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**Measurement of fluid flow by means  
of pressure differential devices —  
Guidelines on the effect of departure  
from the specifications and operating  
conditions given in ISO 5167**

*Mesurage du débit des fluides au moyen d'appareils déprimogènes —  
Lignes directrices relatives aux effets des écarts par rapport aux  
spécifications et aux conditions d'utilisation données dans l'ISO 5167*



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# Contents

Page

<b>Foreword</b>	<b>v</b>
<b>Introduction</b>	<b>vi</b>
<b>1 Scope</b>	<b>1</b>
<b>2 Normative references</b>	<b>1</b>
<b>3 Terms and definitions</b>	<b>1</b>
<b>4 Symbols</b>	<b>2</b>
<b>5 Effect of errors on flowrate calculations</b>	<b>3</b>
5.1 General	3
5.2 Quantifiable effects	3
<b>6 Effects of deviations in construction</b>	<b>3</b>
6.1 Orifice-plate edge sharpness	3
6.2 Thickness of orifice edge	4
6.3 Condition of upstream and downstream faces of orifice plate	5
6.4 Position of pressure tapings for an orifice	6
6.4.1 General	6
6.4.2 Calculation of discharge coefficient	6
6.4.3 Estimation of additional uncertainty	6
6.4.4 Example	6
6.5 Condition of pressure tapings	7
<b>7 Effects of pipeline near the meter</b>	<b>7</b>
7.1 Pipe diameter	7
7.2 Steps and taper sections	7
7.3 Diameter of carrier ring	8
7.4 Undersize joint rings	11
7.5 Protruding welds	11
7.6 Eccentricity	11
<b>8 Effects of pipe layout</b>	<b>13</b>
8.1 General	13
8.2 Discharge coefficient compensation	14
8.2.1 Corrections	14
8.2.2 Additional uncertainty	15
8.3 Pressure tapings	16
8.4 Devices for improving flow conditions	16
<b>9 Operational deviations</b>	<b>16</b>
9.1 General	16
9.2 Deformation of an orifice plate	17
9.2.1 General	17
9.2.2 Elastic deformation	17
9.2.3 Plastic deformation	17
9.3 Deposition on the upstream face of an orifice plate	18
9.4 Deposition in the meter tube	22
9.5 Orifice-plate edge sharpness	23
9.5.1 Deterioration	23
9.5.2 Plate reversal	23
9.6 Deposition and increase of surface roughness in Venturi tubes	24
9.6.1 General	24
9.6.2 Deposition	24
9.6.3 Surface roughness	24
<b>10 Pipe roughness</b>	<b>25</b>
10.1 General	25

10.2	Upstream pipe.....	26
10.3	Downstream pipe.....	30
10.4	Reduction of roughness effects .....	30
10.5	Maintenance.....	30
<b>Bibliography .....</b>		<b>32</b>

## 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 document 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](http://www.iso.org/directives)).

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For an explanation of 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 [www.iso.org/iso/foreword.html](http://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 2, *Pressure differential devices*.

This third edition cancels and replaces the second edition (ISO/TR 12767:2007), which has been technically revised.

The main changes are as follows:

- editorial changes throughout the document.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at [www.iso.org/members.html](http://www.iso.org/members.html).

## Introduction

ISO 5167 series specifies methods for flowrate measurement using pressure differential devices. Adherence to ISO 5167 series results in flowrate measurements whose uncertainty lies within specified limits. If, however, a flow-metering installation departs, for whatever reason, from the conditions specified in ISO 5167 series, the specified limits of uncertainty might not be achieved. Many metering installations exist where these conditions either have not been or cannot be met. In these circumstances, it is usually not possible to evaluate the precise effect of any such deviations. However, a considerable amount of data exists which can be used to give a general indication of the effect of non-conformity to ISO 5167 series and it is presented in this document as a guideline to users of flow-metering equipment.

# Measurement of fluid flow by means of pressure differential devices — Guidelines on the effect of departure from the specifications and operating conditions given in ISO 5167

## 1 Scope

This document provides guidance on estimating the flowrate when using pressure differential devices constructed or operated outside the scope of ISO 5167 series.

Additional tolerances or corrections cannot necessarily compensate for the effects of deviating from ISO 5167 series. The information is given, in the first place, to indicate the degree of care necessary in the manufacture, installation and maintenance of pressure differential devices by describing some of the effects of non-conformity to the requirements; and in the second place, to permit those users who cannot comply fully with the requirements to assess, however roughly, the magnitude and direction of the resulting error in flowrate.

Each variation dealt with is treated as though it were the only one present. Where more than one is known to exist, there might be unpredictable interactions and care has to be taken when combining the assessment of these errors. If there is a significant number of errors, means of eliminating some of them have to be considered. The variations included in this document are by no means complete and relate largely to examples with orifice plates. An example with Venturi tubes has been placed at the end of its section. This document does not apply to cone meters or wedge meters. There are, no doubt, many similar examples of installations not conforming to ISO 5167 series for which no comparable data have been published. Such additional information from users, manufacturers and any others can be taken into account in future revisions of this document.

## 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 5167-1, *Measurement of fluid flow by means of pressure differential devices inserted in circular cross-section conduits running full — Part 1: General principles and requirements*

## 3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 5167-1 and the following apply.

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

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <https://www.electropedia.org/>

### 3.1

#### square edge

angular relationship between the orifice bore of the flow-measurement device and the upstream face, when the angle between them is  $90^\circ \pm 0,3^\circ$