



**Customer Satisfaction Membrane**

CSM RO MEMBRANE, The Professional **Reverse Osmosis Membrane Element** was approved in the whole world.

## RE4040-BLN

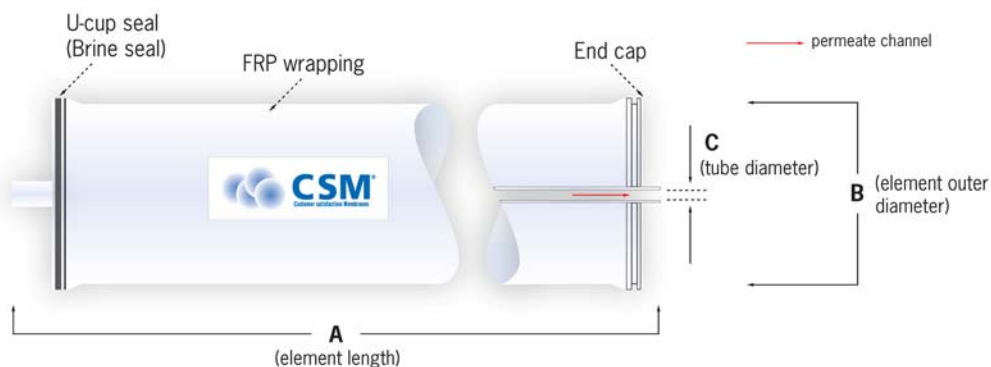
*Low Pressure, Extended Effective Area, Brackish Water use*

<b>Product Specifications</b>	Permeate Flow rate :	2,600 GPD (9.8 m <sup>3</sup> /day)
	Stabilized Salt Rejection :	99.2 %
	Effective Membrane Area :	85 ft <sup>2</sup> (7.9 m <sup>2</sup> )

- 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.
- All elements are vacuum sealed in a polyethylene bag containing 1.0 % SBS (Sodium bisulfite) solution and packaged individually in a cardboard box.

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

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



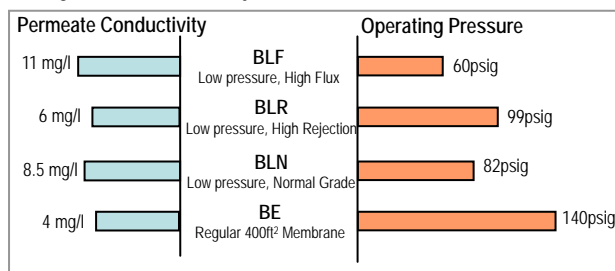
- One interconnector (coupler) would be supplied for each membrane element.
- All CSM membrane elements fit nominal 4.0-inch (102 mm) I.D. pressure vessel.
- Outer feature may vary as design revisions take place.

### Features

- CSM low pressure BLN elements have similar capabilities to the brackish water membrane at low pressure condition, which can reduce the energy cost and capital costs for high pressure pumps, plumbing and pressure vessels.
- Salt rejection and specific permeate flux of BLN are between BLR and BLF products.

### 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 m<sup>3</sup>/hr)
- Min. Concentrate flow rate: 4 gpm (0.91 m<sup>3</sup>/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

- CaSO<sub>4</sub>: 230 % saturation
- SrSO<sub>4</sub>: 800 % saturation
- BaSO<sub>4</sub>: 6,000 % saturation
- SiO<sub>2</sub>: 100 % saturation

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

### CaCO<sub>3</sub> Scaling potential limits as LSI or SDSI

- Without scale inhibitor: < -0.2
- LSI (SDSI) with SHMP: < +0.5
- LSI (SDSI) with special inhibitor<sup>1</sup>: < +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.



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