FILMTEC Membranes

FILMTEC® 8" Fouling Resistant RO Elements

As the acceptance of RO technology has grown so has the diversity of its application leading it to be used in high bio-fouling feed waters. To improve the performance of RO elements operating under those conditions Dow has developed a series of fouling resistant (FR) RO elements using proprietary surface modifications of the FT30 membrane chemistry. The FILMTEC BW30-365 FR1 element is suitable for use in potable water applications; whereas, the FILMTEC BW30-365 FR2 element is recommended for use in non-potable water applications. Both RO elements use FilmTec's unique element construction utilizing more, but shorter membrane leafs that yield an unsurpassed element efficiency not only in productivity but in cleanability.

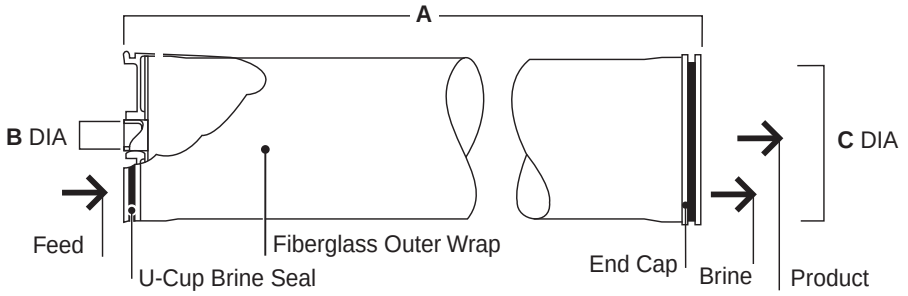
The FILMTEC BW30-365 FR1 and FILMTEC BW30-365 FR2 elements have a nominal active membrane area of 365 square feet and an average permeate flow of 9,500 GPD (36 m^3/d) under standard test conditions. The high surface area of these FR elements permits design of new RO systems that meet productivity targets with fewer elements which means more compact systems resulting in significantly lower system components and installation expenses.

The productivity advantages of the FR elements can also be employed in the design of new systems that can produce the desired flow while operating at lower feed pressures. Also, since the FILMTEC BW30-365 FR1 and FILMTEC BW30-365 FR2 have the same high flow and high rejection spec as the FILMTEC BW30-365 it can easily be used in retrofit applications to obtain lower membrane fouling, reduce average system operating pressure, and extended membrane service life.

Product Specifications

Product	Nominal Active Surface Area ft^2 (m^2)	Product Water Flow Rate gpd (m^3/d)	Stabilized Salt Rejection Cl^- (%)
BW30-365 FR1	365 (34)	9,500 (36)	99.5
BW30-365 FR2	365 (34)	9,500 (36)	99.5

1. Permeate flow and salt rejection based on the following standard conditions: 2000 ppm NaCl, 225 psi (1.6 MPa), 77°F (25°C), pH 8, and 15% recovery.
2. Flow rates for individual elements may vary but will be no more than 7% below the value shown.
3. Minimum salt rejection for individual elements is 98.0%.
4. A 34 mil. brine channel spacer is used to facilitate cleaning.



Product	Single-Element Recovery (Permeate Flow to Feed Flow)	Dimensions – Inches (mm) A	B	C
BW30-365 FR1	0.15	40 (1.016)	1.125 (29)	7.9 (201)
BW30-365 FR2	0.15	40 (1.016)	1.125 (29)	7.9 (201)

1 inch = 25.4 mm

5. Consult the most recent DESIGN GUIDELINES for multiple-element applications and recommended element recovery rates for various feed sources.
6. Element to fit 8.00-inch (203 mm) I.D. pressure vessel.

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Operating Limits

Membrane Type ..... Thin-Film Composite
Maximum Operating Pressure ..... 600 psi (4.1 MPa)
Maximum Operating Temperature ..... 113°F (45°C)
Maximum Feed Turbidity ..... 1 NTU
Free Chlorine Tolerance ..... <0.1 ppm
pH Range, Continuous Operation 2–11
pH Range, Short-Term Cleaning (30 min.) 1–12
Maximum Feed Flow ..... 70 gpm (16 m^3/h)
Maximum Feed Silt Density Index ..... SDI 5

Performance Improvement

Figure 1 illustrates the rapid rise of differential pressure vs. time in the 1st array of an RO system using standard BW RO elements. In just 35 days the differential pressure rose significantly leading to higher energy consumption. Also the 2nd array delta pressure doubled in pressure. 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 O&M costs
- Reduction in permeate quality
- Shortened useful membrane/ element life.

Figure 1. Historical Startup Data – Standard RO Elements Differential Pressure

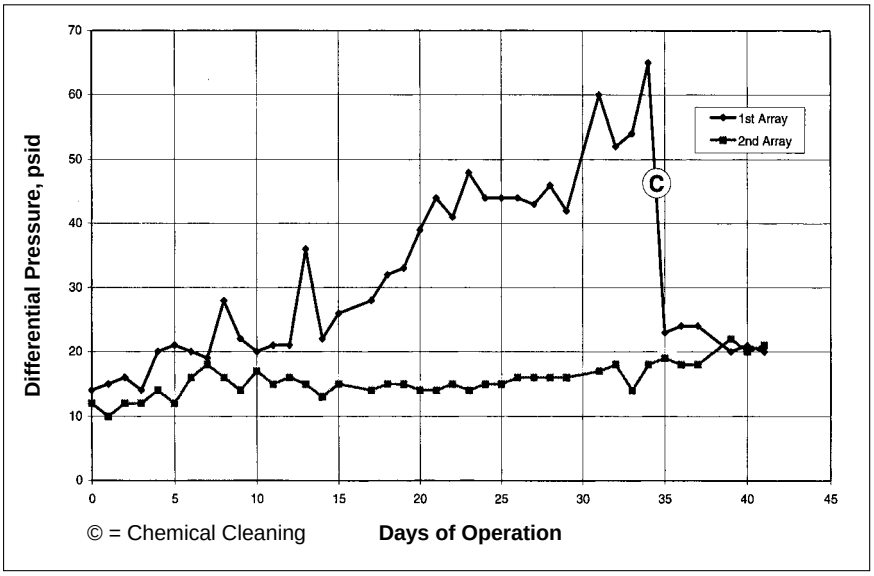

Figure 2. Performance of Fouling Resistant RO Elements Differential Pressure

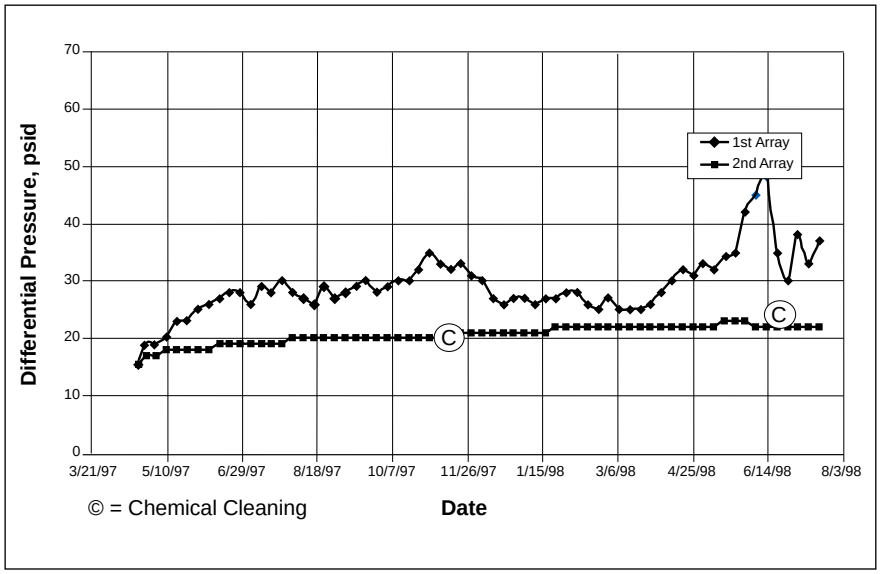

Figure 2 shows the more stable operation, both in the 1st and 2nd array, of a FILMTEC BW30-365 FR2 element. Note that in this example, the cleaning frequency was more than 6 months.

To learn more on how these new FILMTEC FR elements can save you money and get your operation under control we refer you to our brochure “FILMTEC Fouling Resistant Membrane Elements - Winning The Battle Against Biofilm Formation”, Form No. 609-00261 (CH 172-224-E).

FILMTEC Membranes

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Important Operation Information

1. Keep elements moist at all times after initial wetting.
2. If operating specifications given in this Product Information bulletin are not strictly followed, the limited warranty will be null and void.
3. Permeate obtained from the first hour of operation should be discarded.
4. To prevent biological growth during storage, shipping or system shutdowns, it is recommended that elements be immersed in a protective solution. The standard storage solution contains 1.5 percent (by weight) sodium metabisulfite (food grade).
5. Elements must be in use for at least six hours before formaldehyde is used as a biocide. If the elements are exposed to formaldehyde before being in use for this period of time, a loss in flux may result.
6. The membrane shows some resistance to short-term attack by chlorine (hypochlorite). Continuous exposure, however, may damage the membrane and should be avoided.
7. The customer is fully responsible for the effects of incompatible chemicals on elements. Their use will void the element limited warranty.

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