PRODUCT SPECIFICATION SHEET

CSM®

Customer Satisfaction Membrane

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

RE4040-TE

Normal grade RO membrane element with extended area for tap water and/or low TDS water

Product Specifications

Permeate Flow rate : 2,400 GPD (9.1 m^3/day)

Stabilized Salt Rejection : 99.5 %

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; 2,000 mg/L NaCl solution at 225 psig (1.5 MPa) applied pressure, 15 % recovery, 77 ºF (25 ºC) and pH 6.5~7.0.
2. 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

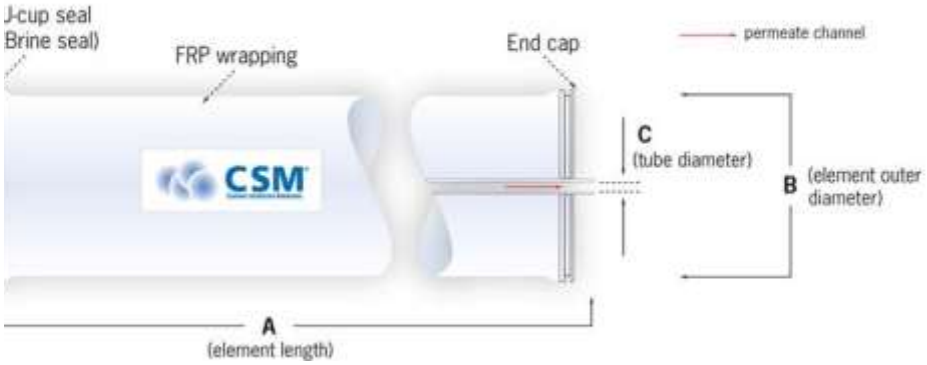
Element Configuration : Spiral-Wound, Tape wrapping

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. CSM membrane elements fit nominal 4.0-inch (102 mm) I.D. pressure vessel.
3. er feature may vary as design revisions take place.

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Features

- High rejection CSM tap water elements can be useful in purifying tap water further in case that it is not of high quality.
- CSM TE elements are suitable for treatment of small systems

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.

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^3/hr)
- **Min. Concentrate flow rate** 4 gpm (0.91 m^3/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

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

- **$CaSO_4$** 230 % saturation
- **$SrSO_4$** 800 % saturation
- **$BaSO_4$** 6,000 % saturation
- **SiO_2** 100 % saturation

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

$CaCO_3$ Scaling potential limits as LSI or SDSI

- **Without scale inhibitor** < -0.2
- **LSI (SDSI) with SHMP** < +0.5
- **LSI (SDSI) with special inhibitor**[1] < +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.