



DOW FILMTEC™ Membranes

DOW FILMTEC™ SW30ULE-440i Seawater Reverse Osmosis Element with iLEC™ Interlocking Endcaps

Features and Benefits

Dow Water & Process Solutions offers various premium seawater reverse osmosis (RO) elements designed to reduce capital and operation cost of desalination systems. DOW FILMTEC™ products combine premium membrane quality with automated precision fabrication which take system performance to unprecedented levels.

DOW FILMTEC™ SW30ULE-440i is an element of choice for low to medium salinity and temperature waters, for permeate staged systems for stringent water quality targets, and for high feed salinity brackish water applications. It has the highest sustainable flow rate available in the industry, coupled with high rejection of NaCl and boron. This performance can lead to significant capital and operation cost savings, especially when this element is mixed with other element types in the same pressure vessel, using the “internally staged design” approach. . In addition, the combination of highest active area and thickest feed spacer of the Dow FILMTEC membranes results in higher productivity and lower cleaning frequency enabling sustainable lower lifecycle cost. Benefits of the DOW FILMTEC SW30ULE-440i element include:

- The highest seawater element flow rate in the industry, coupled with high rejection, allowing ultra-low energy consumptions. This enables lowest capital and operation cost in a seawater system.
- The highest guaranteed active area of 440 ft² (41 m²) permits lowest system cost by maximizing productivity and enables accurate and predictable system design and operating flux.
- The combination of highest active area with wide feed spacer (28 mil) allows low cleaning frequency and high cleaning efficiency.
- Utilization of the distinct iLEC™ interlocking endcaps that help reduce system operating costs and reduce the risk of o-ring leaks that cause poor water quality (See Form No. 609-00446 for information on cost-saving benefits)
- Sustainable high performance over the operating lifetime, because oxidative treatments are not used in membrane production. This is one reason DOW FILMTEC elements are more durable and may be cleaned more effectively over a wider pH range (1-13) than most other RO elements, which use oxidative treatments.
- Can effectively be used in permeate staged seawater desalination systems without impairing the performance of the downstream stage.
- Automated, precision fabrication with a greater number of shorter membrane leaves reduces the effect of overall fouling and maximizes element efficiency, lowering cost of operation.

Product Specifications

Product	Part Number	Active Area ft ² (m ²)	Maximum Operating Pressure psig (bar)	Permeate Flow Rate gpd (m ³ /d)	Stabilized Boron Rejection %	Minimum Salt Rejection %	Stabilized Salt Rejection %
SW30ULE-440i	335158	440 (41)	1,200 (83)	12,000 (45.4)	89	99.6	99.70

1. The above values are normalized to the following conditions: 32,000 ppm NaCl, 800 psi (5.5 MPa), 77°F (25°C), pH 8, 8% recovery.
2. Permeate flows for individual elements may vary +/-17%
3. Product specifications may vary slightly as improvements are implemented.
4. Active area guaranteed +/-5%. Active area as stated by FilmTec is not comparable to the nominal membrane area figure often stated by some element suppliers. Measurement method described in Form No. 609-00434
5. Specific solute stabilized rejection based on the following test conditions: 3 2,000 ppm NaCl, 800 psi (15.5 bar), 77°F (25°C), pH 8 and 15% recovery, 5 ppm boron



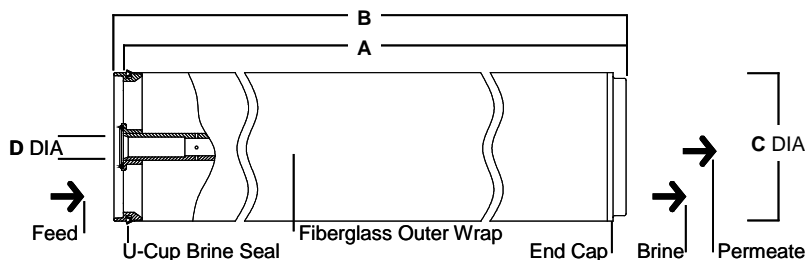
Each DOW™ FILMTEC™ SW30ULE element is tested on flow and rejection performance using a standard test at 700 psi. Further information about these tests is available in the literature (Form No. 609-02161). Potential defects in element construction are detected and elements which do not comply with the quality protocol are discarded. The results of the standard test at 700 psi may be reported in a Certificate of Analysis (COA). All DOW FILMTEC™ elements comply with the performance given in the above table; the certificate of conformance (COC) provides assurance for a customer that the DOW FILMTEC™ element complies with the specified performance.

It is evident the expected results of standard tests performed at 700 psi and 8% recovery, are different from the nominal performance condition of 800 psi and 8% recovery. In order to help with the interpretation of Certificates of Analysis, the performance expectations are described in the Table below.

Performance Expectations of Standard Test, performed at 700 psi (4.8 MPa)

Product	Active Area ft ² (m ²)	Maximum Operating Pressure psig (bar)	Permeate Flow Rate gpd (m ³ /d)	Stabilized Boron Rejection %	Minimum Salt Rejection %	Stabilized Salt Rejection %
SW30ULE-440 <i>z</i>	440 (41)	1,200 (83)	9,000 (34.8)	86.4	99.50	99.60

1. The above benchmark values are based on normalization to the actual test conditions: 32,000 ppm NaCl, 700 psi (4.8 MPa), 77°F (25°C), pH 8 and 8% recovery.
2. Permeate flows for individual elements may vary +/-17%.



Product	Feed Spacer (mil)	Dimensions – Inches (mm)			
		A	B	C	D
SW30ULE-440 ^z	28	40 (1,016)	40.5 (1,029)	7.9 (201)	1.125 (29)

1. Refer to Dow Design Guidelines for multiple-element systems.
 2. Elements fit nominal 8-inch (203 mm) I.D. pressure vessel.
- 1 inch = 25.4 mm

Operating Limits

- Membrane Type Polyamide Thin-Film Composite
- Maximum Operating Temperature 113°F (45°C)
- Maximum Element Pressure Drop 13 psig (0.9 bar)
- pH Range, Continuous Operation^a 2 – 11
- pH Range, Short-Term Cleaning (30 min.)^b 1 – 13
- Maximum Feed Silt Density Index (SDI) SDI 5
- Free Chlorine Tolerance^c <0.1 ppm

A. Maximum temperature for continuous operation above pH 10 is 95°F (35°C).
 B. Refer to Cleaning Guidelines in specification sheet 609-23010.
 C. Under certain conditions, the presence of free chlorine and other oxidizing agents will cause premature membrane failure. Since oxidation damage is not covered under warranty, Dow recommends removing residual free chlorine by pretreatment prior to membrane exposure. Please refer to technical bulletin 609-22010 for more information.

Important Information

Proper start-up of reverse osmosis water treatment systems is essential to prepare the membranes for operating service and to prevent membrane damage due to overfeeding or hydraulic shock. Following the proper start-up sequence also helps ensure that system operating parameters conform to design specifications so that system water quality and productivity goals can be achieved.

Before initiating system start-up procedures, membrane pretreatment, loading of the membrane elements, instrument calibration and other system checks should be completed.

Please refer to the application information literature entitled "[How to Start-Up an RO Membrane System](#)" (Form No. 609-02077) for more information.

Operation Guidelines

Avoid any abrupt pressure or cross-flow variations on the spiral elements during start-up, shutdown, cleaning or other sequences to prevent possible membrane damage. During start-up, a gradual change from a standstill to operating state is recommended as follows:

- Feed pressure should be increased gradually over a 30-60 second time frame.
- Cross-flow velocity at set operating point should be achieved gradually over 15-20 seconds.
- Permeate obtained from first hour of operation should be discarded.

Please refer to product technical manual.

General Information

- Keep elements moist at all times after initial wetting.
- If operating limits and guidelines given in this bulletin are not strictly followed, the limited warranty will be null and void. Refer to the [FILMTEC™ Reverse Osmosis and Nanofiltration Element Three-Year Prorated Limited Warranty](#) (609-35010) for more detail.
- To prevent biological growth during prolonged system shutdowns, it is recommended that membrane elements be immersed in a preservative solution.
- The customer is fully responsible for the effects of incompatible chemicals and lubricants on elements.
- Maximum pressure drop across an entire pressure vessel (housing) is 50 psi (3.4 bar).
- Avoid static permeate-side backpressure at all times.
- Wear protective eye shields, gloves, and sleeves to avoid prolonged contact with eyes, skin, and clothing.

DOW FILMTEC™ Membranes
For more information about DOW FILMTEC membranes, call the Dow Water & Process Solutions business:
North America: 1-800-447-4369
Latin America: (+55) 11-5188-9222
Europe: 800 3 694 6367
Italy: 800 783 825
South Africa: 0800 99 5078
Pacific: +800 7776 7776
China: +800 889 0789
www.dowwaterandprocess.com

Notice: The use of this product in and of itself does not necessarily guarantee the removal of cysts and pathogens from water. Effective cyst and pathogen reduction is dependent on the complete system design and on the operation and maintenance of the system.

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