



## FILMTEC Membranes

### Cleaning and Sanitization: Introduction

#### Introduction

The surface of a reverse osmosis (RO) membrane is subject to fouling by foreign materials that may be present in the feed water, such as hydrates of metal oxides, calcium precipitates, organics and biological matter. The term "fouling" includes the build-up of all kinds of layers on the membrane surface, including scaling.

Pretreatment of the feed water prior to the RO process is basically designed to reduce contamination of the membrane surfaces as much as possible. This is accomplished by installing an adequate pretreatment system and selecting optimum operating conditions, such as permeate flow rate, pressure and permeate water recovery ratio.

Occasionally, fouling of the membrane surfaces is caused by:

- Inadequate pretreatment system
- Pretreatment upset conditions
- Improper materials selection (pumps, piping, etc.)
- Failure of chemical dosing systems
- Inadequate flushing following shutdown
- Improper operational control
- Slow build-up of precipitates over extended periods (barium, silica)
- Change in feed water composition
- Biological contamination of feed water

The fouling of membrane surfaces manifests itself in performance decline, lower permeate flow rate and/or higher solute passage. Increased pressure drop between the feed and concentrate side can be a side effect of fouling.

Cleaning can be accomplished very effectively because of the combination of pH stability and temperature resistance of the membrane and the element components. However, if cleaning is delayed too long, it could be difficult to remove the foulants completely from the membrane surface. Cleaning will be more effective the better it is tailored to the specific fouling problem. Sometimes a wrong choice of cleaning chemicals can make a situation worse. Therefore, the type of foulants on the membrane surface should be determined prior to cleaning. There are different ways to accomplish this:

- Analyze plant performance data. Details are given in [Evaluation of System Performance and Operation \(Section 8.2.1\)](#).
- Analyze feed water. A potential fouling problem may already be visible there.
- Check results of previous cleanings.
- Analyze foulants collected with a membrane filter pad used for [SDI value determination \(Section 2.5.1\)](#).
- Analyze the deposits on the cartridge filter.
- Inspect the inner surface of the feed line tubing and the feed end scroll of the FILMTEC™ element. If it is reddish-brown, fouling by iron materials may be present. Biological fouling or organic material is often slimy or gelatinous.

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