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Standard Guide for Selection of Methods of Particle Size Analysis of Fluvial Sediments (Manual Methods)¹

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1. Scope

1.1 This guide covers the selection of methods for determining the size distribution of fluvial sediments particles in the range greater than 0.45 μm using manual methods. Manual methods are defined as those methods that require the operator to do some actual measurements and calculations. An automated method would be one which after the sample is prepared and inserted into an instrument, the instrument (machine) does the measuring and calculations, not the operator. Not all manual methods are presented in this guide. However, where available, at least two methods for each particle size range are given.

1.2 *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 422 Test Method for Particle-Size Analysis of Soils²
- D 1129 Terminology Related to Water³
- D 4410 Terminology of Fluvial Sediment⁴
- D 4411 Guide for Sampling Fluvial Sediment in Motion⁴
- E 20 Practice for Particle Size Analysis of Particulate Substances in the Range of 0.2 to 75 Micrometers by Optical Microscopy⁵

3. Terminology

3.1 Definitions:

3.1.1 For definitions of terms used in this guide, refer to Terminologies D 1129 and D 4410.

3.2 Definitions of Terms Specific to This Standard:

3.2.1 For descriptions of terms used in this guide, refer to Terminology D 4410.

3.2.2 *particle count*—a method of particle size analysis in which the number of particles in the various size ranges are counted manually.

3.2.3 *particle size*—the diameter, usually the intermediate diameter, of a particle measured by settling, sieving, microscopic, or direct measurement methods (see 5.2).

3.2.4 *particle size distribution*—the relative amount of a sediment sample in a range of specific sizes in terms of percentages by mass, volume, or number, finer than a given particle size.

4. Summary of Guide

4.1 This guide consists of suggested manual test methods for analyzing fluvial sediment samples for particle size distribution.

5. Significance and Use

5.1 This guide is general and is useful in helping the user to determine an appropriate manual test method for determining the particle size distribution of fluvial sediments. The suggested test methods are not described in this guide, but references are given so that the user may obtain more information about each test method.

5.2 It should be noted that different test methods may and often times do produce different particle size distributions for the same sample. This is due in part to the different test methods requiring native or distilled water, differences in dispersion methods used, and differences in what the test method is measuring, that is, physical or sedimentation diameter.

6. Sampling

6.1 Collect the samples in accordance with Guide D 4411 or “Field Methods for Measurement of Fluvial Sediments” (1).⁶

¹ This guide is under the jurisdiction of ASTM Committee D-19 on Water and is the direct responsibility of Subcommittee D19.07 on Sediments, Geomorphology, and Open Channel Flow.

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² *Annual Book of ASTM Standards*, Vol 04.08.

³ *Annual Book of ASTM Standards*, Vol 11.01.

⁴ *Annual Book of ASTM Standards*, Vol 11.02.

⁵ Discontinued; see 1995 *Annual Book of ASTM Standards*, Vol 14.02.

⁶ The boldface numbers in parentheses refer to the list of references at the end of this guide.