BSI Standards Publication

Measurement of fluid flow in closed conduits — Guidance for the use of electromagnetic flowmeters for conductive liquids

bsi.

National foreword

This British Standard is the UK implementation of EN ISO 20456:2019. It is identical to ISO 20456:2017. It supersedes BS EN ISO 6817:1997, BS ISO 13359:1998 and BS EN 29104:1993, which are withdrawn.

The UK participation in its preparation was entrusted to Technical Committee CPI/30/5, Velocity and Mass Methods.

A list of organizations represented on this committee can be obtained on request to its secretary.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

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English Version

Measurement of fluid flow in closed conduits - Guidance for the use of electromagnetic flowmeters for conductive liquids (ISO 20456:2017)

Mesurage du débit des fluides dans les conduites fermées - Lignes directrices pour l'utilisation des débitmètres électromagnétiques dans les liquides conducteurs (ISO 20456:2017)

Messung des Durchflusses in geschlossenen Leitungen - Richtlinie für den Einsatz von elektromagnetischen Durchflussmessgeräten für konduktive Fluide (ISO 20456:2017)

This European Standard was approved by CEN on 26 August 2019.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

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European foreword

The text of ISO 20456:2017 has been prepared by Technical Committee ISO/TC 30 "Measurement of fluid flow in closed conduits" of the International Organization for Standardization (ISO) and has been taken over as EN ISO 20456:2019 by CCMC.

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of an identical text or by endorsement, at the latest by April 2020, and conflicting national standards shall be withdrawn at the latest by April 2020.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN shall not be held responsible for identifying any or all such patent rights.

This document supersedes EN 29104:1993 and EN ISO 6817:1995.

According to the CEN-CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

Endorsement notice

The text of ISO 20456:2017 has been approved by CEN as EN ISO 20456:2019 without any modification.

INTERNATIONAL ISO

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Measurement of fluid flow in closed conduits — Guidance for the use of electromagnetic flowmeters for conductive liquids

Mesurage du débit des fluides dans les conduites fermées — Lignes directrices pour l'utilisation des débitmètres électromagnétiques dans les liquides conducteurs

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation on the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see the following URL: www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 30, *Measurement of fluid flow in closed conduits*, Subcommittee SC 5, *Velocity and mass methods*.

This first edition of ISO 20456 cancels and replaces ISO 6817:1992, ISO 9104:1991 and ISO 13359:1998, which has been technically revised.

Introduction

Clauses 3 to 7 cover the definitions, symbols and basic theory of electromagnetic flowmeters. This document does not cover insertion type meters, partially filled meters or meters for non-conductive and highly conductive fluids.

Clause 8 covers installation types and practice, the different types of meter construction, transmitters, lay lengths and sizing, in order to achieve the best performance of the electromagnetic flowmeter in the field.

Clauses 9 to 11 cover some methods of calibration, verification, evaluation, and uncertainty analysis, which can be useful for users or independent testing establishments to verify manufacturer's relative performance and to demonstrate suitability of application

The tests specified in this document are not necessarily sufficient for instruments specifically designed for unusually difficult duties. Conversely, a restricted series of tests may be suitable for instruments designed to perform within a limited range of conditions.

This document is for users and manufacturers.

Measurement of fluid flow in closed conduits — Guidance for the use of electromagnetic flowmeters for conductive liquids

1 Scope

This document applies to industrial electromagnetic flowmeters used for the measurement of flowrate of a conductive liquid in a closed conduit running full. It covers flowmeter types utilizing both alternating current (AC) and pulsed direct current (DC) circuits to drive the field coils and meters running from a mains power supply and those operating from batteries or other sources of power.

This document is not applicable to insertion-type flowmeters or electromagnetic flowmeters designed to work in open channels or pipes running partially full, nor does it apply to the measurement of magnetically permeable slurries or liquid metal applications.

This document does not specify safety requirements in relation to hazardous environmental usage of the flowmeter.

2 Normative references

There are no normative references in this document.

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— IEC Electropedia: available at http://www.electropedia.org/

— ISO Online browsing platform: available at http://www.iso.org/obp

3.1
electromagnetic flowmeter
flowmeter which creates a magnetic field perpendicular to the direction of flow, so enabling the flowrate to be deduced from the induced voltage, U_V, produced by the motion of a conducting fluid through the magnetic field

Note 1 to entry: The electromagnetic flowmeter consists of a *sensor* (3.2) and a *transmitter* (3.3).

3.2
sensor
device containing at least the following elements:

— an electrically insulating meter tube through which the conductive fluid to be measured flows;

— one pair of electrodes across which the signal generated in the fluid is measured;

— an electromagnet for producing a magnetic field in the *meter tube* (3.4)

Note 1 to entry: The sensor produces a signal proportional to the flowrate and, in some cases, a *reference signal* (3.9). See 6.2.

Note 2 to entry: For a sensor, the wording primary device or flowtube has previously been used.