SVENSK STANDARD SS-EN 60079-29-1

Fastställd	Utgåva	Sida	Ansvarig kommitté
2017-03-15	2	1 (1+54)	SEK TK 31

Explosiv atmosfär –
Del 29-1: Gasdetektorer (gasvarnare) –
Prestandafordringar för utrustning för detektering av brännbara gaser

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

Som svensk standard gäller europastandarden EN 60079-29-1:2016. Den svenska standarden innehåller den officiella engelska språkversionen av EN 60079-29-1:2016.

Nationellt förord

Europastandarden EN 60079-29-1:2016

består av:

– **europastandardens ikraftsättningsdokument,** utarbetat inom CENELEC
– **IEC 60079-29-1, Second edition, 2016 - Explosive atmospheres - Part 29-1: Gas detectors - Performance requirements of detectors for flammable gases**

utarbetad inom International Electrotechnical Commission, IEC.

Tidigare fastställd svensk standard SS-EN 60079-29-1, utgåva 1, 2008, gäller ej fr o m 2019-12-23.

ICS 29.260.20

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som också kan lämna upplysningar om **sakinnehållet** i standarden.
Postadress: Box 1284, 164 29 KISTA
Telefon: 08 - 444 14 00.
E-post: sek@elstandard.se. Internet: www.elstandard.se

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SEK Svensk Elstandard
Box 1284
164 29 Kista
Tel 08-444 14 00
www.elstandard.se

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 60079-29-1

December 2016

ICS 29.260.20

Supersedes EN 60079-29-1:2007

English Version

Explosive atmospheres - Part 29-1: Gas detectors - Performance requirements of detectors for flammable gases (IEC 60079-29-1:2016 , modified)

Atmosphères explosives - Partie 29-1: Détecteurs de gaz - Exigences d'aptitude à la fonction des détecteurs de gaz inflammables (IEC 60079-29-1:2016 , modifiée)

Explosionsfähige Atmosphäre - Teil 29-1: Gasmessgeräte - Anforderungen an das Betriebsverhalten von Geräten für die Messung brennbarer Gase (IEC 60079-29-1:2016 , modifiziert)

This European Standard was approved by CENELEC on 2016-09-19. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CENELEC member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

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European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels

Ref. No. EN 60079-29-1:2016 E

SEK Svensk Elstandard

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European foreword

The text of document 31/1257/FDIS, future edition 2 of IEC 60079-29-1, prepared by IEC/TC 31 "Equipment for explosive atmospheres" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN 60079-29-1:2016.

A draft amendment, which covers common modifications to IEC 60079-29-1 (31/1257/FDIS), was prepared by SC 31-9 "Electrical apparatus for the detection and measurement of combustible gases to be used in industrial and commercial potentially explosive atmospheres", of CLC/TC 31 "Electrical apparatus for potentially explosive atmospheres" and approved by CENELEC.

The following dates are fixed:

• latest date by which the document has to be implemented at national level by publication of an identical national standard or by endorsement	(dop)	2017-06-23
• latest date by which the national standards conflicting with the document have to be withdrawn	(dow)	2019-12-23

This document supersedes EN 60079-29-1:2007.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CENELEC [and/or CEN] shall not be held responsible for identifying any or all such patent rights.

Clauses, subclauses, notes, tables, figures and annexes which are additional to those in IEC 60079-29-1:2016 are prefixed “Z”.

This document has been prepared under a mandate given to CENELEC by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive.

For the relationship with EU Directive see informative Annex ZZ, which is an integral part of this document.

Endorsement notice

The text of the International Standard IEC 60079-29-1:2016 was approved by CENELEC as a European Standard with agreed common modifications.

Annex ZA
(normative)

Normative references to international publications with their corresponding European publications

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

NOTE 1 When an International Publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

NOTE 2 Up-to-date information on the latest versions of the European Standards listed in this annex is available here: www.cenelec.eu.

Publication	Year	Title	EN/HD	Year
-	-	Electromagnetic compatibility - Electrical apparatus for the detection and measurement of combustible gases, toxic gases or oxygen	EN 50270	-
-	-	Electrical apparatus for the detection and measurement of combustible gases, toxic gases or oxygen - Requirements and tests for apparatus using software and/or digital technologies	EN 50271	-
IEC 60050-426	-	International Electrotechnical Vocabulary - Part 426: Equipment for explosive atmospheres	-	-
IEC 60068-2-6	-	Environmental testing - Part 2-6: Tests - Test Fc: Vibration (sinusoidal)	EN 60068-2-6	-
IEC 60079-0	-	Explosive atmospheres - Part 0: Equipment - General requirements	EN 60079-0	-
IEC 60079-20-1	-	Explosive atmospheres - Part 20-1: Material characteristics for gas and vapour classification - Test methods and data	EN 60079-20-1	-

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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EXPLOSIVE ATMOSPHERES –

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

FOREWORD

1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
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International Standard IEC 60079-29-1 has been prepared by IEC technical committee 31: Equipment for explosive atmospheres.

This second edition of IEC 60079-29-1 cancels and replaces the first edition of IEC 60079-29-1:2007 series and constitutes a technical revision.

Significant technical changes between IEC 60079-29-1, Edition 1 (2007), and IEC 60079-29-1, Edition 2 (2016), is as listed below:

Significant changes with respect to IEC 60079-29-1:2007

		Type		
Changes	**Clause**	**Minor and editorial changes**	**Extension**	**Major technical changes**
Measuring range up to 20 %LEL (Modified requirements)	All		X	
Definitions (Additional clarifications)	3	X		
Manufacturer's claims (special applications requirements)	4.1.1	X		
General construction (Malfunction effects on safety related function)	4.2.1			C1
General indicating devices (portable equipment with visual and audible indication)	4.2.2.1			C2
Suppression of indication and measured values below zero (functional limits)	4.2.2.5			C3
Fault signals (Fault indication below minimum voltage limit, sensor disconnection and zero drift condition)	4.2.4			C4
Adjustments (Zero and sensitivity adjustments)	4.2.5			C5
Marking (Portable equipment protective case)	4.3		X	
Instruction Manual (Additions and clarifications)	4.4			C6
Samples and sequence of tests (Optical filter special sensitivity limits, and modification considerations)	5.2.2		X	
Preparation of equipment before testing (separate gas detection control units)	5.2.3	X		
Test gas (methane, and propane or butane for general purpose gas detector)	5.3.2			C7
General test methods (selectable range and wiring worst case conditions)	5.4.1		X	
Calibration curve (fixed volume fractions)	5.4.3.2			C8
Response to different gases (semiconductor and catalytic high gas concentration exposure)	5.4.3.3			C9
Stability (duration of test method)	5.4.4		X	
Alarm set point(s) (alarm set point test method)	5.4.5	X		
Temperature (portable) (temperature range and stabilization period)	5.4.6			C10
Temperature (all other equipment) (temperature range and stabilization period)	5.4.6		X	
Pressure (tolerance on pressure measurement)	5.4.7	X		
Humidity of test gas (test method clarification)	5.4.8	X		
Air velocity (test method clarification)	5.4.9	X		
Flow rate for aspirated equipment (test method clarification)	5.4.10	X		
Vibration (test method clarification)	5.4.12	X		

		Type		
Changes	**Clause**	**Minor and editorial changes**	**Extension**	**Major technical changes**
Drop test for portable and transportable equipment (Automatic re-starting or shut-down requirement clarification)	5.4.13	X		
Warm-up time (user prompt requirement)	5.4.14			C11
High gas concentration operation above the measuring range (test method and requirement clarification)	5.4.16	X		
Battery capacity (test method clarification)	5.4.17	X		
Power supply variation (minimum supply voltage fault limit)	5.4.18			C12
Poisons (applicable only to Group I apparatus with catalytic or semiconductor sensors) (test method clarification)	5.4.20.2	X		
Electromagnetic compatibility (test methods and requirements)	5.4.21			C13
Field calibration kit (test method clarification)	5.4.22	X		
Software function (supporting documentation)	5.4.23		X	
Determination of time of response (test method clarification)	Annex B		X	

NOTE 1 The technical changes referred to include the significance of technical changes in the revised IEC Standard, but they do not form an exhaustive list of all modifications from the previous version. More guidance may be found by referring to the Redline Version of the standard.

Explanations:

A) Definitions

Minor and editorial changes

Clarification decrease of technical requirements minor technical change editorial corrections.

These are changes which modify requirements in an editorial or a minor technical way. They include changes of the wording to clarify technical requirements without any technical change, or a reduction in level of existing requirement.

Extension

Addition of technical options

These are changes which add new or modify existing technical requirements, in a way that new options are given, but without increasing requirements for equipment that was fully compliant with the previous standard. Therefore, these will not have to be considered for products in conformity with the preceding edition.

Major technical changes

Addition of technical requirements increase of technical requirements.

These are changes to technical requirements (addition, increase of the level or removal) made in a way that a product conforming to the preceding edition will not always be able to fulfil the requirements given in the later edition. These changes have to be considered for products conforming to the preceding edition. For these changes additional information is provided in B) below.

NOTE 2 These changes represent current technological knowledge. However, these changes should not normally have an influence on equipment already placed on the market.

B) Information about the background of 'Major technical changes'

C1 Addition of malfunction effects not adversely affecting the safety related function (4.2.1).

C2 Addition of visual and audible indication for portable equipment (4.2.2.1).

C3 Addition of functional limits for suppression of indication and for measured values below zero (4.2.2.5).

C4 Addition of requirements for fault indication below minimum voltage limit, sensor disconnection and zero drift condition (4.2.4).

C5 Addition of requirements for zero and sensitivity adjustments (4.2.5).

C6 Addition and clarification requirements for inclusion within the instruction manual (4.4).

C7 Addition of methane and propane or butane as required test gases for general purpose gas detector (5.3.2).

C8 Specification of fixed volume fractions which are expressed as a percentage of the measuring range (5.4.3.2).

C9 Addition of requirement for semiconductor and catalytic sensors to be exposed to high gas concentration on response to different gases (5.4.3.3).

C10 Addition of temperature range and stabilization period (5.4.6).

C11 Addition of requirement where equipment prompts the user (5.4.14).

C12 Addition of requirement for output functionality above the minimum supply voltage fault limit (5.4.18).

C13 Addition of test methods and requirements for electromagnetic compatibility tests (5.4.21).

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

FDIS	Report on voting
31/1257/FDIS	31/1266/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.

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 stability date indicated on the IEC website 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.

A bilingual version of this publication may be issued at a later date.

INTRODUCTION

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 equipment for the detection and measurement of flammable gas or vapour concentrations with air.

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*.

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*.

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 equipment for the detection and measurement of flammable gas or vapour concentrations with air. The equipment, or parts thereof, is intended for use in explosive atmospheres and in mines susceptible to firedamp.

This part of IEC 60079-29 is applicable to flammable gas detection equipment with a measuring range up to any volume fraction as declared by the manufacturer, and which is intended to provide an indication, alarm or other output function; the purpose of which is to indicate a potential explosion hazard and in some cases, to initiate automatic or manual protective action(s).

For the purposes of this part of IEC 60079-29, the term “indicating up to a volume fraction of X % or X %LFL” includes equipment with an upper limit of the measuring range equal to or less than X % or X %LFL.

This part of IEC 60079-29 is applicable to equipment, including the integral sampling systems of aspirated equipment, intended to be used for commercial, industrial and non-residential safety applications.

This part of IEC 60079-29 does not apply to external sampling systems, or to equipment of laboratory or scientific type, or to equipment used only for process monitoring and/or control purposes. It also does not apply to open path (line of sight) detectors which are within the scope of IEC 60079-29-4. Only equipment with very short optical paths intended for use where the concentration is uniform over the optical path are within the scope of this standard.

For equipment used for sensing the presence of multiple gases, this part of IEC 60079-29 applies only to the detection of flammable gas or vapour.

This part of IEC 60079-29 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 takes precedence.

NOTE 1 IEC 60079-29-1 is intended to provide for the supply of equipment giving a level of safety and performance suitable for general purpose applications. However, for specific applications, a prospective purchaser (or an appropriate authority) can additionally require the equipment to be submitted to particular tests or approval. For example, Group I equipment (i.e. equipment to be used in mines susceptible to firedamp) might 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 equipment calibrated on specific gases or vapours can not be expected to correctly indicate on other gases or vapours.

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 3 Indication of concentration in %(v/v) or vol ppm can also be available for equipment which measures up to 100 %LFL or 20 %LFL. In that case, units of measurement might need to be selected in agreement with the manufacturer when verifying the performance requirements of Annex A.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 60050-426, *International Electrotechnical Vocabulary – Part 426: Equipment for explosive atmospheres*

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

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

IEC 60079-20-1, *Explosive atmospheres – Part 20-1: Material characteristics for gas and vapour classification – Test methods and data*

IEC 61326-1:2012, *Electrical equipment for measurement, control and laboratory use – EMC requirements – Part 1: General requirements*