



WATER TREATMENT ENERGIZED BY

LANXESS
Energizing Chemistry

LEWABRANE®

Reverse osmosis (RO) membrane elements for industrial and potable water treatment

LEWABRANE® PREMIUM PRODUCTS FOR 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). 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!



X Lewabrane®

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.



EFFICIENT DESALINATION WITH LEWABRANE® BRACKISH WATER RO ELEMENTS

Lewabrane® product portfolio

The Lewabrane® RO product family was designed to meet and exceed the nominal performance standards for both potable and industrial water treatment applications. The RO elements have a standard length of 40 inches (1,016 mm) and a diameter of 8 inches (201 mm) suitable for use within standard RO membrane equipment. The product family also includes a 4-inch (101 mm) RO element suitable for smaller applications. All 8-inch diameter elements meet today's industry standards for RO membrane surface area at 370, 400, and 440 square feet per 8-inch by 40-inch element. The 4-inch diameter elements have a unique design, which offers approx. 6% additional active membrane surface area resulting in higher water productivity. The RO elements have standard fiberglass outer wrap, brine seal, interconnectors, and ATDs universal to all 8-inch and 4-inch diameter elements.

Lewabrane® RO products available

- High rejection type (HR) for the best permeate quality
- High flow type (HF) for the best balance of flow and salt rejection
- Fouling resistant type (FR) for fouling resistance via 0.86 mm (34 mil) feed-water spacer
- Low energy type (LE) for energy savings from low pressure operation



The membranes are based on a three-layer composite structure that is manufactured in several production stages. A single Lewabrane® RO element consists of a package with more than 20 layers. This is assembled into a spiral-wound element and then fixed.



For quality assurance purposes each individual **Lewabrane®** product is checked in an element tester.



LANXESS produces **Lewabrane®** RO membrane elements for industrial and potable water treatment in Bitterfeld, Germany.

The **Lewabrane®** RO membrane elements for standard pressure (15.5 bar test pressure) application are offered in both HR (high rejection) and HF (high flow) product types. The HR-type elements are designed to provide extremely low salt passage in normal operation with >99.7% salt rejection measured at standard test conditions. The high rejection for critical ions like calcium, boron, and silica is also remarkable. The HF-type elements offer increased water productivity coupled with a small increase in permeate salinity.

The product portfolio also includes fouling resistant (FR) types. The FR-type membrane elements are designed with a 0.86 mm (34 mil) feed spacer that provides a thicker feed channel, allowing improved movement of solutes and particles through the feed channel. The thicker feed channel also results in a lower pressure drop through the RO membrane element. The FR membrane products are based on 15.5 bar test pressure, and are available in 90, 370, and 400 sq ft membrane surface area. These FR elements are recommended for surface water and wastewater treatment applications.

The **Lewabrane®** RO membrane elements are now available in low energy (LE) product types. These LE-type membrane elements are designed with a highly efficient polyamide membrane barrier layer, providing high flow productivity combined with excellent salt rejection. The LE membrane products are based on a 10.3 bar test pressure, and are available in 90, 400, and 440 sq ft membrane surface area. These LE elements are recommended for low salinity applications, or in applications where low energy consumption is an important consideration.

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

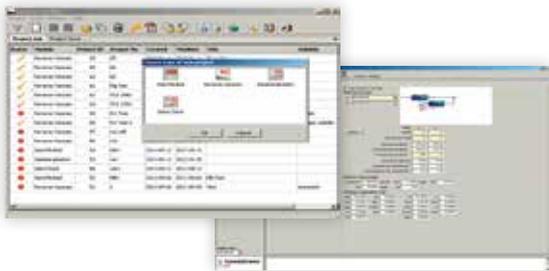
Another important benefit of the new **Lewabrane®** RO membrane elements is the preparation of feed water for downstream **Lewatit®** ion exchange or electrodeionization (EDI) applications. The **Lewabrane®** RO membrane elements are designed to provide stable, lower salinity permeate to minimize the 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 desalination with reverse osmosis



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

LewaPlus™ can be downloaded from www.lewabrane.com



TECHNICAL DETAILS OF THE LEWABRANE® PRODUCT FAMILY

Lewabrane® – product data

RO Element Model	Permeate Flow	Salt Rejection	Membrane Area	Feed Spacer Thickness	Dimensions (L/Ø/ID)
High Rejection (HR)*					(L/Ø/ID)
B370 HR	35.3 m³/day	99.7%	34.4 m²	0.8 mm	1,016 / 201 / 29 mm
	9,300 gpd	99.7%	370 ft²	31 mil	40 / 7.9 / 1.125 inch
B400 HR	37.9 m³/day	99.7%	37.2 m²	0.8 mm	1,016 / 201 / 29 mm
	10,000 gpd	99.7%	400 ft²	31 mil	40 / 7.9 / 1.125 inch
B440 HR	41.7 m³/day	99.7%	40.9 m²	0.7 mm	1,016 / 201 / 29 mm
	11,000 gpd	99.7%	440 ft²	28 mil	40 / 7.9 / 1.125 inch
High Flow (HF)*					(L/Ø/ID/OD)
B090 HF 4040	9.4 m³/day	99.5%	8.4 m²	0.7 mm	1,016 / 101 / 19 mm (OD)
	2,500 gpd	99.5%	90 ft²	28 mil	40 / 4.0 / 0.75 inch
B370 HF	37.2 m³/day	99.5%	34.4 m²	0.8 mm	1,016 / 201 / 29 mm
	9,800 gpd	99.5%	370 ft²	31 mil	40 / 7.9 / 1.125 inch
B400 HF	39.9 m³/day	99.5%	37.2 m²	0.8 mm	1,016 / 201 / 29 mm
	10,500 gpd	99.5%	400 ft²	31 mil	40 / 7.9 / 1.125 inch
B440 HF	43.9 m³/day	99.5%	40.9 m²	0.7 mm	1,016 / 201 / 29 mm
	11,600 gpd	99.5%	440 ft²	28 mil	40 / 7.9 / 1.125 inch
Fouling Resistant (FR)*					(L/Ø/ID/OD)
B090 FR 4040	9.4 m³/day	99.5%	8.4 m²	0.86 mm	1,016 / 101 / 19 mm (OD)
	2,500 gpd	99.5%	90 ft²	34 mil	40 / 4.0 / 0.75 inch
B370 FR	37.2 m³/day	99.5%	34.4 m²	0.86 mm	1,016 / 201 / 29 mm
	9,800 gpd	99.5%	370 ft²	34 mil	40 / 7.9 / 1.125 inch
B400 FR	39.9 m³/day	99.5%	37.2 m²	0.86 mm	1,016 / 201 / 29 mm
	10,500 gpd	99.5%	400 ft²	34 mil	40 / 7.9 / 1.125 inch
Low Energy (LE)**					(L/Ø/ID/OD)
B090 LE 4040***	7.9 m³/day	99.5%	8.4 m²	0.86 mm	1,016 / 101 / 19 mm (OD)
	2,100 gpd	99.5%	90 ft²	34 mil	40 / 4.0 / 0.75 inch
B400 LE	34.8 m³/day	99.5%	37.2 m²	0.86 mm	1,016 / 201 / 29 mm
	9,200 gpd	99.5%	400 ft²	34 mil	40 / 7.9 / 1.125 inch
B440 LE	38.3 m³/day	99.5%	40.9 m²	0.7 mm	1,016 / 201 / 29 mm
	10,100 gpd	99.5%	440 ft²	28 mil	40 / 7.9 / 1.125 inch

Test conditions:

*2,000 mg/l NaCl, 15.5 bar (225 psi), 25 °C (77 °F),
pH 7, recovery rate 15 %

**2,000 mg/l NaCl, 10.3 bar (150 psi), 25 °C (77 °F),
pH 7, recovery rate 15 %

***NSF pending

Dimensions:

L = length
Ø = diameter
ID = center pipe diameter, 8" element
OD = outer diameter, 4" element

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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Lewabrane® RO membrane elements – premium products for many water treatment applications. www.lanxess.com | www.lewabrane.com

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