AS 3778.2.4—2001
ISO/TR 5168:1998

Australian Standard™

Measurement of water flow in open channels

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

[ISO title: Measurement of fluid flow—Evaluation of uncertainties]

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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 29 September 2000 and published on 12 March 2001.

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Australian Water and Wastewater Association

Department of Natural Resources, Qld

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Department of Land and Water Conservation, New South Wales

Department of Public Works and Services, New South Wales

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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.

This Standard is identical to and is reproduced from ISO/TR 5168:1998, *Measurement of fluid flow—Evaluation of uncertainties*.

This Standard is Part 2.4 of AS 3778, *Measurement of water flow in closed conduits*, which is published in parts as follows:

AS		
3778		Measurement of water flow in open channels
3778.1	Part 1:	Vocabulary and symbols
3778.2	Part 2:	General
3778.2.1	Part 2.1:	Guidelines for the selection of methods of measurement
3778.2.2	Part 2.2:	Establishment and operation of a gauging station
3778.2.3	Part 2.3:	Determination of the stage-discharge relation
3778.2.4	Part 2.4:	Estimation of uncertainty of a flow-rate measurement (this Standard)
3778.2.5	Part 2.5:	Guidelines for the selection of flow gauging structures
3778.3	Part 3:	Velocity-area method
3778.3.1	Part 3.1:	Measurement by current meters and floats
3778.3.2	Part 3.2:	Measurement by moving boat method
3778.3.3	Part 3.3:	Measurement by slope-area method
3778.3.4	Part 3.4:	Collection and processing of data for determination of errors in measurement
3778.3.5	Part 3.5:	Investigation of total error
3778.3.6	Part 3.6:	Measurement of flow in tidal channels
3778.3.7	Part 3.7:	Measurement by ultrasonic (acoustic) method
3778.3.8	Part 3.8:	Electromagnetic method using a full-channel-width coil
3778.4	Part 4:	Measurement using flow gauging structures
3778.4.1	Part 4.1:	Thin-plate weirs
3778.4.2	Part 4.2:	Rectangular broad-crested weirs
3778.4.3	Part 4.3:	Round-nose horizontal broad-crested weirs`
3778.4.4	Part 4.4:	V-shaped broad-crested weirs
3778.4.5	Part 4.5:	Triangular profile weirs
3778.4.6	Part 4.6:	Flat-V weirs
3778.4.7	Part 4.7:	Rectangular, trapezoidal and U-shaped flumes
3778.4.8	Part 4.8:	Trapezoidal profile weirs
3778.4.9	Part 4.9:	Parshall and Saniiri flumes
3778.4.10	Part 4.10:	End-depth method for estimation of flow in rectangular channels with a free overfall
3778.4.11	Part 4.11:	End-depth method for estimation of flow in rectangular channels with a free overfall (approximate method)
3778.5	Part 5:	Dilution method
3778.5.1	Part 5.1:	Constant-rate injection method for the measurement of steady flow
3778.5.2	Part 5.2:	Integration method for the measurement of steady flow
3778.6	Part 6:	Measuring devices, instruments and equipment
3778.6.1	Part 6.1:	Rotating element current-meters
3778.6.2	Part 6.2:	Direct depth sounding and suspension equipment
3778.6.3	Part 6.3:	Calibration of rotating element current meters in straight open tanks
3778.6.4	Part 6.4:	Echo sounders for water depth measurements
3778.6.5	Part 6.5:	Water level measuring devices
3778.6.6	Part 6.6:	Cableway system for stream gauging
3778.6.7	Part 6.7:	Ultrasonic (acoustic) velocity meters
3778.6.8	Part 6.8:	Position fixing equipment for hydrometric boats

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CONTENTS

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AUSTRALIAN STANDARD

Measurement of water flow in open channels

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

1 Scope

Whenever a measurement of flowrate (discharge) is made, the value obtained from the experimental data is simply the best possible estimate of the true flowrate. In practice, the true flowrate may be slightly greater or less than this value.

1.1 This Technical Report details step-by-step procedures for the evaluation of uncertainties in individual flow measurements arising from both random and systematic error sources and for the propagation of component uncertainties into the uncertainty of the test results. These procedures enable the following processes to be carried out:

a) estimation of the accuracy of results derived from flowrate measurement;

b) selection of a proper measuring method and devices to achieve a required level of accuracy of flowrate measurement;

c) comparison of the results of measurement;

d) identification of the sources of errors contributing to a total uncertainty;

e) refinement of the results of measurements as data accumulate.

NOTE — It is assumed that the measurement process is carefully controlled and that all calibration corrections have been applied.

1.2 This Technical Report describes the calculations required in order to arrive at an estimate of the interval within which the true value of the flowrate may be expected to lie. The principle of these calculations is applicable to any flow measurement method, whether the flow is in an open channel or in a closed conduit.

NOTE — Although this Technical Report has been drafted taking mainly into account the sources of error due to the instrumentation, it should be emphasized that the errors due to the flow itself (velocity distribution, turbulence, etc.) and to its effect on the method and on the response of the instrument can be of great importance with certain methods of flow measurement (see 5.7). Where a particular device or technique is used, some simplifications may be possible or special reference may have to be made to specific sources of error not identified in this Technical Report. Therefore reference should be made to the "Uncertainty of measurement" clause of the appropriate International Standard dealing with that device or technique.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this Technical Report. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this Technical Report are encouraged to investigate the possibility of applying

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