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Australian Standard®

Measurement of water flow in open channels

Part 2.1: General—Guidelines for the selection of methods

This Australian Standard was prepared by Committee CE/24, Measurement of Water Flow in Open Channels and Closed Conduits. It was approved on behalf of the Council of Standards Australia on 9 April 1990 and published on 10 December 1990.

The following interests are represented on Committee CE/24:

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

Institute of Instrumentation and Control

Monash University

Public Works Department, NSW

Showy Mountains Engineering Corporation

University of New South Wales

University of Queensland

Water Authority of Western Australia

Water Board, Sydney

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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 8363—1986, *Liquid flow measurement in open channels—General guidelines for the selection of methods.*

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 (this Standard)
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
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 using flow gauging structures—
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’.

Measurement of water flow in open channels

Part 2.1: General—Guidelines for the selection of methods

1 Scope and field of application

This International Standard gives general guidelines for the selection of a suitable method for liquid flow measurements in open channels. More specific guidelines are contained in International Standards relevant to each method.

2 Methods of measurement

Methods which are suitable for liquid flow measurements in open channels and which form the subjects of International Standards[1)] are as follows

1) Velocity-area method by wading.

2) Velocity-area method from a bridge.

3) Velocity-area method using a cableway.

4) Velocity-area method using a static boat.

5) Velocity-area method using a moving boat.

6) Velocity-area method using floats.

7) Slope-area method.

8) Ultrasonic method.

9) Electromagnetic method.

10) Dilution method with a chemical tracer (continuous injection).

11) Dilution method with a chemical tracer (sudden injection).

12) Dilution method with a radioactive tracer (sudden injection).

13) Dilution method with a radioactive tracer (continuous injection).

14) Cubature method.

15) Thin-plate weirs (sharp crest, V-notch).

16) Thin-plate weirs (sharp crest, rectangular, with suppressed side contractions).

17) Thin-plate weirs (sharp crest, rectangular, with side contractions).

18) Weirs (broad-crested with sharp upstream edge).

19) Weirs (broad crested with rounded upstream edge).

20) Weirs (triangular profile).

21) Weirs (triangular profile, flat-V).

22) Weirs (V-shaped, broad-crested).

23) Flumes (rectangular throated).

24) Flumes (trapezoidal throated).

25) Flumes (U-shaped throat).

26) Free overfalls, end-depth method (rectangular and non-rectangular channels).

3 Principles of measurement

3.1 Velocity-area methods

3.1.1 Methods using current-meters

The velocity and cross-sectional area of flow in an open channel are measured. The discharge is determined from the product of this velocity and area.

The velocity may be measured by a current-meter. When measurements using current-meters are not feasible, the velocity is measured by floats.

3.1.2 Moving boat method

The moving boat method employs a modification of the conventional current-meter measurements in the velocity-

1) See the bibliography for a list of these International Standards.