Technical Service Bulletin

June 2024 TSB108.17

General Storage Procedures for RO/NF Membrane Elements

This bulletin provides guidelines for storing Hydranautics' Composite Polyamide Reverse Osmosis (RO) and Nanofiltration (NF) membrane elements.

Note: Before undertaking any long-term or short-term storage operation, contact Hydranautics for specific instructions related to the local environment.

Scope

The general storage procedures included in this bulletin are as follows:

1. Short-term storage of RO/NF membrane elements in place in pressure tubes.
2. Long-term storage of RO/NF membrane elements in place in pressure tubes.
3. Dry storage of RO/NF membrane elements as spares or before start-up of an RO/NF plant.

Note: The composite polyamide type of RO/NFmembrane elements may not be exposed to chlorinated water under any circumstances. Any such exposure will cause irreparable damage to the membrane. Absolute care must be taken following any disinfection of piping or equipment or the preparation of cleaning or storage solutions to ensure that no trace of chlorine is present in feedwater to the RO/NF membrane elements. If there is any doubt about the presence of chlorine, perform chemical testing to make sure. Neutralize any chlorine residual with a sodium bisulfite solution, and ensure adequate contact time to accomplish complete dechlorination.

Short-Term Storage

When? Short-term storage is for periods where an RO/NF plant must remain out of operation for more than five days, but fewer than thirty days, with the RO/NF elements in place.

How Long? Maximum 30 days.

Prepare each RO/NF train as follows:

1. Flush the RO/NF section with feedwater, while simultaneously venting any gas from the system. Flushing with RO/NF permeate water instead of feedwater has added benefits, and may help remove build up of foulants (references TSB 107 and 122).
   https://membranes.com/wp-content/uploads/Documents/TSB/TSB107.pdf

   https://membranes.com/wp-content/uploads/Documents/TSB/TSB122.pdf

2. When the pressure tubes are filled, close the appropriate valves to prevent air from entering the system.

3. Reflush as described above at 5-day intervals.

Long-Term Storage

When? Long-term storage is for periods where an RO/NF plant must remain out of operation for more than 30 days with the RO/NF elements in place.

How Long? From 15 days to 6 months depending on temperature and type of biocide (reference TSB110).

Prepare each RO/NF train as follows:

1. Clean the RO/NF membrane elements in place.
2. Flush the RO/NF section with SBS prepared from permeate (see TSB110 or check with Hydranautics for alternatives for SBS). https://membranes.com/wp-content/uploads/Documents/TSB/TSB110.pdf
3. When the RO/NF section is filled with this solution (make sure that it is completely filled), close the valves to retain the solution in the RO/NF section.
4. Repeat Steps 2 and 3 with fresh solution every 90 days if the temperature is below 80°F (27°C), or every 30 days if the temperature is above 80°F (27°C).
5. Check the pH and salinity every 15 days to determine if fresh preservation solution is required.
6. If the design of the RO/NF causes water/solution to leak and air to enter vessels, the pH of the SBS solution may drop below 3.0 and become acidic. If this occurs, drain the existing solution and recirculate a fresh SBS solution.
7. Consider checking vessels that are at the top of the RO/NF rack or suspected of leaking. This will give a better idea of how the preservation solution is doing internally as it may degrade differently from vessel to vessel.
8. Ensure there are no dead leg zones in the piping of the RO/NF system that would decrease the effectiveness of the preservation.
9. When the RO/NF system is ready to be returned to service, flush the system for approximately 30 to 60 minutes using low-pressure feedwater with the product dump valve open to drain. Then flush at high pressure for 30 to 60 minutes with the product dump valve open to drain. Before returning the RO/NF system to service, check for any residual biocide in the product.

Prior To Installation

When RO/NF elements are stored prior to installation, they should be protected from direct sunlight and stored in a cool, dry place with an ambient temperature range of 40°F to 95°F (4.4°C to 35°C). During the period of transit between the factory and the plant site, the elements should not be exposed to temperatures below freezing, 32°F (0°C), or above 113°F (45°C). New Elements are enclosed in a sealed polyethylene bag containing a storage solution, and then packaged in a cardboard box. Large shipments may come packaged in crates strapped to pallets containing 25 single elements. When storing the pallets of elements, they may be stacked 2 high. Pallets should NOT exceed 2 high.

Length of Storage

RO and NF elements are typically stored with a preservative solution and enclosed in a vacuum sealed bag. The preservative is generally sodium bisulfite (SBS) with or without propylene glycol.

Hydranautics will only accept unused elements for return for credit no later than 90 days after purchase, per the guidelines in TSB 116 Returned Goods Authorization (RGA) Procedure.
https://membranes.com/wp-content/uploads/Documents/TSB/TSB116.pdf

While Hydranautics' acceptance for unused elements is typically limited to 90 days, it is noted that elements may be stored for an extended period and still maintain expected performance levels. Provided that the storage conditions outlined in this bulletin are strictly adhered to and the vacuum within the storage bags is adequately maintained. It is strongly advised, however, to inspect bags that have been stored for more than 12 months, and thereafter, conduct inspections every 3 to 4 months to identify any instances of biological fouling.

The installation of elements stored for prolonged periods may lead to reduced flow rates and, in certain cases, initial flow rates may fall below the specified minimum or operating pressures may exceed anticipated levels. In such circumstances, it is advisable to utilize a caustic solution for element cleaning, as outlined in TSB 107 (Solution 7), to improve flux performance.

https://membranes.com/wp-content/uploads/Documents/TSB/TSB107.pdf

Hydranautics Storage Bags (for customers requesting spares)

HYD P/N: 83060.5000 (7”x48”) for 4”x40” elements
HYD P/N: 83060.9000 (14”x55”) for 8”x40” elements