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An American National Standard

Standard Test Method for Open-Channel Flow Measurement of Water with Thin-Plate Weirs[1]

This standard is issued under the fixed designation D 5242; 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 measurement of the volumetric flowrate of water and wastewater in channels with thin-plate weirs. Information related to this test method can be found in Rantz **(1)**[2] and Ackers **(2)**.

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

1.3 *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[3]

D 2777 Practice for Determination of Precision and Bias of Applicable Methods of Committee D-19 on Water[3]

D 3858 Practice for Open-Channel Flow Measurement of Water by Velocity-Area Methods[3]

2.2 *ISO Standards:*

ISO 1438 Flow Measurement in Open Channels Using Weirs and Venturi Flumes—Part 1: Thin-Plate Weirs[4]

ISO 555 Liquid Flow Measurement in Open Channels, Delusion Methods for Measurement of Steady Flow-Constant Rate Injection Method[4]

3. Terminology

3.1 *Definitions:*

3.1.1 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 *crest*—the bottom of the overflow section or notch of a rectangular weir.

3.2.2 *head*—the height of a liquid above a specified point, for example, the weir crest.

3.2.3 *hydraulic jump*—an abrupt transition from supercritical flow to subcritical or tranquil flow.

3.2.4 *nappe*—the curved sheet or jet of water overfalling the weir.

3.2.5 *notch*—the overflow section of a triangular weir or of a rectangular weir with side contractions.

3.2.6 *primary instrument*—the device (in this case the weir) that creates a hydrodynamic condition that can be sensed by the secondary instrument.

3.2.7 *scow float*—an in-stream float for depth sensing, usually mounted on a hinged cantilever.

3.2.8 *secondary instrument*—in this case, a device that measures the depth of flow (referenced to the crest) at an appropriate location upstream of the weir plate. The secondary instrument may also convert the measured depth to an indicated flowrate.

3.2.9 *stilling well*—a small free-surface reservoir connected through a constricted channel to the approach channel upstream of the weir so that a depth (head) measurement can be made under quiescent conditions.

3.2.10 *subcritical flow*—open channel flow in which the average velocity is less than the square root of the product of the average depth and the acceleration due to gravity; sometimes called tranquil flow.

3.2.11 *submergence*—a condition where the water level on the downstream side of the weir is at the same or at a higher elevation than the weir crest; depending on the percent of submergence the flow over the weir and hence the head-discharge relation may be altered.

3.2.12 *supercritical flow*—open channel flow in which the average velocity exceeds the square root of the product of the average depth and the acceleration due to gravity.

3.2.13 *tailwater*—the water level immediately downstream of the weir.

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[1] This test method 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] The boldface numbers in parentheses refer to a list of references at the end of the text.

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

[4] Available from American National Standards Institute, 11 West 42nd Street, NY, NY 10036.

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