Product Data Sheet

FilmTec™ Heat Sanitizable RO Elements

Description

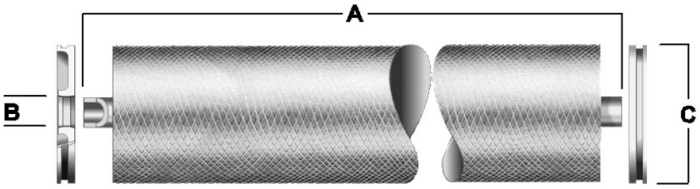
FilmTec™ HSRO heat sanitizable reverse osmosis membrane elements deliver outstanding quality water with the added capability to withstand sanitization with hot water. Hot water sanitization eliminates the need for chemical sanitizers. The full-fit configuration minimizes stagnant areas and is optimal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

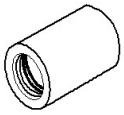
Typical Properties

FilmTec™ Element	Active Area ft^2 (m^2)	Applied Pressure psig (bar)	Stabilized Permeate Flow Rate gpd (m^3/d)	Stabilized Salt Rejection %
HSRO-4040-FF	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





DuPont supplies two end caps (part number 102109) with each HSRO-4040-FF element. DuPont sells coupler part number 89048 for use in multiple element housings. Each coupler includes two 2-210 EPR o-rings (part number 89255).

	Dimensions – inches (mm)		1 inch = 25.4 mm
FilmTec™ Element	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.

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Operating and Cleaning Limits

Membrane Type	Polyamide Thin-Film Composite
Maximum Operating Temperature[a]	113ºF (45ºC)
Maximum Sanitization Temperature (@ 25 psig)	185ºF (85ºC)
Maximum Operating Pressure	600 psig (41 bar)
Maximum Element Pressure Drop	15 psig (1.0 bar)
pH Range	
Continuous Operation[a]	2 – 11
Short-Term Cleaning[b]	1 – 12
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 95ºF (35ºC).
b. Refer to FilmTec™ 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 Dechlorinating Feedwater (Form No. 45-D01569-en) for more information.

Important Operating Information

Before pre-conditioning, membranes will operate at reduced feed pressure and salt rejection. New FilmTec™ HSRO heat sanitizable spiral elements must be pre-conditioned prior to initial use by exposure to hot water, to perform to specifications. 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:

1. Flush to drain with suitable quality water (for ~30 min) at low pressure and low permeate flowrate.
2. Recycle warm water until the system warms up (45°C or less) at very low pressure (< 25 psig (1.7 bar) trans-membrane pressure with a maximum feed pressure of 45 psig (3 bar)). Maximum pressure drop through a single element is 1.5 psig (0.1 bar).
3. Introduce hot water to the system to increase temperature to 80°C (176°F). Ramp temperature up at a rate no faster than 1-2 ºC/min (max 4ºC/min).
4. 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.
5. Maintain temperature for 60 – 90 minutes.
6. Allow system to cool to 45°C or below. Ramp temperature down at a rate no faster than 1-2 ºC/min (max 4ºC/min).
7. Flush to drain with suitable water quality (for ~30 min) at very low pressure (< 25 psig (1.7 bar) trans-membrane pressure with maximum feed pressure of 45 psig (3 bar)).

Note: DO NOT recycle permeate during the FIRST heat-setting process (pre-conditioning) from step 2 to 6. In case the system does not allow to drain permeate during heating process, please contact your DuPont representative for further information and alternatives.

Note: DO NOT start-up a second pass RO before the first pass RO has been pre-conditioned.

The procedure for regular sanitization may be the same as described above, in this case both concentrate and permeate may be recycled.

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.

Product Stewardship

DuPont has a fundamental concern for all who make, distribute, and use its products, and for the environment in which we live. This concern is the basis for our product stewardship philosophy by which we assess the safety, health, and environmental information on our products and then take appropriate steps to protect employee and public health and our environment. The success of our product stewardship program rests with each and every individual involved with DuPont products—from the initial concept and research, to manufacture, use, sale, disposal, and recycle of each product.

Customer Notice

DuPont strongly encourages its customers to review both their manufacturing processes and their applications of DuPont products from the standpoint of human health and environmental quality to ensure that DuPont products are not used in ways for which they are not intended or tested. DuPont personnel are available to answer your questions and to provide reasonable technical support. DuPont product literature, including safety data sheets, should be consulted prior to use of DuPont products. Current safety data sheets are available from DuPont.

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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