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Measurement of fluid flow in closed conduits — Flowrate measurement by means of vortex shedding flowmeters inserted in circular cross-section conduits running full

Mesurage du débit de fluide dans les conduites fermées — Mesurage du débit par débitmètres à effet vortex insérés dans les conduites de section circulaire remplies au droit

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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 12764 cancels and replaces ISO/TR 12764:1997. In general this document reflects the current state of vortex shedding flow meter methodology, with advancements that have occurred since the original TR was published. In particular:

— the terms “systematic measurement error” and “measurement uncertainty” are more clearly defined;

— the terms “rangeability”, “lowest local pressure”, “response time” and “fade” have been removed;

— 6.1.1.4 and 6.1.2 have been added;

— Clause 8 and Clause 9 have been revised;

— Annex A has been revised;

— a new Annex B has replaced the previous version;

— Annex C has been incorporated into 7.2 and updated.

Introduction

This document is one of the series of International Standards and Technical Reports covering a variety of devices that measure the flow of fluids in closed conduits.

The term “vortex shedding flowmeter”, commonly referred to as a “vortex meter”, covers a large family of devices with varying proprietary designs. These devices have in common the shedding of vortices from an obstruction (called a bluff body) which has been deliberately placed in the flow path in the meter. The natural laws of physics relate the shedding frequency of the vortices (f) to the fluid velocity and hence the volumetric flowrate (q_V) of the fluid in the conduit. The vortices can be counted over a given period of time to obtain total flow.

The vortex shedding phenomenon has become an accepted basis for fluid flow measurement. Meters are available for measuring the flow of fluids from cryogenic liquids to steam and high pressure gases. Many vortex shedding flowmeter designs are proprietary and, therefore, their design details cannot be covered in this document.

Insufficient data have been collected and analysed to be able to state, in this document, an expected uncertainty band for this type of vortex-shedding flowmeter.

Measurement of fluid flow in closed conduits — Flowrate measurement by means of vortex shedding flowmeters inserted in circular cross-section conduits running full

1 Scope

This document

a) describes the use of vortex shedding flow meters for liquids, gases, and steam, including a glossary and a set of engineering equations used for specifying performance,

b) provides technical information to assist the user in selecting, specifying and applying vortex shedding flowmeters, including influence effects,

c) describes typical construction and provides recommendations for inspection, certification, and material traceability,

d) describes availability of diagnostics associated with vortex shedding flowmeters,

e) provides calibration guidance,

f) does not apply to insertion type vortex shedding flowmeters,

g) applies only to closed conduits running full,

h) applies only to fluid flow that is steady or varies only slowly with time, and

i) applies to fluids considered to be single-phase.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 4006, *Measurement of fluid flow in closed conduits — Vocabulary and symbols*

ISO/IEC Guide 99:2007 (JCGM 200:2012), *International vocabulary of metrology — Basic and general concepts and associated terms (VIM)*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 4006 and ISO/IEC Guide 99:2007 (JCGM 200:2012) and the following apply.

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

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

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