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Standard Guide for Sampling Fluvial Sediment in Motion¹

This standard is issued under the fixed designation D4411; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ϵ) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 This guide covers the equipment and basic procedures for sampling to determine discharge of sediment transported by moving liquids. Equipment and procedures were originally developed to sample mineral sediments transported by rivers but they are applicable to sampling a variety of sediments transported in open channels or closed conduits. Procedures do not apply to sediments transported by flotation.

1.2 This guide does not pertain directly to sampling to determine nondischarge-weighted concentrations, which in special instances are of interest. However, much of the descriptive information on sampler requirements and sediment transport phenomena is applicable in sampling for these concentrations, and 9.2.8 and 13.1.3 briefly specify suitable equipment. Additional information on this subject will be added in the future.

1.3 The cited references are not compiled as standards; however they do contain information that helps ensure standard design of equipment and procedures.

1.4 Information given in this guide on sampling to determine bedload discharge is solely descriptive because no specific sampling equipment or procedures are presently accepted as representative of the state-of-the-art. As this situation changes, details will be added to this guide.

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, health, and environmental practices and determine the applicability of regulatory limitations prior to use.* Specific precautionary statements are given in Section 12.

1.6 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

¹ This guide 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. Referenced Documents

2.1 ASTM Standards:²

D1129 Terminology Relating to Water

D3977 Test Methods for Determining Sediment Concentration in Water Samples

3. Terminology

3.1 *Definitions*—For definitions of terms used in this standard, refer to Terminology D1129.

3.1.1 *isokinetic, adj*—a condition of sampling, whereby liquid moves with no acceleration as it leaves the ambient flow and enters the sampler nozzle.

3.1.2 *sampling vertical, n*—an approximately vertical path from water surface to the streambed. Along this path, samples are taken to define various properties of the flow such as sediment concentration or particle-size distribution.

3.1.3 *sediment discharge, n*—mass of sediment transported per unit of time.

3.1.4 *suspended sediment, n*—sediment that is carried in suspension in the flow of a stream for appreciable lengths of time, being kept in this state by the upward components of flow turbulence or by Brownian motion.

3.2 Definitions of Terms Specific to This Standard:

3.2.1 *concentration, sediment, n*—the ratio of the mass of dry sediment in a water-sediment mixture to the volume of the water-sediment mixture. Refer to Test Methods D3977.

3.2.2 *depth-integrating suspended sediment sampler, n*—an instrument capable of collecting a water-sediment mixture isokinetically as the instrument is traversed across the flow; hence, a sampler suitable for performing depth integration.

3.2.3 *depth-integration, n*—a method of sampling at every point throughout a sampled depth whereby the water-sediment mixture is collected isokinetically to ensure the contribution from each point is proportional to the stream velocity at the point. This method yields a sample that is discharge-weighted over the sampled depth. Ordinarily, depth integration is performed by traversing either a depth- or point-integrating

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.