SLOVENSKI STANDARD
oSIST prEN ISO 16911-2:2011

01-december-2011

Emisije nepremičnih virov - Določevanje hitrosti in volumenskega pretoka v odvodnikih - 2. del: Avtomatski merilni sistemi ((ISO/DIS 16911-2:2011)

Stationary source emissions - Determination of velocity and volume flow rate in ducts - Part 2: Automated measuring systems (ISO/DIS 16911-2:2011)

Emissionen aus stationären Quellen - Manuelle und automatische Bestimmung der Geschwindigkeit und des Volumenstroms in Abgaskanälen - Teil 2: Kontinuierliche Messverfahren (ISO/DIS 16911-2:2011)

Émissions de sources fixes - Détermination de la vitesse et du débit volumétrique de l'écoulement dans les conduits - Partie 2: Systèmes de mesure automatiques (ISO/DIS 16911-2:2011)

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

ICS:

13.040.40 Emisije nepremičnih virov Stationary source emissions

oSIST prEN ISO 16911-2:2011 **en,fr,de**

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

DRAFT
prEN ISO 16911-2

October 2011

ICS 13.040.40

English Version

Stationary source emissions - Determination of velocity and volume flow rate in ducts - Part 2: Automated measuring systems (ISO/DIS 16911-2:2011)

Émissions de sources fixes - Détermination de la vitesse et du débit volumétrique de l'écoulement dans les conduits - Partie 2: Systèmes de mesure automatiques (ISO/DIS 16911-2:2011)

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This draft European Standard is submitted to CEN members for parallel enquiry. It has been drawn up by the Technical Committee CEN/TC 264.

If this draft becomes a European Standard, CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

This draft European Standard was established by CEN in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

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Recipients of this draft are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

Management Centre: Avenue Marnix 17, B-1000 Brussels

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Foreword

This document (prEN ISO 16911-2:2011) 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 document is currently submitted to the parallel Enquiry.

DRAFT INTERNATIONAL STANDARD ISO/DIS 16911-2

ISO/TC **146**/SC **1** Secretariat: **NEN**

Voting begins on **2011-10-13** Voting terminates on **2012-03-13**

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION • МЕЖДУНАРОДНАЯ ОРГАНИЗАЦИЯ ПО СТАНДАРТИЗАЦИИ • ORGANISATION INTERNATIONALE DE NORMALISATION

Stationary source emissions — Determination of velocity and volume flow rate in ducts —

Part 2: **Automated measuring systems**

Émissions de sources fixes — Détermination de la vitesse et du débit volumétrique de l'écoulement dans les conduit —

Partie 2: Systèmes de mesure automatiques

ICS 13.040.40

ISO/CEN PARALLEL PROCESSING

This draft has been developed within the European Committee for Standardization (CEN), and processed under the **CEN-lead** mode of collaboration as defined in the Vienna Agreement.

This draft is hereby submitted to the ISO member bodies and to the CEN member bodies for a parallel five-month enquiry.

Should this draft be accepted, a final draft, established on the basis of comments received, will be submitted to a parallel two-month approval vote in ISO and formal vote in CEN.

In accordance with the provisions of Council Resolution 15/1993 this document is circulated in the English language only.

Conformément aux dispositions de la Résolution du Conseil 15/1993, ce document est distribué en version anglaise seulement.

To expedite distribution, this document is circulated as received from the committee secretariat. ISO Central Secretariat work of editing and text composition will be undertaken at publication stage.

Pour accélérer la distribution, le présent document est distribué tel qu'il est parvenu du secrétariat du comité. Le travail de rédaction et de composition de texte sera effectué au Secrétariat central de l'ISO au stade de publication.

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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.

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.

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.

ISO 16911-2 was prepared by Technical Committee ISO/TC 146, *Air quality*, Subcommittee SC 1, and by Technical Committee CEN/TC 264, *Air quality* in collaboration.

ISO 16911 consists of the following parts, under the general title *Stationary source emissions — Determination of velocity and volumetric flow in ducts*:

— *Part 1: Manual reference method*

— *Part 2: Automated measuring systems*

Introduction

This part of EN ISO 16911 describes the quality assurance procedures related to Automated Measuring Systems (AMS) for the determination of the volumetric flow rate of flue gas, in order to meet the uncertainty requirements for measured values given by various regulations, e.g. Commission Decision of 18 July 2007 [4].

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

The purpose of this standard 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 this standard is also to secure flow monitoring with a total uncertainty equal to or less than stipulated in Commission Decision of 18 July 2007 [4] and establishing guidelines for the monitoring and reporting of greenhouse gas emissions pursuant to Directive 2003/87/EC [3].

Stationary source emissions — Determination of velocity and volume flow rate in ducts —

Part 2:
Automated measuring systems

1 Scope

This Part of EN ISO 16911 describes specific requirements for AMS flow monitoring. It is partly derived from EN 14181 which is the general document on the quality assurance of AMS and is applicable in conjunction with that document.

This part of EN ISO 16911 specifies conditions and criteria for the choice, mounting, commissioning and calibration of automated measuring systems (AMS) used for determining the volumetric flow rate from a source in ducted gaseous streams. This part of EN ISO 16911 is applicable by correlation with the manual reference method described in this standard part 1, EN ISO 16911-1.

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

2 Normative references

This part of EN ISO 16911 incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this International Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

EN ISO 16911 Part 1, *Stationary source emissions — Manual and automatic determination of velocity and volumetric flow in ducts — Part 1 Manual reference method*

EN 15267 Part 1, *Air quality — Certification of automated measuring systems — Part 1: General principles*

EN 15267 Part 3, *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 14181:2004, *Stationary source emissions — Quality assurance of automated measuring systems*

EN ISO 14956, *Air quality — Evaluation of the suitability of a measurement method by comparison with a stated measurement uncertainty*

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 International Standard, the terms and definitions given in EN 14181 and the following apply.

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

NOTE 1 An AMS is a monitoring technology which is traceable to a reference method.

NOTE 2 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, stack temperature

NOTE For the EU Directives [5] and [1] it is the daily emission value that relates to the uncertainty requirement.

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 The linearity test is described in annex B of EN 15267-3.

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 Basic state is normally the zero reading or the minimum measured by the instrument.

3.5
period of unattended operation
maximum interval of time for which the performance characteristics remain within a predefined range without external servicing, e.g. refill, calibration, 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 [EN 15267-3]:

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

where

x_{1i} is the i^{th} measurement result of analyser 1;

x_{2i} is the i^{th} measurement result of analyser 2;

n is the number of parallel measurements.

The absolute reproducibility in the field ($r_{f,abs}$) is calculated according to:

$$R_{f,abs} = t_{n\text{-}1;\,0,05} \times s_D \qquad (2)$$

where

$t_{n-1,\ 0,05}$ is the two-sided Students t-factor at a confidence level of 0,05, with *n-1* degrees of freedom.

3.7
Standard Reference Method (SRM)
method described and standardised to define an air quality characteristic, temporarily installed on site for verification purposes

NOTE For the purposes of this part of EN ISO 16911, 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 A surrogate for flow is normally the parameter measures 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 the system can measure with a given uncertainty

3.10
upper reference point
The 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 the system is intended to measure in a given installation.

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

3.12
crest factor
or peak-to-average ratio is a measurement of a flow profile, calculated from the measured peak value of the profile divided by the average value of the profile in the primary and secondary monitoring path

NOTE 1 If the measurement is made according to Part 1 of this standard and EN 15259, each measurement represents the same area of flow in the duct, and the crest factors divisor can be calculated from a simple average of the individual measurements.

NOTE 2 Crest factor shall be calculated for both flow profiles, the primary and secondary monitoring path, perpendicular to each other.

3.13
skewness
a measure of asymmetry, and is 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 If the measurement is made according to Part 1 of this standard 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 counting a possible measurement in the centre of the duct.

NOTE 2 Skewness shall be calculated for both flow profiles, perpendicular to each other.