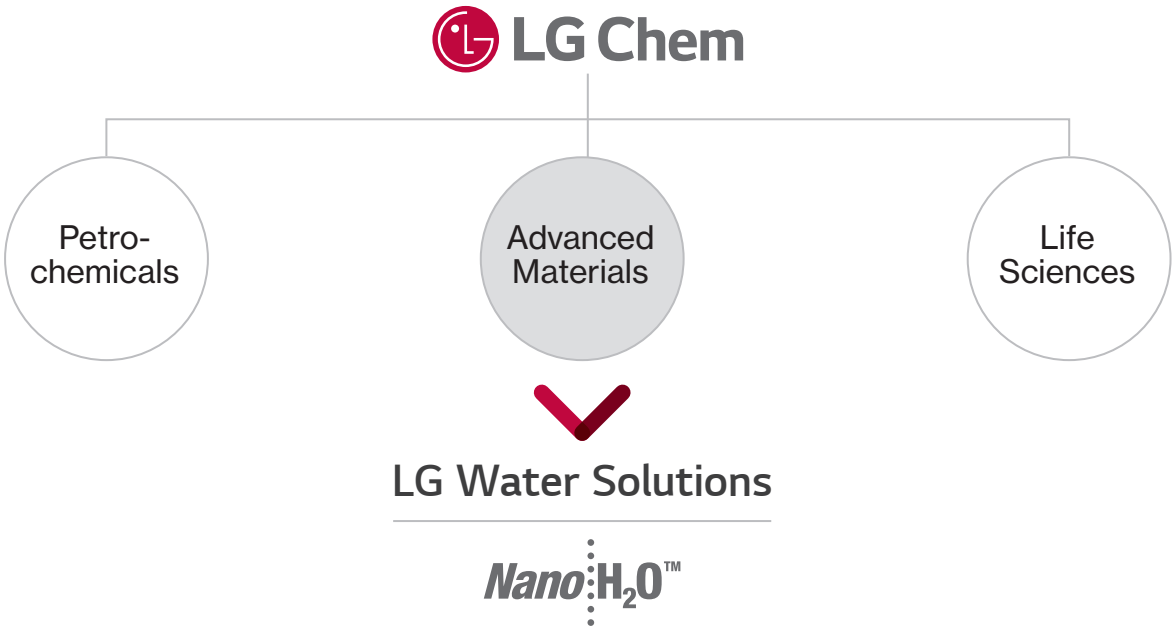
LG Chem

# LG Water Solutions

## TFN RO Membrane Technology

Nano $H_2O$™

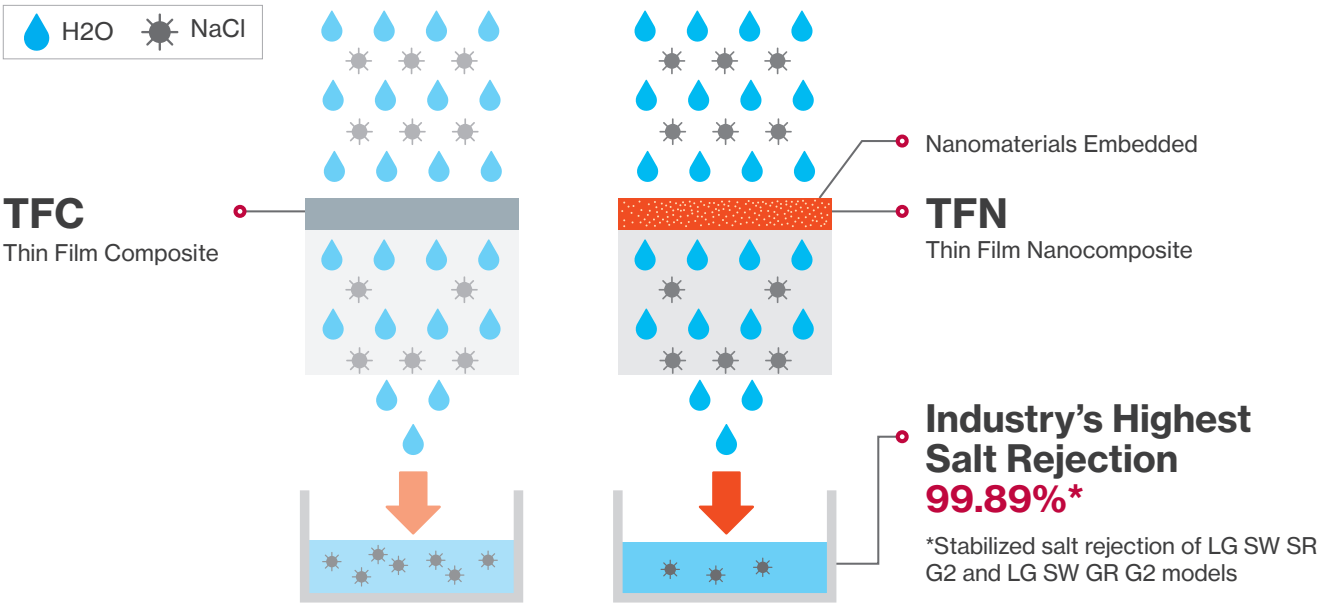
# LG Water Solutions




LG Water Solutions, a division of LG Chem, manufactures Nano$H_2O$™ seawater and brackish water reverse osmosis (RO) membrane elements based on the breakthrough Thin-Film Nanocomposite (TFN) technology.

# Technology

Thin Film Nanocomposite (TFN) technology improves membrane performance by embedding benign nanomaterials on the membrane surface. This innovative approach increases flux in seawater RO membranes by up to 20% without compromising salt rejection.



## Seawater Reverse Osmosis (RO) Membranes

# Global Project Wins Driven by Performance

**Overview**

LG Water Solution's NanoH$_2$O™ seawater RO membranes deliver the industry's highest salt rejection and 20% more flow than the membranes based on conventional technologies. Our seawater RO membranes significantly reduce the cost of desalination while delivering superior water quality. With state-of-the-art manufacturing and a customer-centric approach, LG Waer Solutions has contracted more than 4,000 million litres per Day (MLD) in seawater projects in the past three years (2021).

**LG SW SR G2, GR G2 and R G2**
Next generation membranes with industry-leading salt rejection up to 99.89%

**LG SW SR, GR and R**
High-rejection membrane ideal for high feed TDS and high permeate quality requirements

**LG SW ES**
Energy saving membranes ideal for low feed TDS and low temperature seawater applications

## Brackish Water Reverse Osmosis (RO) Membranes

# Engineered for OPEX Savings

**Overview**

LG Water Solution's NanoH$_2$O™ brackish water RO membranes are gaining traction with major utilities and industrial end-users worldwide. The TFN technology, coupled with intrinsic anti-fouling properties, delivers reliable performance and reduced operational downtime, leading to a lower total cost of plant ownership.

**LG BW AFR G2**
Anti-Fouling, High Rejection, High Flow, High Durability

**LG BW R G2**
Superior Rejection, High Flow, High Durability

**LG BW R Dura**
High Rejection, High Durability

**LG BW R**
High Rejection

**LG BW AFR**
Anti-Fouling, High Rejection

**LG BW ES**
Energy Saving

**LG BW UES**
Ultra Low Energy

## LG SW G2 Membranes

With industry's **highest** salt rejection, LG SW G2 membranes can provide:

- **Improved permeate quality** without increasing operating pressure
- **Reduced energy cost** without sacrificing the permeate quality
- **Reduced capital and operation costs** for multi-pass SWRO systems

| Model | Active Membrane Area, $ft^2$ ($m^2$) | Permeate Flow Rate, GPD ($m^2$/d) | Stabilized Salt Rejection, % | Minimum Salt Rejection, % | Boron Rejection, % | Feed Spacer, mil |
|---|---|---|---|---|---|---|
| LG SW 440 SR G2 | 440 (41) | 6,600 (25.0) | 99.89 | 99.75 | 93 | 28 |
| LG SW 400 SR G2 | 400 (37) | 6,000 (22.7) | 99.89 | 99.75 | 93 | 34 |
| LG SW 440 GR G2 | 440 (41) | 8,250 (31.2) | 99.89 | 99.75 | 93 | 28 |
| LG SW 400 GR G2 | 400 (37) | 7,500 (28.4) | 99.89 | 99.75 | 93 | 34 |
| LG SW 440 R G2 | 440 (41) | 9,900 (37.5) | 99.88 | 99.75 | 93 | 28 |
| LG SW 400 R G2 | 400 (37) | 9,000 (34.1) | 99.88 | 99.75 | 93 | 34 |

Test Conditions : 32,000 ppm NaCl, 5 ppm Boron at 25°C (77°F), 800 psi (55 bar), pH 8, Recovery 8%

## LG SW G1 Membranes

| Model | Active Membrane Area, $ft^2$ ($m^2$) | Permeate Flow Rate, GPD ($m^2$/d) | Stabilized Salt Rejection, % | Minimum Salt Rejection, % | Boron Rejection, % | Feed Spacer, mil |
|---|---|---|---|---|---|---|
| LG SW 440 SR | 440 (41) | 6,600 (25.0) | 99.85 | 99.7 | 93 | 28 |
| LG SW 400 SR | 400 (37) | 6,000 (22.7) | 99.85 | 99.7 | 93 | 34 |
| LG SW 440 GR | 440 (41) | 8,250 (31.2) | 99.85 | 99.7 | 93 | 28 |
| LG SW 400 GR | 400 (37) | 7,500 (28.4) | 99.85 | 99.7 | 93 | 34 |
| LG SW 440 R | 440 (41) | 9,900 (37.5) | 99.85 | 99.7 | 93 | 28 |
| LG SW 400 R | 400 (37) | 9,000 (34.1) | 99.85 | 99.7 | 93 | 34 |
| LG SW 440 ES | 440 (41) | 15,070 (57.0) | 99.80 | 99.6 | 89 | 28 |
| LG SW 400 ES | 400 (37) | 13,700 (51.9) | 99.80 | 99.6 | 89 | 34 |

Test Conditions : 32,000 ppm NaCl, 5 ppm Boron at 25°C (77°F), 800 psi (55 bar), pH 8, Recovery 8%

# LG BWRO Membranes

| Model | Active Membrane Area, $ft^2$ ($m^2$) | Permeate Flow Rate, GPD ($m^2$/d) | Stabilized Salt Rejection, % | Minimum Salt Rejection, % | Feed Spacer, mil | Test Pressure, psi (bar) |
|---|---|---|---|---|---|---|
| **High Rejection Anti-fouling** | | | | | | |
| LG BW 400 R G2 | 400 (37) | 11,500 (43.5) | 99.8 | 99.65 | 34, low dP | 225 (15.5) |
| LG BW 400 AFR G2 | 400 (37) | 11,500 (43.5) | 99.7 | 99.6 | 34, low dP | 225 (15.5) |
| LG BW 400 R Dura | 400 (37) | 10,500 (39.7) | 99.7 | 99.6 | 34, low dP | 225 (15.5) |
| LG BW 400 AFR | 400 (37) | 10,500 (39.7) | 99.6 | 99.5 | 34 | 225 (15.5) |
| **High Rejection Standard** | | | | | | |
| LG BW 440 R G2 | 440 (41) | 12,650 (47.9) | 99.8 | 99.65 | 28 | 225 (15.5) |
| LG BW 440 R Dura | 440 (41) | 11,550 (43.7) | 99.7 | 99.6 | 28 | 225 (15.5) |
| LG BW 440 R | 440 (41) | 11,550 (43.7) | 99.6 | 99.5 | 28 | 225 (15.5) |
| LG BW 400 R | 400 (37) | 10,500 (39.7) | 99.6 | 99.5 | 34 | 225 (15.5) |
| **Energy Saving** | | | | | | |
| LG BW 440 ES | 440 (41) | 11,550 (43.7) | 99.6 | 99.5 | 28 | 150 (10.3) |
| LG BW 400 ES | 400 (37) | 10,500 (39.7) | 99.6 | 99.5 | 34 | 150 (10.3) |
| LG BW 400 ES L | 400 (37) | 10,500 (39.7) | 99.6 | 99.5 | 34, low dP | 150 (10.3) |
| **Ultra Energy Saving** | | | | | | |
| LG BW 440 UES | 440 (41) | 12,650 (47.9) | 99.0 | 98.0 | 28 | 125 (8.6) |
| LG BW 400 UES | 400 (37) | 11,500 (43.5) | 99.0 | 98.0 | 34, low dP | 125 (8.6) |
| Test Conditions : 2,000 ppm NaCl at 25°C (77°F), pH 7, Recovery 15% | | | | | | |

# Light Commercial RO Membranes

| Model | Active Membrane Area, ft² (m²) | Permeate Flow Rate, GPD (m²/d) | Stabilized Salt Rejection, % | Minimum Salt Rejection, % | Recovery, % | Test Pressure, psi (bar) |
|---|---|---|---|---|---|---|
| **Seawater**[1] | | | | | | |
| LG SW 4040 R | 80 (7.4) | 1,950 (7.4) | 99.7 | 99.5 | 8 | 800 (55) |
| **High Rejection**[2] | | | | | | |
| LG BW 4040 R | 85 (7.9) | 2,500 (9.5) | 99.6 | 99.3 | 15 | 225 (15.5) |
| LG BW 4021 R | 34 (3.2) | 1,000 (3.8) | 99.6 | 99.3 | 8 | 225 (15.5) |
| LG BW 2540 R | 22 (2.0) | 750 (2.8) | 99.6 | 99.3 | 15 | 225 (15.5) |
| LG BW 2521 R | 9 (0.9) | 345 (1.3) | 99.6 | 99.3 | 8 | 225 (15.5) |
| **Low Pressure**[2] | | | | | | |
| LG BW 4040 ES | 85 (7.9) | 2,500 (9.5) | 99.5 | 99.2 | 15 | 150 (10.3) |
| LG BW 4021 ES | 34 (3.2) | 1,000 (3.8) | 99.5 | 99.2 | 8 | 150 (10.3) |
| LG BW 2540 ES | 22 (2.0) | 750 (2.8) | 99.5 | 99.2 | 15 | 150 (10.3) |
| LG BW 2521 ES | 9 (0.9) | 345 (1.3) | 99.5 | 99.2 | 8 | 150 (10.3) |
| **Ultra Low Pressure**[3] | | | | | | |
| LG CW 4040 SF* | 85 (7.9) | 2,900 (11.0) | 99.0 | 98.0 | 15 | 100 (6.9) |
| LG BW 4040 UES | 85 (7.9) | 2,700 (10.2) | 99.0 | 98.0 | 15 | 100 (6.9) |
| LG BW 4021 UES | 34 (3.2) | 1,000 (3.8) | 99.0 | 98.0 | 8 | 100 (6.9) |
| LG BW 2540 UES | 22 (2.0) | 800 (3.0) | 99.0 | 98.0 | 15 | 100 (6.9) |
| LG BW 2521 UES | 9 (0.9) | 345 (1.3) | 99.0 | 98.0 | 8 | 100 (6.9) |

[1]Test conditions: 32,000 ppm NaCl at 25°C (77°F), pH 8
[2]Test conditions: 2,000 ppm NaCl at 25°C (77°F), pH 7
[3]Test conditions: 500 ppm NaCl at 25°C (77°F), pH 7
*Shipped dry

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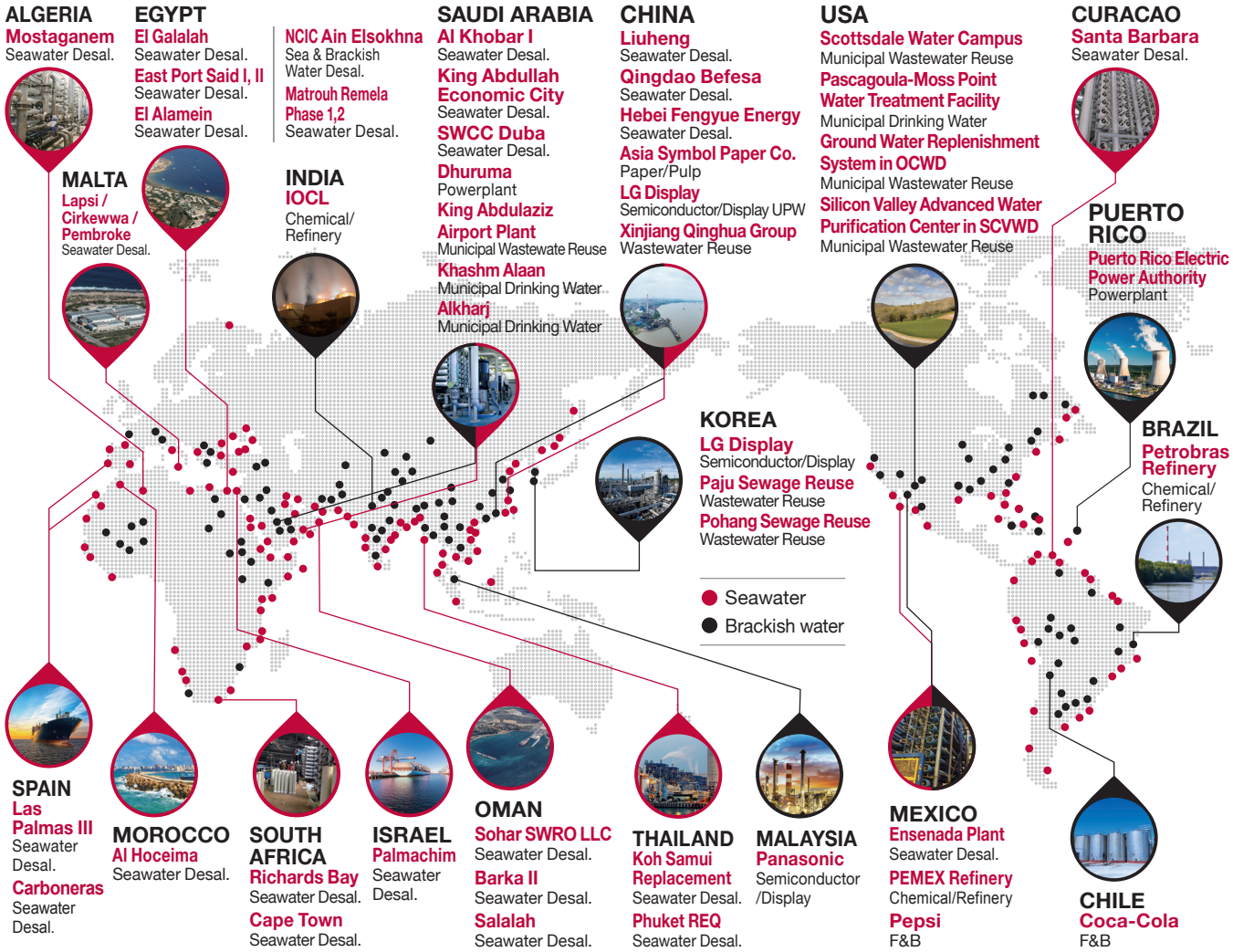
# Proven Track Record

## of Performance and Quality

### Selected Global References