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LANXESS
Energizing Chemistry

New Lewabrane® Ultra Low Pressure (ULP) RO Membrane Elements

LANXESS expands its product portfolio of Lewabrane® RO membrane elements with ultra low pressure (ULP) types, which are specialized on the treatment of water with low salinity.

Key features

Lewabrane® ultra low pressure (ULP) membrane elements have a highly permeable polyamide membrane designed for applications where high productivity and moderate salt passage are important. The ULP membrane also offers high rejection of low molecular weight organics and critical compounds also known as “micro-pollutants.” The main advantage of the membrane is the near complete removal of these organic compounds at a low operational pressure.

Applications

The typical applications are the filtration of drinking water and wastewater. Drinking water and wastewater plants often process large quantities of raw water daily. A membrane with a higher flux or water permeability can process large quantities of water, hence it has a positive impact on operational costs due to its lower operational pressure. The higher permeability results in 40% lower pressure and therefore lower power consumption in comparison to the standard products.

Product name	Permeate flow	Salt rejection	Membrane area	Feed spacer thickness	Dimensions (L/Ø/ID/OD)
B085 ULP 4040	8.2 m ³ /day	99.5%	7.9 m ²	0.86 mm	1,016/100/19 mm (OD)
	2,150 gpd	99.5%	85 ft ²	34 mil	40/3.9/0.75 inch
B400 ULP ASD	38.6 m ³ /day	99.5%	37.2 m ²	0.86 mm (ASD spacer)	1,016/201/29 mm
	10,200 gpd	99.5%	400 ft ²	34 mil (ASD spacer)	40/7.9/1.125 inch
B440 ULP	42.6 m ³ /day	99.5%	40.9 m ²	0.7 mm	1,016/201/29 mm
	11,300 gpd	99.5%	440 ft ²	28 mil	40/7.9/1.125 inch

Elements are tested under the following conditions:

Applied pressure 7.6 bar (110 psi)
NaCl concentration 500 mg/l
Operating temperature 25 °C (77 °F)
pH 7, and recovery rate 15%

Dimensions:

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

X Lewabrane®

Although the ULP membrane has a high flux, its dense polyamide polymeric structure can reliably reject critical substances and salts to a high level. Thus, the typical application for this membrane is the production of drinking water.

It is widely known that troublesome contaminants should be removed at their source in order to avoid critical pollutants in water. Therefore, wastewater treatment is another important application for ULP membranes.

Table 1: Measured rejection of micro-pollutants

Tested micro-pollutant	Measured rejection (%)
Iomeprol	98.7
Acesulfame	90.4
Carbamazepine	99.3
Mecoprop	99.0
Diclofenac	99.6
Ibuprofen	99.6

Coupon test conditions: < 5 µg/l micro-pollutant, 500 mg/l NaCl, pH 7, 25°C, 7.6 bar

High process reliability

In order to reduce the typical organic fouling in wastewater, the ULP membrane is characterized by the highest hydrophilic surface of all **Lewabrane®** types. The hydrophilicity supports a thin protective water layer on the membrane surface, which reduces the adsorption of organics.

Furthermore, **Lewabrane® B400 ULP ASD** elements have a tailor-made feed spacer based on alternating (thick-thin) strand design (ASD). The 34 mil feed spacer height offers a lower pressure drop compared to standard spacers, and also provides less bioaccumulation in the feed channel (by reduction of stagnant flow areas in the channel). During product development, several experiments were conducted to measure resistance to bio-growth. The data show a 40% longer operational time using the ASD spacer as compared to a standard spacer. This leads to lower operational costs from reduced usage of cleaning chemicals, and longer times between cleaning.

Conclusion

Lewabrane® B400 ULP ASD and its companion product, **Lewabrane® B440 ULP** (with a 10% larger membrane area) are highly recommended for low-salinity water applications. **Lewabrane® ULP** membrane elements offer the following key performance benefits:

- Extremely high flux
- Low operational costs
- Reliable performance due to ASD spacer
- High rejection of micro-pollutants

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