

Direct Potable Water Reuse Standard Operating Procedure

Wichita Falls, Texas

SDI Procedure

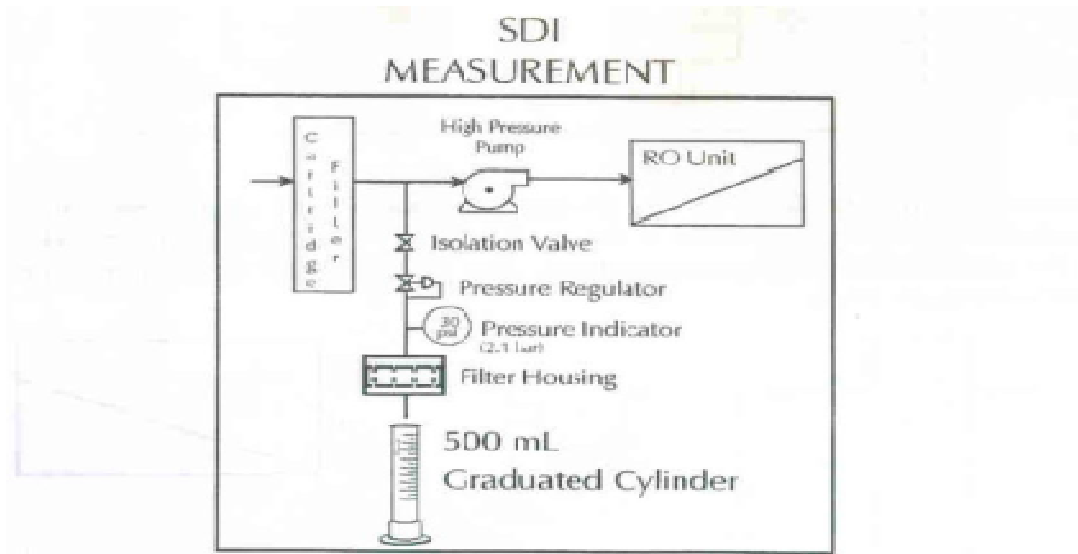
This SOP supersedes any previous SOP on this topic.

INTRODUCTION

Purpose: Silt Density Index is a measurement of the fouling potential in the feed water of the Reverse Osmosis unit. It is the measurement of the reduction in flow through a membrane filter over time. This test is an ASTM (American Society of Testing and Materials) Standard Test Method (D 4189-82).

OBJECTIVE

- The sample line is connected to the suction side of the high pressure pump going to the RO unit.
- A shut off valve is required to isolate the filter when not in use.
- A pressure regulator is required to maintain the pressure at 30psi (2.1bar) throughout the test. A pressure gauge is required to monitor the pressure.
- A filter housing is required to hold the 0.45 micron filter.
- A 500mL graduated cylinder is placed after the filter to collect the filtered water.
- The time required to filter 500mL of feed water is measured at the beginning and at the end of a 15 minute period during which the feed water is being filtered by the 0.45 micron filter. If there were NO particles in the feed water, the 0.45 micron filter would not plug AT ALL, so the amount of time required to pass 500 mL of feed water through the filter would be the same at the end of the 15 minute period as it was in the beginning. If particulate matter plugs the pores of the 0.45 micron filter, however, it will take a longer period of time to pass 500 mL of feed water through the filter at the end of the 15 minute period than it did in the beginning.
- SDI is a relative comparison of the amount of time required to pass 500mL through a 0.45 micron filter before and after a given time period. The time period for RO membranes, required by the membrane manufacturers, is 15 minutes.



PROCEDURE

This test is performed once per shift, and the results are recorded on the SDI log form.

A passing value will be an SDI < 3. If the SDI value is > 3, the break tank water must by-pass the RO until the SDI is back below 3.

Step 1. Flush system without the filter disk installed in the filter housing. This is to flush out any particles that have become lodged in the lines since last measurement.

Step 2. Install the 0.45 micron filter in the housing. Bleed out any air then tighten the housing nuts. Place the discharge line of the filter into the graduated cylinder.

Step 3. Open the isolation valve and simultaneously start a stopwatch to begin timing.

Step 4. Measure the time required (t_1) to pass 500 mL of feed water. The pressure to the filter MUST remain at 30psi the entire time.

Step 5. Allow the feed water to continue to flow at 30psi (2.1) bar of pressure through the filter for a total (from the beginning of t_1) of 15 minutes.

Step 6. Right at the end of 15 minutes, again measure the amount of time required to pass 500 mL of feed water through the filter.

Step 7. Perform the SDI calculation as indicated below.

The actual calculation of SDI is the following:

$$SDI = \frac{100(1 - t_1 / t_2)}{T}$$

Where:

t_1 = Time required to pass 500 mL of feed water, in seconds prior to the 15 minute period.

t_2 = Time required to pass 500 mL of feed water, in seconds after the 15 minute period.

T = Time between the beginning of t_1 and beginning of t_2 , in minutes (15 minutes).

Prepared by: _____ Date: _____

Approved by: _____ Date: _____

*This SOP is considered effective on the date it is approved. SOP's are to be reviewed and/or updated annually or any time this process has changed.

Reviewed by: _____ Date: _____

Reviewed by: _____ Date: _____

Reviewed by: _____ Date: _____

Reviewed by: _____ Date: _____

Reviewed by: _____ Date: _____

Sign below and date that you have read this SOP. By signing you are stating that you understand and will defer to this SOP when applicable.

Printed Name	Signature	Date	Printed Name	Signature	Date
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____