SLOVENSKI STANDARD
SIST EN 45544-2:2015

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Zrak na delovnem mestu - Električne naprave za neposredno odkrivanje in neposredno merjenje koncentracije strupenih plinov in hlapov - 2. del: Zahtevane lastnosti za naprave, namenjene merjenju izpostavljenosti

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 exposure measurement

Arbeitsplatzatmosphäre - Elektrische Geräte für die direkte Detektion und direkte Konzentrationsmessung toxischer Gase und Dämpfe - Teil 2: Anforderungen an das Betriebsverhalten von Geräten, die für Expositionsmessungen eingesetzt werden

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 2: Exigences de performance pour les appareillages utilisés pour la gestion de l'exposition

Ta slovenski standard je istoveten z: **EN 45544-2:2015**

ICS:

13.040.30	Kakovost zraka na delovnem mestu	Workplace atmospheres
13.320	Alarmni in opozorilni sistemi	Alarm and warning systems

SIST EN 45544-2:2015 **en,fr,de**

EUROPEAN STANDARD

NORME EUROPÉENNE

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ICS 13.040.30; 13.320

Supersedes EN 45544-2:1999

English Version

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

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European Committee for Electrotechnical Standardization
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Foreword

This document (EN 45544-2:2015) has been prepared by CEN/CENELEC Joint Working Group Continuous Measuring Instruments (JWG CMI).

The following dates are fixed:

- latest date by which this document has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2015-11-24
- latest date by which the national standards conflicting with this document have to be withdrawn (dow) 2017-11-24

This document supersedes EN 45544-2:1999.

Introduction

National laws and regulations based on European Directives require the assessment of the potential exposure of a worker to chemical agents in workplace atmospheres.

EN 45544, *Workplace atmospheres – Electrical apparatus used for the direct detection and direct concentration measurement of toxic gases and vapours*, consists of the following parts:

— *Part 1: General requirements and test methods;*

— *Part 2: Performance requirements for apparatus used for exposure measurement;*

— *Part 3: Performance requirements for apparatus used for general gas detection;*

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

EN 45544 series is based on EN 482 which specifies general performance requirements for procedures for measuring the concentration of chemical agents in workplace atmospheres. These performance requirements are intended to apply under environmental conditions present at the workplace. However, because a wide range of environmental conditions are encountered in practice, this document specifies requirements that have to be fulfilled by measuring procedures when tested under prescribed laboratory conditions.

EN 45544-2 details the performance requirements outlined in EN 482 specifically for electrical apparatus used for the direct detection and direct concentration measurement of toxic gases and vapours intended for exposure measurement.

EN 45544-3 details the performance requirements for general gas detection apparatus, e.g. safety warning, leak detection. The measuring range will be defined by the manufacturer. In general, the requirements for accuracy will be higher for EN 45544-2 apparatus than for EN 45544-3 apparatus.

The same apparatus may be used for applications covered by EN 45544-2 and EN 45544-3.

EN 45544 series 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.

For a given measurement task the range over which the requirements for the relative expanded uncertainty have to be met depends on 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 volume fractions is given in Annex A of EN 45544-1:2015. The values chosen are equal to or 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.

Electrical apparatus used for the direct detection and direct concentration measurement of toxic gases and vapours generate readings in clean air (zero readings) which vary with environmental conditions and time. This standard therefore includes test methods and requirements for acceptable variations in zero readings which are additional to the general requirements of EN 482.

1 Scope

This European Standard specifies the performance requirements outlined in EN 482 specifically for electrical apparatus used for the direct detection and direct concentration measurement of toxic gases and vapours in workplace atmospheres.

This European Standard is applicable to apparatus used for exposure measurement.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 45544-1:2015, *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*

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

EN 50271, *Electrical apparatus for the detection and measurement of combustible gases, toxic gases or oxygen - Requirements and tests for apparatus using software and/or digital technologies*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 45544-1:2015 apply.

4 General requirements

Unless otherwise stated, the apparatus shall conform to the general requirements of EN 45544-1:2015, Clause 4 and these requirements shall be verified by visual inspection and by tests according to EN 45544-1:2015, 5.2.5.

5 Performance requirements

5.1 General

The apparatus shall be tested in accordance with EN 45544-1:2015, Clause 5. A report of tests shall be prepared in accordance with EN 45544-1:2015, Clause 7.

5.2 Standard requirements

The upper limit of measurement shall be equal to or greater than 2 times the volume fraction of the standard test gas given in EN 45544-1:2015, Annex A.

Minimum requirements for the lower limit of measurement are also given in EN 45544-1:2015, Annex A. Lower limits of measurement less than those given in EN 45544-1:2015, Annex A are permitted.

The performance requirements that are referred to in 5.5 to 5.9 shall be as specified below:

a) the deviation of the measured values in clean air shall be less than or equal to the lower limit of measurement in EN 45544-1:2015, Table A.1 and the value specified in the instruction manual;

b) the deviation of the measured values in standard test gas shall be less than or equal to 20 % of the measured value.

5.3 Unpowered storage

All apparatus shall conform to the relevant requirements of 5.4 to 5.9 after storage.

5.4 Measurement of deviations

See Clause 6.

5.5 Mechanical tests

5.5.1 Vibration

During the vibration test, the apparatus shall not suffer any loss of function nor give any false alarm or fault signal. The apparatus shall not suffer damage resulting in hazard or loss of function.

The performance requirements as specified in 5.2a and 5.2b shall be met.

5.5.2 Drop test

The apparatus shall not suffer damage resulting in hazard or loss of function. The apparatus shall remain in the measuring mode during and after the test.

EXAMPLE Alarm devices, pump function, controls or display can lose function.

The performance requirements specified in 5.2a and 5.2b shall be met.

5.6 Environmental tests

5.6.1 Temperature

The deviation of the measured values at all temperatures from that at 20 °C shall be in accordance with 5.2a and 5.2b.

5.6.2 Pressure

The deviation of the measured values in clean air at all pressures from that at 100 kPa shall be in accordance with 5.2a.

The deviation of the measured values in standard test gas at all pressures from that at 100 kPa shall be less than 35 %.

5.6.3 Humidity

The deviation of the measured values at any relative humidity from that at adjustment shall be in accordance with 5.2a and 5.2b.

5.6.4 Air velocity

The deviation of the measured values at any velocity from that under conditions of no forced ventilation shall be in accordance with 5.2a and 5.2b.

5.7 Performance tests

5.7.1 Alarm set point(s)

The alarm shall be activated by the test gas at each set point within t_{90}.

5.7.2 Time to alarm or alarm reading

The time to alarm or alarm reading shall not be greater than 20 s for temperatures at and above 5 °C and 30 s for temperatures below 5 °C.

5.7.3 Flow rate

The low flow signal shall be activated.

The performance requirements specified in 5.2b shall be met.

5.7.4 Warm-up time

The performance requirements specified in 5.2a and 5.2b shall be met.

5.7.5 Time of response

The response time t_{90} shall not exceed 150 s. t_{50} shall not exceed 60 s.

For apparatus equipped with a sample line or a probe, 3 s per metre length of sample line or probe shall be added to these values.

5.7.6 Time of recovery

The recovery time t_{10} shall not exceed 300 s. t_{50} shall not exceed 60 s.

For apparatus equipped with a sample line or a probe, 3 s per metre length of sample line or probe shall be added to these values.

5.7.7 Addition of sampling probe (portable and transportable apparatus only)

The performance requirements specified in 5.2a and 5.2b shall be met.

5.7.8 Field calibration kit

The performance requirements specified in 5.2a and 5.2b shall be met.