

Silt Density Index (SDI₁₅) Procedure - TB 107

Protecting the Qfx™ membrane elements from particulate fouling minimizes energy use and allows stable long-term product performance. One of the most common methods to determine acceptable RO feedwater quality is the Silt Density Index (SDI). The SDI was developed to assess the membrane fouling potential of RO feedwater. An SDI test measures the time required to filter a specific volume of RO feedwater through a 0.45-micron filter paper at a feed pressure of 2.1 bars (30 psig). The following provides procedures required to determine RO feedwater SDI.

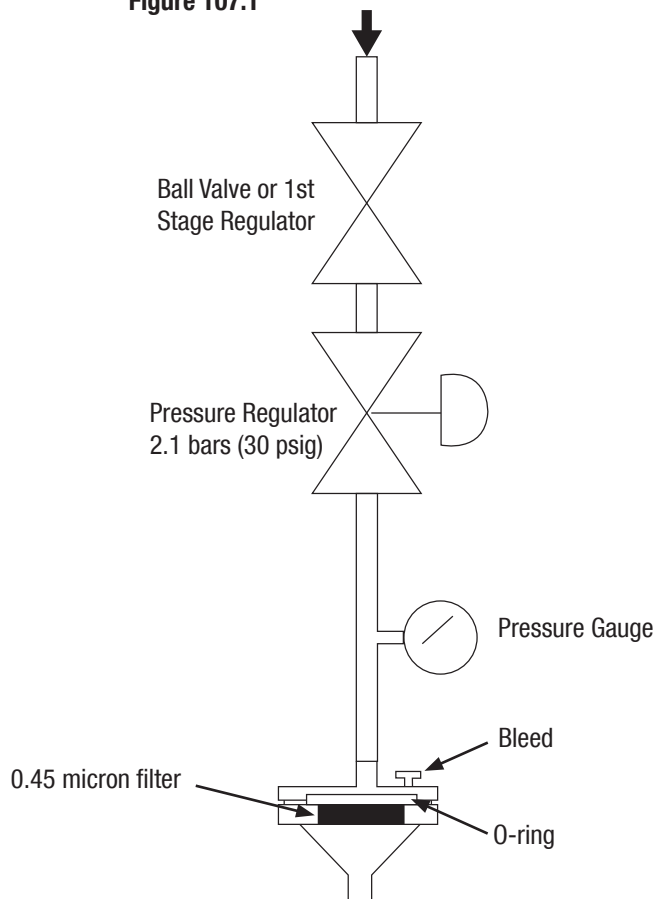
Test Equipment Setup

1. SDI kits may be purchased from NanoH₂O or may be assembled in accordance with Figure 107.1 below. Follow the SDI instructions on equipment setup.
2. Install the test equipment on a sample tap located on the feedwater piping. The sample should be downstream from all chemical dosing points, cartridge filters and immediately before the RO inlet manifold.
3. Install a new 0.45-micron filter pad in the filter housing and adjust the pressure regulator to 2.1 bars (30 psig).

Tips:

- Prior to use, thoroughly flush the test equipment to remove any contaminants to ensure an accurate result.
- Do not touch the filter pad. Use a dull pair of tweezers (to avoid puncturing the filter pad) to remove the pad from the package and place it in its proper position in the filter pad holder.
- Ensure that the O-ring is clean and properly seated.

Figure 107.1



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Test Procedures

1. Measure the feedwater temperature, the temperature should not vary more than +/- 1°C (34°F) during the duration of the test.
2. Remove any entrained air from the filter holder housing by either opening the bleed valve or loosening the filter holder (depending on the model used) while slightly opening the ball valve. Once the air has bled from the housing, close the bleed valve or the filter housing.
3. Place a 500 ml (17 fl oz.) graduated cylinder under the filter housing to collect the volume of water that passes through the filter pad.
4. Fully open the ball valve and measure the time required (use a good quality stopwatch) to collect 100 ml (3.4 fl oz.) and 500 ml (17 fl oz.).
5. After five minutes, repeat the test. As before, measure the time required to collect a 100 ml (3.4 fl oz.) sample and a 500 ml (17 fl oz.) sample. Record the time intervals with the flow continuing to run through the filter housing.
6. Repeat the test at the 10-minute interval and again at the 15-minute interval.
7. If the time required to collect a 100 ml sample is greater than 60 seconds, plugging will be about 90% and it will not be necessary to continue the test.
8. After the 5, 10 and 15-minute samples have been collected, measure the water temperature to confirm that the temperature has not varied by more than +/- 1°C (34°F) .
9. Upon the completion of the test, the spent filter pad should be sealed in a plastic bag, labeled with the time and date of the test and filed for future references.

Calculations

SDI is calculated using the following formula:

$$SDI = P_{30}/T_t = 100 \times (1 - T_i / T_f) / T_t$$

SDI	Silt Density Index
P ₃₀	% plugging at 2.1 bars (30 psig) feed pressure ²
T _t	Total test time in minutes ²
T _i	Time in seconds required to obtain the initial 500 ml (17 fl oz.) sample
T _f	Time in seconds to obtain the final 500 ml (17 fl oz.) sample

Notes:

1. The time required to collect a 500 ml (17 fl oz.) sample should be approximately 5-times greater than the time required to collect a 100 ml (3.4 fl oz.) sample. If the 500 ml (17 fl oz.) sample time is much greater than 5-times that of the 100 ml (3.4 fl oz.) sample, the SDI should be calculated using 100 ml (3.4 fl oz.) sample collection times.
2. The total test time is usually 15 minutes. However, it may be less than 15 minutes if 75% plugging occurs in less than 15 minutes. To obtain accurate SDI measurements, P₃₀ should not exceed 75%. If P₃₀ does exceed 75%, the test should be repeated to obtain T_f in a shorter period of time (T).

Notice: The use of this product in and of itself does not necessarily guarantee the removal of cysts and pathogens from water. Effective cyst and pathogen reduction is dependent on the complete system design and on the operation and maintenance of the system.

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