System Start-Up

The following guide is intended to provide information on system start-up with Membrania® reverse osmosis (RO) elements. For questions regarding deviations from these recommendations, please contact DC Solutions Technical Service.

SAFETY EQUIPMENT

Having proper equipment is essential for safely executing the following start-up procedure. Appropriate gloves, shoes and safety glasses should be worn at all times. Additional equipment may be necessary depending on specific system design.

START-UP PROCEDURE

Mechanical Inspection

A mechanical inspection of the system is recommended prior to start-up. This inspection should ensure that valves are positioned correctly, lines are free of air, safety precautions are functioning, instrumentation is calibrated, pumps are lubricated and have proper rotation and all pre-treatment is operating properly.

Install Elements

Refer to Membrania' **Element Loading Guide – Loading of Pressure Vessels** (TSG-O-006).

Purge Air

After the elements have been installed, it is recommended to perform a low pressure flush to purge air from the piping system, headers and vessels before engaging the high-pressure pump. Failure to purge air from the system can result in water hammer that can mechanically damage the newly installed elements. This can be avoided through the use of a soft-start mechanism or a variable frequency drive. The rate of pressurization (and depressurization) should not exceed 10 psi/second and the feed pressure should be gradually increased until the desired operating feed flow is achieved.

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Flush System
Please refer to one of the corresponding documents for system flushing procedures:

Element Start-Up Guide – Membranes for Water Purification (TSG-O-001)
Element Start-Up Guide – Food & Dairy: RO & NF Elements (TSG-O-002)
Element Start-Up Guide – Food & Dairy: UF & MF Elements (TSG-O-003)
Element Start-Up Guide – Heat-Sanitizable Elements (TSG-O-004)

Initial Trial Run
After purging air from the system and flushing the system, an initial trial run at the design operating parameters is recommended. Check and adjust the following parameters to design value:

- Permeate flow rate
- Recovery ratio
- Operating pressure

Prior to final evaluation of the trial run, operate the system for a minimum of two hours at the design operating conditions. All permeate and concentrate produced during the trial run should be discarded to drain.

Permeate Quality
Check the quality of the permeate and system performance as following:

- Check permeate conductivity for each vessel. If the conductivity of the permeate is above specification, check o-rings and brine seals of the affected vessel. Log all data and corrective measures taken within the first 24 – 48 hours. Although membrane performance should stabilize after the first couple hours of operation, monitoring feed pressure, differential pressure, flows, recovery, and conductivity will help indicate if the elements are performing as expected. This data may be used to normalize and track system performance.

• Recommended data to be logged:
o Feed: feed pressure, temperature, TDS (conductivity), pH
o Differential pressure across each vessel
o Concentrate: flow, TDS (conductivity), pH
o Permeate: permeate flow and TDS (conductivity) of each vessel and total system.

• It is also recommended to take water samples for analysis for individual ions and to compare operation results with projected data.