WATER TREATMENT ENERGIZED BY LEWABRANE®
Reverse osmosis (RO) membrane elements for industrial and potable water treatment
LANXESS has designed Lewabrane® RO membranes for state-of-the-art desalination of seawater, brackish waters, and low-salinity waters in industrial and potable water applications.

These water treatment applications increasingly require the most highly technical, high-performance separation products to achieve treated water quality at the lowest cost of water production. LANXESS offers two product lines to meet the stringent water treatment requirements in today's modern world. The new Lewabrane® RO membrane elements and the well-established Lewatit® ion exchange resins complement each other in providing the user with high-performance polymers and equipment/system configurations for advanced water treatment.

The Lewabrane® RO membrane elements family consists of spiral-wound, thin-film composite membrane elements designed specifically for water treatment applications. The RO membrane chemistry and element construction is designed to provide optimized, low-cost of operation for downstream unit operations, like separate-bed or mixed-bed ion exchange units.

We manufacture our Lewabrane® RO products in a modern, fully automated state-of-the-art production facility in Bitterfeld (Germany). The chemistry approach for our RO membrane places the emphasis on higher cross-linking of the polyamide layer, and therefore, higher durability to cleaning chemicals, more stable rejection of mixed ion salt solutions, and lower surface charge on the membrane to reduce the fouling tendency.

In addition, Lewabrane® comes with a full service package that includes RO system design with our innovative LewaPlus™ software tool, plus RO membrane element testing and autopsy in our laboratory, as necessary, to keep your water treatment facility online. We are your reliable partner for your water treatment-related needs!

Industrial water application areas for RO membranes

The desalination of water by reverse osmosis membrane technology has seen remarkable development over recent years. This development has made RO the preferred solution for salt removal for a wide variety of waters, for both industrial and potable applications. Each water type is, in many ways, unique. Each user has specific requirements for system permeate capacity, permeate quality, and the capital and operating cost to meet these needs. Our Lewabrane® family of RO membranes offers a variety of membrane performances to allow the user to optimize the RO system performance as a stand-alone system, or jointly with high-performance Lewatit® ion exchange resins.

- Production of boiler feed water in power stations
- Demineralization and particle removal in microchip manufacture
- Water desalination for light industry (car wash, laundries, and marine application)
- Wastewater treatment, including post membrane bioreactor (MBR) application
- Groundwater remediation and recharge

**Potable water application**

An important application area for RO membranes is the preparation of potable water from both brackish and seawater supplies. This application is applied on a large scale in the case of cities and municipalities, and on a small scale for application within restaurants, hotels, cruise ships, and other smaller facilities. The preparation of potable water often requires NSF certification, or equivalent, attesting to the evaluation and conformance of an RO element manufacturing process for potable water application.

LANXESS has completed the process for NSF certification, and has received full NSF certification for usage of Lewabrane® RO elements from the HR, HF, FR, and LE membrane families for the preparation of potable water.
High flow type (HF) for the best balance of flow and more stable salt rejection during operating lifetime (as the Fouling resistant type (FR) for fouling resistance via Low energy type (LE) for energy savings from improved organic compound rejection more durable to allow less frequent, more Low salt passage, typically > 99.7% at standard conditions High flow productivity improved barrier layer chemistry (lower charge and higher performance advantages of Lewabrane® RO brackish water elements
- Low salt passage, typically > 99.7% at standard conditions
- High flow productivity
- Improved barrier layer chemistry (lower charge and higher cross-linkage) providing lower membrane fouling rates
- More stable salt rejection during operating lifetime (as the rejection mechanism is based more on solution diffusion than ionic repulsion)
- Improved organic compound rejection
- More durable to allow less frequent, more aggressive cleaning

Make your Lewatit® ion exchange applications more efficient
Another important benefit of the new Lewabrane® RO membrane elements is that the preparation of feed water for downstream Lewatit® ion exchange or electrodeionization (EDI) applications. The Lewabrane® RO membrane elements are designed to provide stable, lower salinity permeate to minimize the load on the downstream ion exchange and EDI operations, thus improving cost performance. The use of Lewabrane® RO membrane elements can provide a lower total cost of operation from reduced chemical regeneration and improvement in ion exchange resin life.
**LEWAPLUS™ DESIGN SOFTWARE**

The LewaPlus™ design software is a comprehensive software design tool for RO membrane and ion exchange resin (IX) systems and available in several languages. It combines the Lewabrane® RO membrane design with the existing Lewatit® ion exchange resin design, allowing the designer to move seamlessly from RO design to ion exchange design all within the same design software. A novel data management process allows the designer to load the RO permeate flow and composition directly to an ion exchange module, and vice versa.

**LewaPlus™ software includes the following modules:**
- Demineralization with ion exchange resins
- Mixed-bed demineralization with ion exchange resins
- Calculation of current operating ion exchange resins performance (Demi check)
- Brackish water and seawater desalination with reverse osmosis

**LewaPlus™ software tool provides direct access to technical documentation like:**
- Product scout tool for proper Lewatit® resin selection
- MSDS documentation for Lewatit® ion exchange resins
- A link to all Lewatit® and Lewabrane® product data sheets

LewaPlus™ can be downloaded from www.lewabrane.com

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**LEWABRANE® PRODUCT FAMILY**

**Lewabrane® – product data**

<table>
<thead>
<tr>
<th>RO Element Model</th>
<th>Permeate Flow</th>
<th>Salt Rejection</th>
<th>Membrane Area</th>
<th>Feed Spacer Thickness</th>
<th>Dimensions</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>High Rejection (HR)</strong></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>B370 HR</td>
<td>35.3 m³/day</td>
<td>99.7%</td>
<td>34.4 m²</td>
<td>0.8 mm</td>
<td>1016/201/29 mm</td>
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<tr>
<td>B420 HR</td>
<td>9,300 gpd</td>
<td>99.7%</td>
<td>370 ft²</td>
<td>0.8 mm</td>
<td>40/7.9/1.125 inch</td>
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<tr>
<td>B440 HR</td>
<td>37.5 m³/day</td>
<td>99.7%</td>
<td>370 ft²</td>
<td>0.8 mm</td>
<td>40/7.9/1.125 inch</td>
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<tr>
<td><strong>High Flow (HF)</strong></td>
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<td></td>
</tr>
<tr>
<td>B085 HF 4040</td>
<td>8.9 m³/day</td>
<td>99.5%</td>
<td>34.4 m²</td>
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<td>B370 HF</td>
<td>2,400 gpd</td>
<td>99.5%</td>
<td>85 ft²</td>
<td>0.8 mm</td>
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<tr>
<td>B420 HF</td>
<td>9,600 gpd</td>
<td>99.5%</td>
<td>370 ft²</td>
<td>0.8 mm</td>
<td>40/7.9/1.125 inch</td>
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<tr>
<td>B440 HF</td>
<td>10,500 gpd</td>
<td>99.5%</td>
<td>400 ft²</td>
<td>0.8 mm</td>
<td>40/7.9/1.125 inch</td>
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<td><strong>Low Energy (LE)</strong></td>
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<tr>
<td>B085 LE 4040</td>
<td>7.4 m³/day</td>
<td>99.5%</td>
<td>34.4 m²</td>
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<tr>
<td>B400 LE</td>
<td>2,000 gpd</td>
<td>99.5%</td>
<td>85 ft²</td>
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<tr>
<td>B440 LE</td>
<td>9,200 gpd</td>
<td>99.5%</td>
<td>400 ft²</td>
<td>0.8 mm</td>
<td>40/7.9/1.125 inch</td>
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<tr>
<td><strong>Seawater (S) High Rejection (HR)</strong></td>
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<tr>
<td>S085 HR 4040</td>
<td>5.2 m³/day</td>
<td>99.8%</td>
<td>34.4 m²</td>
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<tr>
<td>S400 HR</td>
<td>1,380 gpd</td>
<td>99.8%</td>
<td>85 ft²</td>
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<tr>
<td>S440 HR</td>
<td>2,400 gpd</td>
<td>99.8%</td>
<td>400 ft²</td>
<td>0.8 mm</td>
<td>40/7.9/1.125 inch</td>
</tr>
<tr>
<td><strong>Seawater (S) High Flow (HF)</strong></td>
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</tr>
<tr>
<td>S085 HF 4040</td>
<td>7.2 m³/day</td>
<td>99.8%</td>
<td>34.4 m²</td>
<td>0.8 mm</td>
<td>40/7.9/1.125 inch</td>
</tr>
<tr>
<td>S400 HF</td>
<td>1,910 gpd</td>
<td>99.8%</td>
<td>85 ft²</td>
<td>0.8 mm</td>
<td>40/7.9/1.125 inch</td>
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<tr>
<td>S440 HF</td>
<td>3,750 gpd</td>
<td>99.8%</td>
<td>400 ft²</td>
<td>0.8 mm</td>
<td>40/7.9/1.125 inch</td>
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</tbody>
</table>

Test conditions:
- **2,000 mg/l NaCl, 10.3 bar (150 psi), 25 °C (77 °F), pH 7, recovery rate 15%**
- **2,000 mg/l NaCl, 15.3 bar (150 psi), 25 °C (77 °F), pH 7, recovery rate 15%***
- **32,000 mg/l NaCl, 55.2 bar (800 psi), 25 °C (77 °F), pH 8, recovery rate 8%***

A more detailed description of our LewaBrane® RO elements is presented on our data sheets available online at: www.lewabrane.com

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**LEWAPLUS™ Design software**

**Lewabrane® Product details**

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**LEWAPLUS™ Design software**

**LewaPlus®** has recently expanded the RO module to provide some unique features:
- Post-RO treatment to manage chemical addition of the RO permeate prior to final usage
- Power optimization to allow the designer to incorporate the most recent power conservation configuration technology, and calculate the true power consumption around the RO system
- A new cost calculation that prompts the designer to accept or input specific cost parameters based on local considerations, cost of capital, etc., to evaluate all aspects of total water cost.

**LewaPlus®** software tool provides direct access to technical documentation like:
- Product scout tool for proper Lewatit® resin selection
- MSDS documentation for Lewatit® ion exchange resins
- A link to all Lewatit® and Lewabrane® product data sheets

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