FILMTEC Membranes

FILMTEC Heat Sanitizable RO Elements

Features

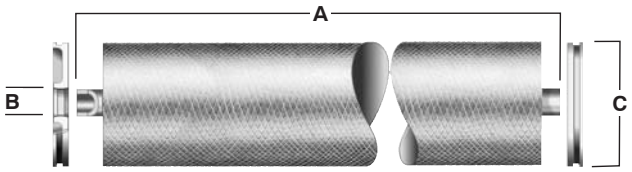
FILMTEC™ HSRO heat sanitizable reverse osmosis membrane elements deliver outstanding quality water with the added capability to withstand sanitization with hot water. HSRO elements, manufactured on advanced automated equipment, have the highest active membrane area in the industry. This high area allows system designs with either lower operating flux or cost savings from fewer membrane elements. The full-fit configuration minimizes stagnant areas and is optimal for applications requiring a sanitary design. All components comply with FDA standards.

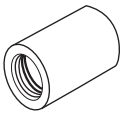
Product Specifications

Product	Part Number	Active Area ft^2 (m^2)	Applied Pressure psig (bar)	Permeate Flow Rate gpd (m^3/d)	Stabilized Salt Rejection (%)
HSRO-4040-FF	98592	90 (8.4)	150 (10.3)	1,900 (7.2)	99.5
HSRO-390-FF	170701	390 (36)	150 (10.3)	9,000 (34)	99.5

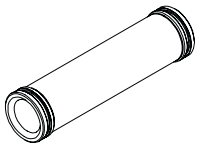
1. HSRO-4040-FF was previously named SG30-85-HS. HSRO-390-FF was previously named SG30-390-HS.
2. Permeate flow and salt rejection based on the following test conditions: 2000 ppm NaCl, pressure specified above, 77°F (25°C) and 15% recovery.
3. Elements must be conditioned prior to start-up. A one-time flux loss will occur during stabilization. Listed values apply after performance stabilization.
4. Permeate flows for individual elements may vary +/-20%.
5. For the purpose of improvement, specifications may be updated periodically.

Figure 1





FilmTec supplies two end caps (part number 102109) with each HSRO-4040-FF element. FilmTec sells coupler part number 89048 for use in multiple element housings. Each coupler includes two 2-210 EPR o-rings (part number 89256).



FilmTec supplies two end caps (part number 113199) and one coupler (part number 103968) with each HSRO-390-FF element. Each coupler includes four 2-119 EPR o-rings (part number 89256).

Dimensions – Inches (mm)

Product	A	B	C
HSRO-4040-FF	40.0 (1,016)	0.75 OD (19.0)	3.9 (99)
HSRO-390-FF	40.0 (1,016)	1.13 ID (28.6)	7.9 (200)

1. Refer to FilmTec Design Guidelines for multiple-element systems.
2. HSRO-4040-FF fits nominal 4 inch I.D. pressure vessels. HSRO-390-FF fits nominal 8 inch I.D. pressure vessels.

1 inch = 25.4 mm

Operating Limits

- Membrane Type: Polyamide Thin-Film Composite
- Maximum Operating Temperature[a]: 113°F (45°C)
- Maximum Sanitization Temperature (@ 25 psig): 185°F (85°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[b]: 1 – 12
- 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 609-22010 for more information.

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Important Information

New HSRO heat sanitizable spiral elements must be pre-conditioned prior to initial use by exposure to hot water. 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)).

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

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 prefiltered feedwater may be used.

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

FILMTEC Membranes
For more information about FILMTEC membranes, call the Dow Liquid Separations business:
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http://www.filmtec.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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