IEC 60079-29-1

Edition 1.0 2007-08

INTERNATIONAL STANDARD

NORME INTERNATIONALE

Withdrawn

Explosive atmospheres –
Part 29-1: Gas detectors – Performance requirements of detectors for flammable gases

Atmosphères explosives –
Partie 29-1: Détecteurs de gaz – Exigences d'aptitude à la fonction des détecteurs de gaz inflammables

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IEC Central Office
3, rue de Varembé
CH-1211 Geneva 20
Switzerland
Email: inmail@iec.ch
Web: www.iec.ch

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EXPLOSIVE ATMOSPHERES –

Part 29-1: Gas detectors – Performance requirements of detectors for flammable gases

INTERPRETATION SHEET 1

This interpretation sheet has been prepared by IEC technical committee 31: Equipment for explosive atmospheres.

The text of this interpretation sheet is based on the following documents:

ISH	Report on voting
31/809/ISH	31/817/RVD

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

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There has been a request for formal interpretation of the drop test fail criterion in the performance standard IEC 60079-29-1 (2007), Subclause 5.4.14.

The fail criterion is:

"The apparatus shall be considered to have failed this test if there is a loss of function (e.g. alarm, pump function, controls, display) after the test".

Question:

Is the interpretation of this text, that the loss of function, even in a short period during the interruption and until restart of the equipment will fail the test? Or is a permanent loss of function needed to fail the equipment, e.g. a broken display or a pump, which cannot restart?

Bouncing of a battery spring in the moment of impact can cause the drop out of power in battery supplied equipment, and make it shut down. Is this considered as sufficient to fail the test? Or would it be sufficient safe situation for the user if the equipment could restart and show the correct measurement?

Interpretation:

Any loss of function after the test including any change of state is considered a failure since there is continued dependency on the life safety device even under adverse affects such as an accidental drop of the device during use. Automatic or manual re-starting is not acceptable.

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

EXPLOSIVE ATMOSPHERES –

Part 29-1: Gas detectors – Performance requirements of detectors for flammable gases

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International Standard IEC 60079-29-1 has been prepared by IEC technical committee 31: Equipment for explosive atmospheres.

This first edition of IEC 60079-29-1 cancels and replaces the first edition of IEC 61779-1 to IEC 61779-5:1998 series and constitutes a technical revision.

The main changes with respect to the previous edition are listed below:

– Subclause 4.2.3 (Alarm or output functions) was modified to ensure alarm devices can not be adjustable outside their measuring range and to include requirements for de-activation of alarm devices.
– Subclause 4.2.7 (Stand-alone gas detection apparatus for use with separate control units) was added to allow separate evaluation of detection apparatus providing an industry recognized output signal.

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– Subclause 4.2.8 (Separate control units for use with stand-alone gas detection apparatus) was added to allow separate evaluation of control unit apparatus using an industry recognized input signal.

– Subclause 4.2.9 (Software-controlled apparatus) was added to the document for improved evaluation of software. The added text is based upon the guiding principles and requirements of EN 50271.

– Subclause 4.5 (Diffusion sensors) was removed from the document based upon the redundant protection allowance for equipment used in Zone 0 areas, such as Ex d ia rated equipment.

– Subclause 5.2.1.1 was modified to require the center wavelength of the optical filters of two apparatus at the minimum and maximum limit of this standard.

– Subclause 5.2.1.2 was modified to allow the order of testing within each block to be conducted at the discretion of the test laboratory.

– Subclause 5.3.11 (Communications options) was added to ensure maximum transaction rates are applied during testing.

– Subclause 5.3.12 (Gas detection apparatus as part of systems) was added to ensure maximum transaction rates are applied during testing.

– Subclause 5.4.6 (Alarm set point(s)) was modified to include text related to alarms that are activated at decreasing concentrations.

– Subclause 5.4.10 (Air velocity) was modified to include testing at 3 m/s and 6 m/s.

– Subclause 5.4.16 (Time of response) was modified to exclude recovery time test requirements for Group II apparatus with a volume fraction up to 100 % LFL indication.

– Subclause 5.4.18 (High gas concentration operation above the measuring range) was modified to define the sequence of tests.

– Annex A (Performance requirements) has undergone major modifications by eliminating the gas/vapour table and replacing the annex with the performance requirements of Parts 2 to 5 of the former edition. Additionally, performance requirements of Parts 2 to 5 were adjusted for consistency as appropriate. The intent of this change is to condense Parts 1 to 5 within a single standard.

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This part of IEC 60079-29 is to be used in conjunction with the following standards:

– IEC 60079-0, Electrical apparatus for explosive gas atmospheres – Part 0: General requirements

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

The text of this standard is based on the following documents:

FDIS	Report on voting
31/695/FDIS	31/711/RVD

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

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

Withdrawn

A list of all parts of the IEC 60079 series, under the general title: *Explosive atmospheres*, can be found on the IEC website.

The committee has decided that the contents of this publication will remain unchanged until the maintenance result date indicated on the IEC web site under "http://webstore.iec.ch" in the data related to the specific publication. At this date, the publication will be

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

The contents of the interpretation sheet of July 2009 have been included in this copy.

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INTRODUCTION

Guidance for the selection, installation, use and maintenance of gas detecting apparatus are 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.

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EXPLOSIVE ATMOSPHERES –

Part 29-1: Gas detectors – Performance requirements of detectors for flammable gases

1 Scope

This part of IEC 60079-29 specifies general requirements for construction, testing and performance, and describes the test methods that apply to portable, transportable and fixed apparatus for the detection and measurement of flammable gas or vapour concentrations with air. The apparatus, or parts thereof, are intended for use in potentially explosive atmospheres (see 3.1.8) and in mines susceptible to firedamp.

This standard is also applicable when an apparatus manufacturer makes any claims regarding any special features of construction or superior performance that exceed these minimum requirements. In these cases, all such claims should be verified and the test procedures should be extended or supplemented, where necessary, to verify the performance claimed by the manufacturer. When verifying the superior performance of one criterion, other performance criteria are not required to meet the standards minimum requirements, however, these reduced claimed performance criteria (as confirmed in the manufactures Installation Manual) should also be verified. (e.g. temperature range of 0 °C to 60 °C; 0 °C to 40 °C at ±10 % accuracy and 40 °C to 60 °C at ±15 % (manufacturers claimed accuracy). The additional tests should be agreed between the manufacturer and test laboratory and identified and described in the test report.

This standard is applicable to flammable gas detection apparatus intended to provide an indication, alarm or other output function; the purpose of which is to give a warning of a potential explosion hazard and in some cases, to initiate automatic or manual protective action(s).

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This standard is applicable to apparatus, including the integral sampling systems of aspirated apparatus, intended to be used for commercial, industrial and non-residential safety applications.

This standard does not apply to external sampling systems, or to apparatus of laboratory or scientific type, or to apparatus used only for process control purposes. It also does not apply to open path (line of sight) area monitors. For apparatus used for sensing the presence of multiple gases, this standard applies only to the detection of flammable gas or vapour.

This standard supplements and modifies the general requirements of IEC 60079-0. Where a requirement of this standard conflicts with a requirement of IEC 60079-0, the requirement of IEC 60079-29-1 will take precedence.

NOTE 1 IEC 60079-29-1 is intended to provide for the supply of apparatus giving a level of safety and performance suitable for general purpose applications. However, for specific applications, a prospective purchaser (or an appropriate authority) may additionally require the apparatus to be submitted to particular tests or approval. For example, group I apparatus (i.e. apparatus to be used in mines susceptible to firedamp) may not be permitted to be used without the additional, prior approval of the relevant authority in mines under its jurisdiction. Such particular tests/approval are to be regarded as additional to and separate from the provisions of the standards referred to above and do not preclude certification to or compliance with these standards.

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NOTE 2 All apparatus calibrated on specific gases or vapours can not be expected to correctly indicate on other gases or vapours.

NOTE 3 For the purposes of this standard, the terms "lower flammable limit (LFL)" and "lower explosive limit (LEL)" are deemed to be synonymous, and likewise the terms "upper flammable limit (UFL)" and "upper explosive limit (UEL)" are deemed to be synonymous. For ease of reference, the two abbreviations LFL and UFL may be used hereinafter to denote these two sets of terms. It should be recognized that particular authorities having jurisdiction may have overriding requirements that dictate the use of one of these sets of terms and not the other.

NOTE 4 For the purposes of this standard, the term “indicating up to a volume fraction of X %” includes apparatus with an upper limit of the measuring range equal to or less than X %.

2 Normative references

The following referenced documents are indispensable for the application 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 60079-0: *Electrical apparatus for explosive gas atmospheres – Part 0: General requirements*

IEC 60079-20: *Electrical apparatus for explosive gas atmospheres – Part 20: Data for flammable gases and vapours, relating to the use of electrical apparatus*

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

IEC 61000-4-1: *Electromagnetic compatibility (EMC) – Part 4-1: Testing and measurement techniques – Overview of IEC 61000-4 series.* Basic EMC publication

IEC 61000-4-3: *Electromagnetic compatibility (EMC) – Part 4-3: Testing and measurement techniques – Radiated, radio-frequency, electromagnetic field immunity test.* Basic EMC publication

IEC 61000-4-4: *Electromagnetic compatibility (EMC) – Part 4-4: Testing and measurement techniques – Electrical fast transient/burst immunity test* – Basic EMC publication

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3 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 60079-0 and the following apply.

NOTE Additional definitions applicable to explosive atmospheres can be found in Chapter 426 of the International Electrotechnical Vocabulary (IEV) IEC 60050 (426).

3.1 Gas properties

3.1.1
ambient air
normal atmosphere surrounding the apparatus

3.1.2
clean air
air that is free of flammable gases and interfering or contaminating substances