

# QUALITY PURIFIES.



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Energizing Chemistry

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

The **Lewabrane®** spiral wound reverse osmosis (RO) elements of the ULP series have a highly permeable composite polyamide (PA) membrane. The high permeability in combination with a good rejection is the preferred solution if a low energy demand is requested like in the treatment of wastewater or the production of drinking water.

### 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 micropollutants. 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 treatment of low-salinity water like the production of drinking water and the filtration of wastewater. The higher permeability of the ULP product results in 40% lower pressure and therefore lower power consumption in comparison to the standard products. 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.

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

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.

### Measured rejection of micropollutants during the pilot tests

Compound	Family	Avg. rejection
Sulfamethoxazole	antibiotic	87.5%
Diclofenac	anti-inflammatory drug	98.5%
EDTA	sequesterant	99.5%
Glyphosate	herbicide	94.5%

Pilot unit with Lewabrane® B085 ULP 4040 in a wastewater treatment plant.

### High process reliability

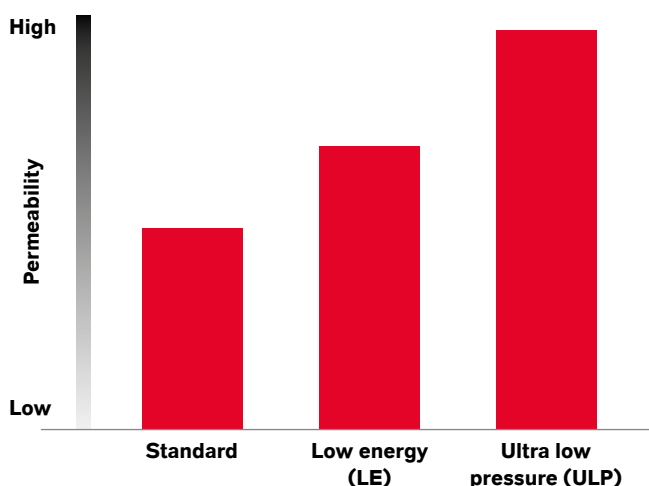
In order to reduce the typical organic fouling in wastewater, the ULP membrane is characterized by the highest hydrophilic surface of all Lewabrane® types. The hydrophilicity supports a thin protective water layer on the membrane surface, which reduces the adsorption of organics.

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 shows a 40% longer operational time using the ASD spacer compared to a standard spacer. This leads to lower operational costs mainly from less downtime of the plant.

### 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 micropollutants



Improved permeability of ultra low pressure elements in comparison to standard brackish water and low energy elements.

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