



Standard Test Method for Silt Density Index (SDI) of Water ¹

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1. Scope

1.1 This test method covers the determination of the silt density index (SDI) of water. This test method can be used to indicate the quantity of particulate matter in water and is applicable to relatively low (<1.0 NTU) turbidity waters such as well water, filtered water, or clarified effluent samples. Since the size, shape, and nature of particulate matter in water may vary, this test method is not an absolute measurement of the quantity of particulate matter.

1.2 This test method is not applicable for reagent grade water Types I, II, and III of Specification D 1193, or effluents from most reverse osmosis and ultrafiltration systems.

1.3 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 ASTM Standards:

- D 1129 Terminology Relating to Water ²
- D 1193 Specification for Reagent Water ²
- D 3370 Practices for Sampling Water from Closed Conduits ²
- E 1 Specification for ASTM Thermometers ³

3. Terminology

3.1 *Definitions*—For definitions of terms used in this test method, refer to Terminology D 1129.

3.2 Definitions of Terms Specific to This Standard:

3.2.1 *silt density index (SDI)*—an index calculated from the rate of plugging of a $0.45\text{-}\mu\text{m}$ membrane filter.

4. Summary of Test Method

4.1 Water is passed through a $0.45\text{-}\mu\text{m}$ membrane filter at a constant applied gage pressure of 207 kPa (30 psi), and the rate of plugging of the filter is measured.

4.2 The SDI is calculated from the rate of plugging.

¹ This test method is under the jurisdiction of ASTM Committee D-19 on Water and is the direct responsibility of Subcommittee D19.08 on Membranes and Ion Exchange Materials.

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² *Annual Book of ASTM Standards*, Vol 11.01.

³ *Annual Book of ASTM Standards*, Vol 14.03.

5. Significance and Use

5.1 The SDI can serve as a useful indication of the quantity of particulate matter in water.

5.2 The SDI can be used to determine effectiveness of various processes such as filtration or clarification used to remove particulate matter.

5.3 The SDI has been empirically correlated with the fouling tendency of some water treatment equipment such as reverse osmosis devices.

5.4 The SDI may vary as a function of water temperature, and values obtained at different temperatures may not necessarily be comparable.

5.5 The SDI will vary with the membrane filter manufacturer. Thus, SDI values obtained with filters from different membrane manufacturers cannot be comparable.

6. Apparatus

6.1 *SDI Assembly*, as schematically described in Fig. 1. All wetted parts should be made of high-quality stainless steel or plastic to prevent contamination by corrosion products. Do not use reactive materials such as carbon steel or cast iron. Suitable filter holders, designed to withstand an operating gage pressure of 350 kPa (50 psi) can be obtained from suppliers of membrane filters.

6.2 *Membrane Filter*, 47 mm in diameter, gridded, and with a mean pore size in the range $0.45 \pm 0.02 \mu\text{m}$, inclusive. Use only filters that are packaged in the same orientation.

6.3 *Graduated Cylinder*, 500-mL capacity.

6.4 *Stopwatch*, graduated in hundredths of a minute.

6.5 *Thermometer*, liquid-in-glass, suitable for measuring the temperature of the water sample; capable of being read to within $\pm 1^\circ\text{C}$ and conforming to the requirements as prescribed in Specification E 1.

7. Procedure

7.1 Assemble the apparatus as shown in Fig. 1 and set the pressure regulator at 207 kPa (30 psi).

7.2 Before installing the membrane filter, flush the water to be tested through the apparatus to remove entrained contaminants. For sampling, follow the procedure given in Practices D 3370. Discrete samples can be used with appropriate pressurizing apparatus such as a booster pump to obtain a feed supply gage pressure of >276 kPa (>40 psi).

7.3 Measure the temperature of the water.

7.4 Open the membrane filter holder and place a $0.45\text{-}\mu\text{m}$ membrane filter (47 mm in diameter) on the support plate of