

PT Watermart Perkasa  
water.co.id



Membrane Technologies  
(RO/NF)



PT Watermart Perkasa  
Email: [sales@water.co.id](mailto:sales@water.co.id) Phone: +62-21-316-1671  
Whatsapp (text only): +62815-8609-3500  
Website: [www.water.co.id](http://www.water.co.id)



Updated June 1st, 2010

\* Additional updates to product specifications may have been implemented after the release of this document.  
Regularly check our website at [www.csmfilter.com](http://www.csmfilter.com) for the latest product performance data.

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

#### **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



Watermart  
[www.w](http://www.w)

## CSM BWM Brackish Water Membrane

| Model Name   | Performance                                     |                     | Effective Area<br>ft <sup>2</sup> (m <sup>2</sup> ) | Dimension        |                     | Test Condition  |
|--------------|-------------------------------------------------|---------------------|-----------------------------------------------------|------------------|---------------------|-----------------|
|              | Permeate Flow rate<br>GPD (m <sup>3</sup> /day) | Salt Rejection<br>% |                                                     | Dia<br>Inch (mm) | Length<br>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 |

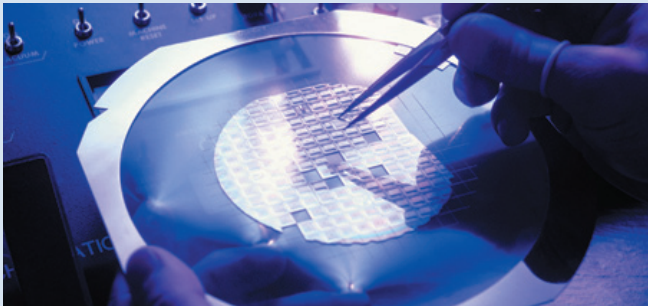
\* Certified by NSF to NSF/ANSI standard 61

- 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  
Email: sales@water.co.id Phone: +62-21-316-1671  
Whatsapp (text only): +62815-8609-3500  
Website: www.water.co.id

## CSM UPWM Ultrapure Water Membrane



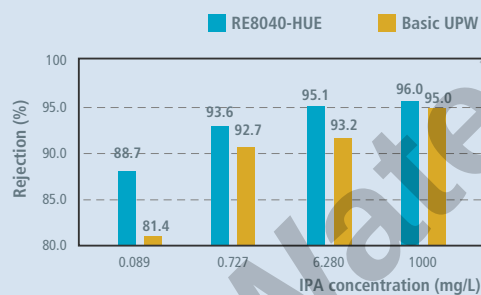
- Ultrapure water for manufacturing of semiconductors, LCDs and electronics.
- High TOC rejection, low TOC extraction and TOC rinse down.

| Model Name    | Performance                                     |                     |                    | Effective Area<br>ft <sup>2</sup> (m <sup>2</sup> ) | Dimension        |                     | Test Condition  |
|---------------|-------------------------------------------------|---------------------|--------------------|-----------------------------------------------------|------------------|---------------------|-----------------|
|               | Permeate Flow rate<br>GPD (m <sup>3</sup> /day) | NaCl Rejection<br>% | IPA Rejection<br>% |                                                     | Dia<br>Inch (mm) | Length<br>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

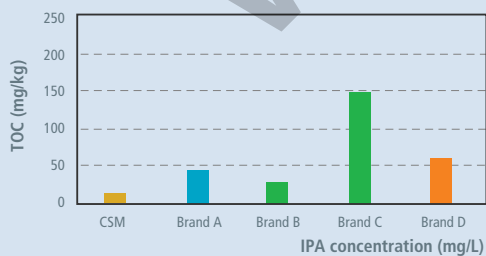


### Low TOC Extraction Property

#### 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:

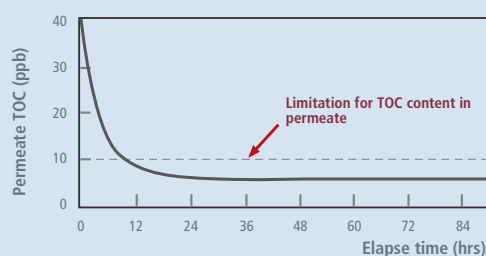
[(TOC conc. after 4hours dipping - feed water TOC conc. before dipping) x [feed water quantity 0.8Lx0.001]]  
Feed water TOC conc. 198ppb



### 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<br>ft <sup>2</sup> (m <sup>2</sup> ) | Dimension        |                     | Test Condition   |
|---------------|-------------------------------------------------|---------------------|-----------------------------------------------------|------------------|---------------------|------------------|
|               | Permeate Flow rate<br>GPD (m <sup>3</sup> /day) | Salt Rejection<br>% |                                                     | Dia<br>Inch (mm) | Length<br>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  |

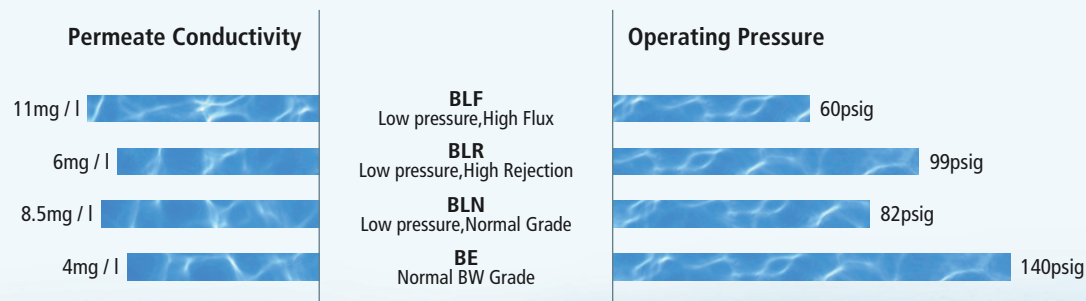
\*Certified by NSF to NSF/ANSI standard 61

- 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



PT Watermart Perkasa  
Email: sales@water.co.id Phone: +62-21-316-1671  
Whatsapp (text only): +62815-8609-3500  
Website: www.water.co.id

## 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<br>ft <sup>2</sup> (m <sup>2</sup> ) | Dimension        |                     | Test Condition  |
|-------------------------|-------------------------------------------------|---------------------|-----------------------------------------------------|------------------|---------------------|-----------------|
|                         | Permeate Flow rate<br>GPD (m <sup>3</sup> /day) | Salt Rejection<br>% |                                                     | Dia<br>Inch (mm) | Length<br>Inch (mm) |                 |
| RE16040-FE <sup>n</sup> | 41,000 (155.0)                                  | 99.7                | 1600 (148.6)                                        | 16 (400)         | 40 (1016)           | 40" BW Standard |
| RE8040-FE <sup>n</sup>  | 10,500 (39.7)                                   | 99.7                | 400 (37.2)                                          | 8.0 (203)        | 40 (1016)           | 40" BW Standard |
| RE8040-FN <sup>n</sup>  | 9,500 (36.0)                                    | 99.7                | 365 (33.9)                                          | 8.0 (203)        | 40 (1016)           | 40" BW Standard |
| RE8040-FD <sup>n</sup>  | 10,000 (37.9)                                   | 99.7                | 380 (35.3)                                          | 8.0 (203)        | 40 (1016)           | 40" BW Standard |
| RE4040-FE <sup>n</sup>  | 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 <sup>n</sup>  | 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 <sup>n</sup>  | 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

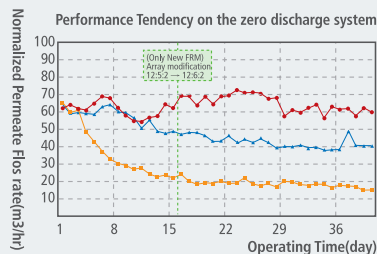
### FRM performance in the field

- Location : ASAN, KOREA (Motor Company)
- Capacity : 5,000m<sup>3</sup>/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

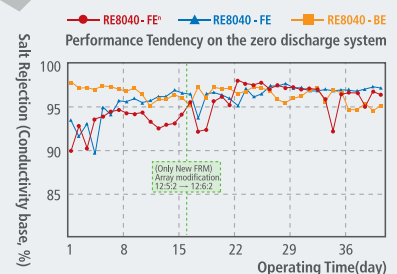
#### [ Feed Water Quality ]

| Parameter        | Unit  | Jun.2004 |
|------------------|-------|----------|
| Na               | mg/L  | 810      |
| Cl               | mg/L  | 1,223    |
| SiO <sub>2</sub> | mg/L  | 8.49     |
| Turbidity        | NTU   | 1.2      |
| Conductivity     | μS/cm | 3,920    |
| TOC              | mg/L  | 23.6     |
| SDI (15min)      | -     | Over 5.0 |

#### [ Normalized Permeate Flow rate ]



#### [ Salt Rejection ]



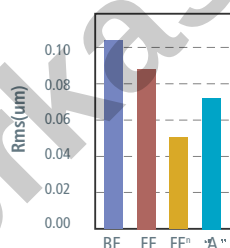
## CSM FRM Fouling Resistant Membrane

Modification of surface roughness, surface charge, and hydrophilicity of the membrane.

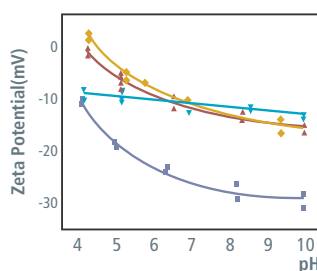
Feed water containing high amount of charged (+,-) and/or non-charged foulants, organic matters, colloidal particles.

### Surface Properties

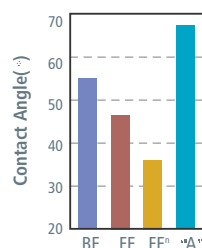
Surface Roughness



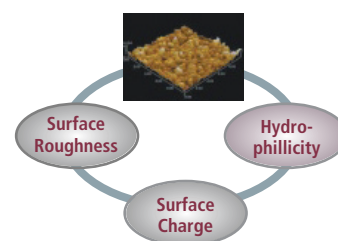
Surface Charge



Hydrophilicity

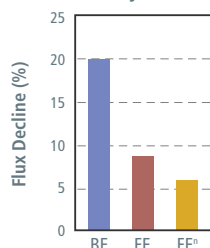


■ BE: Bw (normal) ■ FE: FRM ■ FE<sup>n</sup>: New FRM ■ 'A': Another brand

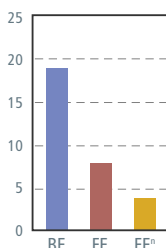


### FRM performance with Model Foulants

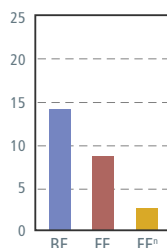
Dry Milk



Non-Ionic Surfactant



Colloidal Silica



■ BE: Bw (normal) ■ FE: FRM ■ FE<sup>n</sup>: New FRM

#### Model Foulants : Test Conditions

- **Dry-Milk** : 30 mg/L, after 8hrs operation
- **Non-Ionic Surfactant** : Tryton X-100:50 mg/L, after 8hrs operation
- **Colloidal Silica** : 100mg/L with divalent cation (Ca<sup>2+</sup>, Mg<sup>2+</sup>), after 8hrs operation at pH7

\* CSM FR membranes show excellent fouling resistant properties to organic and inorganic contaminants

### References

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



PT Watermart Perkasa

Email: sales@water.co.id Phone: +62-21-316-1671

Whatsapp (text only): +62815-8609-3500

Website: www.water.co.id

## 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<br>ft <sup>2</sup> (m <sup>2</sup> ) | Dimension        |                     | Test Condition  |
|---------------|-------------------------------------------------|---------------------|-----------------------------------------------------|------------------|---------------------|-----------------|
|               | Permeate Flow rate<br>GPD (m <sup>3</sup> /day) | Salt Rejection<br>% |                                                     | Dia<br>Inch (mm) | Length<br>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.

| Customers                  | Location           | Model                  | Capacity                 | Date       |
|----------------------------|--------------------|------------------------|--------------------------|------------|
| SOUTH PARS (PHASE 2&3)     | IRAN               | RE8040-SN<br>RE8040-BE | 1800 m <sup>3</sup> /day | AUG. 2000  |
| SOUTH PARS (PHASE 4&5)     | IRAN               | RE8040-SR<br>RE8040-BE | 360 m <sup>3</sup> /day  | MAY. 2003  |
| CHANGZHOU CANGJIN CHEMICAL | CHINA              | RE8040-SR              | 1200m <sup>3</sup> /hr   | APR. 2004  |
| HYDROPRO                   | VENEZUELA / MASHAL | RE8040-SR              | 153 PCS                  | MAR. 2003  |
| MEMBRANE TECH. IND.        | U.S.A / HAWAII     | RE8040-SR              | 1440 m <sup>3</sup> /day | JUN. 2004  |
| KOREA NAVY FORCE           | KOREA JINHAE       | 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 | Permeate Flow rate<br>GPD (m <sup>3</sup> /day) | Performance         |                                  |                                  | Effective<br>Area<br>ft <sup>2</sup> (m <sup>2</sup> ) | Dimension        |                     | Test Condition |
|------------|-------------------------------------------------|---------------------|----------------------------------|----------------------------------|--------------------------------------------------------|------------------|---------------------|----------------|
|            |                                                 | NaCl<br>Rejection % | MgSO <sub>4</sub><br>Rejection % | CaCl <sub>2</sub><br>Rejection % |                                                        | Dia<br>Inch (mm) | Length<br>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

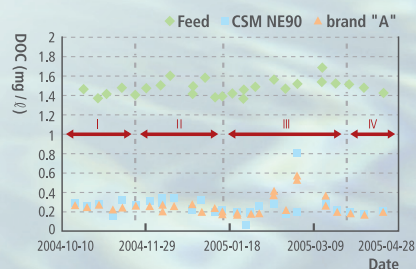
- NE Standard test conditions: NaCl 2,000 mg/L, 75psig, 25°C, pH 6.5 ~ 7.0, Recovery 15%
- MgSO<sub>4</sub> rejection test conditions: MgSO<sub>4</sub> 2,000 mg/L, 75psig, 25°C, pH 6.5 ~ 7.0, Recovery 15%
- CaCl<sub>2</sub> rejection test conditions: CaCl<sub>2</sub> 500 mg/L, 75psig, 25°C, pH 6.5 ~ 7.0, Recovery 15%

### Pilot test results in a municipal WTP

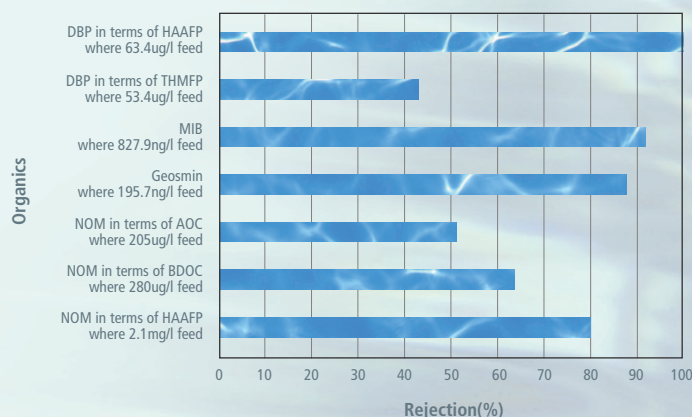
Water source: Paldang Lake in South Korea  
Model : NE4040-90

\* "A": Another brand

|                                                                                                 | CSM<br>NE90 | "A"   | Remark          |
|-------------------------------------------------------------------------------------------------|-------------|-------|-----------------|
| DOC Removal<br>Efficiency                                                                       | 80% †       | 80% † | CSM NE 90 = "A" |
| Permeability<br>( $\mu\text{m}^2 \cdot \text{s} / \text{d} \cdot \text{m}^2 \cdot \text{kPa}$ ) | 2.0         | 1.5   | CSM NE 90 > "A" |



### Organic Rejection Ratios of CSM NE90



PT Watermart Perkasa  
Email: sales@water.co.id Phone: +62-21-316-1671  
Whatsapp (text only): +62815-8609-3500  
Website: www.water.co.id

## 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<br>ft <sup>2</sup> (m <sup>2</sup> ) | Dimension        |                     | Test Condition  |
|------------|-------------------------------------------------|---------------------|-----------------------------------------------------|------------------|---------------------|-----------------|
|            | Permeate Flow rate<br>GPD (m <sup>3</sup> /day) | Salt Rejection<br>% |                                                     | Dia<br>Inch (mm) | Length<br>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<sub>um</sub> 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<br>GPD (L /day) | Salt Rejection<br>% | Dia<br>Inch (mm) | Length<br>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<br>ft <sup>2</sup> (m <sup>2</sup> ) | Dimension        |                     | Test Condition   |
|----------|-------------------------|-------------------------------------------------|---------------------|-----------------------------------------------------|------------------|---------------------|------------------|
|          |                         | Permeate Flow rate<br>GPD (m <sup>3</sup> /day) | Salt Rejection<br>% |                                                     | Dia<br>Inch (mm) | Length<br>Inch (mm) |                  |
| 16 INCH  | RE16040-BE              | 41,000 (155.0)                                  | 99.7                | 1600 (148.6)                                        | 16(400)          | 40 (1016)           | 40" BW Standard  |
|          | RE16040-FE <sup>n</sup> | 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 <sup>n</sup>  | 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 <sup>n</sup>  | 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 <sup>n</sup>  | 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 <sup>n</sup>  | 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 <sup>n</sup>  | 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<br>ft <sup>2</sup> (m <sup>2</sup> ) | Dimension        |                     | Test Condition |
|------|------------|-------------------------------------------------|------------------------------------------|-------------------------------|-----------------------------------------------------|------------------|---------------------|----------------|
|      |            | Permeate Flow rate<br>GPD (m <sup>3</sup> /day) | NaCl Rejection<br>(MgSO <sub>4</sub> ) % | CaCl <sub>2</sub> Rejection % |                                                     | Dia<br>Inch (mm) | Length<br>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%
- MgSO<sub>4</sub> rejection test conditions : MgSO<sub>4</sub> 2,000 mg/L, Pressure 75 psig, Temperature 25°C, pH 6.5 ~ 7.0, Recovery 15%
- CaCl<sub>2</sub> rejection test conditions : CaCl<sub>2</sub> 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.



PT Watermart Perkasa  
Email: sales@water.co.id Phone: +62-21-316-1671  
Whatsapp (text only): +62815-8609-3500  
Website: www.water.co.id

# CSM<sup>®</sup>

Membrane Technologies  
(RO/NF)



23rd Floor Kukdong Building, Chungmuro 3-ga  
Jung-gu, Seoul 100-705, South Korea

**Tel.** +82-2-3279-7000

**Fax.** +82-2-3279-7088

[www.csmfilter.com](http://www.csmfilter.com)

**E-mail.** [csm@wjchemical.co.kr](mailto:csm@wjchemical.co.kr)

**WOONGJIN CHEMICAL AMERICA INC.**

4 Executive Circle, Suite 150, Irvine, CA 92614, USA

TEL +1-949-797-9239 / FAX +1-949-797-9240 / [csmusa@wjcs.com](mailto:csmusa@wjcs.com)

**WOONGJIN CHEMICAL SHANGHAI CO., LTD**

Rm.2307, International Trade Center, 2200 Yanan Rd. (w), Shanghai, China 200339

TEL +86-21-6219-6384 / FAX +86-21-6219-0116

**TIANJIN WOONGJIN CSM ECOTECH CO., LTD**

NO.2 Keyuan 4st TEDA(Jinnan) Micro-electronics industrial Area

Balitai-Zhen Jinnan-District Tianjin China

TEL +86-22-2612-2264/9472/3039/4000 / FAX +86-22-2612-0588

**WOONGJIN CHEMICAL CO., LTD JAPAN OFFICE**

7th Fl., Akasaka Habitation Bldg., 1-3-5, Akasaka, Minato-ku, Tokyo, 107-0052, Japan

TEL +81-3-5114/5950~1 / FAX +81-3-3583-4361

**WOONGJIN CHEMICAL CO., LTD INDIA OFFICE**

No. 203, Mohta Building, Bhikaji Cama Place, New Delhi-110066, India

TEL +91-11-4607-5120 / FAX +91-11-4607-4300