



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

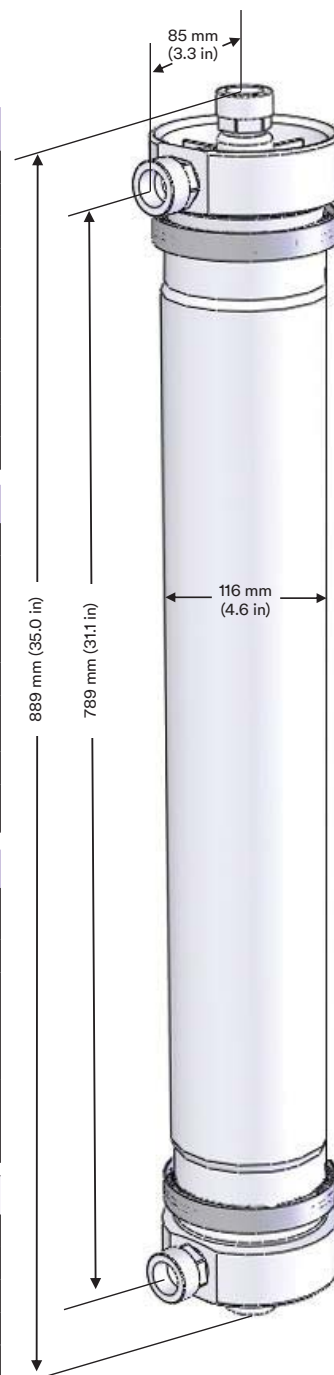
Typical Properties

Membrane Characteristics	
Cartridge Configuration	Extra-Flow with Center Baffle
Liquid Flow Guidelines	0.9 – 6.8 m ³ /hr (4 – 30 gpm)
Membrane Type	X50 X40
	Recommended for CO ₂ removal from water Recommended for all other gas transfer applications
Membrane/Potting Material	Polypropylene / Polyethylene
Priming Volume (approximate)	
Shellside X40 or X50	4.2 L (1.1 gal) PP housing, 3.0 L (0.8 gal) SS housing
Lumenside X50	1.3 L (0.4 gal) PP housing, 1.0 L (0.3 gal) SS housing
Lumenside X40	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
Maximum Shellside LIQUID Working Temperature/ Pressure	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.			
Maximum Applied Gas Pressure	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.			
Note: Liquid pressure should always exceed gas pressure.			

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

Seal Options	
Material	Applications
FKM	General Purpose
FFKM (K - UPW)**	Ultra Pure Water
Buna-N***	General Purpose
**Only available in PP housing with NPT connections or PP housing with sanitary connection and X40 fiber.	
*** Only available in SS housing with sanitary connections and X40 fiber.	



All dimensions are nominal values for the Polypropylene housing with NPT connections. See full housing drawing on 3M.com/Liqui-Cel for additional details.

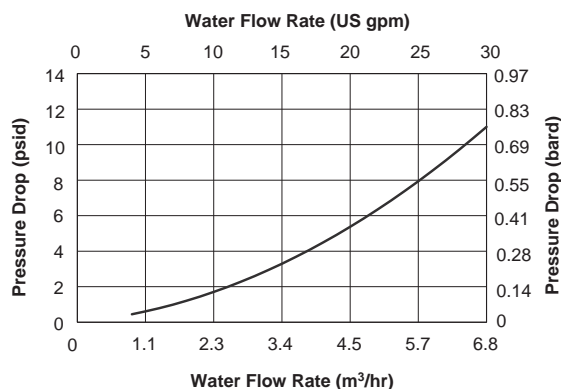
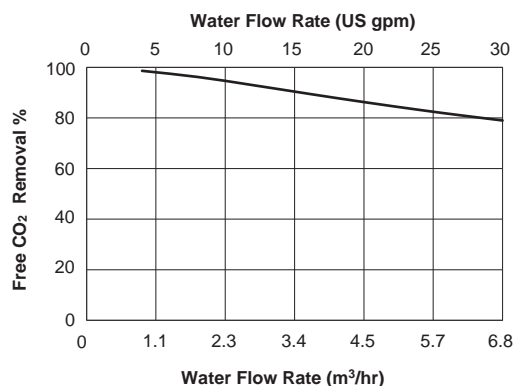
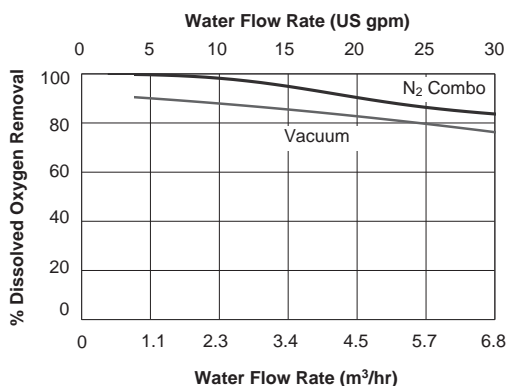
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Typical Properties

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. 3M™ Liqui-Cel™ EXF-4×28 Series Membrane Contactors with FKM seals are constructed of FDA Title 21 CFR parts 177-190 compliant materials for wetted parts only at ambient temperatures. 3M™ Liqui-Cel™ EXF-4×28 Series Membrane Contactors with FFKM (K-UPW) or BUNA-N seals **are not** constructed of FDA Title 21 CFR parts 177-190 compliant materials.



Curves represent nominal values. Characteristics may change under different operating conditions.
 Test condition O₂ Removal with X40 membrane 20°C (68°F): N₂-vacuum combo mode, vacuum: 50 mm Hg N₂ sweep flow 1.4 L/min (0.05 scfm). Vacuum mode: 50 mm Hg.
 Test condition CO₂ 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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