

Standard Test Method for Open-Channel Flow Measurement of Water Indirectly by Slope-Area Method¹

This standard is issued under the fixed designation D 5130; 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 test method covers the computation of discharge (the volume rate of flow) of water in open channels or streams using representative cross-sectional characteristics, the water-surface slope, and coefficient of channel roughness as input to gradually-varied flow computations.²

1.2 This test method produces an indirect measurement of the maximum discharge for one flow event, usually a specific flood. The computed discharge may be used to help define the high-water segment of a stage-discharge relation.

1.3 The values stated in inch-pound units are to be regarded as the standard. The SI units given in parentheses are for information only.

1.4 *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 Water³

D 2777 Practice for Determination of Precision and Bias of Applicable Methods of Committee D-19 on Water³

D 3858 Practice for Open-Channel Flow Measurement of Water by Velocity-Area Method³

2.2 ISO Standards:

ISO 748 Liquid Flow Measurements in Open Channels—Velocity-Area Method⁴

ISO 1070 Liquid Flow Measurements in Open Channels—Slope-Area Method⁴

¹ This test method 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.

Current edition approved June 10, 2003. Published August 2003. Originally approved in 1990. Last previous edition approved in 1999 as D 5130 – 95(1999).

² This test method is similar to methods developed by the U.S. Geological Survey and described in documents referenced in Footnotes 5, 6, and 7.

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

⁴ Available from American National Standards Institute, 25 W. 43rd St., 4th Floor, New York, NY 10036.

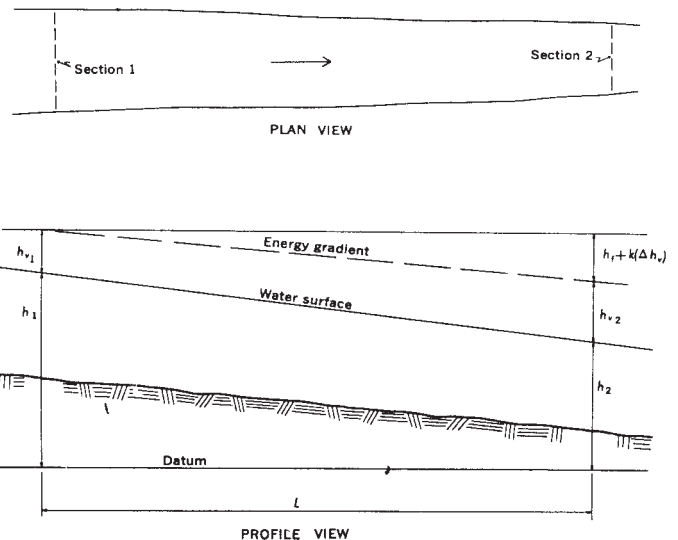


FIG. 1 Definition Sketch of a Slope-Area Reach

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:* Several of the following terms are illustrated in Fig. 1:

3.2.1 *alpha (α)*—a velocity-head coefficient that represents the ratio of the true velocity head to the velocity head computed on the basis of the mean velocity. It is assumed equal to 1.0 if the cross section is not subdivided. For subdivided sections, α is computed as follows:

$$\alpha = \frac{\sum \left(\frac{k_i^3}{A_i^2} \right)}{\frac{K_T^3}{A_T^2}}$$

where: