AS 3778.4.5—1991
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Australian Standard®

Measurement of water flow in open channels

Part 4: Measurement using flow gauging structures

Method 4.5: Triangular profile weirs

[ISO title: Liquid flow measurement in open channels by weirs and flumes—Triangular profile weirs]

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Association of Consulting Engineers, Australia

Australian Water and Wastewater Association

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Engineering and Water Supply Department of South Australia

Forestry Commission, N.S.W.

Institute of Instrumentation and Control

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Water Board, Sydney—Illawarra—Blue Mountains

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PREFACE

This Standard was prepared by the Standards Australia Committee on Measurement of Water Flow in Open Channels and Closed Conduits. It is identical with and has been reproduced from ISO 4360: 1984, *Liquid flow measurement in open channels by weirs and flumes—Triangular profile weirs.*

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This Standard is one of a series which deals with methods of measurement of water flow in open channels. The series when complete will consist of the following parts:

Part 1: *Vocabulary and symbols*
Part 2.1: *General—Guidelines for the selection of methods of measurement*
Part 2.2: *General—Establishment and operation of a gauging station*
Part 2.3: *General—Determination of the stage-discharge relation*
Part 2.4: *General—Estimation of uncertainty of a flow-rate measurement*
Part 2.5: *General—Guidelines for the selection of flow gauging structures*
Part 3: *Velocity-area methods*
Method 3.1: *Measurement by current-meters and floats*
Method 3.2: *Measurement by moving-boat method*
Method 3.3: *Measurement by slope-area method*
Method 3.4: *Collection and processing of data for determination of errors in measurement*
Method 3.5: *Investigation of total error*
Method 3.6: *Measurement of flow in tidal channels*
Method 3.7: *Measurement by ultrasonic (acoustic) method*
Method 3.8: *Electromagnetic method using a full-channel-width coil*
Part 4: *Measurement using flow gauging structures*
Method 4.1: *Thin-plate weirs*
Method 4.2: *Rectangular broad-crested weirs*
Method 4.3: *Round-nose horizontal broad-crested weirs*
Method 4.4: *V-shaped broad-crested weirs*
Method 4.5: *Triangular profile weirs* (this Standard)
Method 4.6: *Flat-V weirs*
Method 4.7: *Rectangular, trapezoidal and U-shaped flumes*
Method 4.8: *Trapezoidal profile weirs*
Method 4.9: *Parshall and Saniiri flumes*
Method 4.10: *End-depth method for estimation of flow in rectangular channels with a free overfall*
Method 4.11: *End-depth method for estimation of flow in non-rectangular channels with a free overfall (approximate method)*
Part 5: *Dilution methods*
Method 5.1: *Constant-rate injection method for the measurement of steady flow*
Method 5.2: *Integration method for the measurement of steady flow*
Part 6.1: *Measuring devices, instruments and equipment—Rotating element current-meters*
Part 6.2: *Measuring devices, instruments and equipment—Direct depth sounding and suspension equipment*
Part 6.3: *Measuring devices, instruments and equipment—Calibration of rotating element current-meters in straight open tanks*
Part 6.4: *Measuring devices, instruments and equipment—Echo sounders for water depth measurements*
Part 6.5: *Measuring devices, instruments and equipment—Water level measuring devices*
Part 6.6 *Measuring devices, instruments and equipment—Cableway system for stream gauging*
Part 6.7: *Measuring devices, instruments and equipment—Ultrasonic (acoustic) velocity meters*
Part 6.8: *Measuring devices, instruments and equipment—Position fixing equipment for hydrometric boats*

For the purposes of this Australian Standard, the ISO text should be modified as follows:

(i) Wherever the words 'International Standard' appear, referring to this Standard, they should be read as 'Australian Standard'.

(ii) Wherever the word 'fluid' appears, it should be read as 'water'.

(iii) Substitute a full point (.) for a comma (,) as a decimal marker.

(iv) The references to other publications should be replaced by references to Australian Standards as follows:

Reference to International Standard		*Australian Standard*	
ISO		AS	
		3778	Measurement of water flow in open channels
772	Liquid flow measurement in open channels—Vocabulary and symbols	3778.1	Part 1: Vocabulary and symbols
5168	Measurement of fluid flow—Estimation of uncertainty of a flow-rate measurement	3778.2.4	Part 2.4: General—Estimation of uncertainty of a flow-rate measurement
748	Liquid flow measurement in open channels—Velocity-area method	3778.3.1	Part 3: Velocity-area methods Method 3.1: Measurement by current-meters and floats
4373	Measurement of liquid flow in open channels—Water level measuring devices	—	

Measurement of water flow in open channels

Part 4:
Measurement using flow gauging structures

Method 4.5:
Triangular profile weirs

1 Scope and field of application

This International Standard specifies methods for the measurement of the flow of water in open channels under steady flow conditions using triangular profile weirs. The flow conditions considered are steady flows which are uniquely dependent on the upstream head and drowned flows which depend on downstream as well as upstream levels.

2 References

ISO 748, *Liquid flow measurement in open channels — Velocity-area methods.*

ISO 772, *Liquid flow measurement in open channels — Vocabulary and symbols.*

ISO 4373, *Measurement of liquid flow in open channels — Water level measuring devices.*

ISO 5168, *Measurement of fluid flow — Estimation of uncertainty of a flow-rate measurement.*

3 Definitions and symbols

For the purpose of this International Standard, the definitions given in ISO 772 apply. The symbols used in this International Standard are given in the annex.

4 Units of measurement

The units of measurement used in this International Standard are seconds and metres.

5 Installation

Conditions regarding preliminary survey, selection of site, installatɒn, the approachchannel,maintenance,measurement of head, and stilling or float wells which are generally necessary for flow measurement are given in the following sub-clauses. The particular requirements for the triangular profile weir are given separately in clause 8.

5.1 Selection of site

5.1.1 A preliminary survey shall be made of the physical and hydraulic features of the proposed site, to check that it conforms (or may be made to conform) to the requirements necessary for measurement by a weir.

Particular attention should be paid to the following features in selecting the site:

a) availability of an adequate length of channel of regular cross-section;

b) the existing velocity distribution;

c) the avoidance of a steep channel, if possible;

d) the effects of any increased upstream water level due to the measuring structure;

e) conditions downstream including such influences as tides, confluences with other streams, sluice gates, mill dams and other controlling features which might cause submerged flow;

f) the impermeability of the ground on which the structure is to be founded, and the necessity for piling, grouting or other sealing-in river installations;

g) the necessity for flood banks to confine the maximum discharge to the channel;

h) the stability of the banks, and the necessity for trimming and/or revetment in natural channels;

j) the clearance of rocks or boulders from the bed of the approach channel;

k) the effect of wind; wind can have a considerable effect on the flow in a river or over a weir, especially when these are wide and the head is small and when the prevailing wind is in a transverse direction.

If the site does not possess the characteristics necessary for satisfactory measurement, the site shall be rejected unless suitable improvements are practicable.

If an inspection of the stream shows that the existing velocity distribution is regular, then it may be assumed that the velocity distribution will remain satisfactory after the construction of a weir.

If the existing velocity distribution is irregular and no other site for a gauge is feasible, due consideration shall be given to checking the distribution after the installation of the weir and to improving it if necessary.