

This is a preview of "ISO 20456:2017". [Click here to purchase the full version from the ANSI store.](#)

First edition
2017-09

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



Reference number
ISO 20456:2017(E)

© ISO 2017

This is a preview of "ISO 20456:2017". Click [here](#) to purchase the full version from the ANSI store.



COPYRIGHT PROTECTED DOCUMENT

© ISO 2017, Published in Switzerland

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office
Ch. de Blandonnet 8 • CP 401
CH-1214 Vernier, Geneva, Switzerland
Tel. +41 22 749 01 11
Fax +41 22 749 09 47
copyright@iso.org
www.iso.org

This is a preview of "ISO 20456:2017". Click here to purchase the full version from the ANSI store.

Contents

	Page
Foreword	iv
Introduction	v
1 Scope	1
2 Normative references	1
3 Terms and definitions	1
4 Symbols	3
5 Theory and basic formulae	4
6 Construction and principle of operation	4
6.1 General.....	4
6.2 Sensor.....	5
6.3 Transmitter.....	7
6.3.1 General.....	7
6.3.2 Alternating magnetic field in the measuring system.....	7
6.3.3 Measuring system with applied pulsed DC excitation (simplified model).....	7
6.3.4 Measuring system with applied AC excitation (simplified model).....	8
6.4 Flowmeter/Transmitter output.....	9
7 Equipment marking	9
7.1 Recommended data.....	9
7.1.1 Sensor.....	9
7.1.2 Transmitter.....	10
8 Installation design and practice	10
8.1 Sensor.....	10
8.1.1 Sizing.....	10
8.1.2 Mounting conditions.....	11
8.1.3 Potential equalization — General requirements.....	12
8.1.4 Electrical connections.....	13
8.1.5 Sensor mounting.....	13
8.1.6 Installation dimensions for flanged connections.....	14
8.2 Transmitter location.....	15
8.3 Operational considerations.....	16
8.3.1 General.....	16
8.3.2 Effect of the liquid conductivity.....	16
8.3.3 Reynolds number effect.....	16
8.3.4 Velocity profile effect.....	16
9 Flowmeter calibration, validation, and verification	16
9.1 Flowmeter calibration.....	16
9.2 Flowmeter verification (<i>in-situ</i> electronic verification).....	16
10 Evaluation of flowmeter performance	17
10.1 General.....	17
10.2 Applications within the scope of other standards.....	17
11 Uncertainty analysis	17
Annex A (informative) Materials for construction of sensors	19
Annex B (informative) Practical considerations for measuring system with AC and DC excitation	22
Annex C (informative) Cathodic protection	23
Annex D (informative) Conversion of nominal diameters from metric to US units	24
Annex E (informative) Manufacturers' accuracy specifications	25
Bibliography	29

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.

This is a preview of "ISO 20456:2017". [Click here to purchase the full version from the ANSI store.](#)

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.