

Workplace Atmospheres - Part 1: Gas detectors -
Performance requirements of detectors for toxic gases

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

See Eesti standard EVS-EN IEC 62990-1:2022 sisaldab Euroopa standardi EN IEC 62990-1:2022 ingliskeelset teksti.	This Estonian standard EVS-EN IEC 62990-1:2022 consists of the English text of the European standard EN IEC 62990-1:2022.
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ICS 29.260.20

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- latest date by which the national standards (dow) 2025-08-27 conflicting with this document have to be withdrawn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

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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IEC Central Office
3, rue de Varembe
CH-1211 Geneva 20
Switzerland

Tel.: +41 22 919 02 11
info@iec.ch
www.iec.ch

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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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INTERNATIONALE

ICS 29.260.20

ISBN 978-2-8322-7080-6

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CONTENTS

FOREWORD.....	4
INTRODUCTION.....	6
1 Scope.....	7
2 Normative references	8
3 Terms and definitions	8
4 General requirements	16
4.1 Overview.....	16
4.2 Design	17
4.2.1 General	17
4.2.2 Indicating devices	17
4.2.3 Alarm signal	19
4.2.4 Fault signals	19
4.2.5 Adjustments.....	20
4.2.6 Battery-powered equipment	20
4.2.7 Gas detection transmitter for use with separate gas detection control units	20
4.2.8 Separate gas detection control units for use with gas detection transmitter(s)	21
4.2.9 Software-controlled equipment	21
4.3 Labelling and marking	22
4.4 Instruction manual	23
5 Test methods.....	25
5.1 General.....	25
5.2 General requirements for tests	26
5.2.1 Samples and sequence of tests	26
5.2.2 Preparation of equipment before each test.....	27
5.2.3 Mask for calibration and test.....	28
5.3 Normal conditions for test	28
5.3.1 General	28
5.3.2 Test gas(es)	28
5.3.3 Flow rate for test gases	28
5.3.4 Power supply.....	29
5.3.5 Temperature.....	29
5.3.6 Pressure.....	29
5.3.7 Humidity	29
5.3.8 Acclimation time	29
5.3.9 Orientation.....	29
5.3.10 Communications options.....	29
5.3.11 Gas detection equipment as part of systems.....	30
5.4 Tests	30
5.4.1 General	30
5.4.2 Unpowered storage	30
5.4.3 Measurement of deviations	31
5.4.4 Mechanical tests.....	31
5.4.5 Environmental tests	33
5.4.6 Performance tests	36
5.4.7 Electrical tests	41

5.4.8	Stability	44
5.4.9	Fault signal tests	45
5.4.10	Software controlled equipment.....	46
5.4.11	Protection against water	46
6	Uncertainty of measurement and lower limit of measurement for type HM equipment	47
6.1	General.....	47
6.2	Method of calculation of uncertainty of measurement	47
6.2.1	Basic concept.....	47
6.2.2	Sources of uncertainty	48
6.2.3	Calculation of relative expanded uncertainty.....	53
6.3	Method of calculation of lower limit of measurement	54
6.4	Acceptance criteria	55
6.4.1	Uncertainty of measurement	55
6.4.2	Lower limit of measurement.....	55
6.5	Relation between uncertainty and accuracy	55
Annex A	(normative) Gas specific performance requirements	56
Annex B	(informative) Determination of time of response and time of recovery	57
B.1	Aspirated equipment	57
B.1.1	Test rig	57
B.1.2	Equipment without internal pump	57
B.1.3	Equipment with internal pump	57
B.2	Equipment that samples by diffusion.....	58
B.2.1	Calibration mask method	58
B.2.2	Diffusion or flow methods	58
Bibliography		60
Figure 1	– Relationship between indication range and measuring range	14
Figure 2	– Warm-up time in clean air (typical).....	15
Figure 3	– Warm-up time in standard test gas (typical)	15
Figure 4	– Example of zero uncertainty.....	16
Figure B.1	– Schematic example of test rig for use with aspirated equipment.....	58
Figure B.2	– Schematic example of test chamber for diffusion method.....	59
Figure B.3	– Schematic example of test chamber for flow method.....	59
Table 1	– Factors to be considered in the expanded uncertainty estimate	48
Table A.1	– Gas specific performance requirements	56

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

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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 ISO/IEC 62990 series, published under the general title *Workplace atmospheres*, can be found on the IEC website.

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INTRODUCTION

This part of ISO/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 IEC 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 IEC 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 IEC 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 IEC 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 ISO/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.

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

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

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

IEC 61000-4-29, *Electromagnetic compatibility (EMC) – Part 4-29: Testing and measurement techniques – Voltage dips, short interruptions and voltage variations on d.c. input power port immunity tests*

IEC 61000-6-3, *Electromagnetic compatibility (EMC) – Part 6-3: Generic standards – Emission standard for residential, commercial and light-industrial environments*

IEC 61000-6-4, *Electromagnetic compatibility (EMC) – Part 6-4: Generic standards – Emission standard for industrial environments*

IEC 61326-1, *Electrical equipment for measurement, control and laboratory use – EMC requirements – Part 1: General requirements*

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).