FILMTEC Membranes

Desalting Nanofiltration Elements for Process Streams

Features

FILMTEC™ NF membrane elements are designed for process applications where a separation of solutes is desired. NF is a durable membrane designed to reject organics with a molecular weight above 200 while passing monovalent salts. FILMTEC NF membrane elements replace NF45 elements in a variety of applications such as desalting organic compounds, acid processing, metal recovery from waste streams and antifreeze recovery.

Product Specifications

Product	Part number	Design active area – ft^2 (m^2)
NF-2540	151538	28 (2.6)
NF-4040	151543	82 (7.6)
NF-400 (8040 style)	151544	400 (37.2)

1. Permeate flow and salt rejection based on the following test conditions: 2,000 ppm $MgSO_4$, 130 psig (8.9 bar), 77°F (25°C), pH 8 and 15% recovery.
2. Target water flow rates for new elements are: NF-2540 – 750 gpd (2.8 m^3/d), NF-4040 – 1,950 gpd (7.4 m^3/d), NF-400 – 11,000 gpd (41.6 m^3/d).
3. Minimum $MgSO_4$ rejection is 98.0%. Stabilized rejection is >99%.
4. Product specifications may vary slightly as improvements are implemented.

Figure 1.

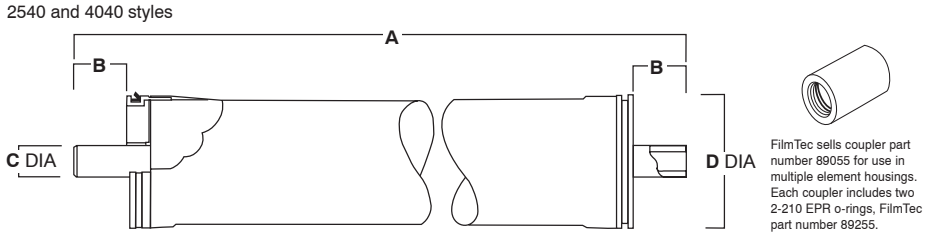
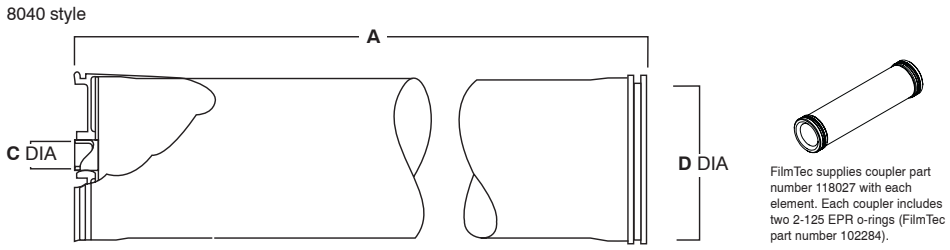


Figure 2.



Product	Maximum feed flow rate, gpm (m^3/h)	Typical recovery rate (%)	Dimensions – inches (mm) A	B	C	D
NF-2540	6 (1.4)	15	40.00 (1,016)	1.19 (30.2)	0.75 (19)	2.4 (61)
NF-4040	16 (3.6)	15	40.00 (1,016)	1.05 (25.7)	0.75 (19)	3.9 (99)
NF-400 (8040 style)	70 (16)	15	40.00 (1,016)	–	1.13 (28.6)	7.9 (200)

1. Typical recovery rate shown is for a single element. Recovery rate is calculated by dividing permeate flow rate by feed flow rate.
2. NF-2540 elements have a tape outerwrap. NF-2540 elements fit nominal 2.5 inch I.D. pressure vessel.
3. NF-4040 elements have a fiberglass outerwrap. NF-4040 elements fit nominal 4 inch I.D. pressure vessel.
4. NF-400 elements have a fiberglass outerwrap. NF-400 elements fit nominal 8 inch I.D. pressure vessel.

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Operating Limits

• Membrane type	Polypiperazine amide 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	3 - 10
• pH range, short-term cleaning[a]	1 - 11.5
• Free chlorine concentration[b]	< 0.1 ppm
• Hydrogen peroxide:	
Continuous operation (@ 77°F/25°C max.)	20 ppm
Short-term sanitizing (@77°F/25°C max.)	1,000 ppm

[a] Refer to Cleaning Guidelines in specification sheet 609-00077.

[b] 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.

Important Information

Because they are used on valuable process streams, new NF spiral elements are often cleaned prior to initial use. The cleaning procedure should be based on the application for which the elements are to be used. If cleaning with formulated agents is not available, an alkaline wash with wetting agent is recommended prior to initial use.

An appropriate alkaline wash consists of the following:

- Flushing with water (ensure water quality meets guidelines found in bulletin 609-00077).
- Heating water to 113°F (45°C) in recirculation made.
- Adding 0.2% Na-EDTA and NaOH to pH 11 and recirculating for 30 minutes.
- Flushing with water until neutral pH is obtained.

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.
- Before initiating cross-flow at high permeate flux conditions (e.g., start-up with high-temperature water), the set operating pressure should be maintained for 5-10 minutes.
- Cross-flow velocity at set operating point should be achieved gradually over 15-20 seconds.

General Information

- Keep elements moist at all times after initial wetting.
- If operating specifications given in this Product Information bulletin are not strictly followed, the limited warranty will be null and void.
- To prevent biological growth during 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 (3.4 bar).
- Avoid permeate-side backpressure at all times.

FILMTEC Membranes
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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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