

MidGee and MidGee Hoop cross flow cartridges

CROSS FLOW FILTRATION

MidGee™ and MidGee Hoop cross flow cartridges are designed for small-scale processing, rapid laboratory concentration, and diafiltration of critical biological solutions in volumes up to 200 mL, with convenience and speed difficult to achieve using stirred cells or dialysis tubing. These single-use hollow fiber cartridges minimize membrane polarization caused by the “sweeping action” generated by a recirculation pump. Data derived from tests with these cartridges can be used for linear scaling to larger cartridge and system designs, or for scale-down process optimization and troubleshooting experiments.

MidGee and MidGee Hoop cartridges offer the following benefits:

- Rapid concentration or diafiltration of critical biological solutions and suspensions
- Low hold-up volume for high concentration factors
- High product recovery due to cross flow design
- Linear scaling to larger cartridge and system designs

Two MidGee Hoop cartridge path lengths are offered that correspond to the lengths of Cytiva pilot- and production-scale cartridges (Fig 1). Within these two lengths, a wide variety of MidGee cartridges are available to match laboratory-, pilot-, and production-scale designs. The uniform flow-path design from laboratory- to production-scale makes hollow fibers an attractive choice for linear scale-up. MidGee Hoop cartridges exhibit no “wall effects” that distort scale-up projections, as is common with plate and frame devices.



Fig 1. MidGee Hoop cross flow cartridges are available in two sizes to match the path lengths of Cytiva pilot- and production-scale hollow fiber cartridges. MidGee Hoops are well-suited for scale-down trials.

Specifications

Specification for MidGee and MidGee Hoop cartridges are listed in Table 1.

Table 1. MidGee and MidGee Hoop cartridge specifications

MidGee cartridge specifications	
Diameter	0.3 cm (0.125 in)
Length	30.8 cm (12.125 in)
End-fitting connections	Male Luer-Lok™
Permeate connection	Male Luer-Lok
Membrane area (nominal)	16 to 26 cm ² (2.325 to 4.03 in ²)
Hold-up volume (nominal)	
Lumen side	0.25 mL
Shell side	0.25 mL
Autoclavable	All except 1,000 NMWC models
Materials of Construction	
Hollow fibers	Polysulfone
Housing components	Polysulfone/Polycarbonate

MidGee Hoop cartridge specifications	
Diameter	0.3 cm (0.125 in)
End-fitting connections	Male Luer-Lok
Permeate connections	Male Luer-Lok
Hold-up volume (nominal)	
60 cm model	0.5 to 1.0 mL each (lumen & shell side)
110 cm model	0.6 to 2.0 mL each (lumen & shell side)
Autoclavable	Yes
Materials of Construction	
Hollow fibers	Polysulfone
Shell	Polysulfone
Luer-Lok	Polycarbonate

MidGee and MidGee Hoop cartridge selection

Ultrafiltration

Membrane fiber i.d.	Nominal molecular weight cut-off
0.5 mm	1000
0.5 mm	3000
0.5, 1 mm	10 000
0.5, 1 mm	30 000
0.5, 1 mm	50 000
0.5, 1 mm	100 000
0.5, 1 mm	300 000
0.5, 1 mm	500 000
0.5, 1 mm	750 000

Microfiltration

Membrane fiber i.d.	Pore size
0.5, 1 mm	0.1 micron
0.5, 1 mm	0.2 micron
0.5, 1 mm	0.45 micron
0.75 mm	0.65 micron

MidGee Hoop scale-up comparison

MidGee Hoop cartridges are provided in nominal 60 cm and 110 cm path lengths to match the path lengths of Cytiva pilot- and process-scale hollow fiber cartridges. In Table 2, membrane areas for scale-up cartridges with equivalent path lengths are compared.

Table 2. Charts for comparison of the membrane areas for scale-up cartridges with equivalent path lengths.

Nominal 60 cm (2 ft) path length

MidGee Hoop	Membrane area		
	0.5 mm i.d.	0.75 mm i.d.	1 mm i.d.
Scale-up cartridge housing size			
H22	—	29 cm ²	38 cm ²
H24	42 cm ²	—	—
4×2	0.14 m ²	—	0.085 m ²
6	0.48 m ²	0.37 m ²	0.28 m ²
9	1.15 m ²	0.93 m ²	0.84 m ²
55	3.25 m ²	2.5 m ²	2.1 m ²
65	6.1 m ²	—	4.4 m ²
152	13 m ²	—	8.5 m ²

Nominal 110 cm (4 ft) path length

MidGee Hoop	Membrane area	
	0.5 mm i.d.	1 mm i.d.
Scale-up cartridge housing size		
H42	41 cm ²	73 cm ²
75	6 m ²	3.7 m ²
85	13 m ²	9.0 m ²
154	28 m ²	20 m ²

Applications

Typical applications for MidGee and MidGee Hoop cartridges are:

- Concentration or purification of monoclonal antibodies, proteins, vaccines, viruses, plasma, liposomes, or plasmids
- Colloidal suspension concentration or diafiltration
- Continuous buffer exchange
- Removal of suspended solids, viruses, bacteria, or pyrogens
- Harvesting or clarification of cell cultures
- Lysate clarification
- Continuous cell culture perfusion

Ordering information

MidGee cartridges, ultrafiltration

Model number	Membrane fiber i.d.	NMWC [†]	Code number
UFP-1-C-MM01	0.5 mm	1000	56-4100-00
UFP-3-C-MM01A	0.5 mm	3000	56-4100-04
UFP-5-C-MM01A	0.5 mm	5000	11-0005-04
UFP-5-E-MM01A	1 mm	5000	11-0005-06
UFP-10-C-MM01A	0.5 mm	10 000	56-4100-12
UFP-10-E-MM01A	1 mm	10 000	56-4100-16
UFP-30-C-MM01A	0.5 mm	30 000	56-4100-20
UFP-30-E-MM01A	1 mm	30 000	56-4100-24
UFP-50-C-MM01A	0.5 mm	50 000	56-4100-28
UFP-50-E-MM01A	1 mm	50 000	56-4100-32
UFP-100-C-MM01A	0.5 mm	100 000	56-4100-36
UFP-100-E-MM01A	1 mm	100 000	56-4100-40
UFP-300-C-MM01A	0.5 mm	300 000	56-4100-44
UFP-300-E-MM01A	1 mm	300 000	56-4100-48
UFP-500-C-MM01A	0.5 mm	500 000	56-4100-52
UFP-500-E-MM01A	1 mm	500 000	56-4100-56
UFP-750-C-MM01A	0.5 mm	750 000	29-0143-04
UFP-750-E-MM01A	1 mm	750 000	56-4108-06

[†] Nominal molecular weight cut-off

MidGee cartridges, microfiltration

Model number	Membrane fiber i.d.	Pore size	Code number
CFP-1-E-MM01A	1 mm	0.1 micron	56-4100-64
CFP-2-E-MM01A	1 mm	0.2 micron	56-4100-72
CFP-4-E-MM01A	1 mm	0.45 micron	56-4100-80
CFP-6-D-MM01A	0.75 mm	0.65 micron	56-4100-84

MidGee Hoop cartridges, ultrafiltration

Model number*	Membrane fiber i.d.	NMWC [†]	Code number
UFP-3-C-H24LA	0.5 mm	3000	56-4101-00
UFP-3-C-H42LA	0.5 mm	3000	56-4101-06
UFP-10-C-H24LA	0.5 mm	10 000	56-4101-01
UFP-10-C-H42LA	0.5 mm	10 000	56-4101-08
UFP-10-E-H22LA	1 mm	10 000	56-4100-89
UFP-10-E-H42LA	1 mm	10 000	56-4101-09
UFP-30-C-H24LA	0.5 mm	30 000	56-4101-02
UFP-30-C-H42LA	0.5 mm	30 000	56-4101-10
UFP-30-E-H22LA	1 mm	30 000	56-4100-90
UFP-30-E-H42LA	1 mm	30 000	56-4101-11
UFP-50-E-H22LA	1 mm	50 000	56-4100-91
UFP-50-E-H42LA	1 mm	50 000	56-4101-12
UFP-100-C-H24LA	0.5 mm	100 000	56-4101-03
UFP-100-C-H42LA	0.5 mm	100 000	56-4101-13
UFP-100-E-H22LA	1 mm	100 000	56-4100-92
UFP-100-E-H42LA	1 mm	100 000	56-4101-14
UFP-300-C-H24LA	0.5 mm	300 000	56-4101-04
UFP-300-C-H42LA	0.5 mm	300 000	56-4101-15
UFP-300-E-H22LA	1 mm	300 000	56-4100-93
UFP-300-E-H42LA	1 mm	300 000	56-4101-16
UFP-500-C-H24LA	0.5 mm	500 000	56-4101-05
UFP-500-C-H42LA	0.5 mm	500 000	56-4101-17
UFP-500-E-H22LA	1 mm	500 000	56-4100-94
UFP-500-E-H42LA	1 mm	500 000	56-4101-18
UFP-750-C-H24LA	0.5 mm	750 000	29-0142-95
UFP-750-C-H42LA	0.5 mm	750 000	29-0143-01
UFP-750-E-H22LA	1 mm	750 000	56-4100-95
UFP-750-E-H42LA	1 mm	750 000	56-4101-19

[†] Nominal molecular weight cut-off

* H22 = 60 cm path length/2 fibers. H24 = 60 cm path length/4 fibers. H42 = 110 cm path length/2 fibers

MidGee Hoop cartridges, microfiltration

Model number*	Membrane fiber i.d.	Pore size	Code number
CFP-1-E-H22LA	1 mm	0.1 micron	56-4100-96
CFP-2-E-H22LA	1 mm	0.2 micron	56-4100-97
CFP-4-E-H22LA	1 mm	0.45 micron	56-4100-98
CFP-6-D-H22LA	0.75 mm	0.65 micron	56-4100-99

* H22 = 60 cm path length/2 fibers. H24 = 60 cm path length/4 fibers. H42 = 110 cm path length/2 fibers

MidGee and MidGee Hoop cartridge accessories

Model number	Description	Code number
RBFL-1	Female Luer to 1/8-in barb, nylon, pkg of 10	56-4105-75
RBFL-2	Female Luer to 3/32-in barb, nylon, pkg of 10	56-4105-76
RBFL-ML	Female Luer to male Luer adaptor, nylon, pkg of 10	56-4105-77
RBFL-SC	Female Luer to solid cap, nylon, pkg of 10	56-4105-78
KMDG-1	MidGee Starter Kit (use with PRP-07WM pump)	56-4105-79
KMDG-2	MidJet System Accessory Kit	56-4105-82
KMRV-030	MidGee Reservoir Kit, 30 mL capacity, polystyrene	56-4105-83
KMRV-120	MidGee Reservoir Kit, 120 mL capacity, polystyrene	56-4105-84
KMDG-175R01A	Autoclavable MidGee Reservoir Kit [†]	56-4105-86
KMDG-175R02A	Autoclavable MidGee Reservoir Replacement Kit [†]	56-4105-87
VT-06	Precision backpressure valve, nylon, size 14 and 16 tubing	56-4105-88
PTSL02-10	Pump tubing, size 14, silicone, 3.1 m (10 ft)	56-4106-16
PTSL03-10	Pump tubing, size 16, silicone, 3.1 m (10 ft)	56-4106-17

[†] See description of MidJet

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