Tech Fact

FilmTec™ Fortilife™ CR100 low pressure drop reverse osmosis membrane element

The Problem

Control of biological fouling is one of the challenges in Reverse Osmosis ("RO") systems operation. Biological fouling (biofouling) can be defined as the growth and accumulation of micro-organisms and their respective extracellular polymeric materials (EPS) inside the feed channel of the spiral wound RO element. When biofouling occurs, the feed channel becomes blocked and causes the feed-concentrate pressure drop (dP) across the RO pressure vessel to increase and the water permeability through the membrane to decrease. In addition to reducing the system efficiency, elements may be irreversibly damaged if the pressure vessel dP exceeds, 3.5 bar (50 psi). Clean-in-place (CIP) protocols employing chemicals are used to manage the system dP when biofouling occurs, but these may be necessary as frequently as every 1-2 weeks. Summarizing, biofouling and frequent cleanings will affect energy and chemical consumption, element lifetime, water productivity and cost of water produced.

The Solution

The FilmTec™ Fortilife™ CR100 fouling resistant Reverse Osmosis Elements ("Elements") offer a reduced frequency of cleanings due to biofouling. These elements are built on FilmTec™ RO characteristic performance standards, and offer greater fouling-resistance supported by advances in membrane chemistry and element design for biofouling prone water types. FilmTec™ Fortilife™ RO Elements can help to achieve:

- Up to 50% reduction in the number of cleanings compared to standard elements
- Effective and efficient cleaning of biofilm, organic compounds and scale, achieved through the ability to use a wide pH range during cleaning (pH 1–13)
- Up to 10% energy savings at the same water productivity compared to the standard elements

The 8-inch FilmTec™ Fortilife™ CR100 elements offer 11,500 gallons of water per day with 99.7% stabilized salt rejection (99.4% minimum rejection) and a pressure drop of 0.1 bar at standard test conditions of 2,000 ppm NaCl, 225 psi (15.5 bar), 77 °F (25 °C), pH 8 and 15% recovery.

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FilmTec™ Fortilife™ CR100 Pressure Drop Competitive Benchmarking

One measure used to assess the biofouling resistance of an RO element is the feed-concentrate pressure drop (dP), which is related to the element construction.

Pressure drop of various fouling resistant RO elements with 34 mil feed spacer available on the market was compared (Figure 1). In comparison to other two commercially available elements, FilmTec™ Fortilife™ CR100 offers energy savings and a potential reduction in cleaning frequencies though:

- Lowest pressure drop element design
- 56%* lower pressure drop (dP) than the Brand A brackish water fouling resistant element
- 30%* lower pressure drop (dP) than the Brand B brackish water fouling resistant element

*measured at feed flow of 12.5 m^3/h, selected as a references for the front element during brackish water filtration

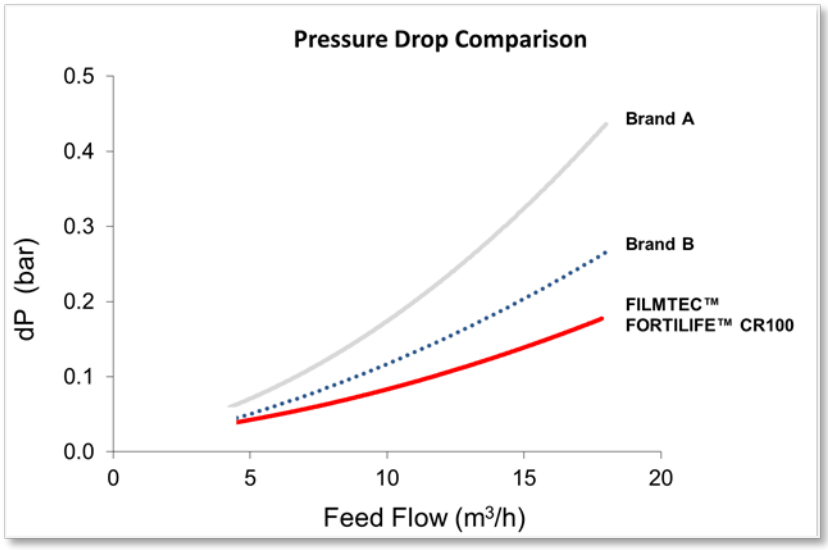

Figure 1: FilmTec™ Fortilife™CR100 provides the lowest pressure drop

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