

**AMERICAN NATIONAL STANDARD**  
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**Explosive Atmospheres – Part 29-1:**  
**Gas detectors – Performance requirements**  
**of detectors for flammable gases**

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## Preface

This ISA standard is based on the 1<sup>st</sup> edition of IEC Publication 60079-29-1. It is the intention of the ISA12 Committee to develop an ANSI Standard that is harmonized with IEC 60079-29-1 to the fullest extent possible. The current edition standard ANSI/ISA-60079-29-1 (12.13.01)-2013 succeeds ANSI/ISA-12.13.01-2002 (IEC 61779-1 through 5 Mod) allowing for the use of the current edition or one previous edition to be valid for approval agency accreditation and product re-certification. This preface is included for informational purposes and is not part of ANSI/ISA-60079-29-1. The document is a modification of the IEC document and includes U.S. National Differences encompassing both additions and deletions of information. National Differences are presented using legislative text (strike-out and underline).

The 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.
- 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.

This preface, as well as all footnotes and Annex B, is included for information purposes and is not part of ANSI/ISA-60079-29-1 (12.13.01)-2013.

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## INTRODUCTION

Guidance for the selection, installation, use and maintenance of gas detecting apparatus are set out in ANSI/ISA-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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## 1 Scope

This part of IEC ANSI/ISA-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 gas atmospheres (see ~~3.1.8~~ 3.1.3) 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 manufacturer's 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).

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 for the type of protection covered in appropriate ANSI standards of IEC ~~60079-0~~. Where a requirement of this standard conflicts with a requirement of the type of protection covered in appropriate ANSI standards ~~IEC 60079-0~~, the requirement of IEC ANSI/ISA-60079-29-1 will take precedence.

NOTE 1 IEC ANSI/ISA-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.

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 %.