

# HFFO2 Module Cleaning Recommendations



## Clean water rinse

Replace all liquids in the HFFO2 module with DI water by rinsing the HFFO2 modules using filtration mode flow rates with the following sequence:

1. Simultaneously flush the lumen (FO active layer) and shell (support) for 5 minutes.
2. Flush the lumen side for an additional 25 minutes with the shell caps open to allow the permeating water to leave the module freely.

Membrane lifetime will be prolonged when clean water rinse is applied after each experiment. Clean water rinse will not remove extensive membrane fouling.

## Chemical cleaning

- ✓ Perform alkaline clean to remove organic fouling
- ✓ Introduce acid clean on both shell and lumen side in case of inorganic fouling

## Chlorine tolerance

Do not use products that contain free chlorine to clean the membrane. Dechlorination upstream of the membrane is required to protect the membrane from oxidation and ensure a long lifetime.

## Suggested cleaning procedures for organic fouling

### Procedure 1

1. 0.3% P3-Ultrasil 78 @ 45°C with 30 minutes recirculation
2. Flush with ambient temperature water until neutral pH is achieved
3. 0.8% P3-Ultrasil 112 @ 45°C with 30 minutes recirculation
4. Flush with ambient temperature water until neutral pH is achieved

### Procedure 2

1. NaOH, KOH or similar cleaning chemicals (pH 11) @ 30-45°C with 30 minutes recirculation
2. Flush with cold water until neutral pH is achieved
3. Citric acid, HNO<sub>3</sub> or similar cleaning chemicals (pH 2) @ 30-45°C with 30 minutes recirculation
4. Flush with cold water until neutral pH is achieved

After every cleaning step, it is highly recommended to test and evaluate the membrane's performance under standard conditions.

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