

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

## RE8040-FD<sup>n</sup>

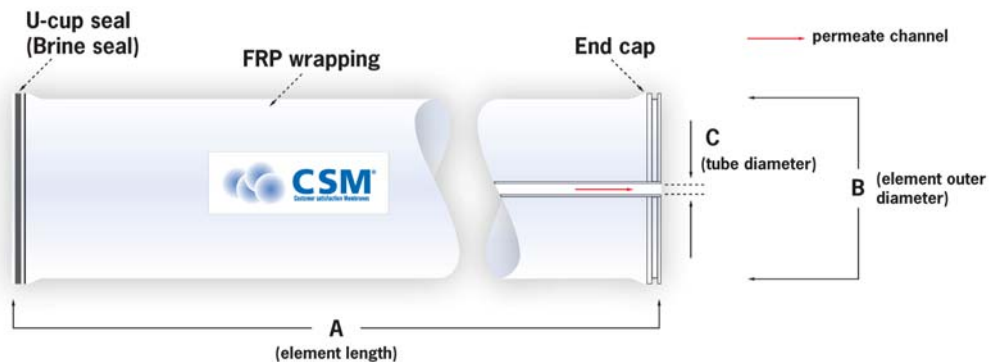
*New fouling resistant RO membrane element of low differential pressure with a thick feed spacer for waste water reuse*

<b>Product Specifications</b>	Permeate Flow rate :	10,000 GPD (37.9 m <sup>3</sup> /day)
	Stabilized Salt Rejection :	99.7 %
	Effective Membrane Area :	380 ft <sup>2</sup> (35.3 m <sup>2</sup> )

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 °F (25 °C) and pH 6.5-7.0.
2. Minimum salt rejection is 99.4%.
3. Permeate Flow rate for individual elements may vary but will be no more than 10 below the value shown.
4. Effective membrane area may vary within 3%.
5. Thicker Feed spacer (32 mil) is used.
6. 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 :	Close to Neutral
	Element Configuration :	Spiral-Wound, FRP wrapping

<b>Product Dimensions</b>	A =	40 inch (1,016 mm)
	B =	8.0 inch (203 mm)
	C =	1.12 inch (28 mm)

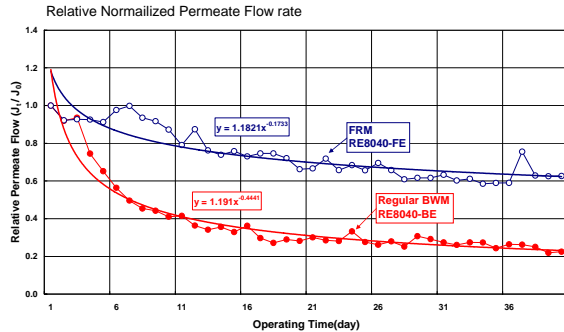


1. One interconnector (coupler) would be supplied for each membrane element.
2. All CSM membrane elements fit nominal 8.0-inch (203 mm) I.D. pressure vessel.
3. Outer feature may vary as design revisions take place.

### Features

- CSM FD<sup>n</sup> element provides an excellent way to treat a feed water having relatively high fouling potential due to the remaining colloidal, biological and organic fouling agents even after controlled pretreatment.
- CSM FD<sup>n</sup> element has more fouling resistant property than CSM FD
- CSM FD<sup>n</sup> element can be used for treating a feed water of high fouling potential due to the presence of heavy colloidal particles.

## Fouling Resistance Characteristics

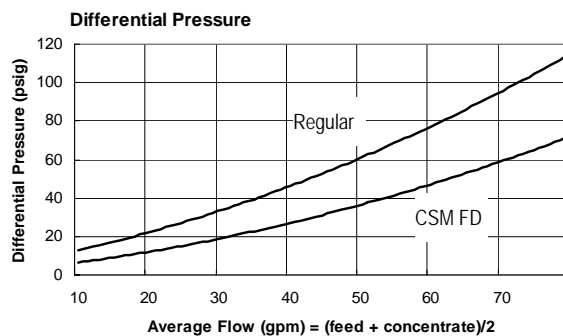


The flux decline of CSM FRM is only half of that of the general brackish water RO membrane under the condition of zero liquid discharge system.

## 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.

## Differential Pressure Comparing between Regular element and CSM FD



1. CSM FD shows less differential pressure than the regular elements as shown in the above graph

## 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 66 gpm (15.0 m<sup>3</sup>/hr)
- Min. Concentrate flow rate 16 gpm (3.6 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
- 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<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.



### Woongjin Chemical Co.,Ltd.

For more information about CSM membranes;  
 12<sup>th</sup> 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@wchemical.co.kr](mailto:csm@wchemical.co.kr)  
 Website <http://www.csmfilter.com>