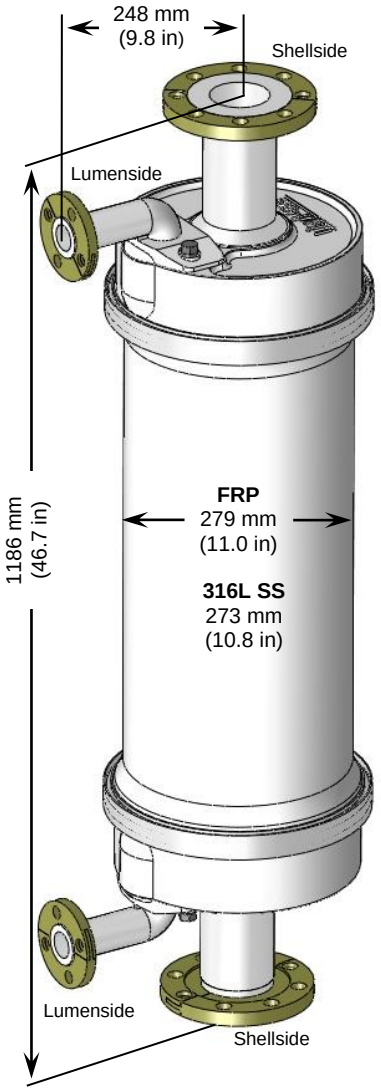
10 x 28 EXTRA-FLOW PRODUCT DATA SHEET



SS Contactors use a different end cap design. Sanitary connections are only available on 316 SS. Complete drawings are available on the web site, **www.liqui-cel.com.**

All dimensions are nominal values.

Membrane Characteristics

Cartridge Configuration	Extra-Flow with Center Baffle	
Liquid Flow Guidelines	10 – 57 m^3/hr (44 – 250 gpm)	
Membrane Type	**X50 Fiber**	**X40 Fiber**
	Recommended for CO_2 removal from liquid and other gas transfer applications	Recommended for O_2 removal from liquid and other gas transfer applications
Membrane/Potting Material	Polypropylene / Epoxy	
Typical Membrane Surface Area	130 m^2 (1400 ft^2)	

Priming Volume (approximate)	**FRP Housing**		**316 SS Sanitary/316 SS ANSI**	
	X50 Fiber	**X40 Fiber**	**X50 Fiber**	**X40 Fiber**
Shellside	26.1 L (6.9 gal)	26.3 L (7.0 gal)	24.3/24.9 L (6.4/6.6 gal)	24.5/25.6 L (6.5/6.8 gal)
Lumenside	10.6 L (2.8 gal)	9.5 L (2.5 gal)	7.5/10.0 L (1.9/2.6 gal)	6.4/9.5 L (1.7/2.5 gal)

Pressure Guidelines*

	X50 Fiber	**X40 Fiber**
Maximum Shellside LIQUID Working Temperature/Pressure	5-50° C, 7.2 barg (41-122° F, 105 psig) 70° C, 2.1 barg (158° F, 30 psig)	5-25° C, 9.3 barg (41-77° F, 135 psig) 50° C, 7.2 barg (77-122° F, 105 psig) 70° C, 2.1 barg (158° F, 30 psig)

If no vacuum is used, 1.0 barg (15 psig) can be added to pressures above.

	FRP	**316 SS**
Maximum Applied Gas Pressure	6.2 barg at 25° C (90 psig at 77° F)	9.0 barg at 25° C (130 psig at 77° F)

Max applied gas pressure is for integrity testing at ambient temperatures. Normal operating pressures are typically lower.

*Pressures are based on non-dangerous liquids and gases per the European Union Pressure Equipment Directive 97/23/EC. See Operating Guide for pressure limits in the European Union with dangerous liquids and gases. Also, 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	Fiber Reinforced Plastic (FRP) with PVDF for all wetted surfaces and FRP flanges	316L SS Vessel/CF3M SS End Caps. ≤ 32RA (0.8µm SI) on schedule 10S pipe per ASTM A312.

Flange Connections	
Shellside (Liquid Inlet/Outlet)	• 3 inch class 150 raised face flange per ANSI B16.5 • 80A 10K flat face flange per JIS B2238 • 3 inch sanitary flange only available on 316L SS fine finish
Lumenside	• 1 inch class 150 raised face flange per ANSI B16.5 • 25A 10K flat face flange per JIS B2238 • 1.5 inch sanitary flange only available on 316L SS fine finish

Mounting Kit

A Mounting Kit with 2 cradles and 2 straps is available and sold separately. It will hold the contactor horizontally or vertically.

Seal Options

Material	**Applications**
EPDM	All Purpose
HP1 Viton	High Purity/Electronics

Weight (approximate)

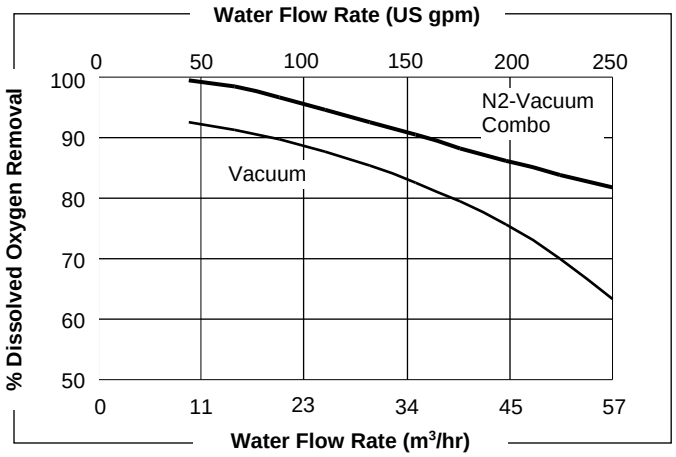
	FRP Housing	**Stainless Steel Housing**	
	ANSI/JIS	**ANSI /JIS**	**Sanitary**
Dry	33 kg (73 lbs)	76 kg (168 lbs)	81 kg (177 lbs)
Liquid Full (shellside)	57 kg (126 lbs)	99 kg (218 lbs)	107 kg (235 lbs)
Cartridge only – dry	10 kg (23 lbs)	10 kg (23 lbs)	10 kg (23 lbs)
Shipping weight (max)	44 kg (98 lbs)	133 kg (294 lbs)	138 kg (303 lbs)

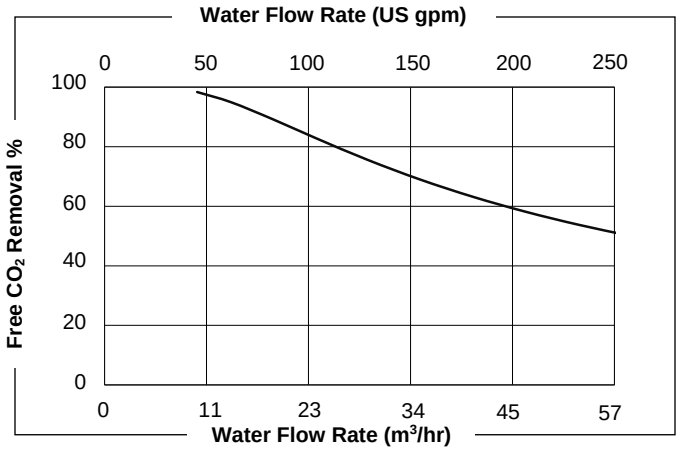
Regulatory

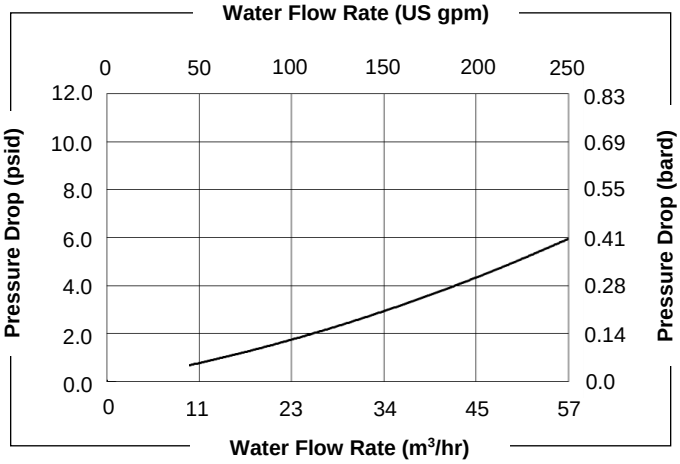
Complies with the limits as set by RoHS Directive 2011/65/EU Annex II; recasting 2002/95/EC. Constructed of FDA CFR title 21 compliant materials for wetted parts only. For CFR title 21 compliance on the PVDF-lined FRP vessel 20,000 gallons of liquid should be flushed through the contactor prior to use.

Liqui-Cel®
MEMBRANE CONTACTORS

10 x 28 EXTRA-FLOW PRODUCT DATA SHEET







Curves represent nominal values using water. Characteristics may change under different operating conditions.

Test condition O_2 Removal with X40 membrane 20° C (68° F): N_2-vacuum combo mode, vacuum: 50 mm Hg N_2 sweep flow 0.40 Nm^3/hr (0.25 scfm).

Test condition CO_2 Removal with X50 membrane 25° C: Air-vacuum combo mode, vacuum 75 mm Hg, air sweep flow 1.6 Nm^3/hr (1 scfm).

Technical Information: The technical information, recommendations and other statements contained in this document are based upon tests or experience that 3M believes are reliable, but the accuracy or completeness of such information is not guaranteed.

Product Use: Many factors beyond 3M's control and uniquely within user's knowledge and control can affect the use and performance of a 3M product in a particular application. Given the variety of factors that can affect the use and performance of a 3M product, user is solely responsible for evaluating the 3M product and determining whether it is fit for a particular purpose and suitable for user's method of application.

Warranty, Limited Remedy, and Disclaimer: Unless an additional warranty is specifically stated on the applicable 3M product packaging or product literature, 3M warrants that each 3M product meets the applicable 3M product specification at the time 3M ships the product. 3M MAKES NO OTHER WARRANTIES OR CONDITIONS, EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, ANY IMPLIED WARRANTY OR CONDITION OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OR ANY IMPLIED WARRANTY OR CONDITION ARISING OUT OF A COURSE OF DEALING, CUSTOM OR USAGE OF TRADE. If the 3M product does not conform to this warranty, then the sole and exclusive remedy is, at 3M's option, replacement of the 3M product or refund of the purchase price.

Limitation of Liability: Except where prohibited by law, 3M will not be liable for any loss or damage arising from the 3M product, whether direct, indirect, special, incidental or consequential, regardless of the legal theory asserted, including warranty, contract, negligence or strict liability.

Liqui-Cel® Membrane Contactors are tested and certified by WQA against NSF/ANSI 61.

ISO 9001

Industrial Business Group
Membranes Business Unit
13840 South Lakes Drive
Charlotte, North Carolina 28273
USA

Phone: +1 704 587 8888
Fax: +1 704 587 8610

3M Deutschland GmbH
Membranes Business Unit
Öhder Straße 28
42289 Wuppertal
Germany

Phone: +49 202 6099 - 658
Fax: +49 202 6099 - 750

3M Japan Ltd.
Membranes Business Unit
6-7-29, Kita-Shinagawa,
Shinagawa-ku, Tokyo | 141-8684
Japan

Phone: +81 3 6409 5732
Fax: +81 3 6409 5827

MEMBRANA
Now proudly part of 3M

www.liqui-cel.com