EESTI STANDARD EVS-EN 45544-1:2000

Workplace atmospheres - Electrical apparatus used for the direct detection and direct concentration measurement of toxic gases and vapours - Part 1: General requirements and test methods

EESTI STANDARDIKESKUS

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

Käesolev Eesti standard EVS-EN 45544-1:2000 sisaldab Euroopa standardi EN 45544-1:1999 ingliskeelset teksti.	This Estonian standard EVS-EN 45544-1:2000 consists of the English text of the European standard EN 45544-1:1999.
Standard on kinnitatud Eesti Standardikeskuse 16.06.2000 käskkirjaga ja jõustub sellekohase teate avaldamisel EVS Teatajas.	This standard is ratified with the order of Estonian Centre for Standardisation dated 16.06.2000 and is endorsed with the notification published in the official bulletin of the Estonian national standardisation organisation.
Standard on kättesaadav Eesti standardiorganisatsioonist.	The standard is available from Estonian standardisation organisation.

ICS 13.040.30, 13.320

EUROPEAN STANDARD
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English version

Workplace atmospheres - Electrical apparatus used for the direct detection and direct concentration measurement of toxic gases and vapours - Part 1: General requirements and test methods

Atmosphères des lieux de travail - Appareillage électrique utilisé pour la détection directe des vapeurs et gaz toxiques et le mesurage direct de leur concentration - Partie 1: Exigences générales et méthodes d'essai

Arbeitsplatzatmosphäre - Elektrische Geräte für die direkte Detektion und direkte Konzentrationsmessung toxischer Gase und Dämpfe - Teil 1: Allgemeine Anforderungen und Prüfverfahren

This European Standard was approved by CEN on 5 September 1999 and by CENELEC on 15 November 1999.

CEN/CENELEC 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 Central Secretariat or to any CEN/CENELEC 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/CENELEC member into its own language and notified to the Central Secretariat has the same status as the official versions.

CEN/CENELEC members are the national standards bodies and national electrotechnical committees, respectively, of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

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Contents

Foreword

This European Standard has been prepared by Technical Committee CEN/CLC/WG CMI "Continuous measuring instruments", 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 May 2000, and conflicting national standards shall be withdrawn at the latest by May 2000.

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

Introduction

This European Standard specifies general requirements and test methods for the determination of the performance characteristics of electrical apparatus used for the direct detection and direct concentration measurement of toxic [1]) gases and vapours in workplace atmospheres. It also provides guidance for the selection, installation, use and maintenance of such apparatus.

This European Standard includes the following parts:

Workplace atmospheres - Electrical apparatus used for the direct detection and direct concentration measurement of toxic gases and vapours -

Part 1: General requirements and test methods.

Part 2: Performance requirements for apparatus used for measuring concentrations in the region of limit values.

Part 3: Performance requirements for apparatus used for measuring concentrations well above limit values.

Part 4: Guide for selection, installation, use and maintenance.

This European standard is based on EN 482 which specifies general performance requirements for procedures for determining the concentration of chemical agents in workplace atmospheres. These performance requirements include maximum values for overall uncertainty (a combination of precision and bias) that should be met under prescribed laboratory conditions and also in the environment representative of the workplace and other areas. For a given measurement task the range over which the requirements for the overall uncertainty have to be met is a function of the limit value. However, for most chemical agents the limit values have not been harmonized at the european level. Therefore, it was decided to use a reference value (standard test gas concentration) instead of the limit value for the performance tests. The list of standard test gas concentrations is given in annex A. The values chosen are close to the limit values used in different European countries but are intended to be used only for type testing apparatus without any legal implications. EN 45544-2 is intended to be used for instruments measuring concentrations up to 10 times the concentrations given in annex A. EN 45544-3 is intended to be used for instruments measuring concentrations greater than 10 times the concentrations given in annex A.

This standard will help manufacturers, test laboratories and users of apparatus to adopt a consistent approach to, and provide a framework for, the assessment of performance criteria. It is the manufacturer's primary responsibility to ensure that the apparatus meets the requirements laid down in this European Standard including environmental influences which can be expected to affect performance.

[1]) For the purposes of this standard, the word 'toxic' should be taken to include 'very toxic', 'toxic', 'harmful', 'corrosive', 'irritating', 'sensitising', 'carcinogenic', 'mutagenic', 'teratogenic',.

1 Scope

This European Standard specifies general requirements for construction and testing, and specifies the test methods that apply to personal, portable, transportable and fixed apparatus intended for the direct detection and direct concentration measurement of a toxic gas or vapour in workplace air. It applies to apparatus whose primary purpose is to indicate the presence of a toxic gas or vapour in the atmosphere with a view to providing an indication or warning of the presence of a toxic hazard within a time of response as specified in EN 45544-2 and EN 45544-3.

Only apparatus in which the presence of the gas causes a change which is manifested as an automatically generated electrical signal will be considered as being within the scope of this European Standard. It is applicable to apparatus intended to provide an indication, alarm and/or other output function, the purpose of which is to give a warning of potential toxic hazard and in some cases to initiate automatic or manual protective actions.

This European Standard does not apply to apparatus:

- used for the measurement of oxygen;
- used only in laboratories for analysis or measurement;
- used only for process measurement purposes;
- used in the domestic environment;
- used in environmental air pollution monitoring;
- used for the measurement of combustible gases and vapours related to the risk of explosion.

2 Normative references

This European Standard 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 European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

EN 482, *Workplace atmosphere - General requirements for the performance of procedures for the measurement of chemical agents*

EN 45544-2:1999, *Workplace atmospheres - Electrical apparatus used for the direct detection and direct concentration measurement of toxic gases and vapours - Part 2: Performance requirements for apparatus used for measuring concentrations in the region of limit values*

EN 45544-3:1999, *Workplace atmospheres - Electrical apparatus used for the direct detection and direct concentration measurement of toxic gases and vapours - Part 3: Performance requirements for apparatus used for measuring concentrations well above limit values*

EN 50270, *Electromagnetic compatibility - Electrical apparatus for the detection and measurement of combustible gases, toxic gases or oxygen*

EN 60073, *Coding of indicating devices and actuators by colours and supplementary means (IEC 60073:1996)*

EN 60068-2-6, *Environmental testing - Part 2: Tests - Tests Fc: Vibration (sinusoidal) (IEC 60068-2-6:1995 + Corrigendum 1995)*

ISO 3534-1, *Statistics, Vocabulary and symbols - Part 1: Probability and general statistical terms*

ISO 6141, *Gas analysis - Calibration gas mixtures - Certificate of mixture preparation*

ISO 6142, *Gas analysis - Preparation of calibration gas mixtures - Weighing methods*

ISO 6143, *Gas analysis - Determination of composition of calibration gas mixtures -Comparison methods*

ISO 6144, *Gas analysis - Preparation of calibration gas mixtures - Static volumetric methods*

ISO 6145-1, *Gas analysis - Preparation of calibration gas mixture - Dynamic volumetric methods - Part 1: Methods of calibration*

ISO 6145-3, *Gas analysis - Preparation of calibration gas mixtures - Dynamic volumetric methods - Part 3: Periodic injections into a flowing gas stream*

ISO 6145-4, *Gas analysis - Preparation of calibration gas mixtures - Dynamic volumetric methods - Part 4: Continuous injection methods*

ISO 6145-6, *Gas analysis - Preparation of calibration gas mixtures - Dynamic volumetric methods - Part 6: Sonic orifices*

ISO 6147, *Gas analysis - Preparation of calibration gas mixtures - Saturation method*

ISO 6879:1995, Air quality - Performance characteristics and related concepts for air quality and measuring methods

ISO 7504, *Gas analysis - Vocabulary*

3 Definitions

For the purposes of this European Standard the following definitions apply.

3.1
toxic gas or vapour
general term for any gas or vapour that can be harmful to human health,[1]).

3.2
clean air
air which is free of gases or vapours to which the sensing element is sensitive or which influence the performance of the sensing element

3.3
standard test gas (STG)
test gas with a composition specified for each apparatus and gas to be tested.

3.4
mask for calibration and test
a piece of equipment which can be attached to the apparatus to present a test gas to the sensor

3.5
volume ratio (V/V)
ratio of the volume of a component to the volume of the gas mixture, under specified conditions of temperature and pressure [ISO 7504].

3.6
limit value (LV)
a reference figure for the concentration of a chemical agent in air. [EN 482]

3.7
short term exposure limit (STEL)
the time weighted average concentration over a specified short period of time.

NOTE The period is specified in National Regulations

3.8
time weighted average (TWA) concentration
the concentration of gas in air integrated over time and divided by the measuring period.

3.9
fixed apparatus
an apparatus which is intended to have all parts permanently installed.

3.10
transportable apparatus
an apparatus not intended to be portable, but which can readily be moved from one place to another.

3.11
portable apparatus
spot-reading or continuously sensing apparatus that has been designed to be readily carried from place to place and to be used whilst being carried. Portable apparatus is generally battery powered.

3.12
personal monitor
a device, attached to a person, that monitors the atmosphere in their breathing zone so that their exposure to toxic gases or vapours can be determined.

3.13
continuous duty apparatus
apparatus which is continuously powered but may have continuous or intermittent sensing.

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