SLOVENSKI STANDARD
SIST EN ISO 16911-2:2014

01-julij-2014

Emisije nepremičnih virov - Ročno in avtomatsko določevanje hitrosti in volumenskega pretoka v odvodnikih - 2. del: Avtomatski merilni sistemi (ISO 16911 -2:2013)

Stationary source emissions - Manual and automatic determination of velocity and volume flow rate in ducts - Part 2: Automated measuring systems (ISO 16911-2:2013)

Emissionen aus stationären Quellen - Manuelle und automatische Bestimmung der Geschwindigkeit und des Volumenstroms in Abgaskanälen - Teil 2: Kontinuierliche Messverfahren (ISO 16911-2:2013)

Émissions de sources fixes - Détermination manuelle et automatique de la vitesse et du débit-volume d'écoulement dans les conduits - Partie 2: Systèmes de mesure automatiques (ISO 16911-2:2013)

Ta slovenski standard je istoveten z: **EN ISO 16911-2:2013**

ICS:

13.040.40	Emisije nepremičnih virov	Stationary source emissions

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EUROPEAN STANDARD

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EUROPÄISCHE NORM

EN ISO 16911-2

March 2013

ICS 13.040.40

English Version

Stationary source emissions - Manual and automatic determination of velocity and volume flow rate in ducts - Part 2: Automated measuring systems (ISO 16911-2:2013)

Émissions de sources fixes - Détermination manuelle et automatique de la vitesse et du débit-volume d'écoulement dans les conduits - Partie 2: Systèmes de mesure automatiques (ISO 16911-2:2013)

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This European Standard was approved by CEN on 23 February 2013.

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Contents

Page

Foreword

This document (EN ISO 16911-2:2013) has been prepared by Technical Committee CEN/TC 264 “Air quality", the secretariat of which is held by DIN, in collaboration with Technical Committee ISO/TC 146 "Air quality".

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by September 2013, and conflicting national standards shall be withdrawn at the latest by September 2013.

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INTERNATIONAL STANDARD

ISO 16911-2

First edition
2013-03-01

Stationary source emissions — Manual and automatic determination of velocity and volume flow rate in ducts —

Part 2: Automated measuring systems

Émissions de sources fixes — Détermination manuelle et automatique de la vitesse et du débit-volume d'écoulement dans les conduits — Partie 2: Systèmes de mesure automatiques

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Contents

Page

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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

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ISO 16911-2 was prepared by the European Committee for Standardization (CEN) in collaboration with ISO Technical Committee TC 146, *Air quality*, Subcommittee SC 1, *Stationary source emissions*.

ISO 16911 consists of the following parts, under the general title *Stationary source emissions — Manual and automatic determination of velocity and volume flow rate in ducts*:

— *Part 1: Manual reference method*

— *Part 2: Automated measuring systems*

Introduction

EN ISO 16911-2 describes the quality assurance (QA) procedures related to automated measuring systems (AMSs) for the determination of the volume flow rate of flue gas with a total uncertainty that accords with the requirements of Commission Decision of 2007-07-18.[4]

The calibration and validation of flow AMSs are performed by parallel measurements with the reference manual method described in EN ISO 16911-1.

The purpose of EN ISO 16911-2 is to secure flow monitoring with a minimized uncertainty for use according to EU Directive 2000/76/EC,[1] EU Directive 2001/80/EC,[2] and EU Directive 2010/75/EU.[5]

The purpose of EN ISO 16911-2 is also to secure flow monitoring with an overall uncertainty equal to or less than stipulated in Commission Decision of 2007-07-18[4] and establishing guidelines for the monitoring and reporting of greenhouse gas emissions pursuant to Directive 2003/87/EC.[3]

Stationary source emissions — Manual and automatic determination of velocity and volume flow rate in ducts —

Part 2: Automated measuring systems

1 Scope

EN ISO 16911-2 describes specific requirements for automated measuring system (AMS) flow monitoring. It is partly derived from EN 14181 which is the general document on the quality assurance of AMSs and is applicable in conjunction with that document.

EN ISO 16911-2 specifies conditions and criteria for the choice, mounting, commissioning and calibration of AMSs used for determining the volume flow rate from a source in ducted gaseous streams. EN ISO 16911-2 is applicable by correlation with the manual reference methods described in EN ISO 16911-1.

EN ISO 16911-2 is primarily developed for monitoring emissions from waste incinerators and large combustion plants. From a technical point of view, it can be applied to other processes for which flow rate measurement is required with a defined and minimized uncertainty.

2 Normative references

The following referenced documents are indispensable for the application 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 14956, *Air quality — Evaluation of the suitability of a measurement procedure by comparison with a required measurement uncertainty*

EN ISO 16911-1:2013, *Stationary source emissions — Manual and automatic determination of velocity and volume flow rate in ducts — Part 1 Manual reference method*

EN 14181:2004, *Stationary source emissions — Quality assurance of automated measuring systems*

EN 15267-3:2007, *Air quality — Certification of automated measuring systems — Part 3: Performance criteria and test procedures for automated measuring systems for monitoring emissions from stationary sources*

EN 15259, *Air quality — Measurement of stationary source emissions — Requirements for measurement sections and sites and for the measurement objective, plan and report*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 14181 and the following apply.

3.1
automated measuring system
AMS
measuring system permanently installed on site for continuous monitoring of flow

Note 1 to entry: An AMS is a monitoring technology which is traceable to a reference method.

Note 2 to entry: The AMS is a complete system for measuring flow rate, and includes the features required for conducting regular functional checks.

3.2
cross-sensitivity
response of the AMS to determinants other than flow rate, e.g. caused by the presence of particulate matter, changes in gas composition, duct temperature

3.3
linearity
lack of fit
systematic deviation, within the range of application, between the accepted value of a flow reference material applied to the measuring system and the corresponding measurement result produced by the AMS

Note 1 to entry: The linearity test is described in EN 15267-3:2007, Annex B.

3.4
limit of detection
minimum value of the measurand for which the measuring system is not in the basic state, with a stated probability

Note 1 to entry: Basic state is normally the zero reading or the minimum measured by the instrument.

3.5
period of unattended operation
maintenance interval
maximum interval of time for which the performance characteristics remain within a predefined range without external servicing, e.g. calibration or adjustment

3.6
reproducibility under field conditions
measure of the agreement between two measurements in field tests at a level of confidence of 95 % expressed as the standard deviation of the difference of paired measurements:

$$s_D = \sqrt{\frac{\sum_{i=1}^{n}(x_{1i} - x_{2i})^2}{2n}} \quad (1)$$

where

x_{1i} is the ith measurement result of AMS 1;

x_{2i} is the ith measurement result of AMS 2;

n is the number of parallel measurements.

Note 1 to entry: The absolute reproducibility in the field, $R_{f,abs}$, is calculated according to:

$$R_{f,abs} = t_{0,05(N-1)} \times s_D \quad (2)$$

where

$t_{0,05(N-1)}$ is the two-sided Student t-factor at a confidence level of 0,05, with $N - 1$ degrees of freedom.

Note 2 to entry: Adapted from EN 15267-3:2007.

3.7
standard reference method
SRM
method described and standardized to define an air quality characteristic, temporarily installed on site for verification purposes

Note 1 to entry: For the purposes of EN ISO 16911-2, the manual reference methods are described in EN ISO 16911-1.

3.8
flow reference material
surrogate for flow for testing the AMS performance

Note 1 to entry: A surrogate for flow is normally the parameter measured directly by the instrument, e.g. pressure, time delay, temperature, heat dissipation or frequency.

3.9
lower reference point
output of the instrument in response to an internally generated function, intended to represent a defined amount of the measured flow at or close to the lowest flow rate that the system can measure with a given uncertainty

3.10
upper reference point
output of the instrument in response to an internally generated function, intended to represent a defined amount of the measured flow at or close to the highest flow rate the system is intended to measure in a given installation

3.11
flow profile
represented by two diagrams showing the gas velocity in the axial direction along a line across the duct passing through the centre of gravity of the duct, and a line perpendicular to the first

Note 1 to entry: The gas velocity is expressed in m/s.

3.12
crest factor
peak-to-average ratio
characteristic of a flow profile, calculated from the measured peak value of each flow profile divided by the average value of each flow profile in the primary and secondary monitoring paths

Note 1 to entry: If the measurement is made according to EN ISO 16911-1 and EN 15259, each measurement represents the same area of flow in the duct, and the crest factor divisor can be calculated from a simple average of the individual measurements.

Note 2 to entry: Crest factor shall be calculated for both flow profiles, the primary and secondary monitoring paths, which are perpendicular to each other.

3.13
skewness
measure of asymmetry defined as the total flow to the left of the centre of the duct divided by the total flow to the right of the centre of the duct, or the inverse thereof, whichever is larger than 1,00

Note 1 to entry: If the measurement is made according to EN ISO 16911-1 and EN 15259, each measurement represents the same area of flow in the duct, and the skewness can be calculated from a simple average of the individual measurements, not including a possible measurement in the centre of the duct.

Note 2 to entry: Skewness shall be calculated for both flow profiles, perpendicular to each other.

3.14
swirl
also referred to as cyclonic flow, is the tangential component of the gas velocity vector