

Microza Membranes

Technical Specifications

Polymeric Membrane Morphology

Microza* ultrafiltration membranes are unique in their construction. Every membrane has an asymmetric structure, with a membrane layer both on the inside, and on the outside of the fiber, overlaying a core comprising a very open support for excellent flow characteristics, and a central strengthening layer for outstanding fiber durability in long-term service. Microza ultrafiltration membranes are resistant to flow in both directions, so there is no risk of delamination or membrane rupture during accidental back-pressure. In fact, in many installations, backpulsing can be used to maintain flux during extended run times.

Microza microfiltration membranes have smooth inner and outer membrane skins with a highly porous symmetrical support structure giving high-flow rates. These modules can also be backflushed.

All Microza membranes have surfaces that minimize entrapment and facilitate cleaning. All Microza membranes are manufactured in a single step, and are not composed of laminates. Membranes and modules are subjected to rigorous quality control to ensure consistency of performance, durability in service, and module integrity for the most demanding applications.

Membrane Types

Polysulfone (PS)

Polysulfone membranes exhibit excellent resistance to pressure, temperature and aggressive cleaning regimes. Very low affinity and adsorption characteristics results in high product recoveries, and long service life.

Polyacrylonitrile (PAN)

PAN membranes are ideally suited to bulk process applications, such as the purification of enzymes. They exhibit high-strength, coupled with high flux rates, minimizing installation size. PAN has a low fouling characteristic for these applications, simplifying cleaning.

Polyvinylidene Fluoride (PVDF)

PVDF membranes are widely used for the filtration of biological solutions. In hollow fiber format, these membranes show excellent retention characteristics, allowing use in critical applications where absolute removal over long periods is required. Lower non-specific binding than many PS membranes used in protein recovery applications ensures excellent results in leading-edge biotechnology processes. PVDF membranes are steamable in situ for additional process security. PVDF exhibits superior chemical resistance to many other polymers used in microfiltration processes.

Polyolefin (P)

Polyolefin membranes are a good choice for bulk clarification processes where sterility is not essential. Nevertheless, P-membranes have good retention characteristics coupled with high flux rates. Availability in fine microfiltration retention ratings ensures protection of downstream processing equipment.

Microza Module Types

Microza hollow fiber modules are available with housings made from polysulfone (native, clear), filled polysulfone (white, opaque), and polyvinylchloride (PVC). Polysulfone modules will withstand autoclaving and in some cases steaming. Clear polysulfone modules are recommended for more critical pharmaceutical applications. Filled polysulfone and PVC modules are ideally suited to long term installations where light might cause biofilm to form, or for bulk processes involving light sensitive materials. PVC modules are ideal for use in feed water systems and bulk processes.

Microza modules are available with industry standard clamp fittings on the feed and retentate side, and some with quick connects. All steamable modules designed for long term use in critical applications such as perfusion have sanitary clamp connections on the feed/retentate and filtrate sides, or filtrate hose barbs on laboratory scale modules.

Retrofitting Existing Applications

To retrofit an existing application, membrane rating should be chosen to be equivalent or superior in performance. For ultrafiltration membranes, this may require testing more than a single cut-off. Differences in membrane area and lumen diameter can typically be accommodated by adjustments to operating conditions to ensure that trans-membrane pressure and fluid velocity conditions at the membrane surface are similar. Hollow fiber modules can be joined end-to-end as required to create similar path length systems. Small adjustments to physical dimensions, and differences in connection type are accomplished using adapters. Please contact Pall for assistance with selecting the right modules to retrofit an existing installation.

The following pages list modules firstly by membrane material, and then within each material by rating, available sizes and available connection types.



* Microza is a trademark of Asahi Kasei Corporation

Microza Membranes

Polysulfone Membranes – Technical Specifications

Microza SP, SV and VP series hollow fiber ultrafiltration modules have a unique double-skinned proprietary polysulfone (PS) membrane with dense internal layer. Currently available in 3000, 4000, 6000, and 10000 molecular weight cut-offs, the modules are used in a range of pharmaceutical applications including pyrogen removal from water, buffer solutions active ingredients such as antibiotics, and concentration of protein solutions. SV modules are used for clarifying antibiotic and other broths used for small molecule API production.

Materials of Construction

Membrane	Polysulfone (with silicone coating on ends in VIP-3017S)
Housing	Native clear polysulfone (P) or PVC (V)
Potting Material	Epoxy resin
Gasket	Silicone (P) or butyl rubber (NBR) (V)
Bacteriostat	Glycerin 65%, ethanol 2%, water balance
Connectors and Adapters	Contact Pall for wide range of fittings for these modules

Connectors and Adapters

For available connections, please refer to table on p202.

Key Features

- Combination of high-strength and high-flow due to unique membrane construction
- Double-skin provides assurance of removal rating
- High-strength fiber allows reverse filtration to assist cleaning in difficult applications
- Available in a range of sizes from 0.015 m² (0.16 ft²) to more than 12 m² (125 ft²)
- All SP and VP modules may be hot water sanitized: up to 95 °C (203 °F) – SIP and SLP, or 90 °C (194 °F) – SEP and SAP; and all may run continuously at 80 °C (176 °F)
- SP Modules may be autoclaved in single use applications
- VIP 6000 MWCO version steam-sterilizable up to 50 cycles at 125 °C (257 °F) at a differential pressure of 100 mBar
- SV modules are designed for maximized recovery in bulk fermentation, limited to 50 °C (122 °F)
- Compatible with a wide range of cleaning agents, up to 5000 ppm sodium hypochlorite or 4% sodium hydroxide
- Meets the specification for biological tests listed in the current revision of USP for class VI plastics at 121 °C (249 °F)
- pH range 1 – 14

Part Number⁽¹⁾

	Rating (MWCO, Daltons)	Fiber ID	Nominal Length ⁽²⁾	Membrane Area	Clean Water Flux Lh -1 bar	Crossflow Rate for 1ms ⁻¹ fluid velocity	Maximum Pressure (barg) at 50 °C (122 °F)	Volume Feed Side ⁽³⁾	Volume Permeate Side ⁽³⁾ (mL)	Feed/Retentate Connection	Permeate Connection
SEP-0013	3000	0.8 mm	130	0.017	2.5	181	1/1/1	9	9	A2	A1
SEP-1013	3000	0.8 mm	347	0.2	25	724	3/3/2	90	120	B1	B1
SEP-2013	3000	0.8 mm	552	1.0	130	1629	5/3/2	300	500	C4	C3
SEP-3013	3000	0.8 mm	1129	4.7	650	3655	5/3/3	1200	3700	C5	C4
SAP-0013	4000	0.8 mm	130	0.017	3.6	181	1/1/1	9	9	A2	A1
SAP-1013	4000	0.8 mm	347	0.2	36	724	3/3/2	90	120	B1	B1
SAP-3013	4000	0.8 mm	1129	4.7	900	3655	5/3/3	1200	3700	C5	C4
SAV-3013	4000	0.8 mm	1126	5.6	1100	4343	5/3/3	1200	3700	C7	D2
SAV-5013	4000	0.8 mm	1126	12.1	2400	9950	5/3/3	3800	5300	C8	D3
SIP-0013	6000	0.8 mm	130	0.017	4.0	181	1/1/1	9	9	A2	A1
SIP-1013	6000	0.8 mm	347	0.2	40	724	3/3/2	90	120	B1	B1
SIP-1023	6000	0.8 mm	347	0.2	44	724	3/3/2	90	130	B1	B1
SIP-2013	6000	0.8 mm	552	1.0	200	1629	5/3/2	300	500	C4	C3
SIP-3013	6000	0.8 mm	1129	4.7	1000	3655	5/3/3	1200	3700	C5	C4
SIP-3023	6000	0.8 mm	1129	7.2	1700	5610	5/3/3	700	3700	C5	C4
VIP-3017S	6000	0.8 mm	1129	4.7	1000	3655	5/3/3	1200	3700	C5	C4
SLP-0053	10000	1.4 mm	130	0.015	5.7	277	1/1/1	11	9	A2	A1
SLP-1053	10000	1.4 mm	347	0.1	40	776	3/3/2	85	120	B1	B1
SLP-2053	10000	1.4 mm	552	0.6	150	1773	5/3/2	310	500	C4	C3
SLP-3053	10000	1.4 mm	1129	4.5	1500	5819	5/3/3	1850	3700	C5	C4

⁽¹⁾ Third letter represents housing material: P – Clear native Polysulfone with silicone gasket, V – white PVC with butyl rubber gasket.

⁽²⁾ Nominal length is flange to flange, or to ends of connectors on quick-connect modules. Detailed drawings available upon request.

⁽³⁾ Guideline module filling volume to allow calculation of minimum system working volumes when added to volumes of attached piping and other components. Drained residual volumes are considerably less.

⁽⁴⁾ VIP-3017S – Maximum Inlet pressure for steam at 121 °C is 1.1 barg, max TMP 0.1 barg, filtrate pressure 0 (open steaming, no back pressure).

Microza Membranes

Polyacrylonitrile Membranes – Technical Specifications

The AP and AV series of Microza hollow fiber ultrafiltration modules feature unique double-skinned proprietary polyacrylonitrile (PAN) membranes with dense internal layer. Available in 6,000, 13,000, 50,000 and 80,000 molecular weight cut-offs, the modules are used in a range of pharmaceutical applications especially in purification and processing of aqueous enzymes and protein solutions. 80,000 MWCO modules are especially useful for raw water pretreatment to pharmaceutical water purification plant.

Materials of Construction

Membrane	Polyacrylonitrile
Housing	Native clear polysulfone (P) or PVC (V)
Potting Material	Epoxy Resin
Gasket	Silicone (P) or butyl rubber (NBR) (V)
Bacteriostat	Glycerin 65%, Ethanol 2%, water balance

Connectors and Adapters

For available connections, please refer to table on p202.

Key Features

- Hydrophilic polyacrylonitrile membrane provides low fouling and excellent flux recovery
- Combination of high-strength and high-capacity due to unique membrane construction
- High-strength fiber allows reverse filtration to assist cleaning in difficult applications
- Available in a range of sizes from 0.012 m² (0.13 ft²) to more than 40 m² (425 ft²)
- Compatible for continuous operation up to 50 °C (122 °F)
- Easily cleanable in most biological applications using minimum chemicals or detergents
- Meets the specifications for biological tests listed in the current revision of USP for class VI plastics at 121 °C (249 °F)
- LGV and LOV modules especially optimized for raw water duty
- pH 2 -10

Part Number⁽¹⁾

	Rating (MWCO, Daltons)	Fiber ID	Nominal Length ⁽²⁾	Membrane Area	Clean Water Flux Lh -1 bar	Crossflow Rate for 1ms ⁻¹ fluid velocity	Maximum Pressure (barg) at 50 °C (122 °F)	Volume Feed Side ⁽³⁾	Volume Permeate Side ⁽³⁾ (mL)	Feed/Retentate Connection	Permeate Connection
AIP-0013	6000	0.8 mm	130	0.017	1.0	181	1/1/1	9	9	A2	A1
AIP-1010	6000	0.8 mm	347	0.2	10	724	3/3/2	90	120	B1	B1
AIP-2013	6000	0.8 mm	552	1.0	50	1629	5/3/3	300	500	C4	C3
AIP-3013	6000	0.8 mm	1129	4.7	160	3655	5/3/3	1200	2700	C5	C4
AIV-3010	6000	0.8 mm	1126	4.7	170	3655	3/3/3	1200	2700	C7	D2
AIV-5010	6000	0.8 mm	1126	12.3	700	10134	3/3/3	3800	5300	C8	D3
ACP-0013	13000	0.8 mm	130	0.017	3.4	181	1/1/1	9	9	A2	A1
ACP-0053	13000	1.4 mm	130	0.012	1.9	222	1/1/1	10	9	A2	A1
ACP-1010	13000	0.8 mm	347	0.2	10	724	3/3/2	90	120	B1	B1
ACP-1050	13000	1.4 mm	347	0.12	19	776	3/3/2	90	120	B1	B1
ACP-2013	13000	0.8 mm	552	1.0	160	1629	5/3/3	300	500	C4	C3
ACP-2053	13000	1.4 mm	552	0.6	90	1773	5/3/3	310	500	C4	C3
ACP-3013	13000	0.8 mm	1129	4.7	750	3655	5/3/3	1200	2700	C5	C4
ACP-3053	13000	1.4 mm	1129	3.1	360	3990	5/3/3	1200	2850	C5	C4
ACV-3010	13000	0.8 mm	1126	4.7	830	3655	3/3/3	1200	2700	C7	D2
ACV-3050	13000	1.4 mm	1126	3.1	420	3990	3/3/3	1200	2700	C7	D2
ACV-5010	13000	0.8 mm	1126	12.3	2200	10134	3/3/3	3800	5300	C8	D3
ACV-5050	13000	1.4 mm	1126	7.8	1100	11084	3/3/3	3800	5300	C8	D3
LGV-3010	13000	0.8 mm	1126	7.6	500	3257	3/3/3	–	–	C7/D2	C7
LGV-5210	13000	0.8 mm	2227	41	4000	8686	3/3/3	–	–	C8/D3	C8
AHP-0013	50000	0.8 mm	130	0.017	8.3	181	1/1/1	9	9	A2	A1
AHP-1010	50000	0.8 mm	347	0.2	82	724	3/2/2	90	120	B1	B1
AHP-2013	50000	0.8 mm	552	1.0	460	1629	4/2/2	300	500	C4	C3
AHP-3013	50000	0.8 mm	1129	4.7	2250	3655	4/2/2	1200	2700	C5	C4
AHV-3010	50000	0.8 mm	1126	4.7	2500	3655	3/3/3	1200	2700	C7	D2
LOV-3010	80000	0.8 mm	1126	7.6	1500	3257	3/3/3	–	–	C7/D2	C7
LOV-5210	80000	0.8 mm	2227	41	7000	8686	3/3/3	–	–	C8/D3	C8

⁽¹⁾ Third letter represents housing material: P – Clear native Polysulfone with silicone gasket, V – white (gray – LGV, LOV) PVC with butyl rubber gasket

⁽²⁾ Nominal length is flange to flange, or to ends of connectors on quick-connect modules. Detailed drawings available upon request.

⁽³⁾ Guideline module filling volume to allow calculation of minimum system working volumes when added to volumes of attached piping and other components. Drained residual volumes are considerably less.

Microza Membranes

Polyvinylidenedifluoride Membranes – Technical Specifications

The U series of Microza hollow fiber microfiltration modules feature unique proprietary membranes in specially resistant PVDF for microfiltration applications. Available in 0.2 µm (UM series) and 0.65 µm (UJ series) rating, the modules are used in a range of pharmaceutical applications especially in cell harvesting, perfusion cell culture, viral vector production, and clarification of microbial extracts.

Materials of Construction

Membrane	Polyvinylidenedifluoride
Housing	Native clear polysulfone (P) or filled polysulfone (W)
Potting Material	Epoxy Resin
Gasket	Silicone (P)
Bacteriostat	Glycerin 65%, Ethanol 2%, water balance

Connectors and Adapters

For available connections, please refer to table on p202.

Key Features

- Low non-specific protein binding for long term flux maintenance in cell culture applications
- Available different fiber diameters allows optimization to different particulate or colloidal loadings
- Superior chemical resistance of Microza PVDF ensures compatibility in a broad range of processing and cleaning applications
- Highly characterized, optimized void structure ensures reproducible separation efficiency and high throughput
- High-strength fiber allows reverse filtration to optimize yield and performance in difficult applications
- Available in a range of sizes from 0.02 m² (0.21 ft²) to 5 m² (54 ft²)
- U series can operate continuously in processes up to 80 °C (176 °F) and may be steamed in situ at 125 °C (257 °F) for 20 cycles
- Meets the specification for biological tests listed in the current revision of USP for Class VI plastics at 121 °C (249 °F)
- pH 2 – 10

Part Number⁽¹⁾

	Rating (MWCO, Daltons)	Fiber ID	Nominal Length ⁽²⁾	Membrane Area	Clean Water Flux Lh -1 bar	Crossflow Rate for 1ms ⁻¹ fluid velocity	Maximum Pressure (barg) at 50 °C (122 °F)	Volume Feed Side ⁽³⁾	Volume Permeate Side ⁽³⁾ (mL)	Feed/Retentate Connection	Permeate Connection
UMP-053	0.2	2.6 mm	130	0.015	1.5	287	1/1/1	1/1/1	12	9	A2/A1
UMP-153	0.2	2.6 mm	347	0.08	8	956	3/3/3	3/3/3	90	120	B1/B1
UMP-353	0.2	2.6 mm	1129	2.2	200	5161	3/3/3	3/3/3	1700	2700	C5/C4
UMW-553	0.2	2.6 mm	1172	5.0	500	12424	3/3/3	3/3/3	3800	5400	C6/C5
UMP-0047R	0.2	1.4 mm	314	0.02	19	116	3/3/1.5	2/2/1	23	30	C1/A2
UMP-1047R	0.2	1.4 mm	316	0.09	80	554	3/3/1.5	2/2/1	202	–	C2/C1
UMP-1147R	0.2	1.4 mm	546	0.19	180	554	3/3/1.5	2/2/1	360	–	C2/C1
UMP-1147M	0.2	1.4 mm	546	0.33	330	953	3/3/1.5	2/2/1	297	–	C2/C1
UMP-2147R	0.2	1.4 mm	546	0.77	750	2216	3/3/1.5	2/2/1	–	–	C4/C2
UMP-3147R	0.2	1.4 mm	630	2.0	2000	–	3/3/1.5	2/2/1	–	–	C4/C3
UMP-3247R	0.2	1.4 mm	1129	4.0	4000	–	3/3/1.5	2/2/1	–	–	C4/C3
UJP-0047R	0.65	1.1 mm	314	0.02	24	92	3/3/1.5	2/2/1	23	33	C1/A2
UJP-1047R	0.65	1.1 mm	316	0.10	120	462	3/3/1.5	2/2/1	204	–	C2/C1
UJP-1147R	0.65	1.1 mm	546	0.19	230	428	3/3/1.5	2/2/1	370	–	C2/C1
UJP-1147M	0.65	1.1 mm	546	0.32	380	708	3/3/1.5	2/2/1	310	–	C2/C1
UJP-2147R	0.65	1.1 mm	546	0.73	850	1625	3/3/1.5	2/2/1	–	–	C4/C2
UJP-3147R	0.65	1.1 mm	630	1.9	2300	–	3/3/1.5	2/2/1	–	–	C4/C3
UJP-3247R	0.65	1.1 mm	1129	3.8	4600	–	3/3/1.5	2/2/1	–	–	C4/C3

⁽¹⁾ Third letter represents housing material: P – Clear native Polysulfone with silicone gasket, V – white (gray – LGV, LOV) PVC with butyl rubber gasket

⁽²⁾ Nominal length is flange to flange, or to ends of connectors on quick-connect modules. Detailed drawings available upon request.

⁽³⁾ Guideline module filling volume to allow calculation of minimum system working volumes when added to volumes of attached piping and other components. Drained residual volumes are considerably less.

Microza Membranes

Polyolefin Membranes – Technical Specifications

The P series of Microza hollow fiber microfiltration modules feature unique proprietary membranes in polyolefin for general microfiltration applications. Available in 0.1 µm rating, the modules are used in a range of pharmaceutical applications especially in clarification of microbial cultures for enzyme production, clarification of natural product extracts, and nutraceutical production.

Materials of Construction

Membrane	Polyolefin
Housing	Native clear polysulfone (P) or PVC (V)
Potting Material	Epoxy resin
Gasket	Silicone (P)
Bacteriostat	Glycerin 65%, ethanol 2%, water balance

Connectors and Adapters

A – A1	Small hose barb 4.5 mm (3/16 in.),
A2	Small hose barb 6 mm (1/4 in.)
B – B1	Quick-connect. To convert feed/retentate to 1½ in. sanitary clamp order part no. 0450163 (fits in body of module), to ¾ in. sanitary clamp order part no. 2055675 (fits in body of module), to ¼ in. hose barb (fits on quick-connect), order part 2055999 no. (polypropylene), and to ¼ in. FNPT (fits on quick-connect), order part no. 2089150 (316L stainless steel).
C – C3	1 in. sanitary flange (ferrule face 34 mm, [1.34 in.])
C4	1½ in. sanitary flange (ferrule face 50 mm [1.98 in.])
C5	2 in. sanitary flange (ferrule face 64 mm [2.52 in.])
C7	4 in. sanitary flange (ferrule face 117 mm [4.61 in.])
C8	6 in. sanitary flange (ferrule face 157 mm [6.18 in.])
D – D2	Cap Nut, 38.5 mm diameter
D3	Cap Nut, 48.5 mm diameter

Part Number⁽¹⁾

	Rating (MWCO, Daltons)	Fiber ID	Nominal Length ⁽²⁾	Membrane Area	Clean Water Flux Lh -1 bar	Crossflow Rate for 1ms ⁻¹ fluid velocity	Maximum Pressure (barg) at 50 °C (122 °F)	Volume Feed Side ⁽³⁾	Volume Permeate Side ⁽³⁾ (mL)	Feed/Retentate Connection	Permeate Connection
PSP-103	0.1	0.7 mm	347	0.2	25	554	3/2.2/2	90	120	B1	B1
PSP-113	0.1	1.9 mm	347	0.1	7	714	3/2.5/2	110	110	B1	B1
WSP-143	0.1	1.4 mm	347	0.09	13	554	3/2.5/2	90	120	B1	B1
PSP-303	0.1	0.7 mm	1129	6.0	700	3879	5/2.2/3	1200	2700	C5	C4
PSV-303	0.1	0.7 mm	1126	6.0	700	3879	5/2.2/3	1200	2700	C7	D3
PSV-313	0.1	1.9 mm	1126	2.9	240	4900	5/2.5/3	1500	2600	C7	D3
WSP-543	0.1	1.4 mm	1172	8.2	930	11083	4/2.5/4	3800	5300	C7	C6

⁽¹⁾ Third letter represents housing material: P – Clear native Polysulfone with silicone gasket, V – white (gray – LGV, LOV) PVC with butyl rubber gasket

⁽²⁾ Nominal length is flange to flange, or to ends of connectors on quick-connect modules. Detailed drawings available upon request.

⁽³⁾ Guideline module filling volume to allow calculation of minimum system working volumes when added to volumes of attached piping and other components. Drained residual volumes are considerably less.

Key Features

- Available different internal fiber diameters provides suitability for processes with varying particulate or colloidal loading
- Broad chemical resistance ensures compatibility in a wide range of processing and cleaning conditions
- Highly characterized, optimized void structure ensures reproducible separation efficiency and high throughput
- High-strength fiber allows reverse filtration to optimize yield and performance in difficult applications
- Available in a range of sizes from 0.09 m² (1 ft²) to over 8 m² (85 ft²)
- P series compatible for continuous operation up to 50 °C (122 °F)
- Meets the specification for biological tests listed in the current revision of USP for Class VI plastics at 121 °C (249 °F)