



SLOVENSKI STANDARD

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Kakovost zraka - Certificiranje avtomatskih merilnih sistemov za nadzor naprav za zmanjševanje emisije prahu iz nepremičnih virov - Zahteve za delovanje in postopki preskušanja

Air Quality - Certification of automated dust arrestment plant monitors for use on stationary sources - Performance criteria and test procedures

Luftbeschaffenheit - Zertifizierung von automatischen Geräten zur Überwachung von Staubabscheidern an stationären Quellen - Mindestanforderungen und Prüfprozeduren
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Qualité de l'air - Certification des analyseurs automatiques pour la surveillance des systèmes de réduction des poussières à l'émission des sources fixes - Spécifications de performance et procédures d'essai
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Air Quality - Certification of automated dust arrestment plant monitors for use on stationary sources - Performance criteria and test procedures

Qualité de l'air - Certification des analyseurs automatiques pour la surveillance des systèmes de réduction des poussières à l'émission des sources fixes - Spécifications de performance et modes opératoires d'essai

Luftbeschaffenheit - Zertifizierung von automatischen Geräten zur Überwachung von Staubabscheidern an stationären Quellen - Mindestanforderungen und Prüfprozeduren

This European Standard was approved by CEN on 11 March 2010.

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Foreword

This document (EN 15859:2010) has been prepared by Technical Committee CEN/TC 264 "Air quality", the secretariat of which is held by DIN.

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of an identical text or by endorsement, at the latest by October 2010, and conflicting national standards shall be withdrawn at the latest by October 2010

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0 Introduction

0.1 General

CEN has established standards for the certification of automated measuring systems (AMS) used for monitoring emissions from stationary sources. This certification is based on the following four sequential stages:

- a) performance testing of an AMS;
- b) initial assessment of the AMS manufacturer's quality management system;
- c) certification;
- d) post certification surveillance.

This European Standard defines the performance criteria and procedures for performance testing of automated dust arrestment plant monitors used on stationary sources.

The following two types of dust arrestment plant monitor are covered by this standard:

- a *filter dust monitor* which can be calibrated in mass concentration units (e.g. mg/m^3) and used for dust arrestment control purposes; (standards.iteh.ai)
- a *filter leakage monitor* which indicates a change in the emissions level or a change in the magnitude of the dust pulses created by the cleaning process.

For the purposes of this standard, the term *instrument* is used to encompass both types of dust arrestment plant monitor. The terms *filter dust monitor* and *filter leakage monitor* are only used where it is necessary to distinguish between the two types.

0.2 Processes

Field-testing of an instrument is ordinarily carried out on the most highly demanding industrial process in the range of applications for which a manufacturer seeks certification. The premise is that if the instrument performs acceptably on this process, then experience has shown that the instrument generally performs well on the majority of other processes. However, there are always exceptions and it is the responsibility of the manufacturer in conjunction with the user to ensure that the instrument performs adequately on a specific process.

0.3 Performance characteristics

A combination of laboratory and field testing is detailed within this European Standard. Laboratory testing is designed to assess whether an instrument can meet, under controlled conditions, the technical requirements of the relevant performance criteria. Field testing, over a minimum three month period, is designed to assess whether an instrument can continue to work and meet the relevant performance criteria in a real application. Field testing is carried out on an industrial process representative of the intended application for the instrument for which the manufacturer seeks certification.

The main instrument performance characteristics are:

- response or detection time;
- influence of ambient conditions;

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- influence of variations of the waste gas velocity;
- susceptibility to physical disturbances;
- cross-sensitivity to likely interferents contained in the waste gas;
- performance and accuracy of the filter dust monitor against a standard reference method (SRM), under field conditions;
- performance and accuracy of the filter leakage monitor against a certified particulate AMS tested according to EN 15267-3, under field conditions;
- drift of automatic internal zero and reference points;
- availability and maintenance interval under field conditions;
- reproducibility from two instruments under identical field conditions.

Measurements made by instruments certified to the requirements of this standard do not necessarily fulfil the uncertainty requirements of the EU Directives for Large Combustion Plant and Waste Incineration or the QAL3 functionality of EN 14181:2004.

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1 Scope

This European Standard provides the performance criteria and test procedures for filter dust monitors and filter leakage monitors used to ensure that dust arrestment plants used on stationary sources are working satisfactorily.

A filter dust monitor is a dust arrestment plant monitor which can be calibrated in mass concentration units (e.g. mg/m^3) and used for dust arrestment control purposes.

A filter leakage monitor is a dust arrestment plant monitor which indicates a possible problem with the dust arrestment plant by monitoring a change in the emissions level or a change in the magnitude of the dust pulses created by the cleaning process.

This standard is intended for use with the certification procedure for automated measuring systems described in EN 15267-1 and EN 15267-2.

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.

EN 13284-2, *Stationary source emissions — Determination of low range mass concentration of dust — Part 2: Automated measuring systems*

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

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

EN 15267-3, *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 50160, *Voltage characteristics of electricity supplied by public distribution networks*

EN 60529, *Degrees of protection provided by enclosures (IP code) (IEC 60529:1989)*

EN ISO/IEC 17025, *General requirements for the competence of testing and calibration laboratories (ISO/IEC 17025:2005)*

IEC 60068-1, *Environmental testing — Part 1: General and guidance*

IEC 60068-2 (all tests), *Environmental testing — Part 2: Tests*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1 dust

particles, of any shape, structure or density, dispersed in the gas phase at the sampling point conditions which may be collected by filtration under specified conditions after representative sampling of the gas to be analysed

NOTE Adapted from EN 13284-1:2001, 3.1.

EN 15859:2010 (E)**3.2****dust arrestment plant monitor**

filter dust monitor or filter leakage monitor and additional devices for obtaining a result

NOTE Apart from the actual measuring device (the analyser), an instrument may include further components, like purge air blowers or external displays.

3.3**instrument**

dust arrestment plant monitor

3.4**filter dust monitor**

instrument, which can be calibrated in mass concentration units and used for dust arrestment control purposes, but does not fulfil the uncertainty demands according to EN 14181, or does not have reference materials for linearity test and QAL3 procedure according to EN 14181:2004

NOTE A mass concentration unit is e.g. mg/m³.

3.5**filter leakage monitor**

instrument, which indicates a possible problem with the dust arrestment plant

NOTE These instruments may either monitor a change in the emissions level or a change in the magnitude of the dust pulses created by the cleaning process.

3.6**reference method****RM**

measurement method taken as a reference by convention, which gives the accepted reference value of the measurand

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NOTE 1 A reference method is fully described [70aeffecd101/sist-en-15859-2010](https://standards.iteh.ai/catalog/standards/sist/8c7ccc17-a90e-45e1-9684-70aeffecd101/sist-en-15859-2010)

NOTE 2 A reference method can be a manual or an automated method.

NOTE 3 Alternative methods can be used if equivalence to the reference method has been demonstrated.

[EN 15259:2007, 2.8]

3.7**standard reference method****SRM**

reference method prescribed by European or National standard

NOTE Standard reference methods are used e.g. to calibrate and validate instrument and for periodic measurements to check compliance with limit values.

[EN 15259:2007, 2.9]

3.8**measurement**

set of operations having the object of determining a value of a quantity

[VIM:1993, 2,1]

3.9**paired measurement**

simultaneous recording of results of measurement at the same measurement point

NOTE Adapted from EN 15267-3:2007, 3.5.

3.10

measurand

particular quantity subject to measurement

[VIM:1993, 2.6]

NOTE The measurand is a quantifiable property of the waste gas under test, for example mass concentration of a measured component, temperature, velocity, mass flow, oxygen content and water vapour content.

3.11

measured component

constituent of the waste gas for which a defined measurand is to be determined by measurement

[EN 15259:2007, 2.6]

NOTE Measured component is also called determinand.

3.12

interferent

substance or phenomenon present in the waste gas under investigation, other than the measured component, that affects the response

NOTE Adapted from EN 15267-3:2007, 3.8.

3.13

calibration

determination of a calibration function with (time) limited validity applicable to an instrument at a specific measurement site

NOTE Adapted from EN 15267-3:2007, 3.9. <http://www.sist-en-15859-2010.org/standards/sist/8c7ccc17-a90e-45e1-9684-70aefcccd101/sist-en-15859-2010>

3.14

calibration function

relationship between the values of the SRM and the instrument with the assumption of a constant residual standard deviation

NOTE 1 Adapted from EN 15267-3:2007, 3.10.

NOTE 2 The calibration function describes the statistical relationship between the starting variable (measured signal) of the measuring system and the associated result of measurement (measured value) simultaneously determined at the same point of measurement using a SRM.

3.15

automatic internal zero point

output of the instrument in response to an internally generated function, intended to represent absence of the measured component

3.16

automatic internal reference point

output of the instrument in response to an internally generated function, intended to represent a defined amount of the measured component

3.17

measured signal

output from an instrument in analogue or digital form which is converted into the measured value with the aid of the calibration function

NOTE Adapted from EN 15267-3:2007, 3.15.

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output**

reading, or digital or analogue electrical signal generated by an instrument in response to a measured object

NOTE Adapted from EN 15267-3:2007, 3.16.

**3.19
independent reading**

reading that is not influenced by a previous individual reading by separating two individual readings by at least four response times

[EN 15267-3:2007, 3.17]

**3.20
individual reading**

reading averaged over a time period equal to the response time of the instrument

NOTE Adapted from EN 15267-3:2007, 3.18.

**3.21
performance characteristic**

quantity assigned to an instrument in order to define its performance

NOTE 1 Adapted from EN 15267-3:2007, 3.19.

NOTE 2 A performance characteristic is described by values, tolerances and ranges.

**3.22
accuracy**

closeness of agreement between a single measured value of the measurand, and the true value (or an accepted reference value)

[EN 15267-3:2007, 3.20] <https://standards.iteh.ai/catalog/standards/sist/8c7ccc17-a90e-45e1-9684-70aeffcd101/sist-en-15859-2010>

**3.23
availability**

fraction of the total monitoring time for which data of acceptable quality have been collected

[EN 15267-3:2007, 3.21]

**3.24
averaging time**

period of time over which an arithmetic or time-weighted average of concentrations is calculated

[EN 15267-3:2007, 3.22]

**3.25
interference**

negative or positive effect that a substance or phenomenon has upon the output of the instrument, when that substance or phenomenon is not the measured component

NOTE Derived from EN 15267-3:2007, 3.24.

**3.26
cross-sensitivity**

response of the instrument to substances and phenomena other than those that it is designed to measure

NOTE See interference.

3.27**drift**

monotonic change of the calibration function over a stated period of unattended operation, which results in a change of the measured value

[EN 15267-3:2007, 3.26]

3.28**internal zero drift**

change in the automatic internal zero point over a stated period of unattended operation

3.29**internal reference drift**

change in the automatic internal reference point over a stated period of unattended operation

3.30**maintenance interval**

maximum admissible interval of time for which the performance characteristics remain within a pre-defined range without external servicing, e.g. refill, calibration, adjustment

NOTE This is also known as the period of unattended operation.

[EN 15267-3:2007, 3.29]

3.31**response time**

t_{90}

time interval between the instant of a sudden change in the value of the input quantity to an instrument and the time as from which the value of the output quantity is reliably maintained above 90 % of the correct value of the input quantity

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NOTE 1 Adapted from EN 15267-3:2007, 3.31.
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NOTE The response time is also referred to as the 90 % time or t_{90} time.

3.32**detection time**

time interval between the onset of an event, and the instrument providing the defined change in output

3.33**reproducibility**

R_f

measure of the agreement between two identical measuring systems applied in parallel in field tests at a level of confidence of 95 % using the standard deviation of the difference of the paired measurements

[EN 15267-3:2007, 3.33]

NOTE Reproducibility is determined by means of two identical instruments operated side by side. It is an instrument performance characteristic for describing the production tolerance specific to that instrument. The reproducibility is calculated from the half-hour averaged output signals (raw values as analogue or digital outputs) during the three-month field test.

3.34**uncertainty**

parameter associated with the result of a measurement, which characterises the dispersion of the values that could reasonably be attributed to the measurand

[ENV 13005:1999, B.2.18]