IEC 60079-29-0

Edition 1.0 2025-11

INTERNATIONAL STANDARD

Explosive atmospheres -
Part 29-0: Gas detection equipment - General requirements and test methods

ICS 29.260.20

ISBN 978-2-8327-0860-6

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FOREWORD

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IEC 60079-29-0 has been prepared by the IEC technical committee 31: Equipment for explosive atmospheres. It is an International Standard.

This first edition of IEC 60079-29-0 cancels and replaces the second edition of 60079-29-1 published in 2016 and its Amendment 1:2020, and the first edition of IEC 60079-29-4 published in 2009. In addition, IEC 60079-29-0 Type TX-SM cancels and replaces Type SM of the first edition of IEC 62990-1; however, Type TX-HM will remain within the standard.

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

Draft	Report on voting
31/1889/FDIS	31/1935/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.

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.

A list of all parts in the IEC 60079-29 series, published under the general title *Explosive 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– withdrawn, or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 60079-29 specifies general requirements, test methods and acceptance criteria that apply to flammable, oxygen and toxic gas detection equipment intended to detect gases and vapours and to provide an indication, alarm or other output function for personnel or property protection in industrial and commercial applications. This part of IEC 60079-29 was developed for the purpose of aligning requirements and test methods of gas detection equipment within a single consolidated document for consistency.

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

General and performance requirements for Type TX-HM gas detection equipment intended for occupational exposure measurement in the region of Occupational Exposure Limit Values are set out in 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 62990-2, *Workplace atmospheres - Part 2: Gas detectors - Selection, installation, use and maintenance of detectors for toxic gases and vapours*

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

1 Scope

This part of IEC 60079-29 specifies general requirements, test methods and acceptance criteria that apply to flammable, oxygen and toxic gas detection equipment intended to detect gases and vapours and to provide an indication, alarm or other output function for personnel or property protection in industrial and commercial applications.

NOTE 1 The term gas detection equipment is often referred to as the term gas detector.

NOTE 2 The terms 'gas' and 'gases' used in this document are also intended to include 'vapour' and 'vapours'.

This document applies to the following gas detection equipment:

– Gas detection equipment Type "FL" intended for the detection of flammable gases:
  - Type FL-Group I, in mines susceptible to firedamp;
  - Type FL-Group II, in locations other than mines susceptible to firedamp; and
  - Type FL-OP, open path gas detection equipment for flammable gases.
– Gas detection equipment Type "O2" intended for the detection of oxygen:
  - Type O2-DE, detection of oxygen deficiency or oxygen enrichment; and
  - Type O2-IN, inertisation as measuring function for explosion protection.

NOTE 3 Inertisation is an explosion protection technique where an explosive atmosphere is purged with inert gas.

– Gas detection equipment Type "TX" intended for the detection of toxic gases:
  - Type TX-SM, detection in areas for safety monitoring applications and typically using alarm signalling;
  - Type TX-HM, occupational exposure measurement in the region of occupational exposure limit values; and

NOTE 4 Type TX-HM gas detection equipment performance requirements reside in IEC 62990-1.

  - Type TX-OP, open path gas detection equipment for toxic gases.

NOTE 5 This document addresses equipment giving a level of performance suitable for general purpose applications. Specific applications might require particular tests or evaluations that are additional to and separate from the compliance with this document.

NOTE 6 Although the focus of this document is gas detection equipment for use in 'explosive atmospheres', this document can be applicable to detection in areas not formally classified as 'explosive atmospheres'.

NOTE 7 Refrigerant gas detection equipment used for life, health and safety area monitoring are within the scope of this document or IEC 62990-1.

This document is not applicable to equipment:

– 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;
– with samplers and concentrators such as sorbents or paper tape having an irreversible indication;
– consisting of a passive optical receiver without a dedicated optical source;
– equipment within the scope of IEC 60335-2-40 and IEC 60335-2-89.

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

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

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

IEC 62990-1, *Workplace atmospheres - Part 1: Gas detectors - Performance requirements of detectors for toxic gases*

ISO/IEC 80079-20-1, *Explosive atmospheres - Part 20-1: Material characteristics for gas and vapour classification - Test methods and data*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

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

– IEC Electropedia: available at https://www.electropedia.org/
– ISO Online browsing platform: available at https://www.iso.org/obp

3.1 Gas properties

3.1.1
ambient air
<gas detection> normal atmosphere surrounding the equipment

3.1.2
clean air
<gas detection> air that is free of gases or vapours to which the sensor is sensitive or which influence the performance of the sensor

3.1.3
reference air
<gas detection> air with an oxygen volume fraction of (21 ± 0,4) %