



SLOVENSKI STANDARD

SIST EN 15446:2008

01-marec-2008

Ubežne in razpršene emisije skupnega pomena za industrijske sektorje - Meritve ubežnih emisij par, ki nastajajo zaradi netesnosti naprav in puščanja cevovodov

Fugitive and diffuse emissions of common concern to industry sectors - Measurement of fugitive emission of vapours generating from equipment and piping leaks

Fugitive und diffuse Emissionen von allgemeinem Interesse für Industriebereiche - Messung fugitiver Emissionen von Gasen und Dämpfen aus Lecks von Betriebseinrichtungen und Rohrleitungen

Emissions fugitives et diffuses concernant divers secteurs industriels - Mesurage de l'émission fugitive de composés gazeux provenant de fuites d'équipement et canalisation

Ta slovenski standard je istoveten z: EN 15446:2008

ICS:

13.040.40 Emisije nepremičnih virov Stationary source emissions

SIST EN 15446:2008

en,fr,de

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EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN 15446

January 2008

ICS 13.040.40

English Version

Fugitive and diffuse emissions of common concern to industry sectors - Measurement of fugitive emission of vapours generating from equipment and piping leaks

Emissions fugitives et diffuses concernant les secteurs industriels - Mesurage des émissions fugitives de composés gazeux provenant d'équipements et de canalisations

Fugitive und diffuse Emissionen von allgemeinem Interesse für Industriebereiche - Messung fugitiver Emissionen von Gasen und Dämpfen aus Lecks von Betriebseinrichtungen und Rohrleitungen

This European Standard was approved by CEN on 30 November 2007.

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. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN Management Centre or to any CEN member.

This European Standard exists 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 Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.



EUROPEAN COMMITTEE FOR STANDARDIZATION
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Foreword

This document (EN 15446:2008) 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 July 2008, and conflicting national standards shall be withdrawn at the latest by July 2008.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

This European Standard has been elaborated under a mandate of the European Commission/DG Enterprise to support essential requirements of the IPPC Directive (96/61/EC).

The horizontal approach of common concern to industrial sectors is to gather industries concerned with diffuse/fugitive emissions and to develop methods suiting their needs. The industries of three trade associations have participated: EUROFER, EUROMETAUX and CEFIC. For practical reasons the two developed measurement methods, one for dusts and the other for gases are published as two separate standards.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and the United Kingdom.

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Introduction

A portable instrument is used to detect VOC leaks from individual sources. Any detector type is allowed, provided it meets the specifications and performance criteria contained in Clause 5. This procedure is intended to locate the leaks, and to estimate the mass emission rate from individual sources and the total emission of the industrial facility over a reporting period by using:

- EPA or user-defined correlations whenever possible;
- fixed emission factors, in all other cases.

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1 Scope

This standard applies to the measurement of fugitive emissions of volatile organic compounds (VOCs) from process equipment. The leak sources include, but are not limited to, valves, flanges and other connections, pressure relief devices, process drains, open-ended valves, pump and compressor seal systems, agitator seals, and access door seals. It does not apply to instrument tubing connections.

This standard applies to all products of which at least 20 % by weight has a vapour pressure higher than 0,3 kPa at 20 °C. For the petroleum industry, this includes all light products and excludes kerosene and all heavier products.

The standard is based on the measurement of the gas concentration at the interface of a leak. This concentration is measured with a portable instrument. It is converted to a mass emission rate by use of a set of correlations. The scope of this standard includes the complete data processing, from the initial concentration measurement up to the generation of an emission report over a reporting period (which is generally one year)¹).

This standard does not prescribe the number of potential emission points that should be screened each year nor the frequency at which these points should be screened. This sampling strategy shall indeed take into account the plant characteristics and the required level of control over fugitive emissions.

Optical methods are currently under development to ease the detection of leaks in plants and use of this standard in conjunction with these methods might be possible. In any case, measurements have to be performed according to the requirements of this standard. To enable direct quantification of total fugitive emissions based only on these methods, a subsequent revision of this standard will be needed.

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2 Normative references

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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 5725-2, *Accuracy (trueness and precision) of measurement methods and results - Part 2: Basic method for the determination of repeatability and reproducibility of a standard measurement method (ISO 5725-2:1994 including Technical Corrigendum 1:2002)*

3 Terms and definitions

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

3.1

fugitive emission

emission to the atmosphere caused by loss of tightness of an item which is designed to be tight

3.2

screening

action of measuring the concentration in VOC at the interface of a potential leak source

3.3

screening Value

local VOC concentration at the surface of a leak source that indicates a VOC emission is present

¹) The standard aims at significantly improving the consistency of emissions reporting, however determination of the trueness of the method is not in the current scope of the TWG.

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NOTE The value is an instrument reading based on a reference compound. These values are indicated in ppm(v/v) (abbreviated as ppm in the remainder of the text).

3.4
threshold concentration

pre-set performance target for the individual sources

3.5
reference compound

VOC substance selected to express the screening value concentration

3.6
calibration gas

VOC substance used to adjust the instrument meter reading to a known value

NOTE The calibration gas is usually the reference compound at a predefined concentration.

3.7
response factor

ratio between the actual concentration of VOC present at the location where a screening measurement is made and the observed meter reading

NOTE This ratio represents the correction that shall be applied to the meter reading to take into account that the meter has been calibrated with a calibration gas that can be different from the substance or mix of substances present in a leak.

3.8
calibration precision

degree of agreement between several measurements of calibration gas with the same known concentration

NOTE It is the ratio of the average absolute value of the difference between the meter readings and the known concentration to the known concentration, expressed in percent.

3.9
response time

time interval from a step change in VOC concentration at the input of the sampling system to the time at which 90 % of the corresponding final value is reached as displayed on the instrument readout meter

4 Measurement equipment

4.1 Specifications of equipment

- 1) VOC instrument detector shall respond to the compounds being screened. Detector types that may meet this requirement include, but are not limited to, catalytic oxidation, flame ionisation, infrared absorption, and photo ionisation.
- 2) Maximum admissible lower detection limit of the detector provided by the manufacturer shall be 10 ppm.
- 3) Scale resolution of the instrument meter shall be ± 5 % of the threshold concentration.
- 4) Instrument shall be equipped with a pump so that a continuous sample is provided to the detector. The nominal sample flow rate shall be 0,2 l/min²⁾ to 1,2 l/min²⁾.
- 5) Instrument shall be intrinsically safe for operation in explosive atmospheres.
- 6) Instrument shall be equipped with a probe or probe extension for sampling with a maximum outside diameter of 6,4 mm, with a single end opening for admission of the sample.

2) Based on available equipment. Actual range is 0,25 to 1,0 l/min.

- 7) Instruments used for quantification of fugitive emissions shall have a minimum measurement range up to 50 000 ppm.

NOTE In case a survey is performed solely to detect leaks or verify repair quality and is not intended to be used for emission quantification purposes, these requirements do not apply.

4.2 Performance criteria

- 1) Instrument response factors for the individual compounds to be measured shall be less than 10.
- 2) Instrument response time shall be equal to or less than 5 s. The response time shall be determined for the instrument configuration to be used during screening.
- 3) Calibration precision shall be lower or equal to 10 % of the calibration gas value.
- 4) Evaluation procedure for each of these parameters is given in Annex A.

4.3 Performance evaluation requirements

- 1) Response factors shall be determined according to the requirements set in 6.4. In case these need to be used, the determination of the response factors should take place before actual measurements are performed.
- 2) Calibration precision test shall be completed prior to placing the analyser into service, and at subsequent 3 month intervals or at the next use, whichever is later.
- 3) Response time test is required before placing a new instrument into service for the first time. If a modification to the sample pumping system or flow configuration is made that would change the response time, a new test is required before further use.

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5 Chemicals / Calibration gases

- 1) Monitoring instrument is calibrated in parts per million by volume [ppm(v/v)] of the reference compound specified in the applicable regulation when possible, or with another calibration gas.
- 2) Gases required for monitoring and instrument performance evaluation are:
 - zero gas (air, less than 10 ppm VOC);
 - mixture of calibration gas in air with a concentration approximately equal to the threshold concentration specified in the regulation (two different concentrations are used, usually 1 000 ppm and 10 000 ppm).
- 3) If cylinder calibration gas mixtures are used, the concentration in calibration gas shall be analysed and certified by the manufacturer to be within ± 2 % accuracy, and a shelf life should be certified. Cylinder standards shall be either reanalysed or replaced at the end of the specified shelf life. Alternatively, calibration gases may be prepared by the user according to any documented gas preparation procedure that will yield a mixture accurate to within + or - 2 %. Prepared standards will be replaced each day of use unless it can be demonstrated that no degradation occurs during storage.
- 4) Calibration may be performed using a compound other than the reference compound provided a conversion factor is determined for that alternative compound in order to convert the resulting meter readings during emission surveys to reference compound measurements.