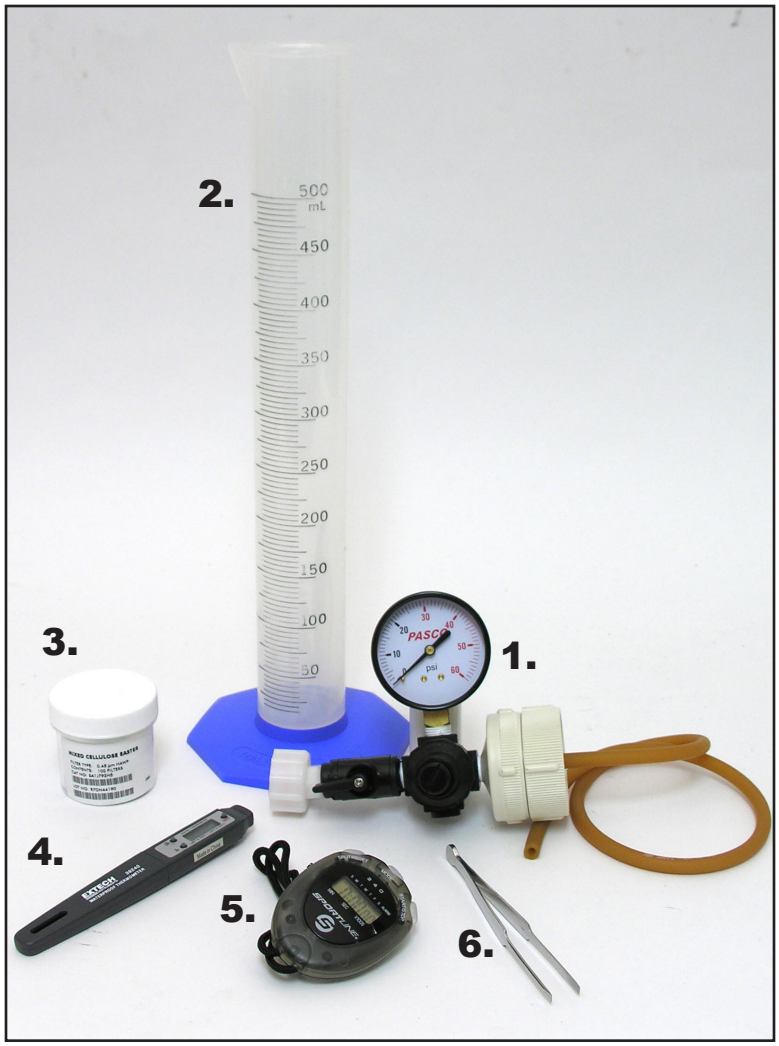
Silt Density Index (SDI) Test Procedure

This procedure is based on the Standard Test Method for Silt Density Index (SDI) of Water. ASTM procedure D4189-95 (Reapproved 2002).



Purpose of SDI

SDI test are used to determine the feed water quality for water feeding a membrane filtration systems. The most common is a reverse osmosis or RO system. This test method indicates the quantity of particulate matter in low turbidity (<1.0 NTU) waters. This method is not an absolute measurement of the quality of particulate because of the variety in shape, size, and nature of the particulate. The test works by passing water through a 0.45µm (47mm) membrane filter at a constant pressure of 30psi and calculating the rate of clogging that occurs with the filter over time.

Supplied Equipment

This kit includes the following equipment:

1. PR-8550	Pressure Control and Filtration Assembly
2 .CY-7500-P	Graduated Cylinder, 500mL, poly
3. FP-0045-47	Filter Paper, 0.45 micron, 100pk, 47mm
4. 39240	Digital Thermometer, -40^{0}C to 200^{0}C
5. S90208	Stopwatch, Digital, Waterproof
6. 10-280	Tweezers, Dull

Optional Equipment

The following equipment can be ordered separately:

1. APTKCASE300, Aluminum carrying case

2. FP-0045-47, Replacement Filter Paper 0.45 micron 100pk 47mm

SDI Test Procedure

1. The apparatus should come pre assembled as shown in the picture above. Begin by attaching it to the feed water spout to be tested.

2. Turn on the water without a filter in the housing. This flushes the system of any contaminates remaining from previous tests. Also use this opportunity to adjust the pressure to 30psi using the pressure regulator.

3. Using the supplied thermometer, measure the water temperature. Record the temperature. Temperature must remain constant ± 1^{0}C

4. With the pressure set and the ball valve shut, open the filter holder and place a 0.45µm filter (47mm) in the filter holder. Never handle the filter with your fingers. Always use the supplied dull tweezers to avoid soiling or puncturing the filter.

5. Check to see that the O-rings are in working order and properly positioned. Screw the filter holder back together, but do not tighten completely.

SDI Test Procedure (continued)

6. Open the ball valve slightly for a few seconds to allow any trapped air to bleed out. Then close the valve and tighten the filter holder the rest of the way.

7. Open the ball valve and at the same time start the stop watch. Measure the amount of time it takes to collect a 500mL sample, and record the time (t_i). Do not stop the watch or the water flow.

8. After a total of 5 minutes from the start point, begin to take another 500mL sample.

9. Record the time it takes to get the 500mL sample. Also record the temperature of the water, and be sure the pressure is still at 30psi. Do not stop the watch or the water flow.

10. After a total of 10 minutes from the start time repeat step 9.

11. After a total of 15 minutes from the start time repeat step 9.

Evaluation of Results

Calculate the silt density index (SDI_T)

$$\mathrm{SDI}_T = \frac{\%\ P_{30}}{T} = \frac{\left[1 - \frac{t_i}{t_f}\right] 100}{T}$$

$\%\ P_{30}$ = percent at 30psi feed pressure
T = total elapsed flow time, min (usually 15min.)
t_i = initial time required to collect 500mL of sample (in seconds)
t_f = time required to collect 500mL of sample after test time T (in seconds)

Expressing Results

The SDI should include a subscript indicating the total elapsed flow time (T) in minutes.
Also include the temperature before and after the test.