DOW™ FILMTEC™ Membranes

DOW FILMTEC **HRLE-440*i*** Surface Area, Low-Energy Brackish Water RO Element with ***i*LEC**™ Interlocking Endcaps

Benefits

Featuring breakthrough membrane chemistry, the DOW™ FILMTEC™ HRLE-440*i* element delivers the same 99.5% nominal NaCl rejection as traditional brackish water elements but at 33% lower pressures.

- Lower energy requirements allow new reverse osmosis systems to be designed to use one third less energy and still deliver the same permeate quality compared with other BW elements
- Existing low energy systems can be retrofitted to achieve lower permeate TDS than possible with previous low energy elements
- The combination of low energy and high rejection is ideally suited for use in the second pass of seawater and high-purity applications
- Excellent rejection of silica, boron, nitrate and ammonium; supported by Dow's modeling software
- Increased IPA rejection (IPA rejection is a common surrogate for TOC removal)
- Available dry for longer storage life and easier handling

Product Specifications

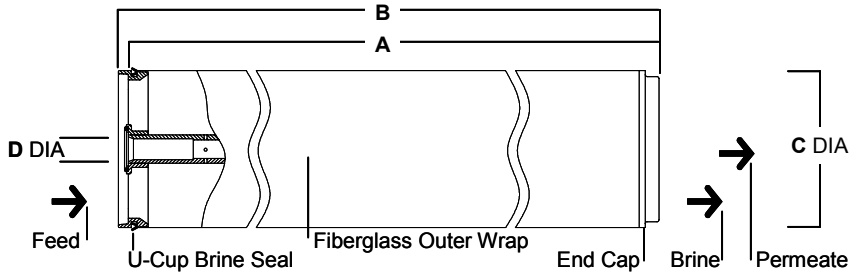
Product	Part number	Active area ft^2 (m^2)	Feed spacer thickness (mil)	Permeate flow rate gpd (m^3/d)	Stabilized salt rejection (%)	Minimum salt rejection (%)
HRLE-440*i*	347733	440 (41)	28	12,650 (48)	99.5	99.3

Typical Stabilized Rejections for Individual Solutes

Silica rejection (%)	Boron rejection (%)	Nitrate rejection (%)	Ammonium rejection (%)	Isopropyl alcohol rejection (%)
99.8	68	97	97.5	94

1. Permeate flow and salt (NaCl) rejection based on the following standard conditions: 2,000 ppm NaCl, 150 psi (10.3 bar), 77°F (25°C), pH 8 and 15% recovery.
2. Flow rates for individual elements may vary but will be no more than 15% below the value shown.
3. Sales specifications may vary as design revisions take place.
4. Active area guaranteed +/-3%. Active area as stated by Dow Water & Process Solutions is not comparable to nominal membrane area often stated by some manufacturers. Measurement method described in Form No. 609-00434.
5. Specific solute stabilized rejections based on the following standard test conditions: 2,000 ppm NaCl, 150 psi (10.3 bar), 77°F (25°C), pH 7 and 15% recovery, 50 ppm SiO_2, 5 ppm B, 100 ppm NO_3^-, 100 ppm $NH4^+$, or 100 ppm IPA.

Figure 1



Dimensions – inches (mm)

Product	A	B	C	D
HRLE-440*i*	40.0 (1,016)	40.5 (1,029)	7.9 (201)	1.125 ID (29)

1. Refer to DOW FilmTec Design Guidelines for multiple-element applications and recommended element recovery rates for various feed sources. 1 inch = 25.4 mm
2. Element to fit nominal 8.0-inch (203 mm) I.D. pressure vessel.
3. Individual elements with ***i*LEC** endcaps measure 40.5 inches (1,029 mm) in length (B). The net length (A) of the elements when connected is 40.0 inches (1,016 mm).

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Operating Limits

• Membrane Type	Advanced Polyamide Thin-Film Composite
• Maximum Operating Temperature[a]	113°F (45°C)
• Maximum Operating Pressure	600 psig (41 bar)
• Maximum Pressure Drop	15 psig (1.0 bar)
• pH Range, Continuous Operation[a]	2 - 11
• pH Range, Short-Term Cleaning (30 min.)[b]	1 - 13
• Maximum Feed Flow	85 gpm (19 m^3/h)
• Maximum Feed Silt Density Index	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 Water & Process Solutions recommends removing residual free chlorine by pretreatment prior to membrane exposure. Please refer to technical bulletin 609-22010 for more information.

General 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 “Start-Up Sequence” (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.

Important Information

- Keep elements moist at all times after initial wetting.
- If operating limits and guidelines given in this bulletin are not strictly followed, the DOW™ FILMTEC™ Reverse Osmosis and Nanofiltration Three-Year Prorated Limited Warranty (Form No. 609-35010) will be null and void.
- 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 drops are 15 psi (1.0 bar) per element or 50 psi (3.4 bar) per multi-element pressure vessel (housing) whichever value is more limiting.
- Avoid static permeate-side backpressure at all times.

Regulatory Note

These membranes may be subject to drinking water application restrictions in some countries: please check the application status before use and sale.

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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