

INTERNATIONAL STANDARD

NORME INTERNATIONALE

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

**Atmosphères explosives –
Partie 29-2: Détecteurs de gaz – Sélection, installation, utilisation et maintenance
des détecteurs de gaz inflammables et d'oxygène**



THIS PUBLICATION IS COPYRIGHT PROTECTED

Copyright © 2015 IEC, Geneva, Switzerland

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from either IEC or IEC's member National Committee in the country of the requester. If you have any questions about IEC copyright or have an enquiry about obtaining additional rights to this publication, please contact the address below or your local IEC member National Committee for further information.

Droits de reproduction réservés. Sauf indication contraire, aucune partie de cette publication ne peut être reproduite ni utilisée sous quelque forme que ce soit et par aucun procédé, électronique ou mécanique, y compris la photocopie et les microfilms, sans l'accord écrit de l'IEC ou du Comité national de l'IEC du pays du demandeur. Si vous avez des questions sur le copyright de l'IEC ou si vous désirez obtenir des droits supplémentaires sur cette publication, utilisez les coordonnées ci-après ou contactez le Comité national de l'IEC de votre pays de résidence.

IEC Central Office
3, rue de Varembe
CH-1211 Geneva 20
Switzerland

Tel.: +41 22 919 02 11
Fax: +41 22 919 03 00
info@iec.ch
www.iec.ch

About the IEC

The International Electrotechnical Commission (IEC) is the leading global organization that prepares and publishes International Standards for all electrical, electronic and related technologies.

About IEC publications

The technical content of IEC publications is kept under constant review by the IEC. Please make sure that you have the latest edition, a corrigenda or an amendment might have been published.

IEC Catalogue - webstore.iec.ch/catalogue

The stand-alone application for consulting the entire bibliographical information on IEC International Standards, Technical Specifications, Technical Reports and other documents. Available for PC, Mac OS, Android Tablets and iPad.

IEC publications search - www.iec.ch/searchpub

The advanced search enables to find IEC publications by a variety of criteria (reference number, text, technical committee,...). It also gives information on projects, replaced and withdrawn publications.

IEC Just Published - webstore.iec.ch/justpublished

Stay up to date on all new IEC publications. Just Published details all new publications released. Available online and also once a month by email.

Electropedia - www.electropedia.org

The world's leading online dictionary of electronic and electrical terms containing 20 000 terms and definitions in English and French, with equivalent terms in 16 additional languages. Also known as the International Electrotechnical Vocabulary (IEV) online.

IEC Glossary - std.iec.ch/glossary

65 000 electrotechnical terminology entries in English and French extracted from the Terms and Definitions clause of IEC publications issued since 2002. Some entries have been collected from earlier publications of IEC TC 37, 77, 86 and CISPR.

IEC Customer Service Centre - webstore.iec.ch/csc

If you wish to give us your feedback on this publication or need further assistance, please contact the Customer Service Centre: csc@iec.ch.

A propos de l'IEC

La Commission Electrotechnique Internationale (IEC) est la première organisation mondiale qui élabore et publie des Normes internationales pour tout ce qui a trait à l'électricité, à l'électronique et aux technologies apparentées.

A propos des publications IEC

Le contenu technique des publications IEC est constamment revu. Veuillez vous assurer que vous possédez l'édition la plus récente, un corrigendum ou amendement peut avoir été publié.

Catalogue IEC - webstore.iec.ch/catalogue

Application autonome pour consulter tous les renseignements bibliographiques sur les Normes internationales, Spécifications techniques, Rapports techniques et autres documents de l'IEC. Disponible pour PC, Mac OS, tablettes Android et iPad.

Recherche de publications IEC - www.iec.ch/searchpub

La recherche avancée permet de trouver des publications IEC en utilisant différents critères (numéro de référence, texte, comité d'études,...). Elle donne aussi des informations sur les projets et les publications remplacées ou retirées.

IEC Just Published - webstore.iec.ch/justpublished

Restez informé sur les nouvelles publications IEC. Just Published détaille les nouvelles publications parues. Disponible en ligne et aussi une fois par mois par email.

Electropedia - www.electropedia.org

Le premier dictionnaire en ligne de termes électroniques et électriques. Il contient 20 000 termes et définitions en anglais et en français, ainsi que les termes équivalents dans 16 langues additionnelles. Egalement appelé Vocabulaire Electrotechnique International (IEV) en ligne.

Glossaire IEC - std.iec.ch/glossary

65 000 entrées terminologiques électrotechniques, en anglais et en français, extraites des articles Termes et Définitions des publications IEC parues depuis 2002. Plus certaines entrées antérieures extraites des publications des CE 37, 77, 86 et CISPR de l'IEC.

Service Clients - webstore.iec.ch/csc

Si vous désirez nous donner des commentaires sur cette publication ou si vous avez des questions contactez-nous: csc@iec.ch.

INTERNATIONAL STANDARD

NORME INTERNATIONALE

Explosive atmospheres –

Part 29-2: Gas detectors – Selection, installation, use and maintenance of detectors for flammable gases and oxygen

Atmosphères explosives –

Partie 29-2: Détecteurs de gaz – Sélection, installation, utilisation et maintenance des détecteurs de gaz inflammables et d'oxygène

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

COMMISSION
ELECTROTECHNIQUE
INTERNATIONALE

ICS 29.260.20

ISBN 978-2-8322-5029-7

Warning! Make sure that you obtained this publication from an authorized distributor.

Attention! Veuillez vous assurer que vous avez obtenu cette publication via un distributeur agréé.

CONTENTS

FOREWORD.....	8
INTRODUCTION.....	11
1 Scope.....	13
2 Normative references	14
3 Terms and definitions	14
3.1 Gas properties and other physics.....	14
3.2 Types of equipment	16
3.3 Sensors and detectors	18
3.4 Supply of gas to instruments.....	19
3.5 Signals and alarms	19
3.6 Times, checks and equipment behaviour.....	20
3.7 Terms exclusive to open path equipment	21
4 Basic information on the properties, behaviour, gases and vapours, and specific applications of gas detection	23
4.1 Detecting gases and vapours	23
4.1.1 General	23
4.1.2 Safety when monitoring for flammable gases where personnel could be present	24
4.2 Some common properties of gases and vapours	25
4.3 The differences between detecting gases and vapours	26
4.3.1 General	26
4.3.2 Detection of gases	26
4.3.3 Detection of vapours.....	28
4.4 Oxygen deficiency.....	31
4.4.1 General	31
4.4.2 Chemical reaction of oxygen, with solid products	31
4.4.3 Chemical reaction of oxygen, with gaseous products	31
4.4.4 Dilution of the atmosphere by displacement by some other gas or vapour.....	32
4.5 Specific applications of gas detection	32
4.5.1 Gas detection as means of reducing risk of explosion.....	32
4.5.2 Gas free work permit	35
4.5.3 Monitoring of air inlets	36
4.6 Specific considerations for open path detection	36
5 Measuring principles.....	37
5.1 General.....	37
5.2 Catalytic sensors	39
5.2.1 General	39
5.2.2 Common applications	39
5.2.3 Limitations	39
5.2.4 Interferences	40
5.2.5 Poisoning	40
5.3 Thermal conductivity sensors.....	40
5.3.1 General	40
5.3.2 Common applications	41
5.3.3 Limitations	41
5.3.4 Interferences	41

5.3.5	Poisoning	41
5.4	Infrared sensors.....	41
5.4.1	General	41
5.4.2	Common applications	41
5.4.3	Limitations	42
5.4.4	Interferences	42
5.4.5	Poisoning	42
5.5	Semiconductor sensors.....	42
5.5.1	General	42
5.5.2	Common applications	42
5.5.3	Limitations	43
5.5.4	Interferences	43
5.5.5	Poisoning	43
5.6	Electrochemical sensors	43
5.6.1	General	43
5.6.2	Common applications	44
5.6.3	Limitations	44
5.6.4	Interferences	44
5.6.5	Poisoning	44
5.7	Flame ionization detectors (FID)	44
5.7.1	General	44
5.7.2	Common applications	44
5.7.3	Limitations	45
5.7.4	Interferences	45
5.7.5	Poisoning	45
5.8	Flame temperature analysers (FTA)	45
5.8.1	General	45
5.8.2	Common applications	45
5.8.3	Limitations	45
5.8.4	Interferences	45
5.8.5	Poisoning	46
5.9	Photo ionisation detector (PID)	46
5.9.1	General	46
5.9.2	Common applications	46
5.9.3	Limitations	46
5.9.4	Interferences	46
5.9.5	Poisoning	46
5.10	Paramagnetic oxygen detector	46
5.10.1	General	46
5.10.2	Common applications	47
5.10.3	Limitations	47
5.10.4	Interference	47
5.10.5	Poisoning	47
6	Selection of equipment	47
6.1	General.....	47
6.2	Selection criteria.....	48
6.2.1	General criteria.....	48
6.2.2	Gases to be detected by the equipment.....	49
6.2.3	Application of fixed equipment	50

6.2.4	Application of transportable and portable equipment.....	53
6.3	Miscellaneous factors affecting selection of equipment	54
6.3.1	Electromagnetic immunity.....	54
6.3.2	Intended Zone(s) of use.....	54
7	Behaviour of gas releases	55
7.1	Nature of a release	55
7.1.1	General	55
7.1.2	Release rate of gas or vapour.....	55
7.1.3	Flammable limits.....	56
7.1.4	Ventilation	56
7.1.5	Relative density of the released gas or vapour.....	56
7.1.6	Temperature and/or pressure.....	56
7.1.7	Other parameters to be considered.....	57
7.1.8	Outdoor sites and open structures	57
7.2	Buildings and enclosures	57
7.2.1	General	57
7.2.2	Unventilated buildings and enclosures.....	57
7.2.3	Ventilated buildings and enclosures.....	57
7.3	Environmental considerations	59
8	Design and installation of fixed gas detection systems.....	59
8.1	General.....	59
8.2	Basic considerations for the installation of fixed systems	59
8.2.1	General	59
8.2.2	Point detection equipment and remote sensors.....	60
8.2.3	Systems consisting of sampling equipment.....	60
8.2.4	Open path (line of sight) equipment.....	60
8.3	Location of detection points	61
8.3.1	General	61
8.3.2	General site considerations	61
8.3.3	Environmental conditions.....	62
8.4	Access for calibration and maintenance	64
8.5	Additional considerations for sample lines.....	65
8.6	Additional considerations for open path equipment	65
8.7	Summary of considerations for the location of measuring points and open paths	66
8.8	Installation of measuring point and open path equipment.....	66
8.9	Integrity and safety of fixed systems	67
8.9.1	General	67
8.9.2	Redundancy in fixed systems.....	67
8.9.3	Protection against loss of main power supply.....	67
8.10	Timing of installation during construction operations	68
8.11	Commissioning	68
8.11.1	Inspection.....	68
8.11.2	Initial gas calibration.....	69
8.11.3	Adjustment of alarm set points.....	69
8.12	Operating instructions, plans and records	69
9	Use of portable and transportable flammable gas detection equipment.....	70
9.1	General.....	70

9.2	Initial and periodic check procedures for portable and transportable instrumentation	71
9.2.1	General	71
9.2.2	Inspection and functional checks	71
9.2.3	Routine tests and recalibration	72
9.2.4	Maintenance and recalibration	73
9.3	Guidance on the use of portable and transportable equipment	74
9.3.1	Electrical safety in hazardous atmospheres	74
9.3.2	Safety of personnel	74
9.3.3	Spot tests and sampling	74
9.3.4	Sampling above liquids	75
9.3.5	Avoidance of condensation	75
9.3.6	Poisoning of sensors	75
9.3.7	Changes of temperature	75
9.3.8	Accidental damage	75
9.3.9	Minimalist operation, the “Read and run” concept	75
10	Training of operational personnel	76
10.1	General	76
10.2	General training – Basic limitations and safety	77
10.3	Operator training	77
10.4	Maintenance training	78
11	Maintenance, routine procedures and general administrative control	78
11.1	General	78
11.2	Operational checks	80
11.2.1	General	80
11.2.2	Fixed systems	80
11.2.3	Portable and transportable gas detection equipment	80
11.3	Maintenance	81
11.3.1	General	81
11.3.2	Fixed equipment	81
11.3.3	Portable and transportable gas detection equipment	81
11.3.4	Off-site maintenance, general	82
11.3.5	Maintenance procedures	82
11.4	Sensors	82
11.4.1	General	82
11.4.2	Flame arrestor	82
11.5	Flow systems	83
11.5.1	General	83
11.5.2	Inspection	83
11.5.3	Filters, traps and flame arrestors	83
11.5.4	Flow system and sample chamber	83
11.5.5	Flow connections	83
11.5.6	Moving parts	83
11.5.7	Automatic sample-draw systems	83
11.5.8	Loss-of-flow signals	83
11.6	Readout devices	83
11.6.1	General	83
11.6.2	Other readouts	84
11.7	Alarms	84

11.8	Calibration	84
11.8.1	Calibration kits and test equipment	84
11.8.2	Calibration procedure	85
Annex A	(normative) Measuring principles	87
A.1	General.....	87
A.2	Catalytic sensors	89
A.2.1	General	89
A.2.2	Common applications	90
A.2.3	Limitations	90
A.2.4	Interferences	90
A.2.5	Poisoning	91
A.3	Thermal conductivity sensors.....	92
A.3.1	General	92
A.3.2	Common applications	92
A.3.3	Limitations	93
A.3.4	Interferences	93
A.3.5	Poisoning	93
A.4	Infrared sensors.....	93
A.4.1	General	93
A.4.2	Common applications	95
A.4.3	Limitations	96
A.4.4	Interferences	96
A.4.5	Poisoning	97
A.5	Semi-conductor sensors.....	97
A.5.1	General	97
A.5.2	Common applications	97
A.5.3	Limitations	97
A.5.4	Interferences	98
A.5.5	Poisoning	98
A.6	Electrochemical sensors	98
A.6.1	General	98
A.6.2	Common applications	99
A.6.3	Limitations	99
A.6.4	Interferences	100
A.6.5	Poisoning	100
A.7	Flame ionization detectors (FID)	101
A.7.1	General	101
A.7.2	Common applications	102
A.7.3	Limitations	102
A.7.4	Interferences	102
A.7.5	Poisoning	102
A.8	Flame temperature analysers (FTA).....	103
A.8.1	General	103
A.8.2	Common applications	103
A.8.3	Limitations	103
A.8.4	Interferences	103
A.8.5	Poisoning	103
A.9	Photo ionisation detector (PID)	104
A.9.1	General	104

A.9.2	Common applications	104
A.9.3	Limitations	105
A.9.4	Interferences	105
A.9.5	Poisoning	105
A.10	Paramagnetic oxygen detector	105
A.10.1	General	105
A.10.2	Common applications	106
A.10.3	Limitations	106
A.10.4	Interference	106
A.10.5	Poisoning	106
Annex B (informative)	Environmental parameters	107
Annex C (informative)	Typical environmental and application check-list for flammable gas detectors (for both Group I and Group II equipment)	108
Annex D (informative)	Typical instrument maintenance record for flammable gas detectors	110
Annex E (informative)	Atmospheric visibility	111
Bibliography	112
Figure 1	– Integral concentration over the path length	37
Figure 2	– Average concentration over the path length	37
Table 1	– Typical Tasks and Most Relevant Causes	12
Table 2	– Overview of gas detection equipment with different measuring principles	38
Table A.1	– Overview of gas detection equipment with different measuring principles	88
Table B.1	– Environmental parameters	107

INTERNATIONAL ELECTROTECHNICAL COMMISSION

EXPLOSIVE ATMOSPHERES –**Part 29-2: Gas detectors – Selection, installation, use
and maintenance of detectors for flammable gases and oxygen**

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.
- 2) The formal decisions or agreements of IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC National Committees.
- 3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
- 4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
- 5) IEC itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, accept IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.
- 6) All users should ensure that they have the latest edition of this publication.
- 7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
- 8) Attention is drawn to the normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
- 9) Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights.

International Standard IEC 60079-29-2 has been prepared by IEC technical committee 31: Equipment for explosive atmospheres.

This bilingual version (2017-12) corresponds to the monolingual English version, published in 2015-03.

This second edition cancels and replaces the first edition published in 2007. This edition constitutes a technical revision.

This edition includes the following significant changes with respect to the previous edition:

Changes	Clause	Type		
		Minor and editorial changes	Extension	Major technical changes
Addition of group 1 to scope	1		x	
Addition of Open Path Gas Detection	3, 4.6, 5.4, 6.2.3.5, 8.2, 8.6, 8.7, 8.8, 11, A4		x	
Changed “combustible” to “flammable”	Throughout	x		
Addition of specific applications	4.5		x	
Improvements to sampling systems	6.2.3.4, 8.2.3, 8.5, 11.2.2	x		

NOTE 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:

- 1) **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.

- 2) **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.

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

- 3) **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 in conformity with 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 in conformity with the preceding edition.

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

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

FDIS	Report on voting
31/1169/FDIS	31/1179/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.

The French version of this standard has not been voted upon.

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

A list of all parts in the IEC 60079 series, published 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.

INTRODUCTION

Flammable gas detection equipment may be used whenever there is the possibility of a hazard to life or property caused by the accumulation of a flammable gas-air mixture. Such equipment can provide a means of reducing the hazard by detecting the presence of a flammable gas and issuing suitable audible or visual warnings. Gas detectors may also be used to initiate precautionary steps (for example plant shutdown, evacuation, and operation of fire extinguishing procedures).

Equipment may be used to monitor a gas atmosphere below the lower flammable limit in circumstances where accumulation of gas may result in a concentration of the gas/air mixture to potentially explosive levels. Performance requirements for gas detecting equipment for such purposes are set out in IEC 60079-29-1 and IEC 60079-29-4. Guidance for functional safety of fixed gas detection systems are set out in IEC 60079-29-3.

However performance capability alone cannot ensure that the use of such equipment will properly safeguard life or property where flammable gases may be present. The level of safety obtained depends heavily upon correct selection, installation, calibration and periodic maintenance of the equipment, combined with knowledge of the limitations of the detection technique required. This cannot be achieved without responsible informed management.

An additional hazard to life is the toxicity of some gases and of the vapours of all liquids except water. It is not generally appreciated that all flammable vapours are potentially toxic at concentration levels which are very small fractions of their respective lower flammable limits. Equipment covered by IEC 60079-29-1 and IEC 60079-29-4 is not specifically intended for toxic protection, and additional personal protection precautions will normally be needed where personnel could be exposed to toxic vapours.

Portable equipment covered by IEC 60079-29-1 and IEC 60079-29-2 commonly have additional detectors for specific toxic gases and also for oxygen deficiency. Users are cautioned that even mild oxygen deficiency may be due to toxic concentrations of some other gas or vapour, which may not be detectable or adequately detected by the equipment in use.

General requirements for the handbook or manual of any particular flammable gas detection equipment are specified in IEC 60079-29-1 and IEC 60079-29-4. These standards provide some necessary background knowledge on the points mentioned above.

This standard has been specifically written to cover all the functions necessary from selection to ongoing maintenance for a successful gas detection operation. Different clauses are appropriate for different tasks within this range of operations. Each clause has been written as stand-alone as far as practicable. This means that some information is repeated in different clauses but with a different emphasis.

Table 1 gives a broad suggestion as to the most relevant clauses to the typical tasks to be performed.

Table 1 – Typical Tasks and Most Relevant Causes

Tasks	Definitions	Basic information properties of gas and vapours	Measuring principles	Selection of equipment	Behaviour of gas releases	Design and installation of fixed gas detection systems	Use of portable and transportable flammable gas detection equipment	Training of operational personnel	Maintenance, routine procedures General administrative control	Measuring principles (full detail) (normative)	Environmental parameters (informative)
Function (Clause)	3	4	5	6	7	8	9	10	11	Annex A	Annex B
Authorities	+	+++	+++	+	+	-	-	-	+	-	-
General management	+	+++	+++	+	+	-	-	+	+	-	+
Selection	+++	+++	+	+++	+++	+	++	-	+	+++	+++
Design engineering / management	+++	+++	+	+++	+++	+++	-	-	-	+++	+++
Installation engineering / management	+++	+++	+	++	+++	+++	-	-	-	+++	+++
Installation, technical	++	+++	++	++	++	++	-	-	-	+	++
Commissioning	+++	+++	++	+	++	+++	-	++	+	-	-
Operations management	++	+++	++	+	+	++	++	+++	+++	+	+++
Operation training	+++	+++	+	+	+	+++	+++	+++	+++	+++	+++
Servicing / Calibration	+++	+++	-	-	-	++	++	+	+++	++	++
Repair	++	+++	++	-	-	+	+	+	+++	++	-
<p>“+++” Most appropriate “++” Advisable “+” Useful “-“ Not applicable</p> <p>It should be noted that Clause 5 is a simplified version of Annex A.</p>											

This standard makes recommendations on how to establish maintenance and calibration intervals. In certain countries there are mandatory general or industry-specific regulations which must be followed as a minimum requirement.

EXPLOSIVE ATMOSPHERES –

Part 29-2: Gas detectors – Selection, installation, use and maintenance of detectors for flammable gases and oxygen

1 Scope

This part of IEC 60079-29 gives guidance on, and recommended practice for, the selection, installation, safe use and maintenance of electrically operated Group II equipment intended for use in industrial and commercial safety applications and Group I equipment in underground coal mines for the detection and measurement of flammable gases complying with the requirements of IEC 60079-29-1 or IEC 60079-29-4.

This standard is applicable for oxygen measurement for the purpose of inertisation where explosion protection is provided by the exclusion of oxygen instead of measuring the flammable gases or vapours present. A similar application is measuring oxygen when inertising a goaf (mined out) area in an underground coal mine.

This standard is a compilation of practical knowledge to assist the user, and applies to equipment, instruments and systems that indicate the presence of a flammable or potentially explosive mixture of gas or vapour with air by using an electrical signal from a gas sensor to produce a meter reading, to activate a visual or audible pre-set alarm or other device, or any combination of these.

Such equipment may be used as a means of reducing the risk whenever there is the possibility of a risk to life or property specifically due to the accumulation of a flammable gas-air mixture, by providing such warnings. It may also be used to initiate specific safety precautions (e.g. plant shutdown, evacuation, fire extinguishing procedures).

This standard is applicable to fixed installations and transportable equipment. Similarly it is applicable to the safe use of portable equipment. Since much modern equipment of this type also includes oxygen deficiency detection and/or specific toxic gas sensors, some additional guidance is given for these topics.

For the purposes of this standard, except where specifically stated otherwise, flammable gases include flammable vapours.

Mists are not covered by this standard due to measurement techniques currently used.

This standard applies to Group II equipment (i.e. equipment intended for use in industrial and commercial safety applications, involving areas classified in accordance with IEC 60079-10-1) and Group I equipment.

For the purposes of this standard, equipment includes

- a) fixed equipment including equipment mounted on a vehicle;
- b) transportable equipment; and
- c) portable equipment.

This standard is not intended to cover, but may provide useful information, for the following:

- a) equipment intended only for the detection of non-flammable toxic gases;
- b) equipment of laboratory or scientific type intended only for analysis or measurement purposes;