

CSM[®]



Membrane Technologies
(RO/NF)



Applying innovative ideas Woongjin Chemical brings you fresh solutions

CSM membrane technologies aims to deliver innovative and reliable products that help enhance the standards of living.

CSM Applications

ULTRAPURE WATER

Rinsing water for fabrication of semiconductors, LCDs, and PCBs

PROCESS PURE WATER / COOLING TOWER MAKEUP WATER / BOILER FEED WATER

Reduces ion concentrations and prevents scaling and corrosion within the pipe

POTABLE WATER

Removes excess minerals, bacteria and viruses

RECYCLING AND ZERO DISCHARGE SYSTEM

Elimination of sewage and accomplishment of zero discharge system

RECOVERY OF DYESTUFF

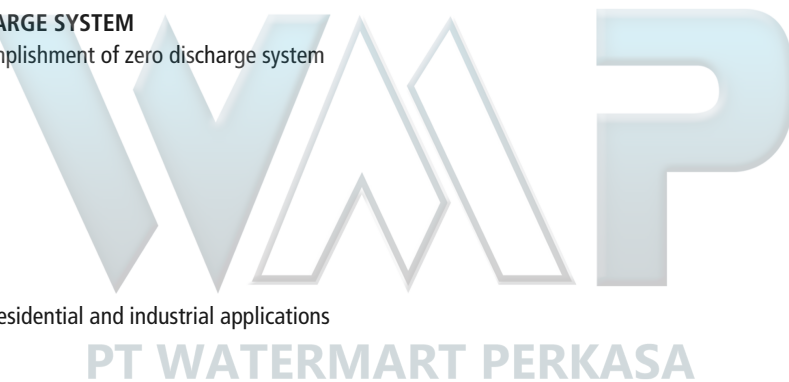
Dye recovery and reuse

PRODUCTION OF BEVERAGES

Concentration of fruit juices

SEAWATER DESALINATION

Reduces salt concentrations for residential and industrial applications



CSM BWM Brackish Water Membrane

| Model Name | Performance | | Effective Area ft ² (m ²) | Dimension | | Test Condition |
|--------------|---|---------------------|---|------------------|---------------------|-----------------|
| | Permeate Flow rate GPD (m ³ /day) | Salt Rejection % | | Dia Inch (mm) | Length Inch (mm) | |
| RE16040-BE | 41,000 (155.0) | 99.7 | 1600 (148.6) | 16 (400) | 40 (1016) | 40" BW Standard |
| RE8040-BE* | 10,500 (39.7) | 99.7 | 400 (37.2) | 8.0 (203) | 40 (1016) | 40" BW Standard |
| RE8040-BE440 | 11,500 (43.5) | 99.7 | 440 (40.9) | 8.0 (203) | 40 (1016) | 40" BW Standard |
| RE8040-BN | 9,500 (36.0) | 99.7 | 365 (33.9) | 8.0 (203) | 40 (1016) | 40" BW Standard |
| RE8040-BR | 6,000 (22.7) | 99.75 | 380 (35.3) | 8.0 (203) | 40 (1016) | 40" BW Standard |
| RE4040-BE | 2,400 (9.1) | 99.7 | 85 (7.9) | 4.0 (102) | 40 (1016) | 40" BW Standard |
| RE4040-BN | 2,000 (7.6) | 99.7 | 75 (7.0) | 4.0 (102) | 40 (1016) | 40" BW Standard |
| RE4021-BE | 1,000 (3.8) | 99.7 | 35 (3.3) | 4.0 (102) | 21 (533) | 21" BW Standard |

* Certified by NSF to NSF/ANSI standard 61

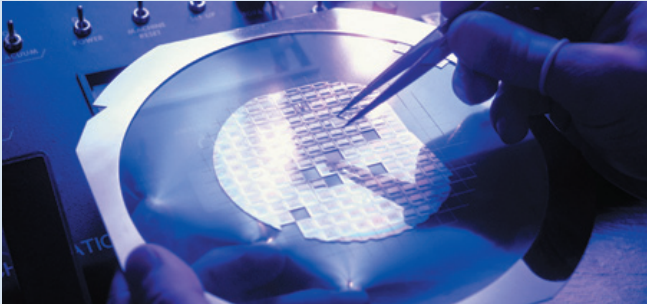
- 40" BW Standard test conditions : NaCl 2,000 mg/L, Pressure 225 psig, Temperature 25°C, pH 6.5 ~ 7.0, Recovery 15%
- 21" BW Standard test conditions : NaCl 2,000 mg/L, Pressure 225 psig, Temperature 25°C, pH 6.5 ~ 7.0, Recovery 8%
- The above data were obtained after operating membrane element at the standard test conditions for 30min.



PT WATERMART PERKASA



CSM UPWM Ultrapure Water Membrane



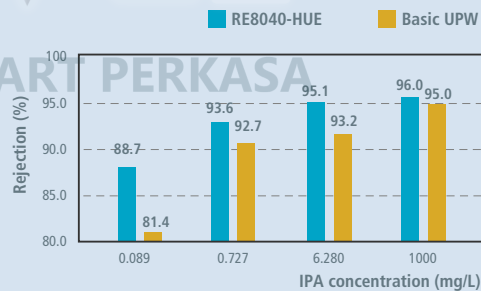
- Ultrapure water for manufacturing of semiconductors, LCDs and electronics.
- High TOC rejection, low TOC extraction and TOC rinse down.

| Model Name | Performance | | | Effective Area ft ² (m ²) | Dimension | | Test Condition |
|---------------|---|---------------------|--------------------|---|------------------|---------------------|-----------------|
| | Permeate Flow rate GPD (m ³ /day) | NaCl Rejection % | IPA Rejection % | | Dia Inch (mm) | Length Inch (mm) | |
| RE8040-HUE440 | 10,000 (37.9) | 99.5 | 96.0 | 440 (40.9) | 8.0 (203) | 40 (1016) | 40" BW Standard |
| RE8040-HUE | 9,000 (34.1) | 99.5 | 96.0 | 400 (37.2) | 8.0 (203) | 40 (1016) | 40" BW Standard |
| RE8040-UR | 5,500 (20.8) | 99.7 | 96.0 | 400 (37.2) | 8.0 (203) | 40 (1016) | 40" BW Standard |
| RE8040-UL | 10,000 (37.9) | 99.5 | 92.0 | 400 (37.2) | 8.0 (203) | 40 (1016) | 40" LP Standard |

- 40" BW Standard test conditions : NaCl 2,000 mg/L, Pressure 225 psig, Temperature 25°C, pH 6.5 ~ 7.0, Recovery 15%
- 40" LP Standard test conditions : NaCl 1,500 mg/L, Pressure 150 psig, Temperature 25°C, pH 6.5 ~ 7.0, Recovery 15%
- IPA rejection test conditions : IPA 1,000 mg/L, Pressure 225 psig for UE, HUE and 150 psig for UL Temperature 25°C, pH 6.5 ~ 7.0, Recovery 15%
- The above data were obtained after operating membrane element at the standard test conditions for 30min.
- IPA rejection data were obtained after operating membrane element at the IPA rejection test conditions for 2 hours.

IPA Rejections of CSM UPW Membrane

- Test Conditions : 225psig, 25 °C, Recovery15%, pH6.5~7.0
- Analyzed by Anatel -1000

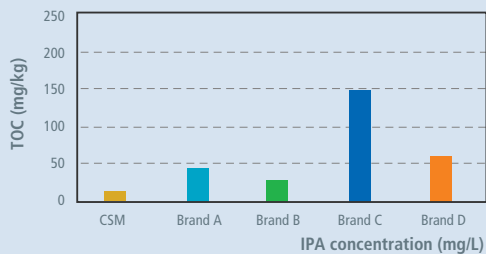


Low TOC Extraction Property

Comparisons of TOC extractions of various UPW elements in the market:

- Extraction testing method: after dipping the weighted permeate channel in 800ml of feed water during 4hours, the extracted TOC conc. was measured. Calculation method for TOC quantity extracted from permeate channel:

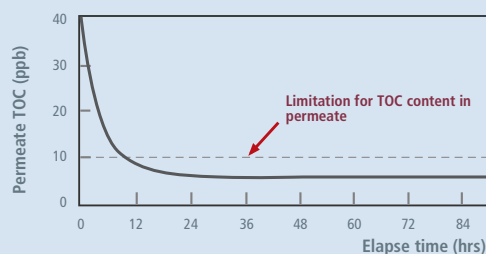
$$\frac{[(\text{TOC conc. after 4hours dipping} - \text{feed water TOC conc. before dipping}) \times (\text{feed water quantity } 0.8\text{L} \times 0.001)]}{\text{Feed water TOC conc. } 198\text{ppb}}$$



TOC Rinse Down Behavior

Operating Conditions

- Feed TOC : 40~80 ppb
- recovery : 90%
- Feed Pressure : 15bar
- TOC analyzer : Anatel - A1000



CSM LPM Low Pressure Membrane

- An efficient and cost-effective solution for energy-savings.
- High salt-rejection at low pressures.

| Model Name | Performance | | Effective Area ft ² (m ²) | Dimension | | Test Condition |
|---------------|---|---------------------|---|------------------|---------------------|------------------|
| | Permeate Flow rate GPD (m ³ /day) | Salt Rejection % | | Dia Inch (mm) | Length Inch (mm) | |
| RE16040-BLR | 36,000 (136.3) | 99.6 | 1600 (148.6) | 16 (400) | 40 (1016) | 40" LP Standard |
| RE8040-BLN440 | 13,000 (49.2) | 99.2 | 440 (40.9) | 8.0 (203) | 40 (1016) | 40" LP Standard |
| RE8040-BLN* | 12,000 (45.4) | 99.2 | 400 (37.2) | 8.0 (203) | 40 (1016) | 40" LP Standard |
| RE8040-BLF* | 11,500 (43.5) | 99.2 | 400 (37.2) | 8.0 (203) | 40 (1016) | 40" LP High Flux |
| RE8040-BLR440 | 9,900 (37.4) | 99.6 | 440 (40.9) | 8.0 (203) | 40 (1016) | 40" LP Standard |
| RE8040-BLR* | 9,000 (34.1) | 99.6 | 400 (37.2) | 8.0 (203) | 40 (1016) | 40" LP Standard |
| RE4040-BLN* | 2,600 (9.8) | 99.2 | 85 (7.9) | 4.0 (102) | 40 (1016) | 40" LP Standard |
| RE4040-BLF* | 2,500 (9.5) | 99.2 | 85 (7.9) | 4.0 (102) | 40 (1016) | 40" LP High Flux |
| RE4040-BLR* | 1,900 (7.2) | 99.6 | 85 (7.9) | 4.0 (102) | 40 (1016) | 40" LP Standard |
| RE4040-TL | 2,600 (9.8) | 99.0 | 85 (7.9) | 4.0 (102) | 40 (1016) | 40" LP Standard |
| RE4021-BL | 1,000 (3.8) | 99.2 | 35 (3.3) | 4.0 (102) | 21 (533) | 21" BW Standard |
| RE4021-TL | 1,050 (4.0) | 99.0 | 35 (3.3) | 4.0 (102) | 21 (533) | 21" LP Standard |
| RE2540-TL | 850 (3.2) | 99.0 | 27 (2.5) | 2.5 (64) | 40 (1016) | 40" LP Standard |
| RE2521-TL | 300 (1.1) | 99.0 | 12 (1.1) | 2.5 (64) | 21 (533) | 21" LP Standard |

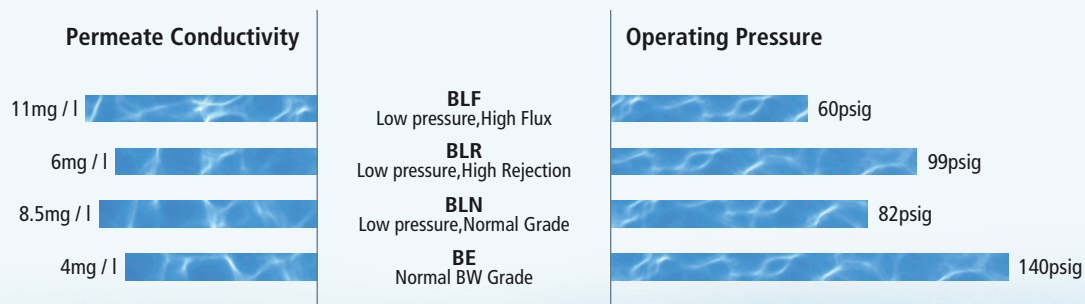
*Certified by NSF to NSF/ANSI standard 61

- 40" LP Standard test conditions : NaCl 1,500 mg/L, Pressure 150 psig, Temperature 25°C, pH 6.5 ~ 7.0, Recovery 15%
- 21" LP Standard test conditions : NaCl 1,500 mg/L, Pressure 150 psig, Temperature 25°C, pH 6.5 ~ 7.0, Recovery 8%
- 40" LP High Flux test conditions : NaCl 500 mg/L, Pressure 100 psig, Temperature 25°C, pH 6.5 ~ 7.0, Recovery 15%
- 21" BW Standard test conditions : NaCl 2,000 mg/L, Pressure 225 psig, Temperature 25°C, pH 6.5 ~ 7.0, Recovery 8%
- The above data were obtained after operating membrane element at the standard test conditions for 30min.

Product Characteristics

Comparisons of Permeate TDS and Operating Pressure between CSM Brackish Water and Low Pressure membranes

*Feed water conditions: NaCl concentration: 500mg/L; permeate flux: 15gfd; Temp: 25°C; Recovery: 15%



BLF
Ideal for when:

- Feed water TDS concentration is low
- High salt rejection is not required
- Energy saving is required through low pressure operation

BLR
Ideal for when:

- Feed water TDS concentration is high
- Energy saving is needed through low pressure operation

BLN
Ideal for when:

- Salt rejection and specific permeate flux are between BLR and BLF products

CSM FRM Fouling Resistant Membrane

- Ideal for feed water with high fouling potentials such as wastewater reuse and surface water applications.
- Saves operating costs by reducing the number of CIPs.

| Model Name | Performance | | Effective Area ft ² (m ²) | Dimension | | Test Condition |
|-------------------------|---|---------------------|---|------------------|---------------------|-----------------|
| | Permeate Flow rate GPD (m ³ /day) | Salt Rejection % | | Dia Inch (mm) | Length Inch (mm) | |
| RE16040-FE ⁿ | 41,000 (155.0) | 99.7 | 1600 (148.6) | 16 (400) | 40 (1016) | 40" BW Standard |
| RE8040-FE ⁿ | 10,500 (39.7) | 99.7 | 400 (37.2) | 8.0 (203) | 40 (1016) | 40" BW Standard |
| RE8040-FN | 9,500 (36.0) | 99.7 | 365 (33.9) | 8.0 (203) | 40 (1016) | 40" BW Standard |
| RE8040-FD ⁿ | 10,000 (37.9) | 99.7 | 380 (35.3) | 8.0 (203) | 40 (1016) | 40" BW Standard |
| RE4040-FE ⁿ | 2,400 (9.1) | 99.7 | 85 (7.9) | 4.0 (102) | 40 (1016) | 40" BW Standard |
| RE16040-FLR | 36,000 (136.0) | 99.6 | 1600 (148.6) | 16 (400) | 40 (1016) | 40" LP Standard |
| RE8040-FLR | 9,000 (34.0) | 99.6 | 400 (37.2) | 8.0 (203) | 40 (1016) | 40" LP Standard |
| RE8040-FL ⁿ | 11,000 (41.6) | 99.0 | 400 (37.2) | 8.0 (203) | 40 (1016) | 40" LP Standard |
| RE4040-FLR | 1,900 (7.2) | 99.6 | 85 (7.9) | 4.0 (102) | 40 (1016) | 40" LP Standard |
| RE4040-FL ⁿ | 2,400 (9.1) | 99.0 | 85 (7.9) | 4.0 (102) | 40 (1016) | 40" LP Standard |

- 40" BW Standard test conditions : NaCl 2,000 mg/L, Pressure 225 psig, Temperature 25°C, pH 6.5 ~ 7.0, Recovery 15%
- 40" LP Standard test conditions : NaCl 1,500 mg/L, Pressure 150 psig, Temperature 25°C, pH 6.5 ~ 7.0, Recovery 15%
- The above data were obtained after operating membrane element at the standard test conditions for 30min

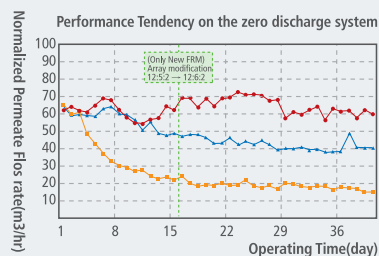
FRM performance in the field

- Location : ASAN, KOREA (Motor Company)
- Capacity : 5,000m³/day (Zero Discharge)
- Feed Water Source : Tertiary Treated Wastewater & Sewage
- RO System Configuration
 - 1st Pass : 12 : 5 : 2 array, 75% recovery 2Trains of 114pcs of CSM FRM elements
 - 2nd Pass for 1st Pass Brine : 4 : 2 : 1 array, 50% recovery 32pcs of SW RO membrane

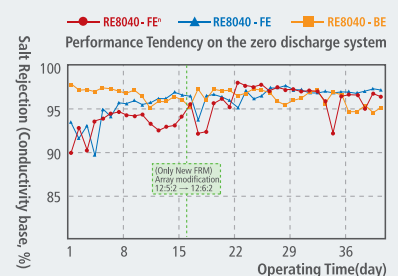
[Feed Water Quality]

| Parameter | Unit | Jun.2004 |
|------------------|-------|----------|
| Na | mg/L | 810 |
| Cl | mg/L | 1,223 |
| SiO ₂ | mg/L | 8.49 |
| Turbidity | NTU | 1.2 |
| Conductivity | μS/cm | 3,920 |
| TOC | mg/L | 23.6 |
| SDI (15min) | - | Over5.0 |

[Normalized Permeate Flow rate]



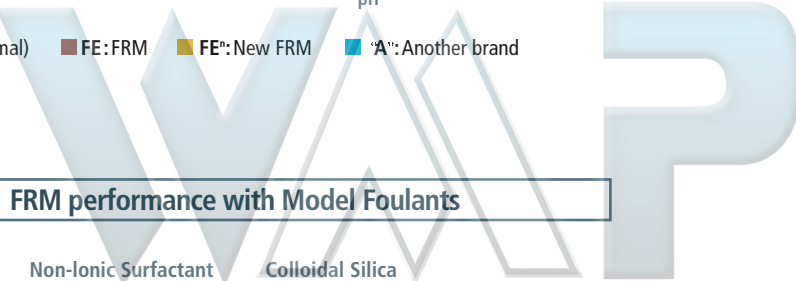
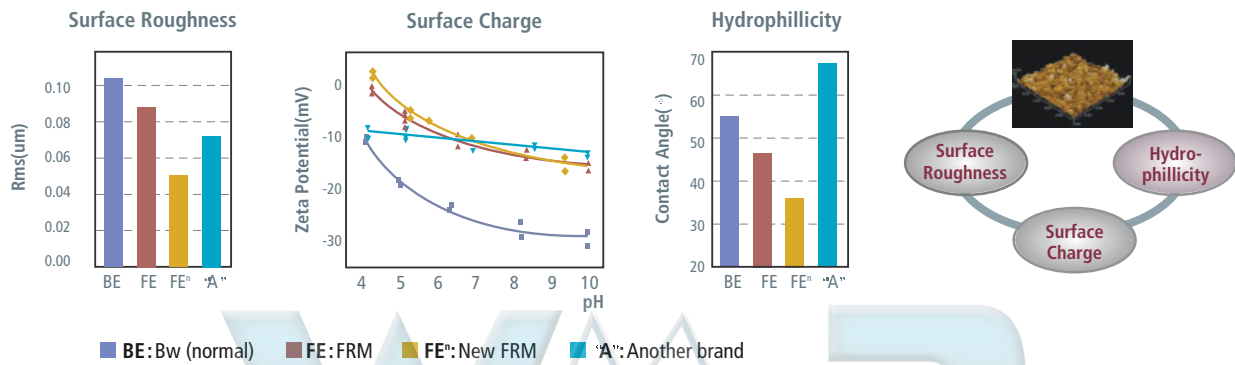
[Salt Rejection]



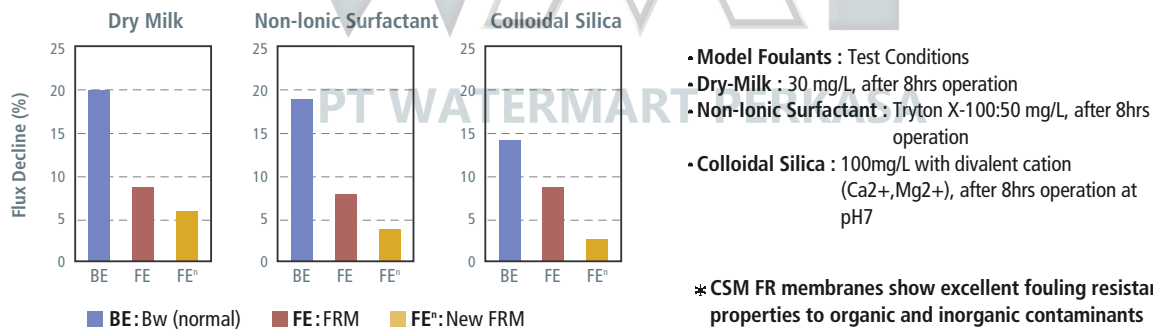
CSM FRM Fouling Resistant Membrane

- Modification of surface roughness, surface charge, and hydrophilicity of the membrane.
- Feed water containing high amount of charged (+,-) and/or non-charged foulants, organic matters, colloidal particles.

Surface Properties



FRM performance with Model Foulants



References

| Customers | Location | Model | Capacity | Date |
|--|-----------|------------------------|---|------------------------|
| VEOLIA WATER (Wollongong) (Wastewater reclamation) | AUSTRALIA | RE8040-FE ⁿ | 20,000 m ³ /day (1,610 pcs) | JUN. 2007 APR. 2008 |
| BRISBANE WATER (Luggage Point) (Sewage reclamation) | AUSTRALIA | RE8040-FE ⁿ | 16,000 m ³ /day (1,116 pcs) | MAR. 2008 |
| SAMSUNG TOTAL (Boiler Feed) | KOREA | RE8040-FE | 65,520 m ³ /day (3,168 pcs) | Since JUL. 2002 |
| VEOLIA WATER (KRANJI II) Expansion (Sewage reclamation) | SINGAPORE | RE8040-FE | 42,000 m ³ /day (2,674 pcs) | FEB. 2006 |
| UNITED KG (Boiler Feed Water) | THAILAND | RE8040-FE | 9,200 m ³ /day (540 pcs) | APR. 2006 |
| WEIDNER (Process Water) | UKRAINE | RE8040-FL | 5,200 m ³ /day (360 pcs) | AUG. 2005 |

CSM SWM Sea Water Membrane

- Seawater desalination application for industrial or potable uses.
- Able to purify high TDS brackish water containing TDS more than 10,000 ppm.

| Model Name | Performance | | Effective Area ft ² (m ²) | Dimension | | Test Condition |
|---------------|---|---------------------|---|------------------|---------------------|-----------------|
| | Permeate Flow rate GPD (m ³ /day) | Salt Rejection % | | Dia Inch (mm) | Length Inch (mm) | |
| RE16040-SHN | 24,600 (93.1) | 99.75 | 1600 (148.6) | 16 (400) | 40 (1016) | 40" SW Standard |
| RE16040-SHF | 36,000 (136.1) | 99.7 | 1600 (148.6) | 16 (400) | 40 (1016) | 40" SW Standard |
| RE8040-SN | 6,000 (22.7) | 99.2 | 370 (34.4) | 8.0 (203) | 40 (1016) | 40" SW Standard |
| RE8040-SH | 4,500 (17.0) | 99.75 | 370 (34.4) | 8.0 (203) | 40 (1016) | 40" SW Standard |
| RE8040-SHA400 | 7,500 (28.4) | 99.75 | 400 (37.2) | 8.0 (203) | 40 (1016) | 40" SW Standard |
| RE8040-SHF | 9,000 (34.0) | 99.7 | 370 (34.4) | 8.0 (203) | 40 (1016) | 40" SW Standard |
| RE8040-SHN | 6,000 (22.7) | 99.75 | 370 (34.4) | 8.0 (203) | 40 (1016) | 40" SW Standard |
| RE8040-SHN400 | 6,500 (24.6) | 99.75 | 400 (37.2) | 8.0 (203) | 40 (1016) | 40" SW Standard |
| RE4040-SHA | 1,400 (5.3) | 99.75 | 74 (6.9) | 4.0 (102) | 40 (1016) | 40" SW Standard |
| RE4040-SHF | 1,900 (7.2) | 99.7 | 75 (7.0) | 4.0 (102) | 40 (1016) | 40" SW Standard |

- 40" SW Standard test conditions : NaCl 32,000 mg/L, Pressure 800 psig, Temperature 25°C, pH 6.5 ~ 7.0, Recovery 8%
- 21" SW Standard test conditions : NaCl 32,000 mg/L, Pressure 800 psig, Temperature 25°C, pH 6.5 ~ 7.0, Recovery 4%
- The above data were obtained after operating membrane element at the standard test conditions for 30min.

PT WATERMART PERKASA

| Customers | Location | Model | Capacity | Date |
|----------------------------|--------------------|------------------------|--------------------------|------------|
| SOUTH PARS (PHASE 2&3) | IRAN | RE8040-SN RE8040-BE | 1800 m ³ /day | AUG. 2000 |
| SOUTH PARS (PHASE 4&5) | IRAN | RE8040-SR RE8040-BE | 360 m ³ /day | MAY. 2003 |
| CHANGZHOU CANGJIN CHEMICAL | CHINA | RE8040-SR | 1200m ³ /hr | APR. 2004 |
| HYDROPRO | VENEZUELA / MASHAL | RE8040-SR | 153 PCS | MAR. 2003 |
| MEMBRANE TECH. IND. | U.S.A / HAWAII | RE8040-SR | 1440 m ³ /day | JUN. 2004 |
| KOREA NAVY FORCE | KOREA JINHAЕ | RE4040-SR | 1485 PCS | Since 1998 |

CSM NFM Nanofiltration Membrane (NFM)



- Up to 95% rejection rate of divalent ions.
- Ideal for water softening, dye recovery, and food applications.
- Also used in the pretreatment of desalination systems.

| Model Name | Performance | | | | Effective Area ft ² (m ²) | Dimension | | Test Condition |
|------------|---|---------------------|----------------------------------|----------------------------------|---|------------------|---------------------|----------------|
| | Permeate Flow rate GPD (m ³ /day) | NaCl Rejection % | MgSO ₄ Rejection % | CaCl ₂ Rejection % | | Dia Inch (mm) | Length Inch (mm) | |
| NE8040-90* | 7,500 (28.4) | 85~95 | 97.0 | 90-95 | 400 (37.2) | 8.0 (203) | 40 (1016) | NE Standard |
| NE4040-90* | 1,600 (6.0) | 85~95 | 97.0 | 90-95 | 85 (7.9) | 4.0 (102) | 40 (1016) | NE Standard |
| NE2540-90 | 500 (1.9) | 85~95 | 97.0 | 90-95 | 27 (2.5) | 2.5 (64) | 40 (1016) | NE Standard |
| NE8040-70 | 7,000 (26.5) | 40~70 | 97.0 | 45-70 | 400 (37.2) | 8.0 (203) | 40 (1016) | NE Standard |
| NE4040-70 | 1,500 (5.6) | 40~70 | 97.0 | 45-70 | 85 (7.9) | 4.0 (102) | 40 (1016) | NE Standard |
| NE2540-70 | 450 (1.7) | 40~70 | 97.0 | 45-70 | 27 (2.5) | 2.5 (64) | 40 (1016) | NE Standard |

*Certified by NSF to NSF/ANSI standard 61

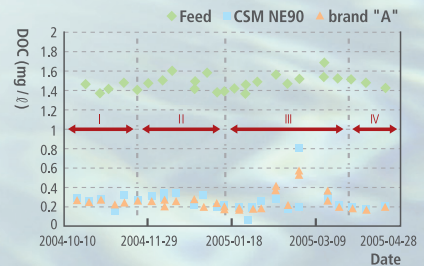
- NE Standard test conditions: NaCl 2,000 mg/L, 75psig, 25°C, pH 6.5 ~ 7.0, Recovery 15%
- MgSO₄ rejection test conditions: MgSO₄ 2,000 mg/L, 75psig, 25°C, pH 6.5 ~ 7.0, Recovery 15%
- CaCl₂ rejection test conditions: CaCl₂ 500 mg/L, 75psig, 25°C, pH 6.5 ~ 7.0, Recovery 15%

Pilot test results in a municipal WTP

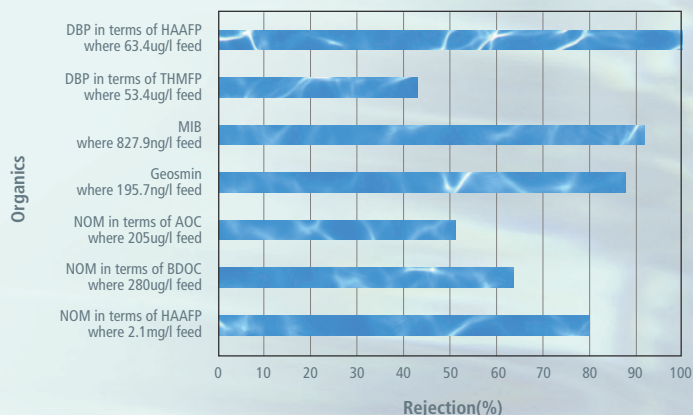
Water source: Paldang Lake in South Korea
Model : NE4040-90

*"A": Another brand

| | CSM NE90 | "A" | Remark |
|--|----------|-------|-----------------|
| DOC Removal Efficiency | 80% ↑ | 80% ↑ | CSM NE 90 = "A" |
| Permeability (l/d .m ² .kPa) | 2.0 | 1.5 | CSM NE 90 > "A" |



Organic Rejection Ratios of CSM NE90



CSM TWM Tap Water Membrane

- Ideal for removing low molecular weight polluted substances.
- Ideal for treating small quantities of water.

| Model Name | Performance | | Effective Area ft ² (m ²) | Dimension | | Test Condition |
|------------|---|---------------------|---|------------------|---------------------|-----------------|
| | Permeate Flow rate GPD (m ³ /day) | Salt Rejection % | | Dia Inch (mm) | Length Inch (mm) | |
| RE4040-TE* | 2,400 (9.1) | 99.5 | 85 (7.9) | 4.0 (102) | 40 (1016) | 40" BW Standard |
| RE4021-TE | 1,000 (3.8) | 99.5 | 35 (3.3) | 4.0 (102) | 21 (533) | 21" BW Standard |
| RE2540-TE* | 800 (3.0) | 99.5 | 27 (2.5) | 2.5 (64) | 40 (1016) | 40" BW Standard |
| RE2521-TE | 300 (1.1) | 99.5 | 12 (1.1) | 2.5 (64) | 21 (533) | 21" BW Standard |
| RE4040-TL | 2,600 (9.8) | 99.2 | 85 (7.9) | 4.0 (102) | 40 (1016) | 40" LP Standard |
| RE4021-TL | 1,050 (4.0) | 99.2 | 35 (3.3) | 4.0 (102) | 21 (533) | 21" LP Standard |
| RE2540-TL | 850 (3.2) | 99.2 | 27 (2.5) | 2.5 (64) | 40 (1016) | 40" LP Standard |
| RE2521-TL | 300 (1.1) | 99.2 | 12 (1.1) | 2.5 (64) | 21 (533) | 21" LP Standard |

* Certified by NSF to NSF/ANSI standard 61

- 40" BW Standard test conditions : NaCl 2,000 mg/L, Pressure 225 psig, Temperature 25°C, pH 6.5 ~ 7.0, Recovery 15%
- 21" BW Standard test conditions : NaCl 2,000 mg/L, Pressure 225 psig, Temperature 25°C, pH 6.5 ~ 7.0, Recovery 8%
- 40" LP Standard test conditions : NaCl 1,500 mg/L, Pressure 150 psig, Temperature 25°C, pH 6.5 ~ 7.0, Recovery 15%
- 21" LP Standard test conditions : NaCl 1,500 mg/L, Pressure 150 psig, Temperature 25°C, pH 6.5 ~ 7.0, Recovery 8%
- The above data were obtained after operating membrane element at the standard test conditions for 30min.

CSM HOUSEHOLD MEMBRANE

- CSM Household or Residential membranes can eliminate substances larger than 0.0001_{µm} such as carcinogens, THMs (Trihalomethanes), heavy metal ions, bacteria and viruses in the water.
- There are several different products from 35 GPD to 100 GPD.
- Both wet and dry type elements are available

| Model Name | Performance | | Dimension | | Test Condition |
|--------------|------------------------------------|---------------------|------------------|---------------------|--------------------|
| | Permeate Flow rate GPD (L /day) | Salt Rejection % | Dia Inch (mm) | Length Inch (mm) | |
| RE1810-30 | 30 (114) | 98.0 | 1.8 (46) | 10 (254) | Household Standard |
| RE1810-50* | 50 (189) | 98.0 | 1.8 (45.7) | 10 (254) | Household Standard |
| RE1812-35* | 35 (132) | 98.0 | 1.8 (46) | 12 (305) | Household Standard |
| RE1812-CE60 | 60 (227) | 99.5 | 1.8 (46) | 10 (254) | Household Standard |
| RE70-1812-50 | 50 (189) | 98.0 | 1.8 (45) | 12 (305) | Household Standard |
| RE1812-60* | 60 (227) | 98.0 | 1.8 (46) | 12 (305) | Household Standard |
| RE1812-80* | 80 (303) | 98.0 | 1.8 (46) | 12 (305) | Household Standard |
| RE2012-100* | 100 (397) | 98.0 | 2.0 (50) | 12 (304.8) | Household Standard |
| RE2012-HD | 75 (284) | 98.0 | 1.8 (45) | 12 (305) | Household Standard |
| RE2012-LPF | 60 (227) | 93.0 | 2.0 (48) | 12 (305) | Household LP |
| RE2010-LP* | 30 (114) | 93.0 | 2.0 (50) | 10 (254) | Household LP |
| RE2012-LP* | 50 (189) | 93.0 | 2.0 (50) | 12 (305) | Household LP |
| RE2812-300 | 300 (1136) | 98.0 | 2.9 (74) | 12 (305) | Household Standard |

* Certified by NSF to NSF/ANSI standard 58

- Household Standard test conditions : NaCl 200mg/L, Pressure 60 psig, Temperature 25°C, pH 6.5 ~ 7.0, Recovery 10~20%
- Household LP test conditions : NaCl 100mg/L, Pressure 20 psig, Temperature 25°C, pH 6.5 ~ 7.0, Recovery 10~20%
- The above data were obtained after operating membrane element at the standard test conditions for 30min.
- The above data are based on nominal salt rejection

| TYPE | Model Name | Performance | | Effective Area ft ² (m ²) | Dimension | | Test Condition |
|-------------|-------------------------|---|---------------------|---|------------------|---------------------|------------------|
| | | Permeate Flow rate GPD (m ³ /day) | Salt Rejection % | | Dia Inch (mm) | Length Inch (mm) | |
| 16 INCH | RE16040-BE | 41,000 (155.0) | 99.7 | 1600 (148.6) | 16(400) | 40 (1016) | 40" BW Standard |
| | RE16040-FE ⁿ | 41,000 (155.0) | 99.7 | 1600 (148.6) | 16(400) | 40 (1016) | 40" BW Standard |
| | RE16040-BLR | 36,000 (136.3) | 99.6 | 1600 (148.6) | 16(400) | 40 (1016) | 40" LP Standard |
| | RE16040-FLR | 36,000 (136.0) | 99.6 | 1600 (148.6) | 16(400) | 40 (1016) | 40" LP Standard |
| | RE16040-SHN | 24,600 (93.1) | 99.75 | 1600 (148.6) | 16(400) | 40 (1016) | 40" SW Standard |
| | RE16040-SHF | 36,000 (136.1) | 99.7 | 1600 (148.6) | 16(400) | 40 (1016) | 40" SW Standard |
| 8 INCH | RE8040-BE | 10,500 (39.7) | 99.7 | 400 (37.2) | 8.0 (203) | 40 (1016) | 40" BW Standard |
| | RE8040-BE440 | 11,500 (43.5) | 99.7 | 440 (40.9) | 8.0 (203) | 40 (1016) | 40" BW Standard |
| | RE8040-BN | 9,500 (36.0) | 99.7 | 365 (33.9) | 8.0 (203) | 40 (1016) | 40" BW Standard |
| | RE8040-BR | 6,000 (22.7) | 99.75 | 380 (35.3) | 8.0 (203) | 40 (1016) | 40" BW Standard |
| | RE8040-FE ⁿ | 10,500 (39.7) | 99.7 | 400 (37.2) | 8.0 (203) | 40 (1016) | 40" BW Standard |
| | RE8040-FN | 9,500 (36.0) | 99.7 | 365 (33.9) | 8.0 (203) | 40 (1016) | 40" BW Standard |
| | RE8040-FD ⁿ | 10,000 (37.9) | 99.7 | 380 (35.3) | 8.0 (203) | 40 (1016) | 40" BW Standard |
| | RE8040-FLR | 9,000 (34.0) | 99.6 | 400 (37.2) | 8.0 (203) | 40 (1016) | 40" LP Standard |
| | RE8040-FL ⁿ | 11,000 (41.6) | 99.0 | 400 (37.2) | 8.0 (203) | 40 (1016) | 40" LP Standard |
| | RE8040-BLN440 | 13,000 (49.2) | 99.2 | 440 (40.9) | 8.0 (203) | 40 (1016) | 40" LP Standard |
| | RE8040-BLN | 12,000 (45.4) | 99.2 | 400 (37.2) | 8.0 (203) | 40 (1016) | 40" LP Standard |
| | RE8040-BLF | 11,500 (43.5) | 99.2 | 400 (37.2) | 8.0 (203) | 40 (1016) | 40" LP High Flux |
| | RE8040-BLR440 | 9,900 (37.4) | 99.6 | 440 (40.9) | 8.0 (203) | 40 (1016) | 40" LP Standard |
| | RE8040-BLR | 9,000 (34.1) | 99.6 | 400 (37.2) | 8.0 (203) | 40 (1016) | 40" LP Standard |
| | RE8040-SN | 6,000 (22.7) | 99.2 | 370 (34.4) | 8.0 (203) | 40 (1016) | 40" SW Standard |
| | RE8040-SH | 4,500 (17.0) | 99.75 | 370 (34.4) | 8.0 (203) | 40 (1016) | 40" SW Standard |
| | RE8040-SHA400 | 7,500 (28.4) | 99.75 | 400 (37.2) | 8.0 (203) | 40 (1016) | 40" SW Standard |
| | RE8040-SHF | 9,000 (34.0) | 99.7 | 370 (34.4) | 8.0 (203) | 40 (1016) | 40" SW Standard |
| | RE8040-SHN | 6,000 (22.7) | 99.75 | 370 (34.4) | 8.0 (203) | 40 (1016) | 40" SW Standard |
| | RE8040-SHN400 | 6,500 (24.6) | 99.75 | 400 (37.2) | 8.0 (203) | 40 (1016) | 40" SW Standard |
| | RE8040-HUE440 | 10,000 (37.9) | 99.5 (IPA 96) | 440 (40.9) | 8.0 (203) | 40 (1016) | 40" BW Standard |
| RE8040-HUE | 9,000 (34.1) | 99.5 (IPA 96) | 400 (37.2) | 8.0 (203) | 40 (1016) | 40" BW Standard | |
| RE8040-UR | 5,500 (20.8) | 99.7 (IPA 96) | 400 (37.2) | 8.0 (203) | 40 (1016) | 40" BW Standard | |
| RE8040-UL | 10,000 (37.9) | 99.5 (IPA 92) | 400 (37.2) | 8.0 (203) | 40 (1016) | 40" LP Standard | |
| 4 INCH | RE4040-BE | 2,400 (9.1) | 99.7 | 85 (7.9) | 4.0 (102) | 40 (1016) | 40" BW Standard |
| | RE4040-BN | 2,000 (7.6) | 99.7 | 75 (7.0) | 4.0 (102) | 40 (1016) | 40" BW Standard |
| | RE4040-FE ⁿ | 2,400 (9.1) | 99.7 | 85 (7.9) | 4.0 (102) | 40 (1016) | 40" BW Standard |
| | RE4040-FLR | 1,900 (7.2) | 99.6 | 85 (7.9) | 4.0 (102) | 40 (1016) | 40" LP Standard |
| | RE4040-FL ⁿ | 2,400 (9.1) | 99.0 | 85 (7.9) | 4.0 (102) | 40 (1016) | 40" LP Standard |
| | RE4040-BLN | 2,600 (9.8) | 99.2 | 85 (7.9) | 4.0 (102) | 40 (1016) | 40" LP Standard |
| | RE4040-BLF | 2,500 (9.5) | 99.2 | 85 (7.9) | 4.0 (102) | 40 (1016) | 40" LP High Flux |
| | RE4040-BLR | 1,900 (7.2) | 99.6 | 85 (7.9) | 4.0 (102) | 40 (1016) | 40" LP Standard |
| | RE4040-TE | 2,400 (9.1) | 99.5 | 85 (7.9) | 4.0 (102) | 40 (1016) | 40" BW Standard |
| | RE4040-TL | 2,600 (9.8) | 99.2 | 85 (7.9) | 4.0 (102) | 40 (1016) | 40" LP Standard |
| | RE4040-SHA | 1,400 (5.3) | 99.75 | 74 (6.9) | 4.0 (102) | 40 (1016) | 40" SW Standard |
| | RE4040-SHF | 1,900 (7.2) | 99.7 | 75 (7.0) | 4.0 (102) | 40 (1016) | 40" SW Standard |
| | RE4021-BE | 1,000 (3.8) | 99.7 | 35 (3.3) | 4.0 (102) | 21 (533) | 21" BW Standard |
| | RE4021-TE | 1,000 (3.8) | 99.5 | 35 (3.3) | 4.0 (102) | 21 (533) | 21" BW Standard |
| | RE4021-BL | 1,000 (3.8) | 99.2 | 35 (3.3) | 4.0 (102) | 21 (533) | 21" BW Standard |
| RE4021-TL | 1,050 (4.0) | 99.2 | 35 (3.3) | 4.0 (102) | 21 (533) | 21" LP Standard | |
| 2.5 INCH | RE2540-TE | 800 (3.0) | 99.5 | 27 (2.5) | 2.5 (64) | 40 (1016) | 40" BW Standard |
| | RE2540-TL | 850 (3.2) | 99.2 | 27 (2.5) | 2.5 (64) | 40 (1016) | 40" LP Standard |
| | RE2521-TE | 300 (1.1) | 99.5 | 12 (1.1) | 2.5 (64) | 21 (533) | 21" BW Standard |
| | RE2521-TL | 300 (1.1) | 99.2 | 12 (1.1) | 2.5 (64) | 21 (533) | 21" LP Standard |

- 40" BW Standard test conditions : NaCl 2,000 mg/L, Pressure 225 psig, Temperature 25°C, pH 6.5 ~ 7.0, Recovery 15%
- 40" LP Standard test conditions : NaCl 1,500 mg/L, Pressure 150 psig, Temperature 25°C, pH 6.5 ~ 7.0, Recovery 15%
- 40" LP High Flux test conditions : NaCl 500 mg/L, Pressure 100 psig, Temperature 25°C, pH 6.5 ~ 7.0, Recovery 15%
- 40" SW Standard test conditions : NaCl 32,000 mg/L, Pressure 800 psig, Temperature 25°C, pH 6.5 ~ 7.0, Recovery 8%
- 21" BW Standard test conditions : NaCl 2,000 mg/L, Pressure 225 psig, Temperature 25°C, pH 6.5 ~ 7.0, Recovery 8%
- 21" LP Standard test conditions : NaCl 1,500 mg/L, Pressure 150 psig, Temperature 25°C, pH 6.5 ~ 7.0, Recovery 8%
- 21" SW Standard test conditions : NaCl 32,000 mg/L, Pressure 800 psig, Temperature 25°C, pH 6.5 ~ 7.0, Recovery 4%
- IPA rejection test conditions : IPA 1,000 mg/L, pressure 225 psig for UE, HUE and 150 psig for UL Temperature 25°C, pH 6.5 ~ 7.0, Recovery 15%
- IPA rejection data were obtained after operating membrane element at the IPA rejection test condition for 2hours.
- The above data were obtained after operating membrane element at the standard test conditions for 30min.

| TYPE | Model Name | Performance | | | Effective Area ft ² (m ²) | Dimension | | Test Condition |
|------|------------|---|--|----------------------------------|---|------------------|---------------------|----------------|
| | | Permeate Flow rate GPD (m ³ /day) | NaCl Rejection (MgSO ₄) % | CaCl ₂ Rejection % | | Dia Inch (mm) | Length Inch (mm) | |
| NF | NE8040-90 | 7,500 (28.4) | 85~95 (97.0) | 90-95 | 400 (37.2) | 8.0 (203) | 40 (1016) | NE Standard |
| | NE4040-90 | 1,600 (6.0) | 85~95 (97.0) | 90-95 | 85 (7.9) | 4.0 (102) | 40 (1016) | NE Standard |
| | NE2540-90 | 500 (1.9) | 85~95 (97.0) | 90-95 | 27 (2.5) | 2.5 (64) | 40 (1016) | NE Standard |
| | NE8040-70 | 7,000 (26.5) | 40~70 (97.0) | 45-70 | 400 (37.2) | 8.0 (203) | 40 (1016) | NE Standard |
| | NE4040-70 | 1,500 (5.6) | 40~70 (97.0) | 45-70 | 85 (7.9) | 4.0 (102) | 40 (1016) | NE Standard |
| | NE2540-70 | 350 (1.3) | 40~70 (97.0) | 45-70 | 27 (2.5) | 2.5 (64) | 40 (1016) | NE Standard |

- NE Standard test conditions : NaCl 2,000 mg/L, Pressure 75 psig, Temperature 25°C, pH 6.5 ~ 7.0, Recovery 15%
- MgSO₄ rejection test conditions : MgSO₄ 2,000 mg/L, Pressure 75 psig, Temperature 25°C, pH 6.5 ~ 7.0, Recovery 15%
- CaCl₂ rejection test conditions : CaCl₂ 500 mg/L, 75psig, 25°C, pH 6.5 ~ 7.0, Recovery 15%
- The above data were obtained after operating membrane element at the standard test conditions for 30min.

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