



Standard Method for OPEN CHANNEL FLOW MEASUREMENT OF WATER AND WASTE WATER BY WEIRS¹

This Standard is issued under the fixed designation D 2034; 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.

1. Scope

1.1 This method covers the measurement of the rate of flow of water and waste water in open channels or streams at or near the ground surface using the triangular (V-notch), rectangular and trapezoidal type weirs having end and bottom contractions.

1.2 Weirs are particularly applicable where there is low head flow at liquid discharge outlets for relatively clear water containing a minimum of suspended solids which, on low flows, tend to settle out upstream.

2. General Principles

2.1 The triangular or V-notch weir (Fig. 1) may have an angle of any desired amount, but the 60- and 90-deg notches are most commonly used with the apex pointed downward. The rectangular weir (Fig. 2) has the notch cut in a rectangular shape with level crest and vertical sides. The trapezoidal weir (Fig. 3) is in reality a combination of the V-notch with the rectangular, a special form being the Cippoletti. (Refer to Table I for an explanation of the dimensions used in Figs. 1, 2, 3 and 4.)

2.2 The V-notch weirs give greater heads for a given discharge than does a rectangular notch of the same width at the water surface. They are, therefore, especially recommended for metering flows less than 0.03 m³/s (1 ft³/s (cfs)) or 28.4 liters/s (450 gal/min (gpm)) and are suitable for measuring fluctuating flows up to 0.3 m³/s (10 cfs). Although 60-deg notch weirs are in use, the more common V-notch weir is cut to 90 deg.

2.3 The rectangular weir is capable of high-capacity metering and is simple and inexpensive to construct.

2.4 The Cippoletti weir is similar to the rectangular weir, except for sloping sides (one horizontal to four vertical) of the notch. This type has the advantage of a simplified discharge formula which is more convenient to work than that for the rectangular weir.

2.5 When built in accordance with one of the standard designs and used under carefully controlled field conditions, weirs are an accepted means of accurate measurement of the rate of flow.

3. Description of Terms

3.1 The terms *weir*, *weir notch*, and *crest* and other terms specific to this method are defined as follows:

3.1.1 *weir*—a flow measuring device consisting of a dam or other obstruction over which water flows, placed in a pipe, channel, or stream.

3.1.2 *weir notch*—the opening cut in the top of a dam through which a stream can flow. In this case, the notch is the weir.

3.1.3 *crest*—the level to which water must rise before it can flow over the weir, that is, the top of the dam or the bottom of the notch cut in the dam. The V-notch weir which comes to a point at the bottom has no crest length.

¹ This method is under the jurisdiction of ASTM Committee D-19 on Water.

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