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Measurement of fluid flow in closed conduits — Velocity area method using Pitot static tubes

Mesurage du débit des fluides dans les conduites fermées — Méthode d'exploration du champ des vitesses au moyen de tubes de Pitot doubles

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Foreword

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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).

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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.

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 third edition cancels and replaces the second edition (ISO 3966:2008), which has been technically revised.

The main changes compared to the previous edition are as follows:

— All the mathematical formulae have been numbered;

— The essential Formula 4 has been corrected from $\Delta\rho/p$ to $\Delta p/p$;

— The related Table 2 is corrected likewise;

— The last sentence in 8.2 "for selected values of g and the $\Delta\rho/p$....." was corrected accordingly;

— In 11.2.2 in the 2nd paragraph *ef* is corrected by *e* or *f*.

— Figure A.5 was changed editorially, the millimetre-grid has been removed.

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.

Measurement of fluid flow in closed conduits — Velocity area method using Pitot static tubes

1 Scope

This document specifies a method for the determination in a closed conduit of the volume rate of flow of a regular flow

a) of a fluid of substantially constant density or corresponding to a Mach number not exceeding 0,25,

b) with substantially uniform stagnation temperature across the measuring cross-section,

c) running full in the conduit, and

d) under steady flow conditions.

In particular, it deals with the technology and maintenance of Pitot static tubes, with the calculation of local velocities from measured differential pressures and with the computation of the flow rate by velocity integration.

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 2186, *Fluid flow in closed conduits — Connections for pressure signal transmissions between primary and secondary elements*

3 Terms, definitions and symbols

3.1 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:

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

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

3.1.1
Pitot static tube
"Pitot tube"
tubular device consisting of a cylindrical head attached perpendicularly to a stem allowing measurement of a differential pressure from which the flow rate of the fluid in which it is inserted can be determined, and which is provided with static pressure tapping holes (drilled all around the circumference of the head at one or more cross-sections) and with a total pressure hole (facing the flow direction at the tip of the axially symmetrical nose of the head)

3.1.2
static pressure tapping
group of holes for the measurement of fluid static pressure