Plahvatusohtlikud keskkonnad. Osa 29-4: Gaasiandurid. Lahtise mõõtetraktiga põlevgaasiandurite toimivusnõuded

Explosive atmospheres - Part 29-4: Gas detectors - Performance requirements of open path detectors for flammable gases

EESTI STANDARDIKESKUS
ESTONIAN CENTRE FOR STANDARDISATION

EESTI STANDARDI EESSÕNA **NATIONAL FOREWORD**

Käesolev Eesti standard EVS-EN 60079-29-4:2010 sisaldab Euroopa standardi EN 60079-29-4:2010 ingliskeelset teksti.	This Estonian standard EVS-EN 60079-29-4:2010 consists of the English text of the European standard EN 60079-29-4:2010.
Standard on kinnitatud Eesti Standardikeskuse 31.05.2010 käskkirjaga ja jõustub sellekohase teate avaldamisel EVS Teatajas.	This standard is ratified with the order of Estonian Centre for Standardisation dated 31.05.2010 and is endorsed with the notification published in the official bulletin of the Estonian national standardisation organisation.
Euroopa standardimisorganisatsioonide poolt rahvuslikele liikmetele Euroopa standardi teksti kättesaadavaks tegemise kuupäev on 09.04.2010.	Date of Availability of the European standard text 09.04.2010.
Standard on kättesaadav Eesti standardiorganisatsioonist.	The standard is available from Estonian standardisation organisation.

ICS 29.260.20

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 60079-29-4

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Supersedes EN 50241-1:1999 + A1:2004, EN 50241-2:1999

English version

Explosive atmospheres - Part 29-4: Gas detectors - Performance requirements of open path detectors for flammable gases

(IEC 60079-29-4:2009, modified)

Atmosphères explosives -
Partie 29-4: Détecteurs de gaz -
Exigences d'aptitude à la fonction
des détecteurs de gaz inflammables
à chemin ouvert
(CEI 60079-29-4:2009, modifiée)

Explosionsfähige Atmosphäre -
Teil 29-4: Gasmessgeräte -
Anforderungen an das Betriebsverhalten
von Geräten mit offener Messstrecke
für die Messung brennbarer Gase
(IEC 60079-29-4:2009, modifiziert)

This European Standard was approved by CENELEC on 2010-04-01. 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 Central Secretariat 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 Central Secretariat has the same status as the official versions.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Bulgaria, Croatia, Cyprus, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and the United Kingdom.

CENELEC

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

Management Centre: Avenue Marnix 17, B - 1000 Brussels

Ref. No. EN 60079-29-4:2010 E

Foreword

The text of document 31/819/FDIS, future edition 1 of IEC 60079-29-4, prepared by IEC Technical Committee 31, Equipment for explosive atmospheres, was submitted to the IEC-CENELEC parallel vote.

A draft amendment, prepared by the CENELEC SC 31-9, Electrical apparatus for the detection and measurement of combustible gases to be used in industrial and commercial potentially explosive atmospheres, of Technical Committee CENELEC TC 31, Electrical apparatus for potentially explosive atmospheres, was submitted to the formal vote.

The combined texts were approved by CENELEC as EN 60079-29-4 on 2010-04-01.

EN 60079-29-4:2010 supplements and modifies the general requirements of EN 60079-0. Where a requirement of this standard conflicts with a requirement of EN 60079-0, the requirement of this standard shall take precedence.

This European Standard supersedes EN 50241-1:1999 + A1:2004 and EN 50241-2:1999.

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

The following dates were fixed:

– latest date by which the amendment has to be implemented at national level by publication of an identical national standard or by endorsement	(dop)	2011-01-01
– latest date by which the national standards conflicting with the amendment have to be withdrawn	(dow)	2013-04-01

Annexes ZA, ZZ and ZY have been added by CENELEC.

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Endorsement notice

The text of the International Standard IEC 60079-29-4:2009 was approved by CENELEC as a European Standard with agreed common modifications as given below.

In the official version, for Bibliography, the following notes have to be added for the standards indicated:

ISO 6142	NOTE	Harmonized as EN ISO 6142
ISO 6144	NOTE	Harmonized as EN ISO 6144
ISO 6145	NOTE	Harmonized as EN ISO 6145

COMMON MODIFICATIONS

1 Scope

Replace “IEC 60079-29” with “EN 60079-29” in paragraph 1.
Replace “IEC 60079-29-1” with “EN 60079-29-1” in Note 1.
Delete note 3.

2 Normative references

Replace “IEC 60079 (all parts)” with “EN 60079 (all parts)” in paragraph 2.
Replace “IEC 60079-0” with “EN 60079-0” in paragraph 3.
Replace “IEC 60079-29-1” with “EN 60079-29-1” in paragraph 4.

Delete references to IEC 61000-4-1 and IEC 61000-4-3 in paragraphs 6 and 7.

Add the following undated references:

EN 50270, *Electromagnetic compatibility - Electrical apparatus for the detection and measurement of combustible gases, toxic gases or oxygen*

EN 50271, *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*

3 Terms and definitions

In the 1st paragraph:
Replace “IEC 60079-0” with “EN 60079-0”.
Replace “IEC 60079-29-1” with “EN 60079-29-1”.

4 General requirements

4.1.1

In the 2nd paragraph, line 2, **replace** “… of these other parts of IEC 60079” with “… of the appropriate regulations for explosion protection”.

4.3

Add “The apparatus shall fulfil the requirements of EN 50271.”
Delete subclauses 4.3.1 to 4.3.5.

5 Test methods

5.2.4.2

In the second paragraph, **replace** reference to test 5.4.16 by 5.4.20.

5.4.12

In the 3rd paragraph, **replace** “A 90% of the change.....” with “90% of the change.....”.

5.4.15 Power supply interruptions and transients

Replace 5.4.15.1, 5.4.15.2 and 5.4.15.3 with “Text deleted”.

5.4.17

Replace this subclause by:

5.4.17 Electromagnetic compatibility
The apparatus shall be set up under normal conditions, in accordance with 5.3, and then shall be subjected to the tests specified in EN 50270.

NOTE For this test the operating distance may be relaxed to suit the requirements of the EMC test facility.”

7.1 Labelling and marking

Delete the text and replace with:

“The equipment shall comply with the marking requirements of EN 60079-0.

In addition, the equipment shall also be marked:

a) “EN 60079-29-4” (to represent conformance with this performance standard);

b) year of construction (may be encoded within the serial number).”

7.2 Instruction manual

Add “EN” before “60079-0” in paragraph 1, line 2.

Annex ZA
(normative)

Normative references to international publications with their corresponding European publications

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.

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

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 60079	Series	Explosive atmospheres	EN 60079	Series
IEC 60079-0	-	Explosive atmospheres - Part 0: Equipment - General requirements	EN 60079-0	-
IEC 60079-29-1 (mod)	-	Explosive atmospheres - Part 29-1: Gas detectors - Performance requirements of detectors for flammable gases	EN 60079-29-1	-
IEC 60825-1	-	Safety of laser products - Part 1: Equipment classification and requirements	EN 60825-1	-

Annex ZY
(informative)

Significant changes between this European Standard and EN 50241-1:1999 and EN 50241-2:1999

This European Standard supersedes EN 50241-1:1999 and EN 50241-2:1999.

The significant changes with respect to EN 50241-1:1999 and EN 50241-2:1999 are as listed below.

	Type		
	Minor and editorial changes	**Extension**	**Substantial change regarding ESR´s [a]**
Normative references: EN 60068-2-6 (vibration), removed, EN 50271 (software) added	X		
Definitions: 3 modified, 3 added, 2 removed	X		
General requirements 4.1 and 4.1.1 modified, 4.1.5 replaced by 4.3 (Software-controlled equipment, new), 4.2.2.4 (low battery indications) replaced within 4.2.4 (Fault signals, new)	X		
General requirements and normal conditions for tests modified and extended (clauses 5.1, 5.2.4.1, 5.2.4.2, 5.3.2, 5.3.3, 5.3.7, 5.3.8, 5.3.11, 5.3.12)	X		
Test method 5.4.2 (Unpowered storage) modified	X		
Test method 5.4.3 (Calibration curve) modified		X	X
Test method 5.4.4.1, 'Short term drift' test removed, replaced with 'Slow increase of gas volume ratio' for equipment with automatic drift compensation		X	X
Test method 5.4.4.2 (Long term stability) modified			
Test method 5.4.4.3, Long term stability (continuous duty, battery powered) test added		X	X
Test method 5.4.4.4, Stability (spot reading equipment only) test added		X	X
Test method 5.4.6 (Temperature variation) modified	X		
Requirements for test 5.4.6 modified	X		
Test method 5.4.7 removed (Pressure variation)	X		
Test method 5.4.7 (Water vapour interference) modified	X		
Requirements for test 5.4.7 modified	X		
Test method 5.4.8 (Vibration) modified	X		
Requirements for test 5.4.8 modified	X		
Test method 5.4.9, Drop test for portable and transportable equipment added		X	X

	Type		
	Minor and editorial changes	**Extension**	**Substantial change regarding ESR´s [a]**
Test method 5.4.12, Minimum time to operate (spot reading equipment) test added		X	X
Test method 5.4.13 removed (Power supply interruptions etc, now part of EMC requirement of EN 50270)	X		
Test method 5.4.13, Battery capacity test added		X	X
Test method 5.4.14 (Power supply variations) modified	X		
Test method 5.4.16 removed (Attenuation of radiation, now part of 5.4.20, Long range operation)	X		
Requirements for test 5.4.16 (now Recovery from power supply interruption) modified	X		
Test method 5.4.19, Partial obscuration test added		X	X
Requirements for test 5.4.20 (Long range operation) modified	X		
Labelling and marking requirements modified	X		
Annex A removed (atmospheric visibility)	X		
New Annex A added (water vapour test apparatus)	X		
Bibliography much reduced	X		
The requirements of EN 50241-2 have been incorporated into the test methods of the new standard, thus combining the two previous standards into one	X		
[a] ESR = Essential Health and Safety Requirements (Annex II of Directive 94/9/EC)			

General conclusion on the change of the State of the Art by this standard

CENELEC/TC 31 as the responsible committee has concluded that this new edition contains substantial changes regarding the ESRs.

Annex ZZ
(informative)

Coverage of Essential Requirements of EC Directives

This European Standard has been prepared under a mandate given to CENELEC by the European Commission and the European free Trade Association and within its scope the Standard covers only the following essential requirements given in Annex II, Clauses 1.5.5 to 1.5.8 of the EC Directive 94/9/EC:

- ER 1.5.5 to 1.5.7 – the essential safety requirements for devices with a measuring function for explosion protection
  - 1.5.5 is covered by 5.4 of this standard
  - 1.5.6 is covered by 4.2.1, 4.2.2, and 4.2.4
  - 1.5.7 is covered by 4.2.3 and 5.4
- ER 1.5.8 – the risks arising from software
  - 1.5.8 is covered by 4.3

Compliance with this standard provides one means of conformity with the specified essential requirements of the Directive concerned.

WARNING: Other requirements and other EC Directives can be applied to the products falling within the scope of this standard.

CONTENTS

EXPLOSIVE ATMOSPHERES –

Part 29-4: Gas detectors – Performance requirements of open path detectors for flammable gases

1 Scope

This part of IEC 60079-29 specifies performance requirements of equipment for the detection and measuring of flammable gases or vapours in ambient air by measuring the spectral absorption by the gases or vapours over extended optical paths, ranging typically from one metre to a few kilometres.

Such equipment measures the integral concentration of the absorbing gas over the optical path in units such as LFL metre for flammable gases.

NOTE 1 Actual values of concentration can be deduced only where it can be established that the concentration is uniform over the optical path, for example in very short optical paths (<100 mm). In such cases, the equipment is within the scope of IEC 60079-29-1.

NOTE 2 This standard is based upon present absorption techniques using infrared radiation. Other techniques and applications may require additional test considerations (e.g. pressure test).

Equipment falling within the scope of this standard is classified by the following types:

Type 1: an optical transmitter and receiver, located at either end of a path through the atmosphere to be monitored.

Type 2: an optical transceiver (i.e. combined transmitter and receiver) and a suitable reflector, which may be a topographic feature or a retroreflector, located at either end of a path through the atmosphere to be monitored.

This standard is also applicable when an equipment manufacturer makes any claims regarding any special features of construction or superior performance that exceed the minimum requirements of this standard. All such claims shall be verified and the test procedures should be extended or supplemented, where necessary, to verify the claimed performance. The additional tests shall be agreed between the manufacturer and the test laboratory and identified and described in the test report.

This standard does not apply to any of following:

a) equipment intended to provide range resolution of gas concentration (e.g. Light direction and ranging (LIDAR));

b) equipment consisting of a passive optical receiver without a dedicated optical source;

c) equipment intended to measure the local volumetric concentration of gas (point sensors);

d) equipment intended for the detection of dusts or mists in air;

e) equipment for cross stack monitoring;

f) equipment intended for the detection of explosives; and

g) equipment intended only for the identification of individual gas or vapour components, (e.g. Fourier transform infrared spectroscopy (FTIR)).

This standard is applicable to equipment which is intended for use in hazardous or non-hazardous areas, or both. Equipment for use in hazardous areas is also required to have explosion protection (see 4.1.1).

This standard applies to portable, transportable and fixed equipment intended for commercial and industrial applications.

NOTE 3 This standard is intended to provide for the supply of equipment giving a level of performance suitable for general purpose applications. However, for specific applications a prospective purchaser or an appropriate authority may additionally require equipment to be submitted for particular tests or approval. Such tests or approval are regarded as additional to and separate from the provisions of the standards referred to above.

2 Normative references

The following referenced documents are indispensable for the application of this document. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 60079 (all parts), *Explosive atmospheres*

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

IEC 60079-29-1, *Explosive atmospheres – Part 29-1: Gas detectors – Performance requirements of detectors for flammable gases*

IEC 60825-1, *Safety of laser products – Part 1: Equipment classification and requirements*

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

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

3 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 60079-0 as well as IEC 60079-29-1 and the following apply.

NOTE Additional definitions applicable to explosive atmospheres can be found in IEC 60050-426.

3.1 Equipment

3.1.1
alarm only equipment
equipment which generates an alarm signal but does not have a meter or output giving a measure of the integral concentration

3.1.2
fixed equipment
equipment fastened to a support, or otherwise secured in a specific location

3.1.3
transportable equipment
equipment not intended to be carried by a person nor intended for fixed installation

3.1.4
portable equipment
equipment intended to be carried by a person

NOTE Typically portable equipment will be used as a spot-reading equipment.