FILMTEC™ Membranes
Disinfecting RO Systems with Hydrogen Peroxide

Introduction

Hydrogen peroxide or a mixture of hydrogen peroxide and peracetic acid has been used successfully for disinfecting reverse osmosis (RO) systems that use FILMTEC™ FT30 membranes.

Examples of commercial hydrogen peroxide/peracetic acid solutions are Renalin® and Minncare® from Minntech Corporation.

These solutions come in a concentrated form and are diluted 1:100 with RO permeate to obtain a 0.25 percent peroxide solution. For more than four years, an RO system in Minneapolis which uses the FT30 membrane has been disinfected once weekly by soaking overnight in diluted Renalin. There has been no indication of membrane degradation during this time.

There are two factors which greatly influence the rate of hydrogen peroxide attack on the membrane: temperature and iron. The disinfecting solution should not exceed 25°C (77°F). FT30 membrane samples tested with 0.5 percent hydrogen peroxide at 34°C showed a very high salt passage after several hours. At 24°C, however, membrane samples demonstrated compatibility with 0.5 percent hydrogen peroxide after 96 hours.

The presence of iron or other transition metals in conjunction with hydrogen peroxide solutions can also cause membrane degradation. FT30 samples were tested using a 0.15 percent solution of hydrogen peroxide and tapwater containing iron. After 150 hours, the salt passage of the membrane began to increase dramatically.

Procedure

For RO systems using the FT30 membrane, the following procedure for disinfection with hydrogen peroxide or Renalin solutions is recommended:

1. Any type of deposit on the membrane or other parts of the system should be removed with an alkaline cleaner before disinfecting. Removal of these deposits, which harbor microorganisms, will maximize the degree of disinfection. After alkaline cleaning, flush the system with RO permeate.
2. Clean the RO system with acid (e.g., 0.1 percent by volume hydrochloric acid or 0.4 percent by volume phosphoric acid) to remove any iron from the membrane surface. Flush the unit with RO permeate.
3. Circulate a solution of 0.20-0.25 percent hydrogen peroxide diluted with RO permeate at a temperature below 25°C (77°F) for 20 minutes. A pH of 3-4 gives optimal biocidal results and longer membrane lifetime.
4. Allow the elements to soak in the disinfecting solution for 2-12 hours. A soak time of 2 hours would be expected to kill more than 90 percent of the bacteria, whereas a 12-hour soak time would achieve a 99 percent kill.
FILMTEC™ Membranes

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