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Measurement of fluid flow in closed conduits — Guidelines on the effects of flow pulsations on flow-measurement instruments

bsi.

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Foreword

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TECHNICAL REPORT **ISO/TR 3313:2018**

Measurement of fluid flow in closed conduits — Guidelines on the effects of flow pulsations on flow-measurement instruments

1 Scope

This document defines pulsating flow, compares it with steady flow, indicates how it can be detected, and describes the effects it has on orifice plates, nozzles or Venturi tubes, turbine and vortex flowmeters when these devices are being used to measure fluid flow in a pipe. These particular flowmeter types feature in this document because they are amongst those types most susceptible to pulsation effects. Methods for correcting the flowmeter output signal for errors produced by these effects are described for those flowmeter types for which this is possible. When correction is not possible, measures to avoid or reduce the problem are indicated. Such measures include the installation of pulsation damping devices and/or choice of a flowmeter type which is less susceptible to pulsation effects.

This document applies to flow in which the pulsations are generated at a single source which is situated either upstream or downstream of the primary element of the flowmeter. Its applicability is restricted to conditions where the flow direction does not reverse in the measuring section but there is no restriction on the waveform of the flow pulsation. The recommendations within this document apply to both liquid and gas flows although with the latter the validity might be restricted to gas flows in which the density changes in the measuring section are small as indicated for the particular type of flowmeter under discussion.

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:

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

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

3.1
steady flow
flow in which parameters such as velocity, pressure, density and temperature do not vary significantly enough with time to prevent measurement to within the required uncertainty of measurement

3.2
pulsating flow
flow in which the flowrate in a measuring section is a function of time but has a constant mean value when averaged over a sufficiently long period of time, which depends on the regularity of the pulsation

Note 1 to entry: Pulsating flow can be divided into two categories:

— periodic pulsating flow;

— randomly fluctuating flow.

Note 2 to entry: For further amplification of what constitutes steady or pulsating flow see 5.1 and 5.2.

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