

Measurement of liquid flow in open channels —

Part 3: Stream flow measurement —

Part 3B: Guide for the establishment and operation of a gauging station

ICS 17.120.20

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Committees responsible for this British Standard

The preparation of this British Standard was entrusted to Technical Committee CPL/113, Flow measurement of surface and ground water, upon which the following bodies were represented:

- British Hydrological Society
- British Waterways Board
- Chartered Institution of Water and Environmental Management
- Department of the Environment (Water and Land Directorate)
- Environment Agency
- Institution of Civil Engineers
- Water Services Association of England and Wales

The following bodies were also represented in the drafting of the standard through subcommittees and panels:

- GAMBICA
- Water Research Centre

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National foreword

This British Standard has been prepared by Technical Committee CPL/113 and is identical with ISO 1100-1:1996 *Measurement of liquid flow in open channels — Part 1: Establishment and operation of a gauging station*, published by the International Organization for Standardization. It supersedes BS 3680-3B:1983 which is withdrawn.

This revision of BS 3680-3B was prepared in order to bring the techniques and equipment described up to date.

As a Guide, this British Standard takes the form of guidance and recommendations. It should not be quoted as if it were a specification and particular care should be taken to ensure that claims of compliance are not misleading.

This standard is one of a series on measurement of liquid flow in open channels. The Parts of BS 3680 are as follows:

- *Part 1: Glossary of terms;*
- *Part 2: Dilution methods;*
- *Part 3: Stream flow measurement;*
- *Part 4: Weirs and flumes;*
- *Part 5: Slope area method of estimation;*
- *Part 6: Measurement of flow in tidal channels;*
- *Part 7: The measurement of liquid level (stage);*
- *Part 8: Measuring instruments and equipment;*
- *Part 9: Water level instruments;*
- *Part 10: Sediment transport;*
- *Part 11: Free surface flow in closed conduits.*

BS 3680-3 is a series on stream flow measurement as follows.

- *Part 3A: Velocity-area methods;*
- *Part 3B: Guide for the establishment and operation of a gauging station;*
- *Part 3C: Methods for determination of the stage-discharge relation;*
- *Part 3D: Moving boat method;*
- *Part 3E: Measurement of discharge by the ultrasonic (acoustic) method;*
- *Part 3F: Collection and processing of data for determination of errors in measurement;*
- *Part 3G: General guidelines for the selection of methods;*
- *Part 3J: Guide to the measurement of discharge using three verticals;*
- *Part 3M: Guide to the methods of measuring high discharges in rivers.*

Cross-references

International Standard	Corresponding British Standard
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Normative references

ISO 31:1992 (all Parts)	BS 5775 <i>Specification for quantities, units and symbols</i> (All Parts identical)
ISO 748:1979 ^a	BS 3680 <i>Measurement of liquid flow in open channels</i> Part 3 <i>Stream flow measurement</i> Part 3A:1980 <i>Velocity area methods</i> (Identical)

^a Reference in the ISO text is to the revised edition currently in preparation, which it is envisaged will be implemented as a British Standard.

International Standard	Corresponding British Standard
ISO 1000:1992	BS 5555:1993 <i>Specification for SI units and recommendations for the use of their multiples and of certain other units</i> (Identical)
ISO 1070:1992	BS 3680 <i>Measurement of liquid flow in open channels</i> Part 5:1992 <i>Slope area method of estimation</i> (Identical)
ISO 1100-2:1982	Part 3 <i>Stream flow measurement</i> Part 3C:1983 <i>Methods for determination of the stage-discharge relation</i> (Identical)
ISO 3454:1983	Part 8 <i>Measuring instruments and equipment</i> Part 8B:1983 <i>Recommendation for direct depth sounding and suspension equipment</i> (Identical)
ISO 3846:1989	Part 4 <i>Weirs and flumes</i> Part 4E:1990 <i>Rectangular broadcrested weirs</i> (Identical)
ISO 4360:1984	Part 4B:1986 <i>Triangular profile weirs</i> (Identical)
ISO 4369:1979	Part 3 <i>Stream flow measurement</i> Part 3D:1980 <i>Moving boat method</i> (Identical)
ISO 4375:1979	Part 8 <i>Measuring instruments and equipment</i> Part 8D:1980 <i>Cableway system for stream gauging</i> (Identical)
ISO 4377:1990	Part 4 <i>Weirs and flumes</i> Part 4G:1990 <i>Flat-V weirs</i> (Identical)
ISO 6416:1992	Part 3 <i>Stream flow measurement</i> Part 3E:1993 <i>Measurement of discharge by the ultrasonic (acoustic) method</i> (Identical)
ISO 8368:1985	Part 4 <i>Weirs and flumes</i> Part 4H:1986 <i>Guide to the selection of flow gauging structures</i> (Identical)
ISO 9213:1992	Part 3 <i>Stream flow management</i> Part 3H:1993 <i>Electromagnetic method using a full-channel-width coil</i> (Identical)
ISO 9555-1:1994	Part 2 <i>Dilution methods</i> Part 2A:1995 <i>General</i> (Identical)
ISO 9555-2:1992	Part 2B:1993 <i>Methods of measurement using radioactive tracers</i> (Identical)
ISO 9555-3:1992	Part 2C:1993 <i>Methods of measurement using chemical tracers</i> (Identical)

International Standard	Corresponding British Standard
ISO 9555-4:1992	Part 2D:1993 <i>Methods of measurement using fluorescent tracers</i> (Identical)

Informative references

ISO 1088:1985	Part 3 <i>Stream flow measurement</i> Part 3F:1986 <i>Collection and processing of data for determination of errors of measurement</i> (Identical)
ISO 1438-1:1980	Part 4 <i>Weirs and flumes</i> Part 4A:1981 <i>Method using thin-plate weirs</i> (Technically equivalent)
ISO 2537:1988	Part 8 <i>Measuring instruments and equipment</i> Part 8A:1989 <i>Current meters incorporating a rotating element</i> (Identical)
ISO 3455:1976	Part 8C:1980 <i>Calibration of rotating element current-meters in straight open tanks</i> (Identical)
ISO 4363 ¹⁾	Part 10 <i>Sediment transport</i> Part 10B:1980 <i>Measurement of suspended sediment</i> (Identical)
ISO 4364 ¹⁾	Part 10C:1980 <i>Bed material sampling</i> (Identical)
ISO 5168 ¹⁾	BS 5844:1980 <i>Methods of measurement of fluid flow: estimation of uncertainty of a flow-rate measurement</i> (Identical) BS 7118 <i>Measurement of fluid flow: assessment of uncertainty in the calibration and use of flow measurement devices</i>
ISO 7066-1 ¹⁾	Part 1:1990 <i>Linear calibration relationships</i> (Identical)
ISO 7066-2:1988	Part 2:1989 <i>Non-linear calibration relationships</i> (Identical)
ISO 8363:1986	BS 3680 <i>Measurement of liquid flow in open channels</i> Part 3 <i>Stream flow measurement</i> Part 3G:1990 <i>General guidelines for the selection of methods</i> (Identical)

The Technical Committee has reviewed the provisions of ISO 772:1988¹⁾, ISO 3847:1977, ISO 4359:1983, ISO 4373:1995, ISO/TR 9123:1986 and ISO 9196:1992, to which normative reference is made in the text, and has decided that they are acceptable for use in conjunction with this standard.

¹⁾ Reference in the ISO text is to the revised edition currently in preparation, which it is envisaged will be implemented as a British Standard.

There are no related British Standards to ISO 2425:1974, ISO 3716:1977, ISO 4366:1979 and ISO/TR 7178:1983, to which informative reference is made in the text.

A British Standard does not purport to include all the necessary provisions of a contract. Users of British Standards are responsible for their correct application.

Compliance with a British Standard does not of itself confer immunity from legal obligations.

Summary of pages

This document comprises a front cover, an inside front cover, pages i to vi, pages 1 to 20, an inside back cover and a back cover.

This standard has been updated (see copyright date) and may have had amendments incorporated. This will be indicated in the amendment table on the inside front cover.

1 Scope

1.1 This part of ISO 1100 deals with the establishment and operation of a gauging station for the measurement of stage or discharge, or both, of a lake, reservoir, river or artificial open channel.

1.2 Requirements are specified for stage and for stage-discharge stations in natural channels and stations with artificial structures, for direct discharge measurement and for measurement under ice conditions.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this part of ISO 1100. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this part of ISO 1100 are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 31:1992, *Quantities and units, all parts*.

ISO 748:—, *Measurement of liquid flow in open channels — Velocity-area methods*²⁾.

ISO 772:—, *Measurement of liquid flow in open channels — Vocabulary and symbols*³⁾.

ISO 1000:1992, *SI units and recommendations for the use of their multiples and of certain other units*.

ISO 1070:1992, *Liquid flow measurement in open channels — Slope-area method*.

ISO 1100-2:1982, *Liquid flow measurement in open channels — Part 2: Determination of the stage-discharge relation*.

ISO 3454:1983, *Liquid flow measurement in open channels — Direct depth sounding and suspension equipment*.

ISO 3846:1989, *Liquid flow measurement in open channels by weirs and flumes — Rectangular broad-crested weirs*.

ISO 3847:1977, *Liquid flow measurement in open channels by weirs and flumes — End-depth method for estimation of flow in rectangular channels with a free overfall*.

ISO 4359:1983, *Liquid flow measurement in open channels — Rectangular, trapezoidal and U-shaped flumes*.

ISO 4360:1984, *Liquid flow measurement in open channels by weirs and flumes — Triangular profile weirs*.

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

ISO 4373:1995, *Measurement of liquid flow in open channels — Water-level measuring devices*.

ISO 4375:1979, *Measurement of liquid flow in open channels — Cableway system for stream gauging*.

ISO 4377:1990, *Liquid flow measurement in open channels — Flat-V weirs*.

ISO 6416:1992, *Measurement of liquid flow in open channels — Measurement of discharge by the ultrasonic (acoustic) method*.

ISO 8368:1985, *Liquid flow measurement in open channels — Guidelines for the selection of flow gauging structures*.

ISO/TR 9123:1986, *Liquid flow measurements in open channels — Stage-fall-discharge relations*.

ISO 9196:1992, *Liquid flow measurement in open channels — Flow measurements under ice conditions*.

ISO 9213:1992, *Measurement of total discharge in open channels — Electromagnetic method using a full-channel-width coil*.

ISO 9555-1:1994, *Measurement of liquid flow in open channels — Tracer dilution methods for the measurement of steady flow — Part 1: General*.

ISO 9555-2:1992, *Measurement of liquid flow in open channels — Tracer dilution methods for the measurement of steady flow — Part 2: Radioactive tracers*.

ISO 9555-3:1992, *Measurement of liquid flow in open channels — Tracer dilution methods for the measurement of steady flow — Part 3: Chemical tracers*.

ISO 9555-4:1992, *Measurement of liquid flow in open channels — Tracer dilution methods for the measurement of steady flow — Part 4: Fluorescent tracers*.

3 Definitions

For the purposes of this part of ISO 1100, the definitions and symbols given in ISO 772 apply.

4 Units of measurement

The units of measurement used in this part of ISO 1100 are SI units in accordance with the appropriate parts of ISO 31 and ISO 1000.

²⁾ To be published. (Revision of ISO 748:1979)

³⁾ To be published. (Revision of ISO 772:1988)