AS 3778.4.1:2022
ISO 1438:2017

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Measurement of water flow in open channels

Part 4.1: Measurement using flow gauging structures — Thin-plate weirs (ISO 1438:2017, IDT)

AS 3778.4.1:2022

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Australian Bureau of Meteorology
Australian Hydrographers Association
Australian Industry Group
Department of Planning, Industry and Environment, NSW
Engineers Australia
Institute of Instrumentation, Control & Automation Australia
Irrigation Australia
Joint Accreditation System of Australia & New Zealand
National Measurement Institute
Water NSW

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Preface

This Standard was prepared by the Standards Australia Committee CE-024, Measurement of water flow in open channels and closed conduits, to supersede AS 3778.4.1:1991, *Measurement of water flow in open channels, Part 4: Measurement using flow gauging structures, Method 4.1: Thin-plate weirs*.

The objective of this document is to define the requirements for the use of rectangular and triangular (V-notch) thin-plate weirs for the measurement of flow of clear water in open channels under free flow conditions. It includes the requirements for the use of full-width rectangular thin-plate weirs in submerged (drowned) flow conditions.

This document is identical with, and has been reproduced from, ISO 1438:2017, *Hydrometry — Open channel flow measurement using thin-plate weirs*.

As this document has been reproduced from an International document, a full point substitutes for a comma when referring to a decimal marker.

Australian or Australian/New Zealand Standards that are identical adoptions of international normative references may be used interchangeably. Refer to the online catalogue for information on specific Standards.

The terms “normative” and “informative” are used in Standards to define the application of the appendices or annexes to which they apply. A “normative” appendix or annex is an integral part of a Standard, whereas an “informative” appendix or annex is only for information and guidance.

Contents

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation on the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see the following URL: www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 113, *Hydrometry*, Subcommittee SC 2, *Flow measurement structures*.

This third edition cancels and replaces the second edition (ISO 1438:2008), which has been technically revised. It also incorporates the Technical Corrigendum ISO 1438:2008/Cor 1:2008.

The major changes from ISO 1438:2008 are as follows:

a) the modular flow discharge formula for weirs with weir plate height of 1 m ≤ p ≤ 2,5 m has been supplemented in 9.7.1;

b) the C_d formula for rectangular weir with b/B = 1,0, Formula (5), has been corrected to the same formula as the full-width weir, Formula (15);

c) subclause numbers of 9.6 have been re-numbered.

NOTES

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1 Scope

This document defines the requirements for the use of rectangular and triangular (V-notch) thin-plate weirs for the measurement of flow of clear water in open channels under free flow conditions. It includes the requirements for the use of full-width rectangular thin-plate weirs in submerged (drowned) flow conditions.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 772, *Hydrometry — Vocabulary and symbols*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 772 apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— IEC Electropedia: available at http://www.electropedia.org/

— ISO Online browsing platform: available at http://www.iso.org/obp

4 Symbols and abbreviated terms

Symbol	Unit	Description
A	m^2	Area of approach channel
B	m	Width of approach channel
b	m	Measured width of the notch
b_{max}	m	Width of notch at maximum head (V-notch)
C		Discharge coefficient (gauged head)
C_d		Coefficient of discharge
f		Drowned flow reduction factor
C_v		Coefficient of velocity
e_b	m	Random uncertainty in the width measurement
g	m/s^2	Acceleration due to gravity
H	m	Total head above crest level
h	m	Upstream gauged head above crest level (upstream head is inferred if no subscript is used)
J		Numerical constant
l	m	Distance of the head measurement section upstream of the weir
n		Number of measurements in a set
p	m	Height of the crest relative to the floor
Q	m^3/s	Volumetric rate of flow