AS 3778.4.10:2022
ISO 18481:2017

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Measurement of water flow in open channels

Part 4.10: Measurement using flow gauging structures — End-depth method for estimation of flow in channels with a free overfall (ISO 18481:2017, IDT)

AS 3778.4.10:2022

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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
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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 3778.4.10 — 1991, *Measurement of water flow in open channels, Method 4.10: Measurement using flow gauging structures — End-depth method for estimation of flow in rectangular channels with a free overfall.*

The objective of this document is to specify a method for the estimation of the sub-critical flow of clear water in a smooth, essentially horizontal channel (or a gently sloping channel), abruptly discontinued at bottom by a hydraulic structure, with a vertical drop and discharging freely. Such an overfall forms a control section and offers a means for the estimation of flow using the end depth measurement method.

A wide variety of channel cross-sections with overfall have been studied, but only those which have received general acceptance after adequate research and testing, and therefore do not require *in situ* calibration, are considered. The types of channel cross-sections covered in this document are the following:

(a) Rectangular with confined and unconfined nappe.

(b) Trapezoidal.

(c) Triangular.

(d) Circular.

(e) Parabolic.

This document is identical with, and has been reproduced from, ISO 18481:2017, *Hydrometry — Liquid flow measurement using end depth method in channels with a free overfall*.

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.

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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 first edition of ISO 18481 cancels and replaces ISO 3847:1977 and ISO 4371:1984, which have been merged and technically revised.

NOTES

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1 Scope

This document specifies a method for the estimation of the sub-critical flow of clear water in a smooth, essentially horizontal channel (or a gently sloping channel), abruptly discontinued at bottom by a hydraulic structure, with a vertical drop and discharging freely. Such an overfall forms a control section and offers a means for the estimation of flow using the end depth measurement method. A wide variety of channel cross-sections with overfall have been studied, but only those which have received general acceptance after adequate research and testing, and therefore do not require in-situ calibration, are considered. This document covers channels with the following types of cross-sections:

a) rectangular with confined and unconfined nappe;

b) trapezoidal;

c) triangular;

d) circular;

e) parabolic.

The flow at the brink is curvilinear; therefore, the measured depth at the drop is not equal to the critical depth as computed by the principle based on assumption of parallel flow. However, the end depth and the critical depth (as in the case of the assumption of parallel flow) have unique relation, which is used to estimate the flow through these structures.

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 https://www.iso.org/obp