

Measurement of conductive liquid flow in closed conduits — Method using electromagnetic flowmeters

The European Standard EN ISO 6817:1995 has the status of a British Standard

ICS 17.120.10

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Committees responsible for this British Standard

The preparation of this British Standard was entrusted by the Industrial-process Measurement and Control Standards Policy Committee (PCL/-) to Technical Committee PCL/2, upon which the following bodies were represented:

- British Compressed Air Society
- British Gas plc
- Department of Trade and Industry (Gas and Oil Measurement Branch)
- Department of Trade and Industry (National Engineering Laboratory)
- Electricity Association
- Energy Industries Council
- Engineering Equipment and Materials Users' Association
- GAMBICA (BEAMA Ltd.)
- Institute of Measurement and Control
- Institute of Petroleum
- Institute of Trading Standards Administration
- Institution of Gas Engineers
- Institution of Mechanical Engineers
- Society of British Gas Industries
- Water Research Centre
- Water Services Association of England and Wales

The following body was also represented in the drafting of the standard, through subcommittees and panels:

AEA Technology

This British Standard, having been prepared under the direction of the Industrial-process Measurement and Control Standards Policy Committee, was published under the authority of the Standards Board and comes into effect on 15 March 1993

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National foreword

This Part of BS 5792 has been prepared under the direction of the Industrial-process Measurement and Control Standards Policy Committee. It is identical with ISO 6817:1992 *Measurement of conductive liquid flow in closed circuits — Method using electromagnetic flowmeters*, published by the International Organization for Standardization (ISO). It supersedes BS 5792:1980 which is now withdrawn.

This standard now forms Part 1 of two Parts of BS 5792 on electromagnetic flowmeters as follows:

- *Part 1: Method using electromagnetic flowmeters;*
- *Part 2: Installation dimensions of flanged type electromagnetic flowmeters.*

In 1995 the European Committee for Standardization (CEN) accepted ISO 6817:1992 as European Standard EN ISO 6817:1995. As a consequence of implementing the European Standard this British Standard is renumbered as BS EN ISO 6817 and any reference to BS 5792-1:1993 should be read as a reference to BS EN ISO 6817.

Cross-references

International standard	Corresponding British Standard
ISO 4006:1991	BS 5875:1991 <i>Glossary of terms and symbols for measurements of fluid flow in closed conduits</i> (Identical)
ISO 5168:1978	BS 5844:1980 <i>Methods of measurement of fluid flow: estimation of uncertainty of a flow-rate measurement</i> (Identical) BS 7118 <i>Measurements of a fluid flow: assessment of uncertainty in the calibration and use of flow measurement devices</i>
ISO 7066-1:1989	Part 1:1990 <i>Linear calibration relationships</i> (Identical)
ISO 7066-2:1988	Part 2:1989 <i>Non-linear calibration relationships</i> (Identical)
ISO 9104:1991	BS 7526:1991 <i>Methods of evaluating the performance of electromagnetic flowmeters</i> (Identical)
Informative reference is also made to the following standards:	
ISO 4185:1980	BS 6199 <i>Measurement of liquid flow in closed conduits using weighing and volumetric methods</i> Part 1:1981 <i>Weighing method</i> (Identical)
ISO 7194:1983	BS 1042: <i>Measurement of fluid flow in closed conduits</i> Section 2.3:1984 <i>Methods of flow measurement in swirling or asymmetric flow conditions in circular ducts by means of current-meters or Pitot static tubes</i> (Identical)
ISO 8316:1987	BS 6199 <i>Measurement of liquid flow in closed conduits using weighing and volumetric methods</i> Part 2:1988 <i>Method for measurement by collection of the liquid in a volumetric tank</i> (Identical)

International standard	Corresponding British Standard
IEC 359:1987	BS 4889:1990 <i>Method for specifying the performance of electrical and electronic measuring equipment</i> (Technically equivalent) BS 5863 <i>Analogue signals for process control systems</i>
IEC 381-1:1982	Part 1:1984 <i>Specification for direct current signals</i> (Identical)
IEC 381-2:1978	Part 2:1980 <i>Specification for direct voltage signals</i> (Identical)

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Summary of pages

This document comprises a front cover, an inside front cover, pages i to iv, the EN ISO title page, pages 2 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.

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Descriptors: Liquid flow, pipe flow, flow measurements, flowmeters, electromagnetic equipments, installation, specifications, marking

English version

Measurement of conductive liquid flow in closed conduits — Method using electromagnetic flowmeters

(ISO 6817:1992)

Mesure de débit d'un fluide conducteur dans les conduites fermées — Méthode par débitmètres électromagnétiques
(ISO 6817:1992)

Durchflußmessung von leitfähigen Flüssigkeiten in geschlossenen Leitungen — Verfahren mit magnetisch-induktiven Durchflußmeßgeräten
(ISO 6817:1992)

This European Standard was approved by CEN on 1995-08-31. CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CEN member.

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CEN

European Committee for Standardization
Comité Européen de Normalisation
Europäisches Komitee für Normung

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Foreword

This European Standard was taken over by CEN from the work of ISO/TC 30, Measurement of fluid flow in closed conduits, of the International Standards Organization (ISO).

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by March 1996, and conflicting national standards shall be withdrawn at the latest by March 1996.

According to the CEN/CENELEC Internal Regulations, the following countries are bound to implement this European Standard: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

1 Scope

This International Standard describes the principle and main design features of industrial electromagnetic flowmeters for the measurement of flow-rate of a conductive liquid in a closed conduit running full. It covers their installation, operation, performance and calibration.

This International Standard does not specify safety requirements in relation to hazardous environmental usage of the meter, nor does it apply to the measurement of magnetically permeable slurries, liquid metals nor usage in medical applications.

This International Standard covers flowmeter types in both a.c. and pulsed d.c. versions.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this International Standard 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 4006:1991, *Measurement of fluid flow in closed conduits — Vocabulary and symbols*.

ISO 5168:1978, *Measurement of fluid flow — Estimation of uncertainty of a flow-rate measurement*.

ISO 7066-1:1989, *Assessment of uncertainty in the calibration and use of flow measurement devices — Part 1: Linear calibration relationships*.

ISO 7066-2:1988, *Assessment of uncertainty in the calibration and use of flow measurement devices — Part 2: Non-linear calibration relationships*.

ISO 9104:1991, *Measurement of fluid flow in closed conduits — Methods of evaluating the performance of electromagnetic flow-meters for liquids*.

3 Definitions

For the purposes of this International Standard, the definitions given in ISO 4006 and the following definitions apply. Many of these are extracted from ISO 4006 for ease of reference.

3.1 electromagnetic flowmeter

Flowmeter which creates a magnetic field perpendicular to the flow, so enabling the flow-rate to be deduced from the induced electromotive force (e.m.f.) produced by the motion of a conducting liquid¹⁾ in the magnetic field. The electromagnetic flowmeter consists of a primary device and one or more secondary devices.

3.1.1

primary device

device containing the following elements:

- an electrically insulated meter tube through which the conductive liquid to be metered flows,
- one or more pairs of electrodes, diametrically opposed, across which the signal generated in the liquid is measured,
- an electromagnet for producing a magnetic field in the meter tube.

the primary device develops a signal proportional to the flow-rate and in some cases the reference signal

3.1.2

secondary device

equipment which contains the circuitry which extracts the flow signal from the electrode signal and converts it to a standard output signal directly proportional to flow-rate. This equipment may be mounted on the primary device

3.2

meter tube

pipe section of the primary device through which the liquid to be measured flows; its inner surface is usually electrically insulated

3.3

meter electrodes

one or more pairs of contacts by means of which the induced voltage is detected

3.4

magnetic field

magnetic flux, generated by the electromagnet in the primary device, which passes through the meter tube and through the liquid

¹⁾ In the present International Standard, for electromagnetic flowmeters, the more correct term “liquid” replaces the word “fluid” (covering liquids and gases) of the general definition in ISO 4006. This usage also aligns with that in ISO 9104.