

**Workplace atmospheres - Electrical
apparatus used for the direct detection
and direct concentration measurement
of toxic gases and vapours - Part 4:
Guide for selection, installation, use
and maintenance**

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

Käesolev Eesti standard EVS-EN 45544-4:2000 sisaldab Euroopa standardi EN 45544-4:1999 ingliskeelset teksti. Käesolev dokument on jõustatud 16.06.2000 ja selle kohta on avaldatud teade Eesti standardiorganisatsiooni ametlikus väljaandes. Standard on kättesaadav Eesti standardiorganisatsioonist.	This Estonian standard EVS-EN 45544-4:2000 consists of the English text of the European standard EN 45544-4:1999. This document is endorsed on 16.06.2000 with the notification being published in the official publication of the Estonian national standardisation organisation. The standard is available from Estonian standardisation organisation.
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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 4: Guide for selection, installation, use
and maintenance

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 4:
Guide de sélection, d'installation, d'utilisation et d'entretien

Arbeitsplatzatmosphäre - Elektrische Geräte für die direkte
Detektion und direkte Konzentrationsmessung toxischer
Gase und Dämpfe - Teil 4: Leitfaden für Auswahl,
Installation, Einsatz und Instandhaltung

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

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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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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 concentration measurement of toxic ¹⁾ gases and vapours in workplace atmospheres. It also provides guidance on the selection, installation, use and maintenance of such instruments.

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.

The advantages and disadvantages of measurements by direct reading apparatus compared to sampling followed by laboratory analysis are shown in the following table:

Table 1: Advantages and disadvantages

Sampling followed by laboratory analysis	Direct reading apparatus
Results are time delayed.	Results are known immediately, on site.
Concentrations are time-averaged.	Concentration fluctuations in time and space of toxic gases and vapours can be monitored such as: – intermittent emissions; – concentrations exceeding short term exposure limit values.
Sample alteration or loss can occur during transportation and storing.	No sample handling, no storage.
Laboratory analysis can be time consuming for example in sample preparation and analysis.	On site analysis can save time.
High degree of selectivity.	Only some instruments have high selectivity.

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 gives guidelines for background information and gives guidance on the selection, installation, use and maintenance of electrical apparatus used for the direct detection and direct concentration measurement of toxic gases and vapours in workplace air. It is concerned with apparatus whose primary purpose is to indicate the presence and concentration of a toxic gas or vapour to provide a rapid indication or warning of the presence of a toxic hazard within a time of response as specified in accordance with EN 45544-2 and EN 45544-3. It applies to:

- personal, portable, transportable and fixed apparatus;
- apparatus where the presence of a gas or vapour causes an automatically generated electrical signal;
- apparatus intended to provide an indication, alarm and/or other output function, whose purpose is to give a warning of potential toxic hazard and in some cases to initiate automatic or manual protective actions.

This European Standard is not intended, but can provide useful information, for the following:

- apparatus used for the measurement of oxygen deficiency which can affect human health;
- apparatus used for the measurement of combustible gases and vapours or oxygen related to the risk of explosion (see EN 50073);
- apparatus of laboratory or scientific type used only for analysis or measurement purposes;
- apparatus used only for process control applications;
- apparatus used for underground mining applications;
- apparatus used in the domestic environment;
- apparatus used for environmental air pollution monitoring;
- open path apparatus not used for point measurement.

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 482:1994, *Workplace atmospheres - General requirements for the performance of procedures for the measurement of chemical agents*

EN 45544-1, *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 45544-2, *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, *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 689:1995, *Workplace atmospheres - Guidance for the assessment of exposure by inhalation to chemical agents for comparison with limit values and measurement strategy*

- EN 50014, *Electrical apparatus for potentially explosive atmospheres - General requirements*
- EN 50015, *Electrical apparatus for potentially explosive atmospheres - Oil immersion "o"*
- EN 50016, *Electrical apparatus for potentially explosive atmospheres - Pressurized apparatus "p"*
- EN 50017, *Electrical apparatus for potentially explosive atmospheres - Powder filling "q"*
- EN 50018, *Electrical apparatus for explosive atmospheres - Flameproof enclosures "d"*
- EN 50019, *Electrical apparatus for potentially explosive atmospheres - Increased safety "e"*
- EN 50020, *Electrical apparatus for potentially explosive atmospheres - Intrinsic safety "i"*
- EN 50028, *Electrical apparatus for potentially explosive atmospheres - Encapsulation "m"*
- EN 50039, *Electrical apparatus for potentially explosive atmospheres - Intrinsic safety "i" Systems*
- EN 50054, *Electrical apparatus for the detection and measurement of combustible gases - General requirements and test methods*
- EN 50073, *Guide for selection, installation, use and maintenance of apparatus for the detection and measurement of combustible gases*
- EN 50270, *Electromagnetic compatibility - Electrical apparatus for the detection and measurement of combustible gases, toxic gases or oxygen*
- EN 60079-10:1996, *Electrical apparatus for explosive gas atmospheres - Part 10: Classification of hazardous areas (IEC 60079-10:1995)*
- ISO 3534-1, *Statistics - Vocabulary and symbols - Part 1: Probability and general statistical terms*
- ISO 6141:1984, *Gas analysis - Calibration gas mixtures - Certificate of mixture preparation*
- ISO 6142:1981, *Gas analysis - Preparation of calibration gas mixtures - Weighing methods*
- ISO 6143:1981, *Gas analysis - Determination of composition of calibration gas mixtures - Comparison methods*
- ISO 6144:1981, *Gas analysis - Preparation of calibration gas mixtures - Static volumetric methods*
- ISO 6145-1:1986, *Gas analysis - Preparation of calibration gas mixture - Dynamic volumetric methods - Part 1: Methods of calibration*
- ISO 6145-3:1986, *Gas analysis - Preparation of calibration gas mixtures - Dynamic volumetric methods - Part 3 - Periodic injections into a flowing gas stream*
- ISO 6145-4:1986, *Gas analysis - Preparation of calibration gas mixtures - Dynamic volumetric methods - Part 4 - Continuous injection method*
- ISO 6145-6:1986, *Gas analysis - Preparation of calibration gas mixtures - Dynamic volumetric methods - Part 6: Sonic orifices*
- ISO 6147:1979, *Gas analysis - Preparation of calibration gas mixtures - Saturation method*
- ISO 6349:1995, *Gas analysis - Preparation of calibration gas mixtures - Permeation method*
- ISO 6879:1996, *Air quality - Performance characteristics and related concepts for air quality measuring methods*
- ISO 7504:1984, *Gas analysis - Vocabulary*