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**Workplace atmospheres - Part 1: Gas detectors -
Performance requirements of detectors for toxic gases
(IEC 62990-1:2019 + COR1:2019)**



EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

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ICS 29.260.20

Supersedes EN 45544-1:2015; EN 45544-3:2015;
EN 45544-2:2015

English Version

**Workplace atmospheres - Part 1: Gas detectors - Performance
requirements of detectors for toxic gases
(IEC 62990-1:2019 + COR1:2019)**

Atmosphères des lieux de travail - Partie 1: Détecteurs de
gaz - Exigences d'aptitude à la fonction des détecteurs de
gaz toxiques
(IEC 62990-1:2019 + COR1:2019)

Arbeitsplatzatmosphäre - Teil 1: Gasmessgeräte -
Anforderungen an das Betriebsverhalten von Geräten für
die Messung toxischer Gase
(IEC 62990-1:2019 + COR1:2019)

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Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

European foreword

This document (EN IEC 62990-1:2022) consists of the text of IEC 62990-1:2019 and IEC 62990-1:2019/COR1:2019 prepared by IEC/TC 31 "Equipment for explosive atmospheres" in cooperation with ISO/TC 146 "Air quality, sub-committee 2: Workplace atmospheres".

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- latest date by which this document has to be (dop) 2023-08-27 implemented at national level by publication of an identical national standard or by endorsement
- latest date by which the national standards (dow) 2025-08-27 conflicting with this document have to be withdrawn

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IEC 60079-29-1	NOTE	Harmonized as EN 60079-29-1
IEC 60079-29-2	NOTE	Harmonized as EN 60079-29-2
IEC 60079-29-3	NOTE	Harmonized as EN 60079-29-3
IEC 60079-29-4	NOTE	Harmonized as EN 60079-29-4
ISO 6145-1	NOTE	Harmonized as EN ISO 6145-1
ISO 6145-4	NOTE	Harmonized as EN ISO 6145-4
ISO 6145-5	NOTE	Harmonized as EN ISO 6145-5
ISO 6145-6	NOTE	Harmonized as EN ISO 6145-6
ISO 6145-7	NOTE	Harmonized as EN ISO 6145-7
ISO 6145-9	NOTE	Harmonized as EN ISO 6145-9
ISO 6145-10	NOTE	Harmonized as EN ISO 6145-10
ISO 20581	NOTE	Harmonized as EN 482

A11 Amendment A11 European foreword

This document (EN IEC 62990-1:2022/A11:2022) has been prepared by CLC/SC 31-9, "Electrical apparatus for the detection and measurement of combustible gases to be used in industrial and commercial potentially explosive atmospheres", of CLC/TC 31, "Electrical apparatus for potentially explosive atmospheres".

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- latest date by which the national standards conflicting with this document have to be withdrawn (dow) 2025-08-27

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Clauses, subclauses, notes, tables, figures and annexes which are additional to those in IEC 62990-1:2019 and IEC 62990-1/COR1:2019 are prefixed "Z". **A11**

INTERNATIONAL STANDARD

NORME INTERNATIONALE



**Workplace atmospheres –
Part 1: Gas detectors – Performance requirements of detectors for toxic gases**

**Atmosphères des lieux de travail –
Partie 1: Détecteurs de gaz – Exigences d'aptitude à la fonction des détecteurs
de gaz toxiques**



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INTERNATIONAL STANDARD

NORME INTERNATIONALE



**Workplace atmospheres –
Part 1: Gas detectors – Performance requirements of detectors for toxic gases**

**Atmosphères des lieux de travail –
Partie 1: Détecteurs de gaz – Exigences d'aptitude à la fonction des détecteurs
de gaz toxiques**

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WORKPLACE ATMOSPHERES –**Part 1: Gas detectors –
Performance requirements of detectors for toxic gases**

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International Standard IEC 62990-1 has been prepared by Joint Working Group (JWG) 45 of IEC technical committee 31: Equipment for explosive atmospheres in cooperation with ISO technical committee 146: Air quality, sub-committee 2: Workplace atmospheres.

It is published as a dual logo standard.

The text of this International Standard is based on the following documents:

FDIS	Report on voting
31/1463/FDIS	31/1480/RVD

Full information on the voting for the approval of this International Standard can be found in the report on voting indicated in the above table.

This document has been drafted in accordance with the ISO/IEC Directives, Part 2.

A list of all parts in the IEC 62990 series, published under the general title *Workplace atmospheres*, can be found on the IEC website.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under "<http://webstore.iec.ch>" in the data related to the specific document. At this date, the document will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

The contents of the corrigendum of December 2019 have been included in this copy.

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INTRODUCTION

This part of IEC 62990 specifies general requirements for construction, testing and performance of equipment intended to measure the concentration of toxic gas and vapour in workplace atmospheres and other industrial and commercial applications. The performance requirements are intended to apply under environmental conditions present at the site of operation. However, because a wide range of environmental conditions are encountered in practise, this document specifies requirements that have to be fulfilled by equipment when tested under prescribed laboratory conditions.

This document applies to the following types of equipment: Health Monitoring (HM) and Safety Monitoring (SM). For a given measurement task of Type HM equipment the range over which the requirements must be met depends on the occupational exposure limit value. However, for most toxic gases and vapours the occupational exposure limit values have not been harmonized at the international level. Therefore, it was decided to use a reference value instead of the occupational exposure limit value for the performance tests. The list of reference values is given in Annex A. The reference values chosen are equal to or close to the occupational exposure limit values used in different countries but are intended to be used only for type testing equipment without any legal implications.

Electrical equipment used for the direct detection and direct concentration measurement of toxic gases and vapours generate readings in clean air (nominally zero), which vary with environmental conditions and time. This document therefore includes test methods and requirements for acceptable variations in measured values at application of zero gas and of defined test gases.

For gas detection equipment including additional function for detecting flammable gas and/or oxygen, consideration should be given to the relevant standards.

General requirements for construction, testing and performance of gas detectors for flammable gases and vapours are set out in **EN 60079-29-1**, *Explosive atmospheres – Part 29-1: Gas detectors – Performance requirements of detectors for flammable gases*.

General requirements for construction, testing and performance of open path detectors for flammable gases are set out in **EN 60079-29-4**, *Explosive atmospheres – Part 29-4: Gas detectors – Performance requirements of open path detectors for flammable gases*.

Guidance for the selection, installation, use and maintenance of gas detecting equipment is set out in **EN 60079-29-2**, *Explosive atmospheres – Part 29-2, Gas detectors – Selection, installation, use and maintenance of detectors for flammable gases and oxygen*.

Guidance for functional safety of fixed gas detection systems is set out in **EN 60079-29-3**, *Explosive atmospheres – Part 29-3, Gas detectors – Guidance on functional safety of fixed gas detection systems*.

WORKPLACE ATMOSPHERES –

Part 1: Gas detectors – Performance requirements of detectors for toxic gases

1 Scope

This part of IEC 62990 specifies general requirements for design, function and performance, and describes the test methods that apply to portable, transportable, and fixed equipment for the detection and concentration measurement of toxic gases and vapours in workplace atmospheres and other industrial and commercial applications.

This document is applicable to continuously sensing equipment whose primary purpose is to provide an indication, alarm and/or other output function the purpose of which is to indicate the presence of a toxic gas or vapour in the atmosphere and in some cases to initiate automatic or manual protective action(s). It is applicable to equipment in which the sensor generates an electrical signal when gas is present.

This document applies to two types of equipment:

- Type HM (Health Monitoring) ‘occupational exposure’ equipment:
For occupational exposure measurement, the performance requirements are focused on uncertainty of measurement of gas concentrations in the region of Occupational Exposure Limit Values (OELV). The upper limit of measurement will be defined by the manufacturer in accordance with 4.2.1.
- Type SM (Safety Monitoring) ‘general gas detection’ equipment:
For general gas detection applications (e.g. safety warning, leak detection), the performance requirements are focused on alarm signalling. The upper limit of measurement will be defined by the manufacturer according to the intended use of the equipment.

In general, the requirements for accuracy will be higher for Type HM equipment than for Type SM equipment. The same equipment may meet the requirements of both Type HM and Type SM.

For equipment used for sensing the presence of multiple gases this document applies only to the detection of toxic gas or vapour.

This document is not applicable to equipment:

- with samplers and concentrators such as sorbents or paper tape having an irreversible indication;
- used for the measurement of gases and vapours related to the risk of explosion;
- 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 open-path (line of sight) area gas measurement;
- used for ventilation control in car parks or tunnels.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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.

EN 60068-2-6, *Environmental testing – Part 2-6: Tests – Test Fc: Vibration (sinusoidal)*

EN 60079-0, *Explosive atmospheres – Part 0: Equipment – General requirements*

EN 60529, *Degrees of protection provided by enclosures (IP Code)*

deleted text

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

EN 50271:2018, *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 following terms and definitions apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at <http://www.electropedia.org/>
- ISO Online browsing platform: available at <http://www.iso.org/obp>

3.1 gas properties

3.1.1

ambient air

normal atmosphere surrounding the equipment

3.1.2

clean air

air that is free of gases or vapours which the sensor is sensitive to or which influence the performance of the sensor

3.1.3

occupational exposure limit value

OELV

limit of the time-weighted average of the concentration of a chemical agent in the air within the breathing zone of a worker in relation to a specified reference period

Note 1 to entry: The term "limit value" is often used as a synonym for "occupational exposure limit value", but the term "occupational exposure limit value" is preferred because there is more than one limit value (e.g., biological limit value and occupational exposure limit value).

Note 2 to entry: Occupational exposure limit values (OELVs) are often set for reference periods of 8 h, but can also be set for shorter periods or concentration excursions.

[SOURCE: ISO 18158:2016, 2.1.5.4, modified (Note 2 to entry is shortened)]