

Element Shutdown Guide System Shutdown

The following guidelines are intended to provide information on shutting down systems with TRISEP® reverse osmosis (RO), nanofiltration (NF), ultrafiltration (UF) and microfiltration (MF) elements. For questions regarding deviations from these guidelines, please contact MANN+HUMMEL Water & Fluid Solutions Technical Service.

SAFETY EQUIPMENT

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

SHUTTING DOWN PROCEDURE

1. Ensure that all chemical injections used for pretreatment have been stopped.
2. Flush the system at low pressure with permeate quality water (see Table 1) to remove high salt concentration from the pressure vessels and until the concentrate conductivity matches the feed water conductivity.
3. After flushing the system, make sure all feed valves are completely closed.
4. If the concentrate line ends into a drain below the level of the pressure vessels, employ an air break in the concentrate line at a position higher than the highest pressure vessel to prevent a siphoning effect.
5. If the permeate line is pressurized during operation and the system is shut down, the membrane might become exposed to a static permeate backpressure, which may damage the membrane and void the warranty. Check valves or atmospheric drain valves in the permeate line can be used.
6. When the system is shut down for longer than 48 hours, be sure that the elements do not dry out. Dry elements will irreversibly lose flux. Please refer to MANN+HUMMEL Water & Fluid Solutions' **Element Storage Guide - Storage for Offline Elements** (TSG-O-009).

TABLE 1. FLUSH WATER QUALITY RECOMMENDATIONS.

Solute	Recommended Limit
Iron (Fe)	< 0.05 mg/L
Manganese (Mn)	< 0.02 mg/L
Aluminum (Al)	< 0.05 mg/L
Silica (SiO ₂)	< 5.0 mg/L
Total Hardness as CaCO ₃	< 50 mg/L as CaCO ₃
Total Alkalinity as CaCO ₃	< 50 mg/L as CaCO ₃
Chlorine	0 mg/L
Turbidity	< 0.5 NTU
Silt	< 1 SDI

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