
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

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Arbeitsplatzatmosphäre - Elektrische Geräte für die direkte Detektion und direkte Konzentrationsmessung toxischer Gase und Dämpfe - Teil 3: Anforderungen an das Betriebsverhalten von Geräten für Konzentrationsmessungen weit oberhalb von Grenzwerten

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Atmospheres des lieux de travail - Appareillage électrique utilisé pour la détection directe des vapeurs et gaz toxiques et le mesurage direct de leur concentration - Partie 3: Exigences de performance pour les appareillages utilisés pour le mesurage des concentrations tres supérieures aux valeurs limites

Ta slovenski standard je istoveten z: EN 45544-3:1999

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| 13.320 | Alarmni in opozorilni sistemi | Alarm and warning systems |

SIST EN 45544-3:2004

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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

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 3: Exigences de performance pour les appareillages utilisés pour le mesurage des concentrations très supérieures aux valeurs limites

Arbeitsplatzatmosphäre - Elektrische Geräte für die direkte Detektion und direkte Konzentrationsmessung toxischer Gase und Dämpfe - Teil 3: Anforderungen an das Betriebsverhalten von Geräten für Konzentrationsmessungen weit oberhalb von Grenzwerten

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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	Page
Foreword	4
Introduction	5
1 Scope	6
2 Normative references	6
3 Definitions	6
4 General requirements	6
5 Test conditions	6
6 Performance requirements	6
6.1 Standard requirements	6
6.2 Unpowered storage	6
6.3 Measurement of deviations	6
6.4 Mechanical tests	6
6.4.1 Vibration	6
6.4.2 Droptest	6
6.5 Environmental tests	7
6.5.1 Temperature	7
6.5.2 Pressure	7
6.5.3 Humidity	7
6.5.4 Air speed	7
6.6 Performance tests	7
6.6.1 Audible alarm (for personal, portable and transportable apparatus)	7
6.6.2 Alarm set point(s)	7
6.6.3 Alarm response time (applicable to all alarm instruments)	7
6.6.4 Flow failure warning	7
6.6.5 Warm-up time	7
6.6.6 Time of response	7
6.6.7 Time of recovery	7
6.6.8 Addition of sampling probe (portable and transportable apparatus only)	7
6.6.9 Field verification kit	7
6.6.10 Gas concentrations above the upper limit of the measuring range	8
6.6.11 Extended operation in standard test gas	8
6.6.12 Orientation tests	8
6.7 Electrical tests	8
6.7.1 Battery capacity	8
6.7.2 Mains power supply	8
6.7.3 Electrical fault signal	8
6.7.4 Electromagnetic compatibility	8
6.7.5 Time-weighted average (TWA) function	8
6.8 Drift tests	8
6.8.1 Personal, portable, transportable and fixed apparatus	8

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6.8.2 Spot reading apparatus 8

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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.

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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 of EN 45544-1. 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 of the standard is intended to be used for measuring concentrations up to 10 times the concentrations given in annex A of EN 45544-1. EN 45544-3 is intended to be used for measuring concentrations greater than 10 times the concentrations given in annex A of EN 45544-1. These concentrations are not covered by EN 482.

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 may 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 the performance requirements for electrical apparatus used for the direct detection and direct concentration measurement of toxic gases and vapours in workplace atmospheres.

The standard test gas concentrations (STGC) used for the tests are given in 5.6 of EN 45544-1:1999.

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 45544-1:1999, *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*

3 Definitions

For the purposes of this European Standard the definitions of EN 45544-1 apply.

4 General requirements

Unless otherwise stated, the general requirements of EN 45544-1 are applicable and shall be checked by visual inspection.

Compliance shall be determined in accordance with the appropriate test methods including initial calibration specified in EN 45544-1.

5 Test conditions

Clause 5 of EN 45544-1:1999 is applicable.

6 Performance requirements

6.1 Standard requirements

When specified, the performance requirements in 6.3 to 6.8 shall be as follows:

The difference between the measured values before and after the test shall not exceed $\pm 20\%$ of the measured value or $\pm 10\%$ of the measuring range, whichever is the greater.

6.2 Unpowered storage

All apparatus shall meet the relevant requirements of 6.3 to 6.8 after storage.

6.3 Measurement of deviations

The overall uncertainty shall be calculated according to 3.31 of EN 45544-1:1999.

The overall uncertainty of the measured values for each of the gas concentrations distributed over the measuring range shall not exceed $\pm 20\%$ of the measured value or $\pm 10\%$ of the measuring range, whichever is the greater.

6.4 Mechanical tests

6.4.1 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 shall be as stated in 6.1

6.4.2 Droptest

The apparatus shall not suffer damage resulting in hazard or loss of function.

The performance requirements shall be as stated in 6.1

6.5 Environmental tests

6.5.1 Temperature

The deviation of the measured values at 5 °C and 40 °C from that at 20 °C shall conform to the performance requirements stated in 6.1.

The deviation of the measured value at -10 °C from that at 20 °C shall conform to twice the values of the performance requirements stated in 6.1.

6.5.2 Pressure

The deviation of the measured values at 90 kPa and 110 kPa from that at 100 kPa shall conform to the performance requirements stated in 6.1.

6.5.3 Humidity

The deviation of the measured values at 20 % relative humidity and 90 % relative humidity from that at 50 % relative humidity shall conform to the performance requirements stated in 6.1.

6.5.4 Air speed

The deviation of the measured values 0,5 m/s and 4,0 m/s from that under static conditions shall conform to the performance requirements stated in 6.1.

6.6 Performance tests

6.6.1 Audible alarm (for personal, portable and transportable apparatus)

The sound output of the audible alarm shall not be less than 70 dB(A) at 0,3 m from the apparatus.

6.6.2 Alarm set point(s)

The alarm shall be activated by the test gas at each set point. If a latching alarm is provided, the manual reset action shall be checked during each test.

6.6.3 Alarm response time (applicable to all alarm instruments)

The time interval T_{ALARM} shall not be greater than 20 s.

6.6.4 Flow failure warning

The activation of the flow failure warning shall be confirmed.

The performance requirements shall be as stated in 6.1.

6.6.5 Warm-up time

The deviation of the value of all six readings from the test gas concentration shall not exceed $\pm 20\%$.

6.6.6 Time of response

The response time T_{90} shall not exceed 2,5 min. In the case of difficult to handle gases where a T_{50} is used it shall not exceed 1 min.

6.6.7 Time of recovery

The recovery time T_{10} shall not exceed 5 min. In the case of difficult to handle gases where a T_{50} is used it shall not exceed 1 min.

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

The time of response shall not exceed 4 min.