

ARRAYFORCE™ GAS-LIQUID SEPARATION MEMBRANE CONTACTOR

Highly efficient, energy-saving and environmental friendly gas-liquid separation/mix solution using hollow fiber membrane

ARRAYFORCE™ GAS-LIQUID SEPARATION MEMBRANE CONTACTORS

LIQUID DEGASSING OR INJECTION USING HYDROPHOBIC HOLLOW FIBER MEMBRANE

Cobetter Arrayforce™ gas-liquid separation membrane contactors use hydrophobic hollow fiber membrane technology to remove dissolved gases from liquids, or to inject gases into liquids.

In typical operation, liquid to be degassed flows outside the hollow fiber. At the same time, vacuum, sweep gas or a certain adsorption liquid go through inside the hollow fiber. There are a lot of micro pores on the surface of hydrophobic hollow fiber, which allow gas molecules pass through, but reject water molecules. Under the force caused by vacuum, sweep gas or adsorption liquid, the gases dissolved in liquid outside the hollow fiber moves continuously through the micropores to the inside hollow fiber, and then is taken away by vacuum, sweep gas or a certain adsorption liquid. In this way, dissolved gases in liquid are removed.

FEATURE	BENEFIT
Simple operation process	Quick start. Very short time for system stability.
No chemical dosing	No chemical elements in liquid eliminates subsequent treatment steps
Expandable configurations	Parallel or in-series contactor configurations allow simple adjustment of gas removal or injection efficiency to match process needs
Standard housing options	Housing flange connections are designed in accordance with international standards to allow connection to industry-standard connections.

SPECIFICATIONS		
Hollow Fiber	Polypropylene, Polyolefin, Super Phobic Polypropylene	
Seal Material	FKM, FFKM, or EPDM	
Potting Material	Epoxy resin (Food Grade)	

APPLICATION CONDITIONS		
Hollow Fiber Material	Liquid Material Surface Tension	Liquid Material Viscosity
PP (Polypropylene)	≥60 Dyne/cm	≤50cp
PMP (Polyolefin)	≥32Dyne/cm	≤50cp
SP (Super Phobic Polypropylene)	≥27 Dyne/cm	≤10cp



Typical Applications

- Deoxygenation for ultrapure water
- Decarbonation for ultrapure water
- Deammonia for wastewater
- Carbon dioxide injection into pure water
- Oxygen injection into pure water
- Food and beverage (precision control of oxygen, carbon dioxide, and nitrogen)
- Boiler makeup water
- Oilfield reinjection water
- Gas injection

APPLICATION CONDITIONS

Model	Membrane Area	Flow Range (Flux)	Hollow Fiber Structure	Weight	
				Dry	Water Full
1*3	0.05 m ²	5 - 50 ml/min	Knitted hollow fiber, no baffle	0.025 kg	0.04 kg
1*5.5	0.1 m ²	30 - 300 ml/min		0.047 kg	0.072 kg
2*6	0.35 m ²	50 - 1000 ml/min		0.146 kg	0.230 kg
2*7	0.4 m ²	100 - 1500 ml/min		0.17 kg	0.27 kg
2.5*8	1.41 m ²	0.1 - 0.7 m ³ /hr		0.51 kg	0.75 kg
4*13	7.66 m ²	0.5 - 3.4 m ³ /hr	Knitted hollow fiber with mid baffle	3 kg	4 kg
6*20	27 m ²	1 - 7.2 m ³ /hr		7 kg	12 kg
6*28	42 m ²	1 - 10 m ³ /hr		10 kg	17 kg
8*20	53 m ²	1 - 10 m ³ /hr		12.7 kg	19.3 kg
10*28	130 m ²	8 - 40 m ³ /hr		33 kg	57 kg
14*28	220 m ²	15 - 90 m ³ /hr		62 kg	97 kg

Model	Priming Volume		Max. Working		
	Shell Side (Liquid Side)	Tube (Lumen) Side (Gas Side)	Temperature	Pressure*	Max. Gas Inlet Pressure
1*3	0.013 L (0.003 gal)	0.008 L (0.002 gal)	80°C	2 bar (29 psi)	0.42 MPa (4.2 bar) @ 25°C
1*5.5	0.024 L (0.006 gal)	0.016 L (0.004 gal)	80°C	2 bar (29 psi)	0.42 MPa (4.2 bar) @ 25°C
2*6	0.081 L (0.021 gal)	0.054 L (0.014 gal)	80°C	2 bar (29 psi)	0.42 MPa (4.2 bar) @ 25°C
2*7	0.095 L (0.025 gal)	0.064 L (0.017 gal)	80°C	2 bar (29 psi)	0.42 MPa (4.2 bar) @ 25°C
2.5*8	0.23 L (0.061 gal)	0.09 L (0.024 gal)	80°C	6 bar (87 psi) @ 25°C 2 bar (29 psi) @ 70°C	0.42 MPa (4.2 bar) @ 25°C
4*13	1.3 L (0.34 gal)	0.6 L (0.16 gal)	5-30°C	7.2 bar (104 psi)	0.42 MPa (4.2 bar, 60 psi) @ 25°C
			40°C	5.2 bar (72.5 psi)	
6*20	4.7 L (1.24 gal)	1.6 L (0.42 gal)	5-25°C	7.2 bar (104 psi)	0.41 MPa (4.1 bar) @ 25°C
			60°C	2.1 bar (30 psi)	
6*28	6.7 L (1.77 gal)	2.3 L (0.61 gal)	5-25°C	7.2 bar (104 psi)	0.41 MPa (4.1 bar) @ 25°C
			60°C	2.1 bar (30 psi)	
8*20	6.7 L (1.77 gal)	5.2 L (1.37 gal)	5-25°C	4.8 bar (70 psi)	0.21 MPa (2.1 bar) @ 25°C
			40°C	2.1 bar (30 psi)	
10*28	26 L (6.87 gal)	10 L (2.64 gal)	5-50°C	7.2 bar (104 psi)	0.42 MPa (4.2 bar) @ 25°C
			70°C	2.1 bar (30 psi)	
14*28	33.5 L (8.85 gal)	22 L (5.8 gal)	5-25°C	7.2 bar (104 psi)	0.41 MPa (4.1 bar) @ 25°C
			50°C	2.1 bar (30 psi)	

* 1 bar (14.5 psi) can be increased if no vacuum is utilized on Tube (Lumen) Side

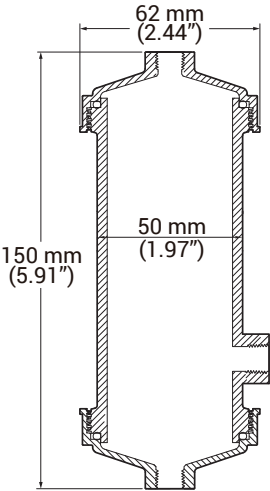
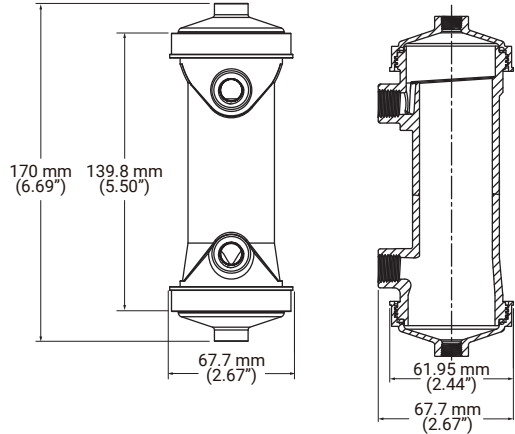
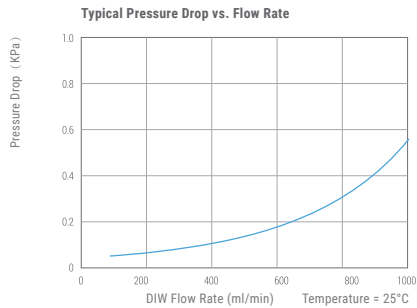
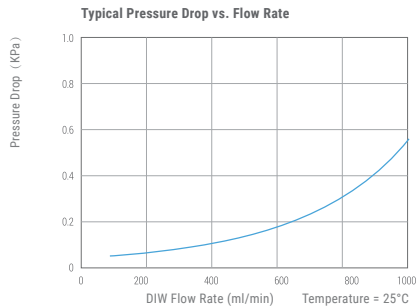
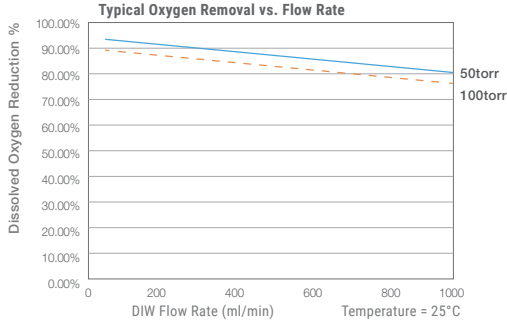
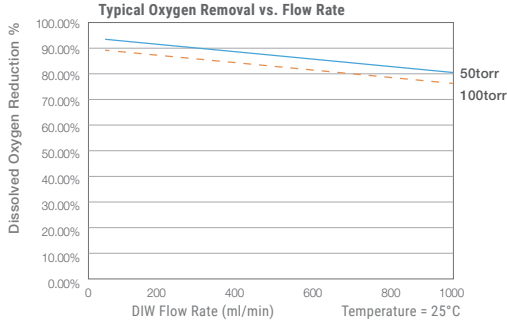
The above pressures are based on pure water and clean air. If other medias are used, consult Technical Support.

DIMENSIONS, FITTINGS, FLOW RATES, DEGASSING EFFICIENCY

TYPE:	1 x 3	1 x 5.5
Tube (Vacuum/Gas) Side	Female Luer Lock	1/8" FNPT
Shell (Liquid) Side	Female Luer Lock	1/8" FNPT
Flow Rates	<p>Typical Pressure Drop vs. Flow Rate</p>	<p>Typical Pressure Drop vs. Flow Rate</p>
Degassing Efficiency	<p>Typical Oxygen Removal vs. Flow Rate</p>	<p>Typical Oxygen Removal vs. Flow Rate</p>
Hollow Fiber Material	Polyolefin - PMP, SuperphobicPP - SP	Polyolefin - PMP
Potting Material	Epoxy Resin	Epoxy Resin
Sealing Ring Materials	FKM/FFKM/EPDM/Silicone	FKM/FFKM/EPDM/Silicone
Shell (Housing) Material	Polypropylene - PP	Polypropylene - PP

Additional fittings available upon request

DIMENSIONS, FITTINGS, FLOW RATES, DEGASSING EFFICIENCY

		
TYPE:	2 x 6	2 x 7
Tube (Vacuum/Gas) Side	1/8" FNPT	1/4" FNPT
Shell (Liquid) Side	1/8" FNPT	1/4" FNPT
Flow Rates		
Degassing Efficiency		
Hollow Fiber Material	Polyolefin - PMP Polypropylene - PP, SP	Polyolefin - PMP Polypropylene - PP, SP
Potting Material	Epoxy Resin	Epoxy Resin
Sealing Ring Materials	FKM/FFKM/EPDM/Silicone	FKM/FFKM/EPDM/Silicone
Shell (Housing) Material	Polypropylene - PP	Polypropylene - PP Polycarbonate - PC

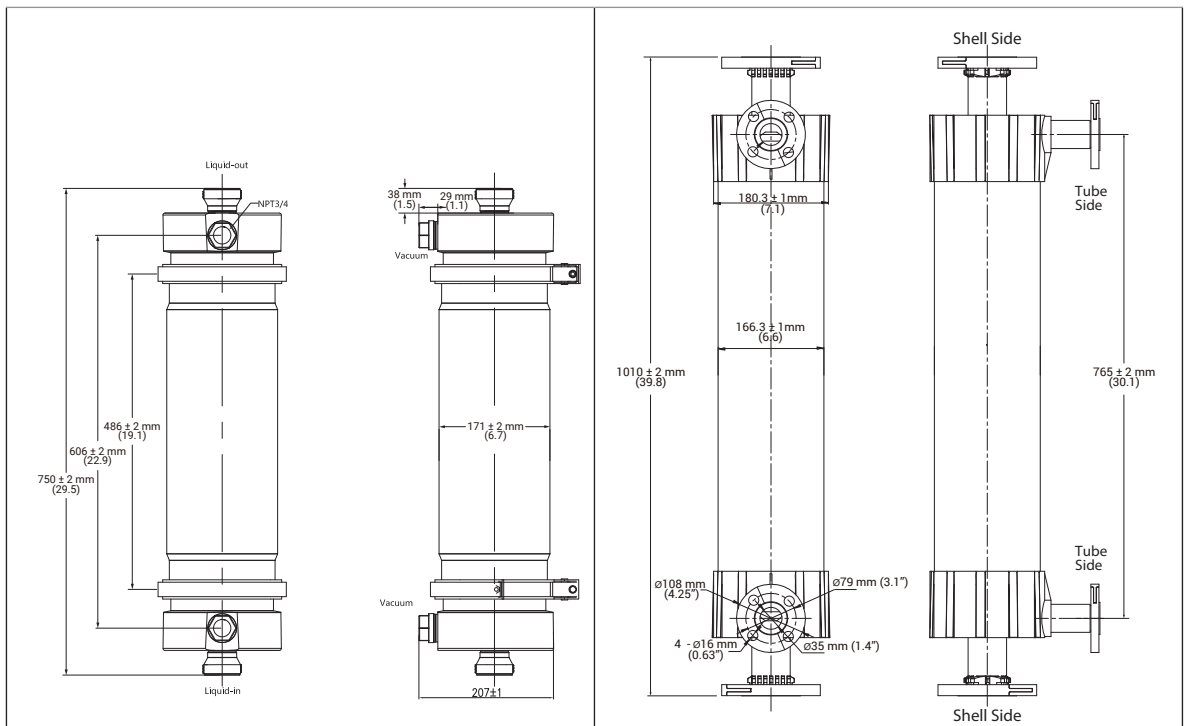
Additional fittings available upon request

DIMENSIONS, FITTINGS, FLOW RATES, DEGASSING EFFICIENCY

TYPE:	2.5 x 8	4 x 13
Tube (Vacuum/Gas) Side	1/4" FNPT	1" Sanitary (Tri-Clamp), 3/4" NPT
Shell (Liquid) Side	1/4" FNPT	1" Sanitary (Tri-Clamp), 3/4" NPT, 1" GF
Flow Rates	<p>Typical Pressure Drop vs. Flow Rate</p>	<p>Typical Pressure Drop vs. Flow Rate</p>
Degassing Efficiency	<p>Typical Oxygen Removal vs. Flow Rate</p>	<p>Typical Oxygen Removal vs. Flow Rate</p>
Hollow Fiber Material	Polyolefin - PMP Polypropylene - PP, SP	Polyolefin - PMP Polypropylene - PP, SP
Potting Material	PMP/Epoxy Resin	Epoxy Resin
Sealing Ring Materials	FKM/FFKM/EPDM	FKM/FFKM/EPDM
Shell (Housing) Material	Polypropylene - PP	Polypropylene - PP Stainless Steel - SS (custom)

Additional fittings available upon request

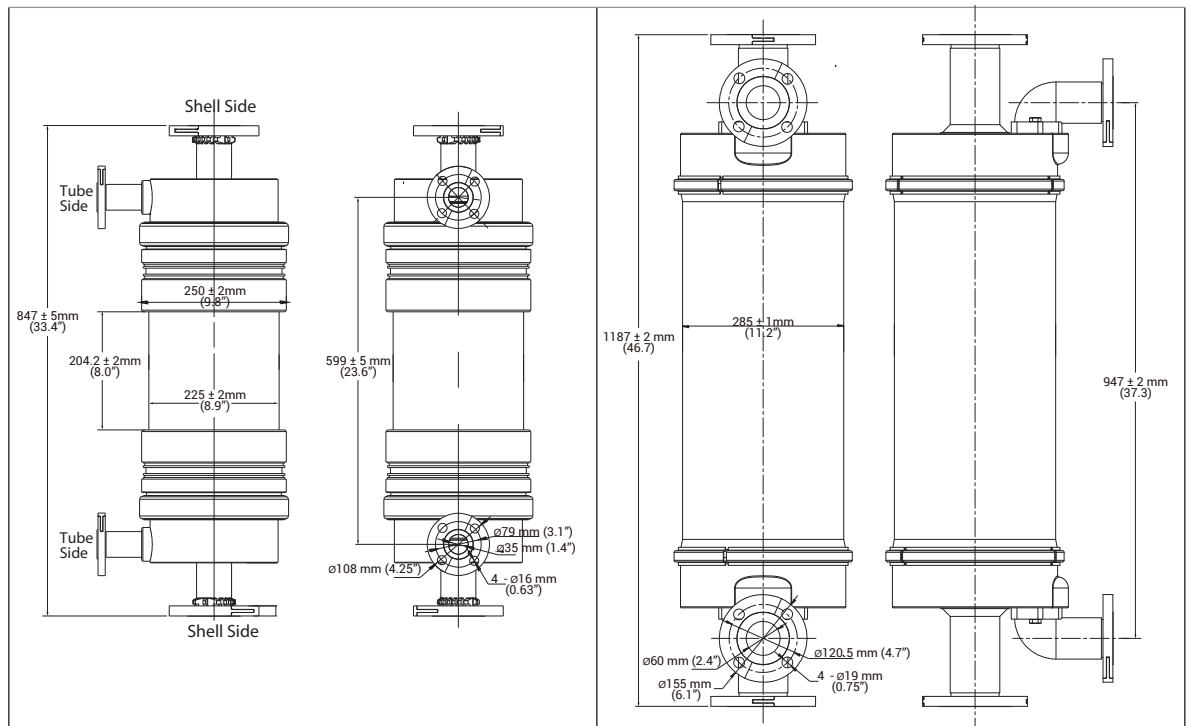
DIMENSIONS, FITTINGS, FLOW RATES, DEGASSING EFFICIENCY



TYPE:	6 x 20	6 x 28														
Tube (Vacuum/Gas) Side	3/4" NPT	1" 150# ANSI Flange														
Shell (Liquid) Side	2" GF	2" 150# ANSI Flange														
Flow Rates		<p>Typical Pressure Drop vs. Flow Rate</p> <table border="1"> <caption>Typical Pressure Drop vs. Flow Rate Data</caption> <thead> <tr> <th>DIW Flow Rate (m³/hr)</th> <th>Pressure Drop (MPa)</th> </tr> </thead> <tbody> <tr><td>1</td><td>0.03</td></tr> <tr><td>2</td><td>0.05</td></tr> <tr><td>4</td><td>0.08</td></tr> <tr><td>6</td><td>0.11</td></tr> <tr><td>8</td><td>0.15</td></tr> <tr><td>10</td><td>0.20</td></tr> </tbody> </table>	DIW Flow Rate (m³/hr)	Pressure Drop (MPa)	1	0.03	2	0.05	4	0.08	6	0.11	8	0.15	10	0.20
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1	98															
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Hollow Fiber Material	Polyolefin - PMP Polypropylene - PP, SP	Polypropylene - PP, SP														
Potting Material	Epoxy Resin	Polyurethane														
Sealing Ring Materials	FKM/FFKM	FKM/FFKM/EPDM														
Shell (Housing) Material	Polypropylene - PP Stainless Steel - SS (custom)	ABS														

Additional fittings available upon request

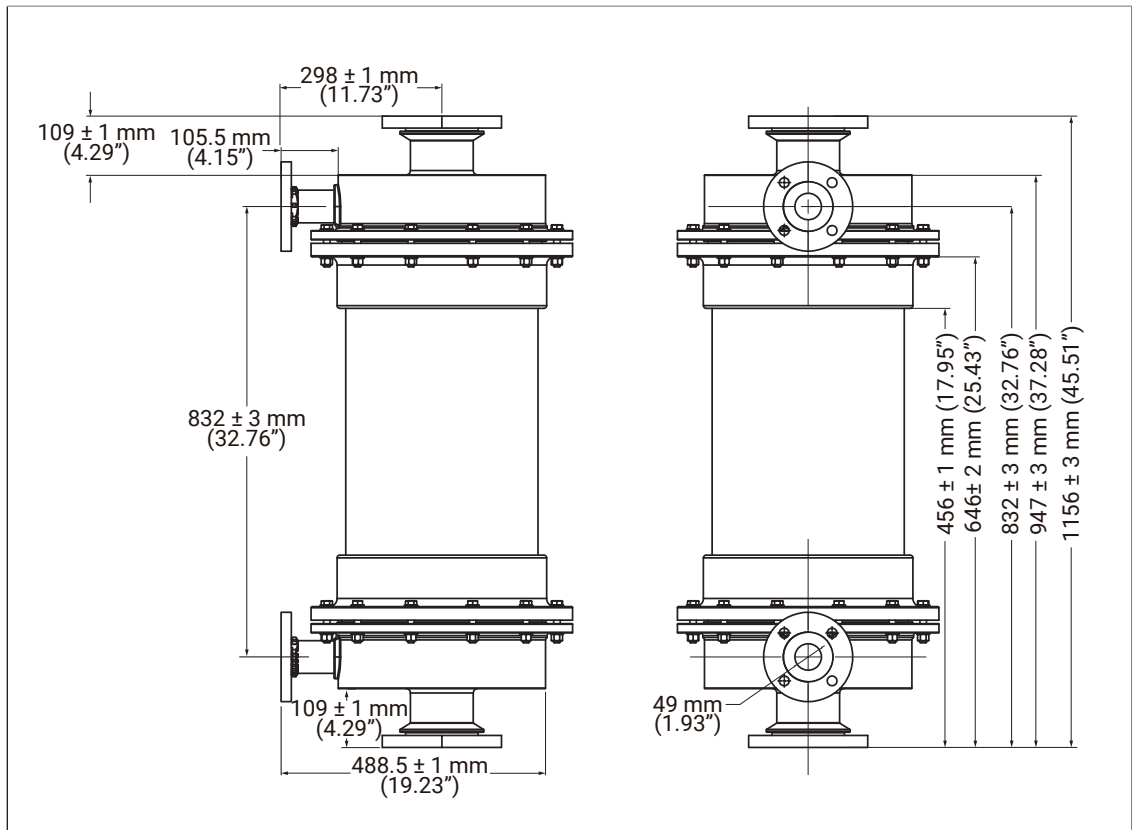
DIMENSIONS, FITTINGS, FLOW RATES, DEGASSING EFFICIENCY



TYPE:	8 x 20	10 x 28
Tube (Vacuum/Gas) Side	1" 150# ANSI Flange	1" 150# ANSI Flange
Shell (Liquid) Side	2" 150# ANSI Flange	3" 150# ANSI Flange
Flow Rates	<p>Typical Pressure Drop vs. Flow Rate</p>	<p>Typical Pressure Drop vs. Flow Rate</p>
Degassing Efficiency	<p>Typical Oxygen Removal vs. Flow Rate</p>	<p>Typical Oxygen Removal vs. Flow Rate</p>
Hollow Fiber Material	Polypropylene - PP, SP	Polypropylene - PP, SP
Potting Material	Polyurethane	Polyurethane
Sealing Ring Materials	FKM/FFKM/EPDM	FKM/FFKM/EPDM
Shell (Housing) Material	UPVC, CPVC	FRP, FRP coated with PVDF on the inside, SS special

Additional fittings available upon request

DIMENSIONS, FITTINGS, FLOW RATES, DEGASSING EFFICIENCY

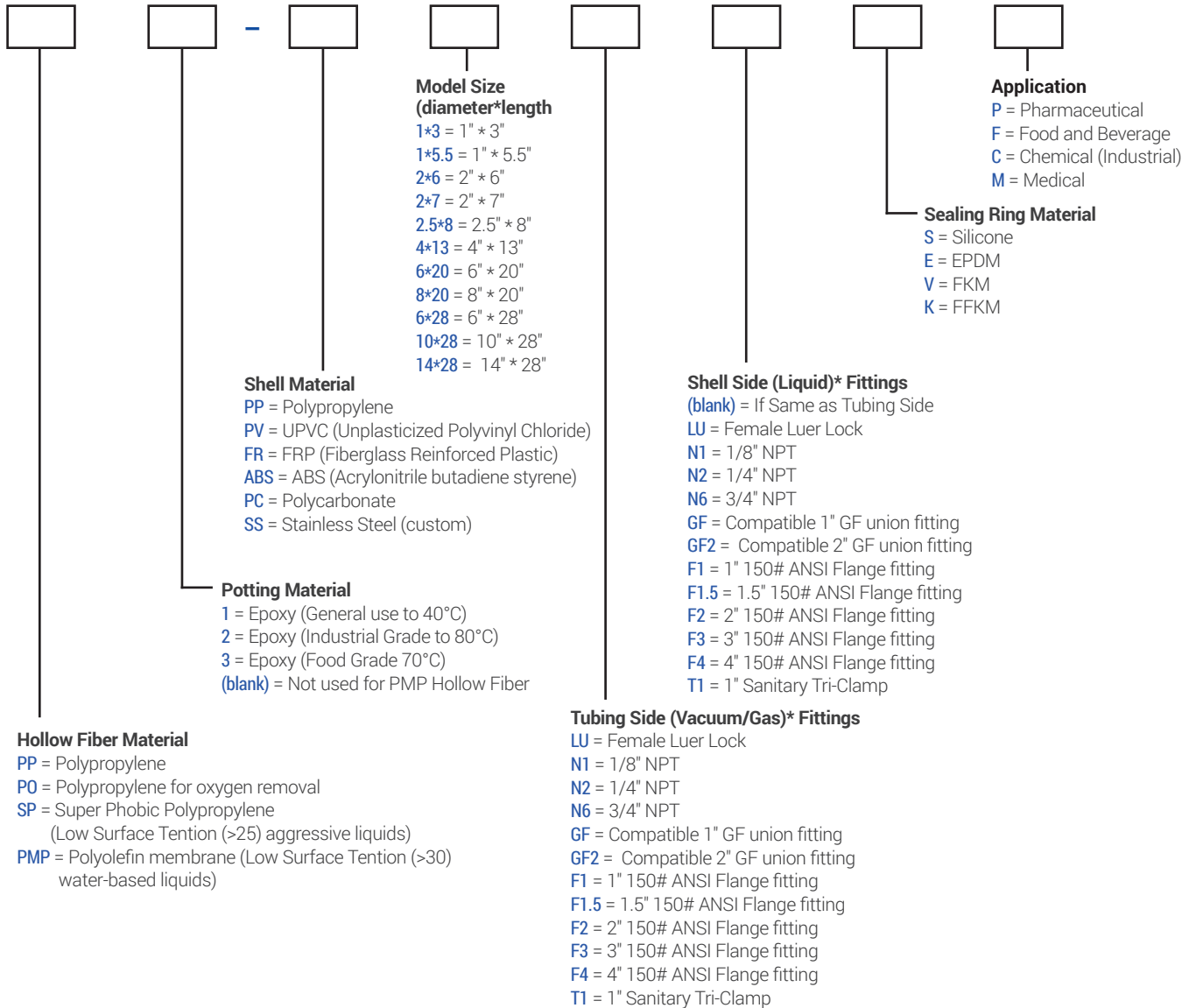


TYPE:	14 x 28
Tube (Vacuum/Gas) Side	2" 150# ANSI Flange
Shell (Liquid) Side	4" 150# ANSI Flange
Flow Rates	
Degassing Efficiency	
Hollow Fiber Material	Polypropylene - PP, SP
Potting Material	Polyurethane
Sealing Ring Materials	FKM/FFKM/EPDM
Shell (Housing) Material	UPVC, CPVC (Custom)

Additional fittings available upon request

ORDERING INFORMATION

EXAMPLE: **PP2-PP4*13N6T1EC** = Polypropylene Hollow Fiber, Industrial Potting material, PP Shell, 4x13 size, 3/4" NPT Tube side fitting, EPDM seals, Chemical (Industrial) application



*Additional fittings available upon request.
 Not all combinations available. Refer to tables on prior pages.



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