



Customer Satisfaction Membrane

CSM RO MEMBRANE, The approved **Reverse Osmosis Membrane** in the world.

RE4040-BLR

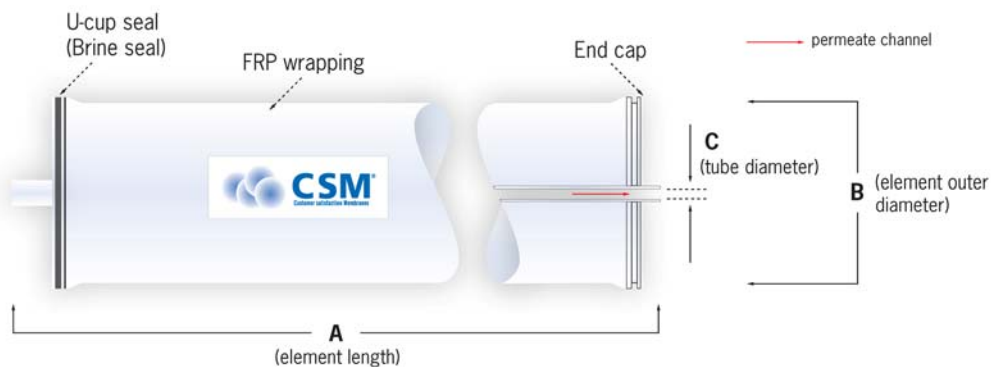
Low pressure RO membrane element with high salt rejection for brackish water

Product Specifications	Permeate Flow rate :	1,900 GPD (7.2 m ³ /day)
	Stabilized Salt Rejection :	99.6 %
	Effective Membrane Area :	85 ft ² (7.9 m ²)

1. The stated performance is initial data taken after 30 minutes of operation based on the following conditions:
1,500 mg/L NaCl solution at 150 psig (1.0 MPa) applied pressure, 15 % recovery, 77 °F (25 °C) and pH 6.5-7.0.
2. Minimum salt rejection is 99.5%
3. All elements are vacuum sealed in a polyethylene bag containing 1.0 % SBS (Sodium bisulfite) solution and packaged individually in a cardboard box.

Product Description	Membrane Type :	Thin-film Composite
	Membrane Material :	PA (Polyamide)
	Membrane Surface Charge :	Negative
	Element Configuration :	Spiral-Wound, FRP wrapping

Product Dimensions	A =	40 inch (1,016 mm)
	B =	4.0 inch (102 mm)
	C =	0.75 inch (19.1 mm)

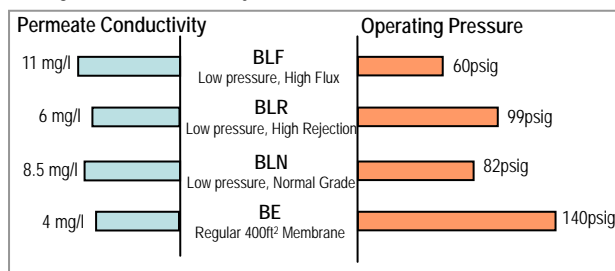


1. One interconnector (coupler) would be supplied for each membrane element.
2. All CSM membrane elements fit nominal 4.0-inch (102 mm) I.D. pressure vessel.
3. Outer feature may vary as design revisions take place.

- Features**
- CSM BLR element shows high salt rejection and high permeate flow at a lower pressure than regular brackish water membrane. It can produce higher quality of water using less energy and less capital cost for the high pressure pumps, plumbing and the pressure vessels than the regular membrane.
 - More useful for high TDS feed water or for higher permeate quality.

Product Characteristics Comparison

Comparison of CSM low pressure membranes with respect to permeate TDS and operating pressure under the same feed water condition (500 mg/l NaCl) and permeate flux (15 gfd) at 25 °C (recovery 15 %)



Application Data

Operating Limits

- Max. Pressure drop / Element: 15 psi (0.1 MPa)
- Max. Pressure drop / 240" vessel: 60 psi (0.42 MPa)
- Max. Operating pressure: 600 psi (4.14 MPa)
- Max. Feed flow rate: 18 gpm (4.09 m³/hr)
- Min. Concentrate flow rate: 4 gpm (0.91 m³/hr)
- Max. Operating temperature: 113 °F (45 °C)
- Operating pH range: 3.0 ~ 10.0
- CIP pH range: 2.0 ~ 11.0
- Max. Turbidity: 1.0 NTU
- Max. SDI (15 min): 5.0
- Max. Free Chlorine concentration: 0.1 mg/L

Conditions for Handling CSM in general

- Customers must keep the element boxes dry at room temperature to prevent them from freezing and damages from heat. If the polyethylene bag is broken, a new protective solution has to be added to the RO membrane element and the element has to be repackaged air-tight to prevent from biological growth.
- Keep elements moist at all times after initial wetting
- Permeate water obtained from first hour of operation should be discarded in order to flush the protective solution in the elements.
- CSM elements should be immersed in a protective solution during storage, shipping or system shutdowns to prevent biological growth and freeze damage. The standard storage solution contains one (1) weight percent sodium bisulfite or sodium metabisulfite (food grade). For short term storage of one week, one (1) weight percent sodium metabisulfite solution is adequate for inhibiting biological growth.
- The customer is fully responsible for the effects of incompatible chemicals on elements. Their use will void the element limited warranty.

Design Guideline for Various Water Source

- Waste water (SDI < 5): 8 ~ 12 gfd
- Waste water pretreated by UF (SDI < 3): 10 ~ 14 gfd
- Seawater, open intake (SDI < 5): 7 ~ 10 gfd
- High salinity well water (SDI < 3): 8 ~ 12 gfd
- Surface water (SDI < 5): 12 ~ 16 gfd
- Surface water (SDI < 3): 13 ~ 17 gfd
- Well water (SDI < 3): 13 ~ 17 gfd
- RO/UF permeate (SDI < 1): 21 ~ 30 gfd

Saturation Limits for Salts

- CaSO₄: 230 % saturation
- SrSO₄: 800 % saturation
- BaSO₄: 6,000 % saturation
- SiO₂: 100 % saturation

Above values are saturation limit at the tail end of the membrane elements for each sparingly soluble salts with proper scale inhibitor.

CaCO₃ Scaling potential limits as LSI or SDSI

- Without scale inhibitor: < -0.2
- LSI (SDSI) with SHMP: < +0.5
- LSI (SDSI) with special inhibitor¹: < +1.5
- SDSI with any inhibitor: < +0.5

1. Special inhibitor means one of approved organic inhibitors. It should be approved from real plant for more than three years.



Woongjin Chemical Co.,Ltd.

For more information about CSM membranes;
 12th Floor ASPO Bd., 254-8 Kongduk-Dong, Mapo-Gu,
 SEOUL 121-710, KOREA
 TEL +82-2-3279-7514, +82-2-3279-7367
 FAX +82-2-3279-7088
 Email csm@wjchemical.co.kr
 Website <http://www.csmfilter.com>