

TWRO Element Cleaning And Storage Recommendations



Cleaning Recommendations

Cleaning Requirements

Membrane fouling by organic matter, microbial growth and mineral scaling can deteriorate membrane performance over time. To recover the performance of your RO element, we recommend the following cleaning procedure. TWRO element should be cleaned (i) when the stabilized permeate flowrate has decreased significantly, (ii) when the salt rejection has decreased significantly or (iii) when the pressure drop (pressure difference between feed and retentate pressure) has increased significantly.

Cleaning Steps

1. Start with an alkaline cleaning at $\text{pH} \approx 11$ using NaOH. Temperature should be $25\text{ }^{\circ}\text{C}$.
2. Pump the cleaning solution through the element to replace the feed water with the cleaning solution. The flowrate should be as low as possible and no pressure should be applied to avoid permeation of the cleaning solution. The retentate stream should be drained to avoid any dilution of the cleaning solution with the displaced feed water.
3. Recirculate the cleaning solution for 30 min at $25\text{ }^{\circ}\text{C}$ at low flowrate and no applied pressure. Readjust the pH and temperature during recirculation, if needed.

4. In cases of severe membrane fouling, recirculation can be extended or supplemented by an additional soaking step (up to several hours). After soaking, a short recirculation step at a higher flowrate should follow to flush out dissolved foulants.
5. After cleaning flush out the cleaning solution. It is recommended to use RO permeate or clean water for flushing at $25\text{ }^{\circ}\text{C}$. Drain retentate and permeate streams until the cleaning solution has been flushed out completely.
6. Repeat steps 2 – 5 with an acidic cleaning solution at $\text{pH} \approx 2$ (2.0 wt% citric acid or 0.2 wt% HCl) and $25\text{ }^{\circ}\text{C}$.

Wear necessary protective gear when handling chemicals and refer to the chemical's MSDS for safety information and potential hazards.

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.



Storage Recommendations

Preservation Requirements

Operation of Aquaporin Inside® TWRO element can be stopped for up to 24 hours without preservation. If operation is halted for more than 24 hours, the element should be flushed with fresh feed water daily. This procedure is necessary to limit biological growth. Make sure that the element always stays wet after initial wetting.

For long-term storage - longer than 48 hours - or element shipping, it is recommended to store the element in a preservative solution according to the below procedure.

Preservation Recommendations

As standard preservative solution, we recommend 1 wt% food-grade sodium metabisulfite (SMBS) preferably dissolved in previously produced RO permeate.

1. Soak the element in the solution for 1 hour to completely wet all the membrane surface preferably by submerging it vertically in the solution.
2. Take the element out of the solution and allow it to drip out.

3. Place the element in an oxygen barrier plastic bag (e.g. by reusing the original bag) and seal airtight.

4. Now, the element will stay moist and biological growth is prevented. The bag should not be filled with additional preservative solution.

5. The droplets of preservative solution in the bag should always be clear. Re-check every three months and re-preserve the element if the solution does not appear clear.

6. The pH value of the preservative solution must always be above pH 3. If the pH value drops below pH 3, re-preserve the element.

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