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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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This draft is submitted to a parallel vote in ISO and in IEC.

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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

FOREWORD

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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 an International Standard.

It is published as a dual logo standard.

This second edition cancels and replaces the first edition published in 2019. This edition constitutes a technical revision. Users of this document are advised that interpretation sheets clarifying the interpretation of this document can be published. Interpretation sheets are available from the IEC webstore and can be found in the “history” tab of the page for each document.

This edition includes the following significant technical changes with respect to the previous edition:

a) Transferred all requirements for Type TX-SM (Safety Monitoring) from the document to IEC 60079-29-0;
b) Aligned major technical requirements for Type TX-HM (Health Monitoring) with IEC 60079-29-0.

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

Draft	Report on voting
XX/XX/FDIS	XX/XX/RVD

Full information on the voting for its approval can be found in the report on voting indicated in the above table.

The language used for the development of this International Standard is English.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/publications.

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 webstore.iec.ch in the data related to the specific document. At this date, the document will be

– reconfirmed,
– withdrawn, or
– revised.

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.

Although a wide range of environmental conditions are encountered in practice, this document specifies requirements that have to be fulfilled by gas detection equipment when tested under prescribed laboratory conditions.

This document applies to the type of equipment: Health Monitoring (Type TX-HM). Requirements for type of equipment Safety Monitoring (SM) are moved to the IEC 60079-29-0 [1]. For a given measurement task of Type TX-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.

General and performance requirements for gas detection equipment including additional function for detecting flammable gas and/or oxygen and/or toxic gases in areas for safety monitoring, are set out in IEC 60079-29-0 [1]. The IEC 60079-29-0 standard includes a bibliography of relevant standards that can provide assistance when applying IEC 62990-1.

Consideration needs to also be given to the following relevant international standards:

IEC 60079-29-2, *Explosive atmospheres - Part 29-2, Gas detectors - Selection, installation, use and maintenance of detectors for flammable gases and oxygen*IEC 60079-29-2 [2]

IEC 62990-2, *Workplace atmospheres - Part 2: Gas detectors - Selection, installation, use and maintenance of detectors for toxic gases and vapours*IEC 62990-2

IEC 60079-29-3, *Explosive atmospheres - Part 29-3, Gas detectors - Guidance on functional safety of fixed gas detection systems*IEC 60079-29-3 [3].

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.

NOTE The term gas detection equipment is often referred to as the term gas detector.

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 Type TX-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.

For equipment used for sensing the presence of multiple gases this document applies only to the part for occupational exposure measurement 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 for medical applications;
– used only in laboratories for analysis or measurement;
– used only for process monitoring or control purposes (such as a gas analyser);
– used in the domestic environment;
– used in environmental air pollution monitoring;
– used for flue gas analysis;
– used for sampling systems external to the gas detection equipment;
– 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 60079-29-0, *Explosive atmospheres - Part 29-0: Gas detection equipment - General requirements and test methods*