4-E-55A
			15	8.30	CFP-4-E-152SB
			0.65	0.75	30
0.9	0.012	CFP-6-D-3A			
0.9	0.012	CFP-6-D-3MA			
1.9	0.046	CFP-6-D-4A			
1.9	0.046	CFP-6-D-4MA			
3.2	0.16	CFP-6-D-5A			
5.1	0.41	CFP-6-D-8A			
60	7.6	1.00			CFP-6-D-35A
	0.3	0.0029			CFP-6-D-H22LA
	0.9	0.026			CFP-6-D-3X2MA
	1.9	0.095			CFP-6-D-4X2MA
	3.2	0.37			CFP-6-D-6A
	5.1	0.93			CFP-6-D-9A
	7.6	2.50			CFP-6-D-55A

## Autoclavable ultrafiltration products

NMWC (Da)	Fiber lumen i.d. (mm)	Nominal flow path (cm)	Cartridge o.d. (cm)	Surface area (m <sup>2</sup> )	Product code			
3000	0.5	30	0.3	0.0026	UFP-3-C-MM01A			
			0.9	0.014	UFP-3-C-3MA			
			1.9	0.065	UFP-3-C-4A			
			1.9	0.065	UFP-3-C-4MA			
			3.2	0.2	UFP-3-C-5A			
	60			5.1	0.53	UFP-3-C-8A		
				0.3	0.0042	UFP-3-C-H24LA		
				0.9	0.029	UFP-3-C-3X2MA		
				1.9	0.14	UFP-3-C-4X2MA		
				3.2	0.48	UFP-3-C-6A		
5000	0.5	30	0.3	0.0026	UFP-5-C-MM01A			
			0.9	0.014	UFP-5-C-3MA			
			1.9	0.065	UFP-5-C-4A			
			1.9	0.065	UFP-5-C-4MA			
			3.2	0.2	UFP-5-C-5A			
	60			5.1	0.53	UFP-5-C-8A		
				0.9	0.029	UFP-5-C-3X2MA		
				1.9	0.14	UFP-5-C-4X2MA		
				3.2	0.48	UFP-5-C-6A		
				5.1	1.15	UFP-5-C-9A		
1.0	30		0.3	0.0016	UFP-5-E-MM01A			
			0.9	0.011	UFP-5-E-3MA			
10 000	0.5	30	0.3	0.0026	UFP-10-C-MM01A			
			0.9	0.014	UFP-10-C-3MA			
			1.9	0.065	UFP-10-C-4A			
			1.9	0.065	UFP-10-C-4MA			
			3.2	0.2	UFP-10-C-5A			
			5.1	0.53	UFP-10-C-8A			
			60			0.3	0.0042	UFP-10-C-H24LA
						0.9	0.029	UFP-10-C-3X2MA
						1.9	0.14	UFP-10-C-4X2MA
						3.2	0.48	UFP-10-C-6A
	5.1	1.15				UFP-10-C-9A		
	7.6			3.25	3.25	UFP-10-C-55A		
				6.1	6.1	UFP-100-C-65A		
	110			0.3	0.0041	UFP-10-C-H42LA		
				0.3	0.0016	UFP-10-E-MM01A		
	1.0	30		0.9	0.011	UFP-10-E-3MA		
				1.9	0.042	UFP-10-E-4A		
1.9				0.042	UFP-10-E-4MA			
3.2				0.12	UFP-10-E-5A			
0.3				0.0038	UFP-10-E-H22LA			
60			1.9	0.085	UFP-10-E-4X2MA			
			3.2	0.28	UFP-10-E-6A			
			5.1	0.84	UFP-10-E-9A			
110			0.3	0.0041	UFP-10-E-H42LA			

NMWC (Da)	Fiber lumen i.d. (mm)	Nominal flow path (cm)	Cartridge o.d. (cm)	Surface area (m <sup>2</sup> )	Product code	
30 000	0.5	30	0.3	0.0026	UFP-30-C-MM01A	
			0.9	0.014	UFP-30-C-3MA	
			1.9	0.065	UFP-30-C-4A	
			1.9	0.065	UFP-30-C-4MA	
			3.2	0.2	UFP-30-C-5A	
			5.1	0.53	UFP-30-C-8A	
		60	0.3	0.0042	UFP-30-C-H24LA	
			0.9	0.029	UFP-30-C-3X2MA	
			1.9	0.14	UFP-30-C-4X2MA	
			3.2	0.48	UFP-30-C-6A	
	110	0.3	0.0041	UFP-30-C-H42LA		
		0.3	0.0016	UFP-30-E-MM01A		
	1.0	30	0.9	0.011	UFP-30-E-3MA	
			1.9	0.042	UFP-30-E-4A	
			1.9	0.042	UFP-30-E-4MA	
			3.2	0.12	UFP-30-E-5A	
			60	0.3	0.0038	UFP-30-E-H22LA
				1.9	0.085	UFP-30-E-4X2MA
		3.2		0.28	UFP-30-E-6A	
		5.1		0.84	UFP-30-E-9A	
7.6		2.1	UFP-30-E-55A			
		15	8.3	UFP-30-E-152SB		
110		0.3	0.0041	UFP-30-E-H42LA		
50 000		0.5	30	0.3	0.0026	UFP-50-C-MM01A
				0.9	0.014	UFP-50-C-3MA
				1.9	0.029	UFP-50-C-4A
	1.9			0.065	UFP-50-C-4MA	
	3.2			0.065	UFP-50-C-5A	
	5.1			0.14	UFP-50-C-8A	
	60		0.9	0.2	UFP-50-C-3X2MA	
			1.9	0.48	UFP-50-C-4X2MA	
			3.2	0.53	UFP-50-C-6A	
			5.1	1.15	UFP-50-C-9A	
	1.0	30	0.3	0.0016	UFP-50-E-MM01A	
			0.9	0.011	UFP-50-E-3MA	
			1.9	0.042	UFP-50-E-4MA	
			3.2	0.12	UFP-50-E-5A	
			60	0.3	0.004	UFP-50-E-H22LA
				1.9	0.085	UFP-50-E-4X2MA
		3.2		0.28	UFP-50-E-6A	
		5.1		0.84	UFP-50-E-9A	
		110	0.3	0.004	UFP-50-E-H42LA	

NMWC (Da)	Fiber lumen i.d. (mm)	Nominal flow path (cm)	Cartridge o.d. (cm)	Surface area (m <sup>2</sup> )	Product code	
100 000	0.5	30	0.3	0.0026	UFP-100-C-MM01A	
			0.9	0.014	UFP-100-C-3MA	
			1.9	0.065	UFP-100-C-4A	
			1.9	0.065	UFP-100-C-4MA	
			3.2	0.2	UFP-100-C-5A	
			5.1	0.53	UFP-100-C-8A	
			60	0.3	0.0042	UFP-100-C-H24LA
				0.9	0.029	UFP-100-C-3X2MA
				1.9	0.14	UFP-100-C-4X2MA
	3.2	0.48		UFP-100-C-6A		
	5.1	1.15		UFP-100-C-9A		
	7.6	3.25		UFP-100-C-55A		
	110	0.3	0.0041	UFP-100-C-H42LA		
	1.0	30	0.3	0.0016	UFP-100-E-MM01A	
			0.9	0.011	UFP-100-E-3MA	
			1.9	0.042	UFP-100-E-4A	
			1.9	0.042	UFP-100-E-4MA	
			3.2	0.12	UFP-100-E-5A	
			5.1	0.36	UFP-100-E-8A	
			7.6	0.92	UFP-100-E-35A	
			60	0.3	0.0038	UFP-100-E-H22LA
0.9				0.023	UFP-100-E-3X2MA	
1.9		0.085		UFP-100-E-4X2MA		
3.2		0.28		UFP-100-E-6A		
5.1		0.84		UFP-100-E-9A		
7.6		2.1		UFP-100-E-55A		
110		0.3	0.0041	UFP-100-E-H42LA		
300 000		0.5	30	0.3	0.0026	UFP-300-C-MM01A
	0.9			0.014	UFP-300-C-3MA	
	1.9			0.065	UFP-300-C-4A	
	1.9			0.065	UFP-300-C-4MA	
	3.2			0.2	UFP-300-C-5A	
	5.1			0.53	UFP-300-C-8A	
	60			0.3	0.0042	UFP-300-C-H24LA
				0.9	0.029	UFP-300-C-3X2MA
				1.9	0.14	UFP-300-C-4X2MA
		3.2	0.48	UFP-300-C-6A		
		5.1	1.15	UFP-300-C-9A		
		15	14	UFP-300-C-152SB		
	110	0.3	0.004	UFP-300-C-H42LA		
	1.0	30	0.3	0.0016	UFP-300-E-MM01A	
			0.9	0.011	UFP-300-E-3MA	
			1.9	0.042	UFP-300-E-4A	
			1.9	0.042	UFP-300-E-4MA	
			3.2	0.12	UFP-300-E-5A	
			5.1	0.36	UFP-300-E-8A	
			60	0.3	0.0038	UFP-300-E-H22LA
				0.9	0.023	UFP-300-E-3X2MA
1.9				0.085	UFP-300-E-4X2MA	
3.2		0.28		UFP-300-E-6A		
5.1		0.84		UFP-300-E-9A		
7.6		2.1		UFP-300-E-55A		
110		0.3	0.0041	UFP-300-E-H42LA		

<b>NMWC (Da)</b>	<b>Fiber lumen i.d. (mm)</b>	<b>Nominal flow path (cm)</b>	<b>Cartridge o.d. (cm)</b>	<b>Surface area (m<sup>2</sup>)</b>	<b>Product code</b>	
500 000	0.5	30	0.3	0.0026	UFP-500-C-MM01A	
			0.9	0.014	UFP-500-C-3MA	
			1.9	0.065	UFP-500-C-4A	
				0.065	UFP-500-C-4MA	
			3.2	0.2	UFP-500-C-5A	
		5.1	0.53	UFP-500-C-8A		
		60	0.3	0.0042	UFP-500-C-H24LA	
			0.9	0.029	UFP-500-C-3X2MA	
			1.9	0.14	UFP-500-C-4X2MA	
			3.2	0.48	UFP-500-C-6A	
	5.1		1.15	UFP-500-C-9A		
	110	7.6	3.25	UFP-500-C-55A		
		0.3	0.0041	UFP-500-C-H42LA		
		10.8	13	UFP-500-C-85A		
		1.0	30	0.3	0.0016	UFP-500-E-MM01A
				0.9	0.011	UFP-500-E-3MA
	1.9			0.042	UFP-500-E-4A	
	1.9			0.042	UFP-500-E-4MA	
	3.2			0.12	UFP-500-E-5A	
	5.1		0.36	UFP-500-E-8A		
60	0.3		0.0038	UFP-500-E-H22LA		
	0.9		0.023	UFP-500-E-3X2MA		
	1.9		0.085	UFP-500-E-4X2MA		
	3.2		0.28	UFP-500-E-6A		
	5.1	0.84	UFP-500-E-9A			
110	7.6	2.1	UFP-500-E-55A			
	15	8.3	UFP-500-E-152SB			
	0.3	0.004	UFP-500-E-H42LA			

Pore size ( $\mu\text{m}$ )	Fiber lumen i.d. (mm)	Nominal flow path (cm)	Cartridge o.d. (cm)	Membrane surface area		Product code			
				m <sup>2</sup>	ft <sup>2</sup>				
0.1	1.0	30	0.6	0.0050	0.054	CFP-1-E-2U			
			10.8	2.50	26.91	CFP-1-E-45			
		60	0.3	0.0040	0.043	CFP-1-E-H22U			
			7.6	2.10	22.60	CFP-1-E-55			
			10.8	4.40	47.36	CFP-1-E-65			
		110	15	8.30	89.34	CFP-1-E-152M			
			7.6	3.70	39.83	CFP-1-E-75R			
			10.8	9.00	96.88	CFP-1-E-85			
			0.2	1.0	30	0.6	0.005	0.05	CFP-2-E-2U
						10.8	2.5	26.91	CFP-2-E-45
60	7.6	2.1			22.60	CFP-2-E-55			
	7.6	2.1			22.60	CFP-2-E-55R			
	15	8.3			89.34	CFP-2-E-152M			
110	7.6	3.7			39.83	CFP-2-E-75R			
	10.8	9			96.88	CFP-2-E-85			
	15	19			204.51	CFP-2-E-154M			
	0.45	1.0			30	0.6	0.005	0.054	CFP-4-E-2U
10.8						2.50	26.91	CFP-4-E-45	
60			7.6	2.10	22.60	CFP-4-E-55			
			7.6	2.10	22.60	CFP-4-E-55R			
			10.8	4.40	47.36	CFP-4-E-65			
0.65			0.75	30	0.6	0.005	0.054	CFP-6-D-2U	
				60	10.80	2.65	28.52	CFP-6-D-45	
					10.8	4.90	52.74	CFP-6-D-65	

NMWC (Da)	Fiber lumen i.d. (mm)	Nominal flow path (cm)	Cartridge o.d. (cm)	Surface area (m <sup>2</sup> )	Product code			
						3000	0.5	30
7.6	1.35	UFP-3-C-35						
60	0.3	0.004	UFP-3-C-H24U					
	7.6	3.25	UFP-3-C-55					
	10.8	6.1	UFP-3-C-65					
110	7.6	6	UFP-3-C-75					
	5000	0.5	30	7.6	1.35			UFP-5-C-35
			60	7.6	3.25			UFP-5-C-55
				10.8	6.10			UFP-5-C-65
				110	7.6			6.00
10.8			13.00		UFP-5-C-85			

NMWC (Da)	Fiber lumen i.d. (mm)	Nominal flow path (cm)	Cartridge o.d. (cm)	Surface area (m <sup>2</sup> )	Product code		
10 000	0.5	30	0.6	0.005	UFP-10-C-2U		
			7.6	1.35	UFP-10-C-35		
			10.8	3.50	UFP-10-C-45		
		60	0.3	0.004	UFP-10-C-H24U		
			7.6	3.25	UFP-10-C-55		
			7.6	3.25	UFP-10-C-55R		
			10.8	6.10	UFP-10-C-65		
		110	7.6	6.00	UFP-10-C-75		
			7.6	6.00	UFP-10-C-75R		
	10.8		13.00	UFP-10-C-85			
	15		28.00	UFP-10-C-154M			
	1.0	30	7.6	0.92	UFP-10-E-35		
			60	7.6	2.10	UFP-10-E-55	
			7.6	2.10	UFP-10-E-55R		
		60	10.8	4.40	UFP-10-E-65		
			110	7.6	3.70	UFP-10-E-75	
7.6			3.70	UFP-10-E-75R			
110		10.8	9.00	UFP-10-E-85			
		30	7.6	0.92	UFP-10-E-35		
		60	7.6	2.10	UFP-10-E-55		
30 000	0.5	30	0.6	0.005	UFP-30-C-2U		
			7.6	1.35	UFP-30-C-35		
			10.8	3.50	UFP-30-C-45		
		60	0.3	0.004	UFP-30-C-H24U		
			7.6	3.25	UFP-30-C-55		
			10.8	6.10	UFP-30-C-65		
			110	7.6	6.00	UFP-30-C-75	
		110	7.6	6.00	UFP-30-C-75R		
			10.8	13.00	UFP-30-C-85		
	1.0		30	7.6	0.92	UFP-30-E-35	
	60		7.6	2.10	UFP-30-E-55		
	1.0	60	10.8	4.40	UFP-30-E-65		
			15	8.30	UFP-30-E-152M		
			110	7.6	3.70	UFP-30-E-75	
		110	7.6	3.70	UFP-30-E-75R		
			10.8	9.00	UFP-30-E-85		
30			7.6	0.92	UFP-30-E-35		
50 000		0.5	30	0.6	0.005	UFP-50-C-2U	
				60	7.6	3.25	UFP-50-C-55
				10.8	6.10	UFP-50-C-65	
	110		10.8	13.00	UFP-50-C-85		
			1.0	60	7.6	2.10	UFP-50-E-55
			10.8	4.40	UFP-50-E-65		
	110	7.6	3.70	UFP-50-E-75			
		10.8	9.00	UFP-50-E-85			

NMWC (Da)	Fiber lumen i.d. (mm)	Nominal flow path (cm)	Cartridge o.d. (cm)	Surface area (m <sup>2</sup> )	Product code	
100 000	0.5	30	0.6	0.005	UFP-100-C-2U	
			7.6	1.35	UFP-100-C-35	
		60	0.3	0.004	UFP-100-C-H24U	
			7.6	3.25	UFP-100-C-55	
			7.6	3.25	UFP-100-C-55R	
			10.8	6.10	UFP-100-C-65	
	110	7.6	6.00	UFP-100-C-75		
		7.6	6.00	UFP-100-C-75R		
		10.8	13.00	UFP-100-C-85		
		1.0	30	7.6	0.92	UFP-100-E-35
			60	7.6	2.10	UFP-100-E-55
	7.6			2.10	UFP-100-E-55R	
	110	7.6	3.70	UFP-100-E-65		
			3.70	UFP-100-E-75		
			3.70	UFP-100-E-75R		
10.8		4.40	UFP-100-E-85			
		9.00	UFP-100-E-85			
		9.00	UFP-100-E-85			
300 000	0.5	30	0.6	0.005	UFP-300-C-2U	
			7.6	1.35	UFP-300-C-35	
		60	0.3	0.004	UFP-300-C-H24U	
			7.6	3.25	UFP-300-C-55R	
			7.6	3.25	UFP-300-C-55	
			10.8	6.10	UFP-300-C-65	
	110	7.6	6.00	UFP-300-C-75		
		7.6	6.00	UFP-300-C-75R		
		10.8	13.00	UFP-300-C-85		
		1.0	30	7.6	0.92	UFP-300-E-35
			60	7.6	2.10	UFP-300-E-55
	10.8			4.40	UFP-300-E-65	
	110	7.6	3.70	UFP-300-E-75		
			3.70	UFP-300-E-75		
			3.70	UFP-300-E-75R		
10.8		4.40	UFP-300-E-85			
		9.00	UFP-300-E-85			
		9.00	UFP-300-E-85			
500 000	0.5	30	0.6	0.005	UFP-500-C-2U	
			0.9	0.014	UFP-500-C-3M	
			7.6	1.35	UFP-500-C-35	
		60	10.8	3.50	UFP-500-C-45	
			0.3	0.004	UFP-500-C-H24U	
			1.9	0.14	UFP-500-C-4X2M	
	7.6		2.10	UFP-500-C-55R		
	110	7.6	3.25	UFP-500-C-55		
			3.25	UFP-500-C-55		
			3.25	UFP-500-C-55R		
		10.8	6.10	UFP-500-C-65		
		7.6	6.00	UFP-500-C-75		
	6.00		UFP-500-C-75R			
	6.00		UFP-500-C-75R			
	10.8	13.00	UFP-500-C-85			
1.0		30	0.6	0.01	UFP-500-E-2U	
		7.6	0.92	UFP-500-E-35		
	0.92		UFP-500-E-35			
60	10.8	2.50	UFP-500-E-45			
		2.50	UFP-500-E-45			
		2.50	UFP-500-E-45			
	7.6	2.10	UFP-500-E-55			
		2.10	UFP-500-E-55R			
		2.10	UFP-500-E-55R			
110	10.8	4.40	UFP-500-E-65			
		4.40	UFP-500-E-65			
		4.40	UFP-500-E-65			
	15	8.30	UFP-500-E-152M			
		8.30	UFP-500-E-152M			
		8.30	UFP-500-E-152M			
7.6	3.70	UFP-500-E-75				
	3.70	UFP-500-E-75R				
	3.70	UFP-500-E-75R				
10.8	9.00	UFP-500-E-85				
	9.00	UFP-500-E-85				
	9.00	UFP-500-E-85				
15	19.00	UFP-500-E-154M				
	19.00	UFP-500-E-154M				
	19.00	UFP-500-E-154M				

NMWC (Da)	Fiber lumen i.d. (mm)	Nominal flow path (cm)	Cartridge o.d. (cm)	Surface area (m <sup>2</sup> )	Product code		
750 000	0.5	30	0.6	0.005	UFP-750-C-2U		
			7.6	1.35	UFP-750-C-35		
			10.8	3.50	UFP-750-C-45		
		60	0.3	0.004	UFP-750-C-H24U		
			7.6	3.25	UFP-750-C-55		
			10.8	6.10	UFP-750-C-65		
	110	15	14.00	UFP-750-C-152M			
			7.6	6.00	UFP-750-C-75		
			10.8	13.00	UFP-750-C-85		
		15	28.00	UFP-750-C-154M			
			1.0	30	0.6	0.01	UFP-750-E-2U
					7.6	0.92	UFP-750-E-35
	10.8	2.50			UFP-750-E-45		
	60	7.6		2.10	UFP-750-E-55		
		10.8		4.40	UFP-750-E-65		
15		8.30		UFP-750-E-152M			
110	7.6	3.70	UFP-750-E-75				
		10.8	9.00	UFP-750-E-85			

## ATF compatible cartridges

### ATF 2 compatible cartridges

Filtration	Pore size (µm) or MWCO* (kDa)	Lumen i.d. (mm)	Path length (cm)	Cartridge o.d. (cm)	Surface area (m <sup>2</sup> )	Product code
MF	0.1	1.0	60	1.9	0.085	CFP-1-E-4X2MA
	0.2	1.0	60	1.9	0.085	CFP-2-E-4X2MA
	0.45	1.0	60	1.9	0.085	CFP-4-E-4X2MA
	0.65	0.75	60	1.9	0.095	CFP-6-D-4X2MA
UF	10	1.0	60	1.9	0.085	UFP-10-E-4X2MA
	30	1.0	60	1.9	0.085	UFP-30-E-4X2MA
	50	1.0	60	1.9	0.085	UFP-50-E-4X2MA
	100	1.0	60	1.9	0.085	UFP-100-E-4X2MA
	300	1.0	60	1.9	0.085	UFP-300-E-4X2MA
	500	1.0	60	1.9	0.085	UFP-500-E-4X2MA
	750	1.0	60	1.9	0.085	UFP-750-E-4X2MA

\* MWCO: Molecular weight cut-off.

### ATF 4 compatible cartridges

Filtration	Pore size (µm) or MWCO* (kDa)	Lumen i.d. (mm)	Path length (cm)	Cartridge o.d. (cm)	Surface area (m <sup>2</sup> )	Product code
MF	0.2	1.0	30	5.1	0.46	CFP-2-E-8SIP
	0.45	1.0	30	5.1	0.46	CFP-4-E-8SIP
	0.65	0.8	30	5.1	0.53	CFP-6-D-8SIP
UF	10	1.0	30	5.1	0.46	UFP-10-E-8SIP
	30	1.0	30	5.1	0.46	UFP-30-E-8SIP
	50	1.0	30	5.1	0.46	UFP-50-E-8SIP
	100	1.0	30	5.1	0.46	UFP-100-E-8SIP
	300	1.0	30	5.1	0.46	UFP-300-E-8SIP
	500	1.0	30	5.1	0.46	UFP-500-E-8SIP
	750	1.0	30	5.1	0.46	UFP-750-E-8SIP

**ATF 6 compatible cartridges**

Filtration	Pore size (µm) or MWCO* (kDa)	Lumen i.d. (mm)	Path length (cm)	Cartridge o.d. (cm)	Surface area (m <sup>2</sup> )	Product code
MF	0.1	1.0	60	7.6	2.1	CFP-1-E-55SMO
	0.2	1.0	60	7.6	2.1	CFP-2-E-55SMO
	0.45	1.0	60	7.6	2.1	CFP-4-E-55SMO
UF	10	1.0	60	7.6	2.1	UFP-10-E-55SMO
	30	1.0	60	7.6	2.1	UFP-30-E-55SMO
	50	1.0	60	7.6	2.1	UFP-50-E-55SMO
	100	1.0	60	7.6	2.1	UFP-100-E-55SMO
	300	1.0	60	7.6	2.1	UFP-300-E-55SMO
	500	1.0	60	7.6	2.1	UFP-500-E-55SMO
	750	1.0	60	7.6	2.1	UFP-750-E-55SMO

**ATF 8 compatible cartridges**

Filtration	Pore size (µm) or MWCO* (kDa)	Lumen i.d. (mm)	Path length (cm)	Cartridge o.d. (cm)	Surface area (m <sup>2</sup> )	Product code
MF	0.1	4.2	60	10.2	1.0	CFP-1-E-65MSM
	0.2	4.2	60	10.2	1.0	CFP-2-E-65MSM
	0.45	4.2	60	10.2	1.0	CFP-4-E-65MSM
UF	10	4.2	60	10.2	1.0	UFP-10-E-65MSM
	30	4.2	60	10.2	1.0	UFP-30-E-65MSM
	100	4.2	60	10.2	1.0	UFP-100-E-65MSM
	300	4.2	60	10.2	1.0	UFP-300-E-65MSM
	500	4.2	60	10.2	1.0	UFP-500-E-65MSM
	750	4.2	60	10.2	1.0	UFP-750-E-65MSM

**ATF 10 compatible cartridges**

Filtration	Pore size (µm) or MWCO* (kDa)	Lumen i.d. (mm)	Path length (cm)	Cartridge o.d. (cm)	Surface area (m <sup>2</sup> )	Product code
MF	0.1	8.3	60	15	1.0	CFP-1-E-152SB
	0.2	8.3	60	15	1.0	CFP-2-E-152SB
	0.45	8.3	60	15	1.0	CFP-4-E-152SB
UF	30	8.3	60	15	1.0	UFP-30-E-152SB
	500	8.3	60	15	1.0	UFP-500-E-152SB
	750	8.3	60	15	1.0	UFP-750-E-152SB

**STM housings and accessories**

Description	Model number	Code number
Housing assembly for 35STM cartridges, 316L stainless steel with 2 gaskets and 2 clamps.	SS-35STM	56-4106-27
Housing assembly for 55STM cartridges, 316L stainless steel with 2 gaskets and 2 clamps.	SS-55STM	56-4106-28
0.5 in. sanitary clamp gasket, silicone, pack of 4.	KG4S	56-4109-94
1.5 in. sanitary clamp gasket, silicone, pack of 4.	KG12S	56-4109-96
3 in. sanitary clamp (schedule 5 pipe) gasket, silicone, pack of 4.	KG24S	11-0005-25
0.5 in. quick disconnect sanitary clamp, 304 stainless steel.	CL4	56-4106-65
1.5 in. quick disconnect sanitary clamp, 304 stainless steel.	CL12	56-4106-67
3 in. sanitary clamp (schedule 5 pipe), 304 stainless steel.	CL24	56-4106-71
STM cartridge O-ring set, silicone, pack of 8.	K02ORS	56-4106-90
0.5 in. sanitary clamp, permeate-side condensate drain or vent valve, 316L stainless steel.	VPC4	56-4105-90

## SMO housings and accessories

Description	Model number	Code number
Housing assembly with drain port for 35SMO cartridges, 316L stainless steel with 2 gaskets and 2 clamps.	SS-35SMO-DP	56-4106-29
Housing assembly with drain port for 55SMO cartridges, 316L stainless steel with 2 gaskets and 2 clamps.	SS-55SMO-DP	56-4106-30
1.5 in. sanitary clamp gasket, silicone, pack of 4.	KG12S	56-4109-96
3 in. sanitary clamp (schedule 5 pipe) gasket, silicone, pack of 4.	KG24S	11-0005-25
1.5 in. quick disconnect sanitary clamp, 304 stainless steel.	CL12	56-4106-67
3 in. sanitary clamp (schedule 5 pipe), 304 stainless steel.	CL24	56-4106-71
SMO cartridge O-ring set, silicone, pack of 4.	K03ORS	56-4106-91

## MSM housing and accessories

Description	Model number	Code number
Stainless steel housing assembly with drain port and 2 in. sanitary clamp straight adaptors for 45MSM cartridges, 316L stainless steel with 2 gaskets (silicone) and 2 clamps.	SS-45MSM-DP	56-4106-31
Stainless steel housing assembly with drain port and 2 in. sanitary clamp straight adaptors for 65MSM cartridges, 316L stainless steel with 2 gaskets (silicone) and 2 clamps.	SS-65MSM-DP	56-4106-32
Stainless steel housing assembly with drain port and 2 in. sanitary clamp straight adaptors for 85MSM cartridges, 316L stainless steel with 2 gaskets (silicone) and 2 clamps.	SS-85MSM-DP	56-4106-33
Stainless steel housing assembly with drain port and 2.5 in. sanitary clamp straight adaptors for 85MSM cartridges, 316L stainless steel with 2 gaskets (silicone) and 2 clamps.	SS-85MSM-EL-DP	56-4106-34
0.5 in. quick disconnect sanitary clamp, 304 stainless steel.	CL4	56-4106-65
1.5 in. quick disconnect sanitary clamp, 304 stainless steel.	CL12	56-4106-67
2 in. toggle clamp, 304 stainless steel.	CL16-LT	56-4106-70
0.5 in. sanitary clamp gasket, silicone, pack of 4.	KG4S	56-4109-94
1.5 in. sanitary clamp gasket, silicone, pack of 4.	KG12S	56-4109-96
1.5 in. sanitary clamp gasket, Buna-N, pack of 4.	KG12B	56-4109-97
2 in. sanitary clamp gasket, silicone, pack of 4.	KG16S	56-4109-98
2 in. sanitary clamp gasket, Buna-N, pack of 4.	KG16B	11-0005-24
MSM cartridge O-ring set, silicone, pack of 4.	K05ORS	56-4106-95
Diaphragm valve, 0.75 in. sanitary clamp, 316L stainless steel.	VDM-6SS	56-4105-92
Diaphragm valve, 1.5 in. sanitary clamp, 316L stainless steel.	VDM-12SS	56-4105-93

## MaxCell cartridge accessories (size 45, 65, and 85)

Description	Model number	Code number
Straight adaptor for MaxCell cartridges, polysulfone.	RBMX-16PS-ST	56-4107-26
Straight adaptor kit for installation. Either kit KAMX-16PS or kit KAMX-16EL-PS, required for each new MaxCell cartridge. Contains 2 each: RBMX-16PS-EL elbow adaptors in polysulfone, cartridge end nuts in polysulfone, O-rings in silicone.	KAMX-16PS	56-4107-37
Straight adaptor kit for installation. Either kit KAMX-16PS or kit KAMX-16EL-PS, required for each new MaxCell cartridge. Contains 2 each: RBMX-16PS-EL elbow adaptors in polysulfone, cartridge end nuts in polysulfone, O-rings in silicone.	KAMX-16EL-PS	56-4107-38
2 in. toggle sanitary clamp, 304 stainless steel.	CL16-LT	56-4106-70
2 in. sanitary clamp gasket, silicone, pack of 4.	KG16S	56-4109-98
MaxCell cartridge O-ring set, silicone, pack of 2.	K04ORS	56-4106-92
MaxCell cartridge wrench set, standard.	SWR-MX01	56-4107-39
MaxCell cartridge wrench set, applied torque.	SWR-MX02	56-4107-40

## ProCell cartridge housings and accessories (size 152M and 154M)

Description	Model number	Code number
Housing assembly for ProCell 152M cartridges, 316L stainless steel with 2 gaskets and 2 clamps.	SS-152TC	56-4106-35
Housing assembly for ProCell 154M cartridges, 316L stainless steel with 2 gaskets and 2 clamps.	SS-154TC	56-4106-36
1.5 in. quick disconnect sanitary clamp, 304 stainless steel.	CL12	56-4106-67
2 in. quick disconnect sanitary clamp, 304 stainless steel.	CL16-LT	56-4106-70
6 in. sanitary clamp (schedule 5 pipe), 304 stainless steel.	CL48	56-4106-74
1,5 in. sanitary clamp gasket, silicone, pack of 4.	KG12S	56-4109-96
1.5 in sanitary clamp gasket, Buna-M, pack of 4.	KG12B	56-4109-97
2 in. sanitary clamp gasket, silicone, pack of 4.	KG16S	56-4109-98
2 in. sanitary clamp gasket, Buna-N, pack of 4.	KG16B	11-0005-24
6 in. sanitary clamp gasket (schedule 5 pipe), silicone, pack of 4.	KG48S	11-0005-28
ProCell cartridge O-ring set, silicone, pack of 2.	K06ORS	56-4106-96

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