Technical Service Bulletin 109

Membrane Element Flushing

Prior to first use, it is strongly recommended that the membrane elements be flushed. RO membrane elements must also be flushed following system or train shutdown to remove highly concentrated salts from the membrane elements.

Pre-Flush of RO System at Start-up

Prior to installing the membrane element(s), the system or train MUST be flushed to remove any debris in the system and in the pressure vessels.

Ensure that the pressure vessel should make it clean internally and lubricate by 50% solution of glycerin and water (TSB-102).

Prior to initial flushing, please ensure that the elements are correctly loaded and that all O-rings and brine seals are properly installed (TSB-102).

Ensure that the elements in each pressure vessel have been properly shimmed to remove any excess slack in the pressure vessels (TSB-103).

Initiate a low pressure flush at 1 - 1.4 bars (15-20 psig) to ensure that all air is purged from the membrane elements and pressure vessels prior to the next step. The low pressure flush should be carried out with the permeate valves open to drain, the concentrate control valve fully open and a soft-start mechanism or variable speed drive.

Remove membrane preservatives. The membrane elements are shipped after being immersed in a 0.5 wt% sodium metabisulfite solution and drained. In order to remove the preservative, It is recommended to perform a flushing step at the flow rate of 7-9 m^3/h per 8 inch PV, applying the lowest possible pressure to achieve this flow, what typically occurs at a feed pressure of 4 bar with a dP of 1.5-2 bar for a 6-7 elements PV.

Ramp up the pressure to achieve normal operation (TSB-106).

The permeate produced for the first 10 minutes of plant operation should be discharged. To ensure the highest quality permeate stream, discard the permeate for the first hour of operation after initial start up. Furthermore, prolonged flushing may be necessary depending on the application and required water quality.

⚠ CAUTION

Failure to remove entrained air can result in mechanical damage to the membrane elements due to high hydraulic forces resulting from water hammer.

Notes:

When flushing a membrane element, the permeate valves should be open to drain and the concentrate control valves should also be fully open to avoid damaging the membrane elements. For any flushing operation to be effective, the volume used for flushing should exceed the liquid hold-up volume of the membrane elements. For standard 8-inch x 40-inch elements, assume the hold-up volume is 37.85 liters (10 gallons) for each membrane element. For standard 4-inch x 40-inch elements, assume the hold-up volume is 11.35 liters (3 gallons) for each membrane element. To ensure the highest quality permeate stream, discard the first hour's worth of permeate after initial start-up.

⚠ CAUTION

System pressurization and depressurization should be accomplished slowly and should not exceed 0.7 bar/sec (10 psig/sec).

LG Water Solutions

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Post-Flush of RO System at Shutdown

It is ***strongly recommended*** to remove the highly concentrated salts from the system by flushing after every shutdown.

Following the system or train shutdown, it is ***REQUIRED*** to flush the membrane elements with RO feedwater to remove the high concentrations of salts. Never shut down the RO system or train without immediately flushing the high TDS (Total Dissolved Solids) concentration from the membrane elements.

CAUTION

Failure to remove the high TDS concentration of the hold-up volume in the membrane elements may result in damage to the elements.

Notes:

When flushing a membrane element, the permeate valves should be open to drain and the concentrate control valves should also be fully open to avoid damaging the membrane elements. For any flushing operation to be effective, the volume used for flushing should exceed the liquid hold-up volume of the membrane elements. For standard 8-inch x 40-inch elements, assume the hold-up volume is 37.85 liters (10 gallons) for each membrane element. For standard 4-inch x 40-inch elements, assume the hold-up volume is 11.35 liters (3 gallons) for each membrane element.

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