AS 3778.3.2—1990
ISO 4369:1979
Reconfirmed 2022

AS 3778.3.2—1990

Australian Standard®

Measurement of water flow in open channels

Method 3.2: Velocity-area methods—Measurement by moving-boat method

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- Association of Consulting Engineers of Australia
- Australian Water and Wastewater Association
- Board of Works, Melbourne
- Department of Water Resources, NSW
- Engineering and Water Supply Department of South Australia
- Forestry Commission, NSW
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Standards Australia wishes to acknowledge the participation of the expert individuals that contributed to the development of this Standard through their representation on the Committee.

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STANDARDS AUSTRALIA

RECONFIRMATION

OF
AS 3778.3.2—1990
Measurement of water flow in open channels
Method 3.2: Velocity-area methods—Measurement by moving-boat method

RECONFIRMATION NOTICE

Technical Committee CE-024 has reviewed the content of this publication and in accordance with Standards Australia procedures for reconfirmation, it has been determined that the publication is still valid and does not require change.

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NOTES

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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 4369 — 1979, *Measurement of liquid flow in open channels — Moving-boat method.*

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 (this Standard)
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 structures methods —
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
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:

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

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

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

(d) The references to other publications should be replaced by references to Australian Standards.

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 methods	3778.3.1	Part 3: Velocity-area methods—Method 3.1: Measurement by current-meters and floats

Measurement of water flow in open channels

Part 3: Velocity-area methods
Method 3.2: Measurement by moving-boat method

1 Scope and field of application

This International Standard specifies methods for measuring discharge in large rivers and estuaries by the moving-boat technique. In the following sections procedures applicable to this method and the general requirements of equipment are covered. A complete facsimile example of computation of a moving boat measurement is given in the annexes.

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 3454, *Liquid flow measurement in open channels — Sounding and suspension equipment.*

ISO 4366, *Liquid flow measurement in open channels — Echo sounders.*

ISO 5168, *Calculation of the uncertainty of a measurement of flowrate.*[1)]

3 Definitions

For the purpose of this International Standard the definitions given in ISO 772 apply.

4 Units of measurement

The units of measurement used in this International Standard are SI units.

5 General

Frequently, on large rivers and estuaries, conventional methods of measuring discharge by current meters are difficult and involve costly and tedious procedures.

This is particularly true at remote sites where no facilities exist, or during floods when facilities may be inundated or inaccessible.

In those cases where unsteady flow conditions require that measurement be made as rapidly as possible, the moving-boat technique is applicable. It requires no fixed facilities and it lends itself to the use of alternate sites.

The moving-boat technique uses a velocity-area method of determining discharge. The technique requires that the following information be obtained

a) location of observation points across the stream with reference to the distance from an initial point;

b) stream depth, d, at each observation point;

c) stream velocity, v, perpendicular to the cross section at each observation point.

The principal difference between a conventional measurement and the moving-boat measurement is in the method of data collection. The mean velocity in the segments of a cross-section of the stream in the case of a conventional technique is determined by point velocities or an integrated mean velocity in the vertical. The moving-boat technique measures the velocity over the width of a segment by suspending the current meter at a constant depth during the traverse of the boat across the stream. The measured velocity and the additional information of the depth sounding gives the required data for determining the discharge.

1) At present at the stage of draft.