AS 3778.2.4—2007
ISO 5168:2005

AS 3778.2.4—2007

Australian Standard®

Measurement of water flow in open channels

Part 2.4: General—Estimation of uncertainty of a flow rate measurement

This Australian Standard® was prepared by Committee CE-024, Measurement of Water Flow in Open Channels and Closed Conduits. It was approved on behalf of the Council of Standards Australia on 5 April 2007.
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The following are represented on Committee CE-024:

- Australian Industry Group
- Australian National Committee on Irrigation and Drainage
- Department of Environment and Water Resources
- Institute of Instrumentation, Control and Automation Australia
- Irrigation Association of Australia
- National Measurement Institute
- Plumbing Products Industry Group
- University of New South Wales
- University of South Australia
- Water Services Association of Australia

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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 3778.2.4—2001.

The objective of this Standard is to specify methods for measuring discharge in large rivers and estuaries by the moving-boat technique.

This Standard is identical to and reproduced from ISO 5168:2005, *Measurement of fluid flow—Procedures for the evaluation of uncertainties*.

As this Standard is reproduced from an international standard, the following applies:

(a) Its number appears on the cover and title page while the international standard number appears only on the cover.

(b) In the source text 'ISO 5168' should read 'AS 3778.2.4'.

(c) A full point substitutes for a comma when referring to a decimal marker.

The terms 'normative' and 'informative' have been used in this Standard to define the application of the appendix to which they apply. A 'normative' appendix is an integral part of a Standard, whereas an 'informative' appendix is only for information and guidance.

CONTENTS

Page

INTRODUCTION

Whenever a measurement of fluid flow (discharge) is made, the value obtained is simply the best estimate that can be obtained of the flow-rate or quantity. In practice, the flow-rate or quantity could be slightly greater or less than this value, the uncertainty characterizing the range of values within which the flow-rate or quantity is expected to lie, with a specified confidence level.

GUM is the authoritative document on all aspects of terminology and evaluation of uncertainty and should be referred to in any situation where this International Standard does not provide enough depth or detail. In particular, GUM (1995), Annex F, gives guidance on evaluating uncertainty components.

STANDARDS AUSTRALIA

Australian Standard

Measurement of water flow in open channels
Part 2.4: General—Estimation of uncertainty of a flow rate measurement

1 Scope

This International Standard establishes general principles and describes procedures for evaluating the uncertainty of a fluid flow-rate or quantity.

A step-by-step procedure for calculating uncertainty is given in Annex A.

2 Normative references

The following referenced documents are indispensable for the application 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 9300, *Measurement of gas flow by means of critical flow Venturi nozzles*

ISO Guide to the expression of uncertainty in measurement (*GUM*), 1995

International vocabulary of basic and general terms in metrology (*VIM*), 1993

3 Terms and definitions

For the purposes of this document, the terms and definitions given in VIM (1993), GUM (1995) and the following apply.

3.1
uncertainty
parameter, associated with the results of a measurement, that characterizes the dispersion of the values that could reasonably be attributed to the measurand

NOTE Uncertainties are expressed as an absolute value and do not take a positive or negative sign.

3.2
standard uncertainty
$u(x)$
uncertainty of the result of a measurement expressed as a standard deviation

3.3
relative uncertainty
$u^*(x)$
standard uncertainty divided by the best estimate

NOTE 1 $u^*(x) = u(x)/x$.

NOTE 2 $u^*(x)$ can be expressed either as a percentage or in parts per million.

NOTE 3 Relative uncertainty is sometimes referred to as dimensionless uncertainty.

NOTE 4 The best estimate is in most cases the arithmetic mean of the related uncertainty interval.