



## Product Data Sheet

### FilmTec™ Heat Sanitizable RO Elements

#### Description

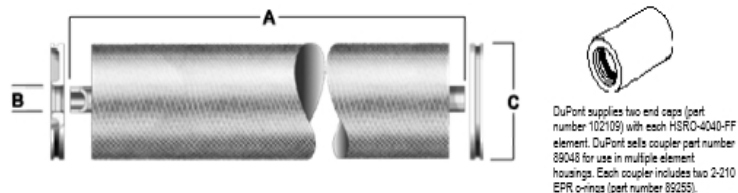
FilmTec™ HSRO heat sanitizable reverse osmosis membrane elements deliver outstanding quality water with the added capability to withstand sanitization with hot water. Hot water sanitization eliminates the need for chemical sanitizers. The full-fit configuration minimizes stagnant areas and is optimal for applications requiring a sanitary design. All components comply with FDA standards.

#### Typical Properties

| FilmTec™ Element | Part Number | Active Area<br>ft <sup>2</sup> (m <sup>2</sup> ) | Applied Pressure<br>psig (bar) | Permeate Flow Rate<br>gpd (m <sup>3</sup> /d) | Stabilized Salt Rejection % |
|------------------|-------------|--------------------------------------------------|--------------------------------|-----------------------------------------------|-----------------------------|
| HSRO-4040-FF     | 98592       | 90 (8.4)                                         | 150 (10.3)                     | 1,900 (7.2)                                   | 99.5                        |

1. Permeate flow and salt rejection based on the following test conditions: 2,000 ppm NaCl, pressure specified above, 77°F (25°C) and 15% recovery.
2. Elements must be conditioned prior to start-up. A one-time flux loss will occur during stabilization. Listed values apply after performance stabilization.
3. Permeate flows for individual elements may vary ±20%.
4. For the purpose of improvement, specifications may be updated periodically.

#### Element Dimensions



| FilmTec™ Element | Dimensions – inches (mm) |                | 1 inch = 25.4 mm |
|------------------|--------------------------|----------------|------------------|
|                  | A                        | B              | C                |
| HSRO-4040-FF     | 40.0 (1,016)             | 0.75 OD (19.0) | 3.9 (99)         |

1. Refer to [FilmTec™ Design Guidelines for multiple-element systems of midsize elements](#) (Form No. 45-D01588-en).
2. HSRO-4040-FF fits nominal 4 inch I.D. pressure vessels.

## Operating Limits

|                                              |                               |
|----------------------------------------------|-------------------------------|
| Membrane Type                                | Polyamide Thin-Film Composite |
| Maximum Operating Temperature <sup>a</sup>   | 113°F (45°C)                  |
| Maximum Sanitization Temperature (@ 25 psig) | 185°F (85°C)                  |
| Maximum Operating Pressure                   | 600 psig (41 bar)             |
| Maximum Element Pressure Drop                | 15 psig (1.0 bar)             |
| pH Range                                     |                               |
| Continuous Operation <sup>a</sup>            | 2 – 11                        |
| Short-Term Cleaning <sup>b</sup>             | 1 – 12                        |
| Maximum Feed Silt Density Index (SDI)        | SDI 5                         |
| Free Chlorine Tolerance <sup>c</sup>         | <0.1 ppm                      |

- a. Maximum temperature for continuous operation above pH 10 is 95°F (35°C).
- b. Refer to [Cleaning Guidelines](#) (Form No. 45-D01696-en).
- 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, residual free chlorine should be removed by pretreatment prior to membrane exposure. Please refer to [FilmTec™ Design Guidelines for multiple-element systems of 8-inch elements](#) (Form No. 45-D01695-en) for more information.

## Important Operating Information

New FilmTec™ HSRO heat sanitizable spiral elements must be pre-conditioned prior to initial use by exposure to hot water. Suitable quality water must be used during all pre-conditioning steps. This water is chlorine-free, non scaling/fouling water. RO permeate is preferred, but pre-filtered feed water may be used. An appropriate conditioning procedure consists of the following:

- Flush to drain with suitable quality water at low pressure and low permeate flow rate.
- Recycle warm water (45°C or less) at very low pressure (< 25 psig trans-membrane pressure with a maximum feed pressure of 45 psig (3 bar)).
- Introduce hot water to the system to increase temperature to 80°C (176°F).
- Keep trans-membrane pressure below 25 psig (1.7 bar) when warm or hot water (45°C or higher) is being fed to the membranes.
- Maintain temperature for 60-90 minutes.
- Allow system to cool to 45°C or below.
- Flush to drain with suitable water quality at very low pressure (< 25 psig trans-membrane pressure with maximum feed pressure of 45 psig (3 bar))<sup>d</sup>.
- DO NOT recycle permeate during pre-conditioning.
- DO NOT start-up a second pass RO before the first pass RO has been pre-conditioned.

d. This step is needed to ensure that the element components have cooled to below 45°C.

## 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.

Please refer to the [FilmTec™ Reverse Osmosis Membranes Technical Manual](#) (Form No. 45-D01504-en).

## 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 control 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 60 psi (4.1 bar).
- Avoid static permeate-backpressure at all times.

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Please be aware of the following:

- 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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