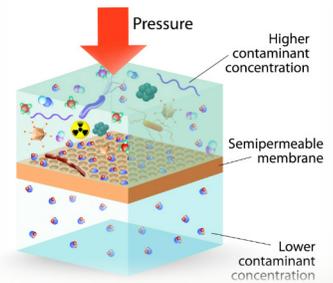


**PROCESS
TECHNOLOGY**

...Clean In Place

REVERSE OSMOSIS



The use of reverse osmosis (RO) technology is increasing worldwide, as water quality and quantity issues become more prevalent. As water tables sink, the concentration of contaminants increases and RO provides a good solution to purify this water. In coastal desert areas, RO is often the most economical means to extract pure water from seawater. In industry, RO provides a means to meet ever-increasing purity standards.

RO is a process where contaminated water is pressurized to force it through a membrane in the direction against the osmotic gradient. Dissolved ions and solids are left behind, leaving purified water on the other side. Over time, the solids build up on the membranes and must be cleaned off. Many RO systems are now offering clean in place (CIP) systems so that the system users can clean their own membranes instead of throwing them away. This CIP process uses a dilute acid chemistry to remove solids or dilute caustic chemistry to remove biological debris. According to system maker Applied Membranes, while the cleaning can be done with ambient chemistry, the cleaning is much more efficient at 77 – 85°F, as that is the optimum processing temperature for the membrane. To hold those temperatures, Applied provides their systems with Process Technology screw plug or immersion heaters. The screw plug heaters are installed inline and fitted with their own temperature control. Immersion heaters can also be installed in bulk chemical tanks to feed large quantities of heated chemistry.

Falcon Water has developed a procedure for taking membranes not suitable for cleaning in place due to near complete blockage and determining a chemical recipe that can return those membranes to commercial quality. Higher chemical concentrations and operating temperatures may be needed but Process Technology heaters are still used for the chemical heating process.

A famous semiconductor chip maker has recently outfitted clean in place equipment at their facility with Process Technology heaters to heat 1000 gallons of cleaning chemistry to over 100°F in a very short time so that batch cleaning of membranes critical to producing deionized water for chip fabrication can be done quickly without interrupting the production of these very valuable devices.

If you are currently using reverse osmosis for water purification and sending membranes out for cleaning, your Process Technology representative can provide information on heating clean in place chemistry or provide a referral to a water expert in your area.

<http://www.processtechnology.com/inline-water-heaters.html>

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