DOW™ FILMTEC™ Membranes

DOW FILMTEC **BW30FR-365** Fouling Resistant RO Element

Features

DOW™ FILMTEC™ BW30FR-365 elements have purified high biofouling feed waters since 1997. Numerous customers around the world have experienced lower operating costs by using DOW FILMTEC fouling resistant elements due to their exceptional fouling resistance and cleanability. The BW30FR-365 element features:

- A wide (34 mil) feed spacer to facilitate improved cleaning.
- A proprietary modification to the FT30 membrane chemistry providing superior cleanability and resistance to fouling.
- DOW FILMTEC membrane with one of the widest pH cleaning ranges in the industry (pH 1-13) allowing for effective cleaning of scaling, organic compounds and biofilm.
- Efficient membrane element design with more, shorter membrane leaves to help reduce the overall effect of fouling.

The DOW FILMTEC BW30FR-365 element can be used for both potable and non-potable water applications.

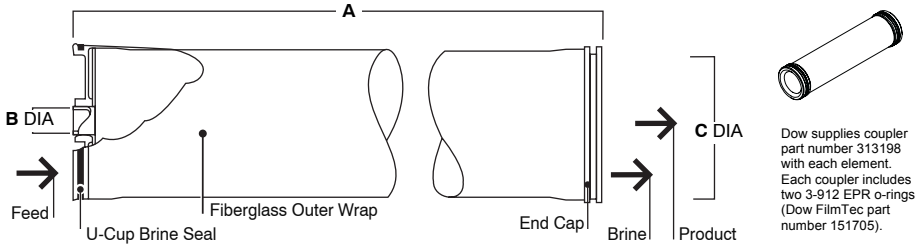
A system designer can take advantage of this high productivity, high rejection, fouling resistant reverse osmosis (RO) element in any system design where the potential of high biofouling is expected. In addition, existing installations that are experiencing high biofouling or frequent cleanings can be upgraded by retrofitting to the FILMTEC BW30-365-FR element. In either case DOW FILMTEC BW30FR-365 elements can reduce the operating costs in most biofouling cases by lowering membrane fouling, reducing average system operating pressure, and extending membrane life.

Product Specifications

Product	Part number	Active area ft^2 (m^2)	Feed spacer thickness (mil)	Permeate flow rate gpd (m^3/d)	Stabilized salt rejection (%)	Minimum salt rejection (%)
BW30FR-365	174961	365 (34)	34	9,500 (36)	99.5	99.0

1. Permeate flow and salt rejection based on the following standard conditions: 2,000 ppm NaCl, 225 psi (15.3 bar), 77°F (25°C), pH 8 and 15% recovery.
2. Flow rates for individual elements may vary but will be no more than 15% below the value shown.
3. Sales specifications may vary as design revisions take place.
4. Active area guaranteed +/-3%. Active area as stated by Dow is not comparable to nominal membrane area often stated by some manufacturers. Measurement method described in Form No. 609-00434.

Figure 1.



Product	Dimensions – inches (mm) A	B	C
BW30FR-365	40.0 (1016)	1.125 (29)	7.9 (201)

1. Refer to Dow FilmTec Design Guidelines (Form Number 609-21010) for multiple-element systems.
2. BW30FR-365 fits nominal 8-inch (203 mm) I.D. pressure vessel.

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Operating Limits

• Membrane Type	Polyamide 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[a]	2 - 11
• pH Range, Short-Term Cleaning (30 min.)[b]	1 - 13
• Maximum Feed Flow	70 gpm (16 m^3/h)
• 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.

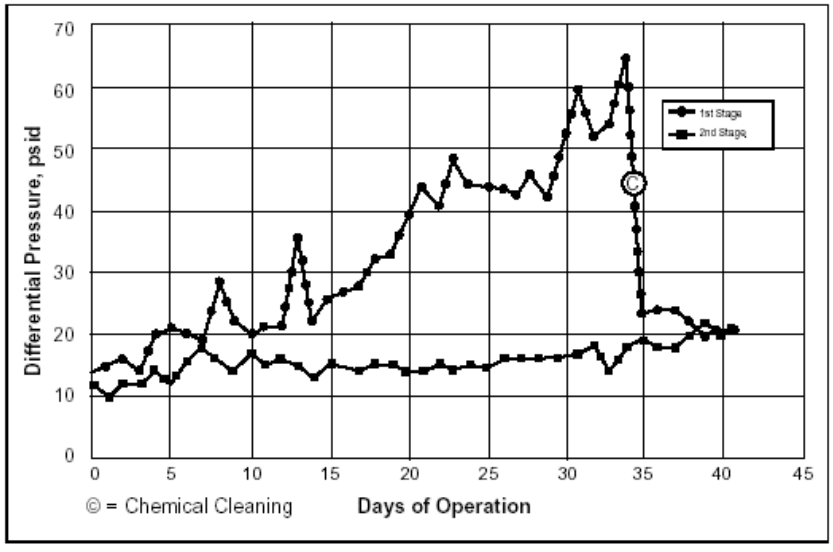
[c] Under certain conditions, the presence of free chlorine and other oxidizing agents will cause premature membrane failure. Since oxidation damage is not covered under warranty, Dow recommends removing residual free chlorine by pretreatment prior to membrane exposure. Please refer to technical bulletin 609-22010 for more information.

Performance Improvement

Figure 2 illustrates the rapid rise of differential pressure vs. time in stage 1 of an RO system using standard brackish water RO elements. In just 35 days the differential pressure rose significantly leading to higher energy consumption. Also the pressure drop in stage 2 doubled. Other performance throttling effects on the RO membrane are:

- Loss of or decline in membrane flux resulting in lower productivity;
- Frequent chemical cleanings triggering an increase in operation and maintenance costs;
- Reduction in permeate quality;
- Shortened useful membrane/element life.

Figure 2. Historical Startup Data – Standard RO Elements Differential Pressure

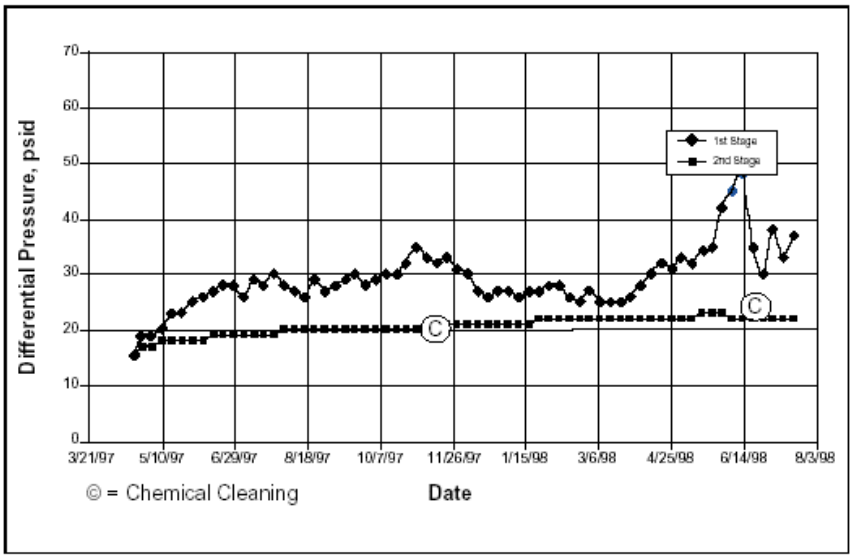


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Figure 3 shows the stable operation, in stage 1 and stage 2, of a DOW™ FILMTEC™ BW30FR-365 element. Note that in this example, the cleaning frequency was more than 6 months.

To learn more on how DOW FILMTEC FR elements can reduce operating costs and improve RO system reliability, we refer you to our brochure "DOW FILMTEC Fouling Resistant Membrane Elements – Winning The Battle Against Biofilm Formation", Form No. 609-00261.

Figure 3. Performance of Fouling Resistant RO Elements Differential Pressure



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.

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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 DOW™ FILMTEC™ Reverse Osmosis and Nanofiltration Three-Year Prorated Limited Warranty (Form No. 609-35010) 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 (3.4 bar).
- Avoid static permeate-side backpressure at all times.

Regulatory Note

These membranes may be subject to drinking water application restrictions in some countries: please check the application status before use and sale.

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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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