



# 3M™ Liqui-Cel™ EXF-4×28 Series Membrane Contactor

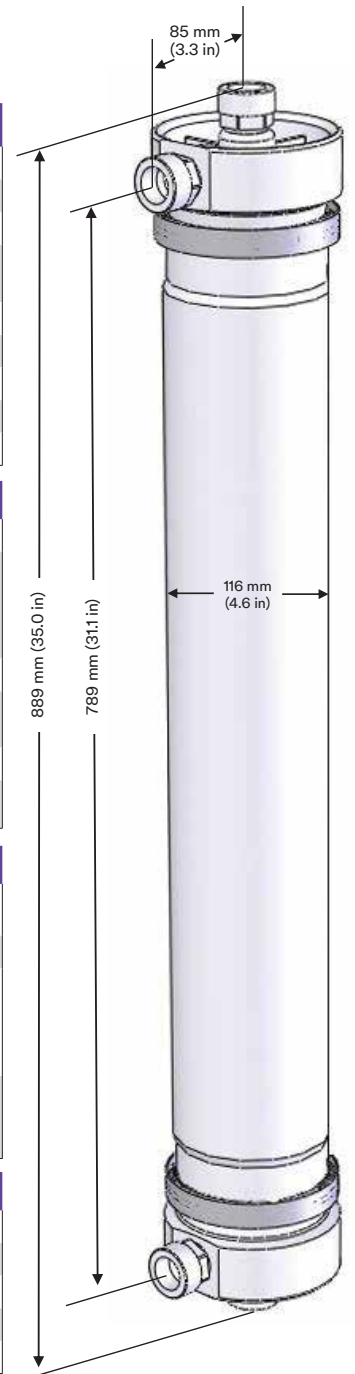
## Typical Properties

Membrane Characteristics	
<b>Cartridge Configuration</b>	Extra-Flow with Center Baffle
<b>Liquid Flow Guidelines</b>	0.9 – 6.8 m <sup>3</sup> /hr (4 – 30 gpm)
<b>Membrane Type</b>	X50
	Recommended for CO <sub>2</sub> removal from water
	X40
	Recommended for all other gas transfer applications
<b>Membrane/Potting Material</b>	Polypropylene / Polyethylene
<b>Priming Volume (approximate)</b>	
<b>Shellside X40 or X50</b>	4.2 L (1.1 gal) PP housing, 3.0 L (0.8 gal) SS housing
<b>Lumenside X50</b>	1.3 L (0.4 gal) PP housing, 1.0 L (0.3 gal) SS housing
<b>Lumenside X40</b>	1.1 L (0.3 gal) PP housing, 0.9 L (0.2 gal) SS housing

Pressure Guidelines*			
	PP X50 or X40	316L SS X50	316L SS X40
<b>Maximum Shellside LIQUID Working Temperature/ Pressure</b>	5-30°C, 7.2 barg (41-86°F, 105 psig) 40°C, 5.2 barg (104°F, 75 psig)	5-50°C, 7.2 barg (41-122°F, 105 psig) 70°C, 2.1 barg (158°F, 30 psig)	5-50°C, 9.3 barg (41-122°F, 135 psig) 70°C, 2.1 barg (158°F, 30 psig)
If no vacuum is used, 1 barg (15 psig) can be added to pressures above.			
<b>Maximum Applied Gas Pressure</b>	4.1 barg at 25°C (60 psig at 77°F)	6.2 barg at 25°C (90 psig at 77°F)	
Maximum applied gas pressure is for integrity testing at ambient temperatures. Normal operating pressures are typically lower.			
* See Operating Guide for complete temp/pressure limits for housings and membrane. <b>Note:</b> Liquid pressure should always exceed gas pressure.			

Housing Options and Characteristics		
<b>Material</b>	Polypropylene	316L SS Surface Finish ≤ 0.8µm SI (32 RA)
<b>Flange Connections</b>		
<b>Shellside (Liquid Inlet/Outlet)</b>	1 inch Sanitary ¾ inch NPT Female 1 inch George Fisher Rc ¾ per JIS B0203	1 inch Sanitary
<b>Lumenside (gas/vacuum)</b>	1 inch 90° Sanitary ¾ inch 90° NPT Female Rc ¾ per JIS B0203	1 inch Sanitary

Seal Options	
<b>Material</b>	<b>Applications</b>
Viton	General Purpose
K - UPW	Ultra Pure Water
K - EXT	Chemical Extraction
Buna-N	Beverage



All dimensions are nominal values for the Polypropylene housing. See full housing drawing on [3M.com/Liqui-Cel](http://3M.com/Liqui-Cel) for additional details.

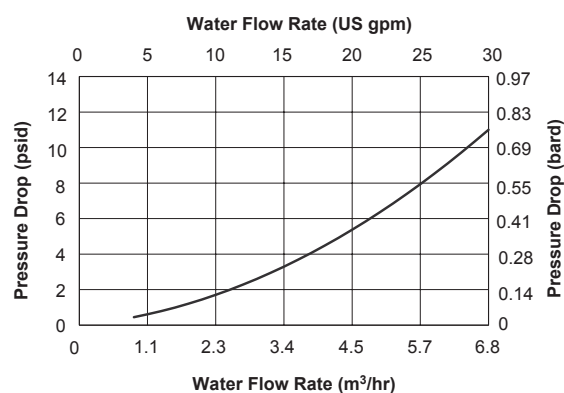
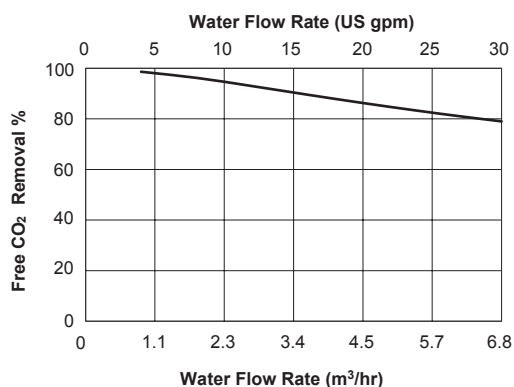
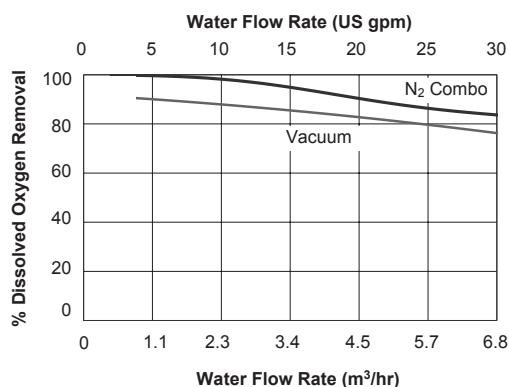
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## Typical Properties

Weight (approximate)	PP	316L SS
Dry (cartridge and housing)	4 kg (9 lbs)	7 kg (15 lbs)
Water-filled (shellside)	7 kg (15 lbs)	10 kg (21 lbs)
Cartridge only – dry	X50: 1 kg (2 lbs), X40: 1 kg (3 lbs)	

### Regulatory

Complies with the limits as set by RoHS Directive 2011/65/EU Annex II; recasting 2002/95/EC.  
Constructed of FDA CFR title 21 compliant materials for wetted parts only at ambient temperatures.



Curves represent nominal values. Characteristics may change under different operating conditions.  
Test condition O<sub>2</sub> Removal with X40 membrane 20°C (68°F): N<sub>2</sub>-vacuum combo mode, vacuum: 50 mm Hg N<sub>2</sub> sweep flow 1.4 L/min (0.05 scfm). Vacuum mode: 50 mm Hg.  
Test condition CO<sub>2</sub> Removal with X50 membrane 20°C (68°F): Air-vacuum combo mode, air sweep: 4 G/L, vacuum: 150 mm Hg.

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