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# FILMTEC™ Membranes

8" Semiconductor Grade Reverse Osmosis Elements

## Features

Ultrapure water specifications and analytical measurement capabilities have advanced to meet the exacting needs of microprocessor, semiconductor and other silicon based device manufacturers.

FILMTEC™ SG30-400/34*i* and SG30LE-440*i* reverse osmosis elements have been developed to meet the requirements of higher overall rejection, higher rejection of lower molecular weight organic compounds and silica and an accelerated TOC rinse down profile. These high surface area elements allow for system design with fewer elements and a lower applied operating pressure, thus optimizing amortization of capital costs while lowering operating cost.

Both elements now come with the unique *iLEC*™ interlocking endcaps that reduce system operating costs, reduce the risk of o-ring leaks and the generation of small particles that lead to poor water quality, and eliminate the need for lubricants. See form No. 609-00446 for more information on the benefits of *iLEC* interlocking endcaps.

SG30-400/34*i* is intended primarily for polishing use in traditional UPW systems designed for higher pressure operation. It features a 34 mil spacer to lessen the impact of fouling and pressure drop across a vessel, increasing running time between cleaning and enhancing cleaning effectiveness.

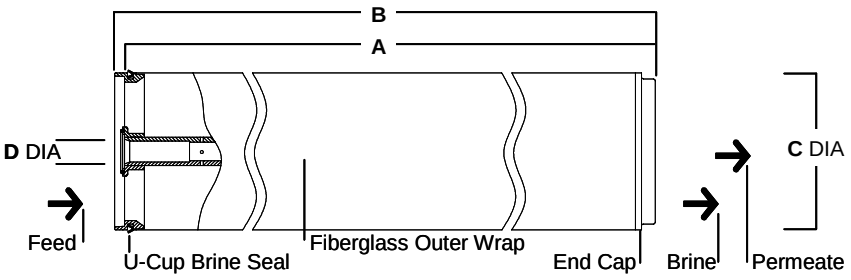
SG30LE-440*i* is intended primarily for polishing use in newer UPW equipment where the benefits of lower capital cost and lower energy consumption add value.

## Product Specifications

| Product | Part Number | Active Area $ft^2$ ($m^2$) | Permeate Flow Rate gpd ($m^3$/d) |
|---|---|---|---|
| SG30-400/34*i* | 272569 | 400 (37) | 10,200[1] (38.6) |
| SG30LE-440*i* | 272573 | 440 (41) | 10,000[2] (38) |

1. Pure water flow based on the following conditions: 225 psi (1.55 MPa), 77°F (25°C) and 15% recovery.
2. Pure water flow based on the following conditions: 107 psi (0.74 MPa), 77°F (25°C) and 15% recovery.
3. Flow rates for individual elements may vary but will be not more than 15% below the value shown.
4. Product specifications may vary slightly as improvements are implemented.
5. Typical stabilized salt rejection ($Cl^-$) for individual element is 99.5% under the test conditions of 2,000 ppm NaCl, 225 psi (1.55 MPa) for SG30-400/34*i* and 150 psi (1.03 MPa) for SG30LE-440*i*, 77°F (25°C), pH 8 and 15% recovery. At lower TDS (<5 ppm), ion rejections are decreased depending on ionic strength, pH and ionic species.

## Figure 1




| Product | Maximum Feed Flow Rate gpm ($m^3$/h) | Typical Recovery Rate (%) | Dimensions – Inches (mm) A | B | C | D |
|---|---|---|---|---|---|---|
| SG30-400/34*i* | 85 (19) | 15 | 40.0 (1,016) | 40.5 (1,029) | 7.9 (201) | 1.125 ID (29) |
| SG30LE-440*i* | 85 (19) | 15 | 40.0 (1,016) | 40.5 (1,029) | 7.9 (201) | 1.125 ID (29) |

1. Typical recovery rate shown is for a single element. Recovery rate is calculated by dividing permeate flow rate by feed flow rate.
2. Refer to FilmTec Design Guidelines for multiple-element systems.
3. SG30-400/34*i* and SG30LE-440*i* elements fit nominal 8.0-inch (203 mm) I.D. pressure vessel.
4. SG30LE-440*i* now has an industry standard 1.125-inch I.D. permeate tube. If required, SG30LE-440*i* can be connected in series with the old SG30LE-430 (1.5-inch I.D. tube) using interconnector part number 196309.

1 inch = 25.4 mm

## Operating Limits

| | |
|---|---|
| • Membrane Type | Polyamide Thin-Film Composite |
| • Maximum Operating Temperature | 113°F (45°C) |
| • Maximum Operating Pressure | 600 psig (4.1 MPa) |
| • Maximum Differential Pressure | 15 psig (0.1 MPa) |
| • pH Range, Continuous Operation[a] | 2 - 11 |
| • pH Range, Short-Term Cleaning (30 min.)[b] | 1 - 13 |
| • 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, FilmTec recommends removing residual free chlorine by pretreatment prior to membrane exposure. Please refer to technical bulletin 609-02034 for more information.

## Organic Rejection Data

Rejection data for organic species are tabulated below.

Table 1. Typical organic compounds rejection

| Organic compound | MW | Rejection (%) SG30-400/34*i*[1] | Rejection (%) SG30LE-440*i*[2] |
|---|---|---|---|
| Methanol | 32 | 14 | 13 |
| Ethanol | 46 | 50 | 40 |
| Acetone | 58 | 68 | 48 |
| Isopropanol | 60 | 95 | 92 |

Test conditions: 1. Feed concentration 10 ppm, 214 psi (1.47 MPa), 25°C, pH 7 and 15% recovery.
2. Feed concentration 10 ppm, 107 psi (0.74 MPa), 25°C, pH 7 and 15% recovery.

## 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 “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.

## 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.
- 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 (0.34 MPa).
- Avoid static permeate-side backpressure at all times.