

8-2. Instrument Calibrations

Instrument calibrations are the first thing to check in any troubleshooting operation since wrong instrumentation can miss a real decrease in salt rejection or cause a false alarm.

8-2-1. On-line TDS Meters

Accuracy of on-line TDS meters can be verified by measuring the feed and permeate water TDS with a separate handheld meter.

The percent salt rejection calculated by the handheld meter is compared to the values obtained from the on-line meter following the instrumentation. The two values should be relatively close. If a discrepancy arises, recalibrate the on-line meter following the instructions of the manufacturer. Before recalibrating, inspect the probe for the possible accumulation of foreign material that may interfere with the reading. Also, make sure that the probes are mounted properly according to the manufacturer's specifications. Improperly mounted probes may trap air bubbles or have inadequate water circulation through the probe, which may give false readings.

8-2-2. Flowmeters

Flow meter calibration is also important in an RO system, since the correct measurement of permeate and concentrate flow rates is critical to the successful operation of the system. For instance, the concentrate flow rate lower than the system specification may create a situation for fouling and scaling, and the normalized permeate flow rate is a critical parameter to monitor any trend in fouling or membrane deterioration.

One method of calibration is to direct the water from the flow meter into a vessel and to measure the time that it takes to fill the known volume. This should be repeated several times for accuracy. If the variation is slight, the values (the volume divided by the time) can be averaged. The other method is to calibrate a flow meter to a known flow meter which has been calibrated previously.

8-2-3. Pressure Sensors

Besides the feed pressure and the permeate pressure, the measurement of the differential pressure is necessary to monitor the build up of deposits on the membrane surface, or in the element flow channels. Inaccuracy in the pressure readings will cause to miss the timing for cleaning the system.

The accuracy of mechanical pressure gauges should be periodically verified using a calibrated pressure gauge. Electronic pressure sensors have the potential for greater accuracy. However, they are

subject to sensor drift and damage resulting from vibration of the high pressure pumps. To reduce the effects of vibration, the sensor can be mounted remotely and connected to the high pressure piping with a length of stainless steel or high-pressure nylon tubing.

A calibration pressure gauge mounted with a quick-connect fitting is useful for calibrating pressure sensors.

8-2-4. pH Meters and Temperature

The pH meters should be regularly calibrated using buffer solutions of a known pH. Small variations in feed water temperature do not significantly affect the percent salt rejection.

The temperature readings are still important because they are used to determine the normalized permeate flow rate. Therefore the accuracy of the feed water temperature readings should therefore be regularly verified with an accurate thermometer.