



Standard Guide for Monitoring of Suspended-Sediment Concentration in Open Channel Flow Using Optical Instrumentation¹

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1. Scope

1.1 This guide covers the equipment and basic procedures for installation, operation, and calibration of optical equipment as a surrogate for the continuous determination of suspended-sediment concentration (SSC) in open channel flow.

1.2 This guide emphasizes general principles for the application of optical measurements to be used to estimate suspended-sediment concentration (SSC) in water. Only in a few instances are step-by-step instructions given. Continuous monitoring is a field-based operation, methods and equipment are usually modified to suit local conditions. The modification process depends upon the operator skill and judgment.

1.3 This guide covers the use of the output from an optical instrument, such as turbidity and suspended-solids meters, to record data that can be correlated with suspended-sediment concentration. It does not cover the process of collecting data for continuous turbidity record, which would require additional calibration of the turbidity readings to the mean turbidity of the measurement cross section. For the purposes of this method it is assumed that the dependent variable will be mean cross-sectional suspended-sediment concentration data.

1.4 The values stated in SI units are to be regarded as standard. No other units of measurement are included in this standard.

1.5 *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:²

D3977 Test Methods for Determining Sediment Concentration in Water Samples

D4411 Guide for Sampling Fluvial Sediment in Motion

D7315 Test Method for Determination of Turbidity Above 1 Turbidity Unit (TU) in Static Mode

3. Terminology

3.1 Definitions:

3.1.1 *calibration drift, n*—the error that is the result of drift in the sensor reading from the last time the sensor was calibrated, and is determined by the difference between cleaned-sensor readings in calibration standards and the true, temperature-compensated value of the calibration standards.

3.1.2 *continuous, adj*—refers to a time series of unit values that are close enough in time to simulate a continuous record.

3.1.2.1 *Discussion*—Generally, in studies of open-channel flow, 15-minute intervals are used and are adequate to estimate continuous record. However, the time interval may be as little as a minute or as great as an hour.

3.1.3 *fouling, n*—the error that can result from a variety of sources (such as biological growth on the sonde and covering of the probe with sediment), and is determined by the difference between sensor measurements in the environment before and after the sensors are cleaned.

3.1.4 *sonde, n*—part of the monitoring equipment that contains the measurement sensors.

3.1.4.1 *Discussion*—A sonde may be either a single parameter sensor or a combination of different sensors of different parameters.

4. Summary of Guide

4.1 This guide covers the equipment and basic procedures for installation, operation, and calibration of optical equipment as a surrogate for the continuous or near continuous determination of SSC in open channel flow.

¹ This practice is under the jurisdiction of ASTM Committee D19 on Water and is the direct responsibility of Subcommittee D19.07 on Sediments, Geomorphology, and Open-Channel Flow.

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² For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.