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REDLINE VERSION



Explosive atmospheres – Part 10-1: Classification of areas – Explosive gas atmospheres

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

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CONTENTS

FOREWORD.....	6
INTRODUCTION.....	9
1 Scope.....	10
2 Normative references	11
3 Terms and definitions	11
4 General	16
4.1 Safety principles	16
4.2 Area classification objectives	17
4.3 Explosion risk assessment	17
4.4 Competence of Personnel	18
5 Area classification procedure methodology.....	18
5.1 General.....	18
5.2 Classification by sources of release method.....	19
5.3 Use of industry codes and national standards	19
5.4 Simplified methods	19
5.4.1 Release rate of gas or vapour	19
5.4.2 Lower explosive limit (LEL).....	19
5.4.3 Ventilation	19
5.4.4 Relative density of the gas or vapour when it is released.....	19
5.4.5 Other parameters to be considered.....	19
5.4.6 Illustrative examples	19
5.5 Combination of methods	20
6 Release of flammable substance	20
6.1 General.....	20
6.2 Sources of release	20
6.3 Forms of release.....	22
6.3.1 General	22
6.3.2 Gaseous release	22
6.3.3 Liquefied under pressure	23
6.3.4 Liquefied by refrigeration	23
6.3.5 Aerosols	23
6.3.6 Vapours.....	23
6.3.7 Liquid releases	24
6.4 Ventilation (or air movement) and dilution	24
6.5 Main types of ventilation	25
6.5.1 General	25
6.5.2 Natural ventilation.....	25
6.5.3 Artificial ventilation	26
6.5.4 Degree of dilution	27
7 Type of zone	28
7.1 General.....	28
7.2 Influence of grade of the source of release	28
7.3 Influence of dilution.....	28
7.4 Influence of availability of ventilation.....	28
8 Extent of zone	29
9 Documentation	32

9.1	General.....	32
9.2	Drawings, data sheets and tables	33
Annex A (informative) Suggested presentation of hazardous areas		34
A.1	Hazardous area zones – Preferred symbols	34
A.2	Hazardous area suggested shapes	39
Annex B (informative) Examples of sources of release and release rate Estimation of sources of release		42
B.1	Symbols.....	42
B.2	Process plant Examples of grade of release	42
B.2.1	General	42
B.2.2	Sources giving a continuous grade of release	43
B.2.3	Sources giving a primary grade of release	43
B.2.4	Sources giving a secondary grade of release.....	43
B.3	Assessment of grades of release	43
B.4	Summation of releases	44
B.5	Hole size and source radius	45
B.6	Forms of release.....	46
B.7	Release rate	48
B.7.1	General	48
B.7.2	Estimation of Release Rate	49
B.7.3	Release rate of evaporative pools.....	53
B.8 – Examples of estimating release rate		
B.8	Release from openings in buildings.....	57
B.8.1	General	57
B.8.2	Openings as possible sources of release	57
B.8.3	Openings classification	57
Annex B (informative) Ventilation.....		
Annex C (informative) Ventilation guidance.....		75
C.1	Symbols.....	75
C.2	General.....	76
C.3	Assessment of ventilation and dilution and its influence on hazardous area	76
C.3.1	General	76
C.3.2	Effectiveness of ventilation	77
C.3.3	Criteria for dilution	77
C.3.4	Assessment of ventilation velocity	78
C.3.5	Assessment of the degree of dilution	79
C.3.6	Dilution in a room	80
C.3.7	Criteria for availability of ventilation	82
C.4	Examples of ventilation arrangements and assessments	83
C.4.1	Introduction	83
C.4.2	Jet release in a large building	83
C.4.3	Jet release in a small naturally ventilated building	84
C.4.4	Jet release in a small artificially ventilated building.....	84
C.4.5	Release with low velocity.....	85
C.4.6	Fugitive emissions	86
C.4.7	Local ventilation-extraction	86
C.5	Natural Ventilation in buildings.....	87
C.5.1	General	87
C.5.2	Wind induced ventilation.....	87

C.5.3	Buoyancy induced ventilation.....	88
C.5.4	Combination of the natural ventilation induced by wind and buoyancy	90
Annex D (informative)	Estimation of hazardous zones.....	92
D.1	General.....	92
D.2	Estimating types of the zones	92
D.3	Estimating the extent of the hazardous zone.....	92
Annex E (informative)	Examples of hazardous area classification	95
E.1	General.....	95
E.2	Examples.....	96
E.3	Example case study for area classification.....	124
Annex F (informative)	Schematic approach to classification of hazardous areas	141
F.1	Schematic approach to classification of hazardous areas.....	141
F.2	Schematic approach to classification of hazardous areas.....	142
F.3	Schematic approach to classification of hazardous areas.....	143
F.4	Schematic approach to classification of hazardous areas.....	144
Annex G (informative)	Flammable mists.....	145
Annex H (informative)	Hydrogen	147
Annex I (informative)	Hybrid mixtures	149
I.1	General.....	149
I.2	Use of ventilation	149
I.3	Concentration limits	149
I.4	Chemical reactions	149
I.5	Energy/Temperature limits	149
I.6	Zoning requirements	149
Annex J (informative)	Useful equations in support to hazardous area classification	150
J.1	General.....	150
J.2	Dilution with air of a flammable substance release	150
J.3	Estimate of the time required to dilute a flammable substance release.....	150
Annex K (informative)	Industry codes and national standards	152
K.1	General.....	152
Bibliography.....		154
Figure C.1 A.1	– Preferred symbols for hazardous area zones.....	34
Figure A.2	– Gas/vapour at low pressure (or at high pressure in case of unpredictable release direction).....	39
Figure A.3	– Gas/vapour at high pressure	39
Figure A.4	– Liquefied gas	40
Figure A.5	– Flammable liquid (non boiling evaporative pool).....	41
Figure B.1	– Forms of release.....	47
Figure B.2	– Volumetric evaporation rate of liquids	54
Figure C.1	– Chart for assessing the degree of dilution.....	79
Figure C.2	– Schematic approach to the classification of hazardous areas.....	
Figure C.2	– Self diffusion of an unimpeded high velocity jet release	84
Figure C.3	– Supply only ventilation.....	85
Figure C.4	– Supply and extraction ventilation	85
Figure C.5	– Local extraction ventilation	87

Figure C.6 – Volumetric flow rate of fresh air per m ² of equivalent effective opening area	90
Figure C.7 – Example of opposing ventilation driving forces	91
Figure D.1 – Chart for estimating hazardous area distances	93
Figure E.1 – Degree of dilution (Example No. 1)	98
Figure E.2 – Hazardous distance (Example No. 1)	99
Figure E.3 – Zone classification (Example No. 1)	99
Figure E.4 – Degree of dilution (Example No. 2)	102
Figure E.5 – Hazardous distance (Example No. 2)	103
Figure E.6 – Degree of dilution (Example No. 3)	106
Figure E.7 – Hazardous distance (Example No. 3)	107
Figure E.8 – Zones classification (Example No. 3)	108
Figure E.9 – Degree of dilution (Example No. 4)	111
Figure E.10 – Hazardous distance (Example No. 4)	112
Figure E.11 – Zones classification (Example No. 4)	112
Figure E.12 – Degree of dilution (Example No. 5)	116
Figure E.13 – Hazardous distance (Example No. 5)	117
Figure E.14 – Enclosed compressor handling natural gas	133
Figure E.15 – Example of area classification for a compressor facility handling natural gas (elevation)	139
Figure E.16 – Example of area classification for a compressor facility handling natural gas (plan)	140
Figure F.1 – Schematic approach to classification	141
Figure F.2 – Schematic approach to classification for continuous grade releases	142
Figure F.3 – Schematic approach to classification for primary grade releases	143
Figure F.4 – Schematic approach to classification for secondary grade releases	144
Table C.1 A.1 – Hazardous area classification data sheet – Part I: Flammable material substance list and characteristics	35
Table C.2 A.2 – Hazardous area classification data sheet – Part II: List of sources of release	37
Table B.1 – Influence of independent ventilation on type of zone	
Table B.1 – Suggested hole cross sections for secondary grade of releases	46
Table B.2 – Procedure for summation of multiple releases within location V_0	
Table B.2 – Effect of hazardous zones on openings as possible sources of release	58
Table B.3 – Procedure for summation of multiple primary grade releases	
Table C.1 – Indicative outdoor ventilation velocities (u_w)	79
Table D.1 – Zones for grade of release and effectiveness of ventilation	92
Table E.1 – Compressor facility handling natural gas	134
Table E.2 – Hazardous area classification data sheet – Part I: Flammable substance list and characteristics	136
Table E.3 – Hazardous area classification data sheet – Part II: List of sources of release (1 of 2)	137
Table K.1 – Examples of codes and standards	153

INTERNATIONAL ELECTROTECHNICAL COMMISSION

EXPLOSIVE ATMOSPHERES –

Part 10-1: Classification of areas – Explosive gas atmospheres

FOREWORD

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This Redline version is not an official IEC Standard and is intended only to provide the user with an indication of what changes have been made to the previous version. Only the current version of the standard is to be considered the official document.

This Redline version provides you with a quick and easy way to compare all the changes between this standard and its previous edition. A vertical bar appears in the margin wherever a change has been made. Additions are in green text, deletions are in strikethrough red text.

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International Standard IEC 60079-10-1 has been prepared by subcommittee 31J: Classification of hazardous areas and installation requirements, of IEC technical committee 31: Equipment for explosive atmospheres.

This second edition of IEC 60079-10-1 cancels and replaces the first edition, published in 2008, and constitutes a technical revision. The significant technical changes with respect to the previous edition are as follows:

Changes	Clause	Type		
		Minor and editorial changes	Extension	Major technical changes
Complete restructuring and dividing into sections to identify possible methodologies for classifying hazardous areas and to provide further explanation on specific assessment factors	Main body of the text	X	X	X
Introducing new terms and the definitions	3		X	
Introducing clauses for alternative methods of area classification	5		X	X
Updating examples for presentation of hazardous area classification	Annex A		X	X
Updating calculations for release rate	Annex B		X	X
Complete re-write with a new approach based upon the degree of dilution instead of the degree of ventilation	Annex C		X	X
Introduced as a new Annex for zone extents	Annex D		X	
Updated with new examples to explain the methodology set forth in Annexes A, B, C and D	Annex E			X
Update of the flow chart illustrating the area classification procedure by dividing it into four sections	Annex F		X	
Introduced as a new Annex on hydrogen	Annex H		X	
Introduced as a new Annex on hybrid mixtures	Annex I		X	
Introduced as a new Annex with supplementary equations	Annex J		X	
Introduced as a new Annex for reference to national and industry codes with specific examples of hazardous area classification	Annex K		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.

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Explanations:

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.

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.

Major technical changes

addition of technical requirements
increase of technical requirements

These are changes to technical requirements (addition, increase of the level or removal).

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
31J/253/FDIS	31J/256/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.

The contents of the corrigendum of November 2015 have been included in this copy.

IMPORTANT – The 'colour inside' logo on the cover page of this publication indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this document using a colour printer.

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INTRODUCTION

In areas where dangerous quantities and concentrations of flammable gas or vapour may arise, protective measures ~~are~~ need to be applied in order to reduce the risk of explosions. This part of IEC 60079 sets out the essential criteria against which the ignition hazards can be assessed, and gives guidance on the design and control parameters which can be used in order to reduce such hazards.

EXPLOSIVE ATMOSPHERES –

Part 10-1: Classification of areas – Explosive gas atmospheres

1 Scope

This part of IEC 60079 is concerned with the classification of areas where flammable gas or vapour ~~or mist~~ hazards ~~(see Notes 1, 2 and 3)~~ may arise and may then be used as a basis to support the proper selection and installation of equipment for use in hazardous areas.

It is intended to be applied where there may be an ignition hazard due to the presence of flammable gas or vapour, mixed with air ~~under normal atmospheric conditions (see Note 4)~~, but it does not apply to:

- a) mines susceptible to firedamp;
- b) the processing and manufacture of explosives;
- c) catastrophic failures ~~or rare malfunctions~~ which are beyond the concept of abnormality dealt with in this standard (see ~~Note 5~~ 3.7.3 and 3.7.4);
- d) rooms used for medical purposes;
- e) commercial and industrial applications where only low pressure fuel gas is used for appliances e.g. for cooking, water heating and similar uses, where the installation is compliant with relevant gas codes;
- f) domestic premises;
- g) ~~areas~~ where a hazard may arise due to the presence of combustible dusts or ~~fibres~~ combustible flyings but the principles may be used in assessment of a hybrid mixture (refer also ~~IEC 61241-10-1~~ IEC 60079-10-2).

~~This standard does not take into account the effects of consequential damage.~~

~~Definitions and explanations of terms are given together with the main principles and procedures relating to hazardous area classification.~~

~~For detailed recommendations regarding the extent of the hazardous areas in specific industries or applications, reference may be made to national or industry codes relating to those applications.~~

NOTE Additional guidance on hybrid mixtures is provided in Annex I.

~~NOTE 1~~ Flammable mists may form or be present at the same time as flammable vapour. ~~Liquids not considered to be hazardous in terms of this standard (due to the flash point), when released under pressure may also generate flammable mists.~~ In such case, the strict application of ~~area classification for gases and vapours~~ the details in this standard may not be appropriate ~~as the basis for selection of equipment~~. Flammable mists may also form when liquids not considered to be a hazard due to the high flash point are released under pressure. In these cases the classifications and details given in this standard do not apply. Information on flammable mists is provided in Annex G.

~~NOTE 2~~ The use of IEC 60079-14 for selection of equipment and installations is not required for mist hazards.

~~NOTE 3~~ For the purpose of this standard, an area is a three-dimensional region or space.

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~~NOTE 4~~ Atmospheric conditions include variations above and below reference levels of 101,3 kPa (1 013 mbar) and 20 °C (293 K), provided that the variations have a negligible effect on the explosion properties of the flammable ~~materials~~ substances.

~~NOTE 5~~ Catastrophic failure in this context is applied, for example, to the rupture of a process vessel or pipeline and events that are not predictable.

~~NOTE 6~~ In any process plant, irrespective of size, there may be numerous sources of ignition apart from those associated with equipment. Appropriate precautions will be necessary to ensure safety in this context. This standard ~~may be used~~ is applicable with judgement for other ignition sources.

This standard does not take into account the consequences of ignition of an explosive atmosphere.

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 (IEV) — Part 426: Equipment for explosive atmospheres~~

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

~~IEC 60079-4, Electrical apparatus for explosive gas atmospheres — Part 4: Method of test for ignition temperature~~

~~IEC 60079-4A, First supplement to IEC 60079-4 (1966), Electrical apparatus for explosive gas atmospheres — Part 4: Method of test for ignition temperature~~

IEC 60079-14, *Explosive atmospheres – Part 14: Electrical installations design, selection and erection*

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

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INTERNATIONAL STANDARD



Explosive atmospheres – Part 10-1: Classification of areas – Explosive gas atmospheres



CONTENTS

FOREWORD.....	6
INTRODUCTION.....	9
1 Scope.....	10
2 Normative references	10
3 Terms and definitions	11
4 General	15
4.1 Safety principles	15
4.2 Area classification objectives	16
4.3 Explosion risk assessment.....	16
4.4 Competence of Personnel.....	17
5 Area classification methodology	17
5.1 General.....	17
5.2 Classification by sources of release method.....	18
5.3 Use of industry codes and national standards	18
5.4 Simplified methods	18
5.5 Combination of methods	19
6 Release of flammable substance	19
6.1 General.....	19
6.2 Sources of release.....	19
6.3 Forms of release.....	20
6.3.1 General	20
6.3.2 Gaseous release	21
6.3.3 Liquefied under pressure	21
6.3.4 Liquefied by refrigeration	22
6.3.5 Aerosols	22
6.3.6 Vapours.....	22
6.3.7 Liquid releases	22
6.4 Ventilation (or air movement) and dilution	23
6.5 Main types of ventilation	23
6.5.1 General	23
6.5.2 Natural ventilation.....	23
6.5.3 Artificial ventilation	24
6.5.4 Degree of dilution	25
7 Type of zone	26
7.1 General.....	26
7.2 Influence of grade of the source of release	26
7.3 Influence of dilution.....	27
7.4 Influence of availability of ventilation.....	27
8 Extent of zone	27
9 Documentation	28
9.1 General.....	28
9.2 Drawings, data sheets and tables	28
Annex A (informative) Suggested presentation of hazardous areas.....	30
A.1 Hazardous area zones – Preferred symbols.....	30
A.2 Hazardous area suggested shapes	33

Annex B (informative) Estimation of sources of release.....	35
B.1 Symbols.....	35
B.2 Examples of grade of release.....	35
B.2.1 General	35
B.2.2 Sources giving a continuous grade of release	35
B.2.3 Sources giving a primary grade of release	36
B.2.4 Sources giving a secondary grade of release.....	36
B.3 Assessment of grades of release	36
B.4 Summation of releases	37
B.5 Hole size and source radius.....	38
B.6 Forms of release.....	40
B.7 Release rate	41
B.7.1 General	41
B.7.2 Estimation of Release Rate	41
B.7.3 Release rate of evaporative pools.....	44
B.8 Release from openings in buildings.....	46
B.8.1 General	46
B.8.2 Openings as possible sources of release.....	46
B.8.3 Openings classification	46
Annex C (informative) Ventilation guidance.....	48
C.1 Symbols.....	48
C.2 General.....	49
C.3 Assessment of ventilation and dilution and its influence on hazardous area	49
C.3.1 General	49
C.3.2 Effectiveness of ventilation	50
C.3.3 Criteria for dilution	50
C.3.4 Assessment of ventilation velocity	51
C.3.5 Assessment of the degree of dilution	52
C.3.6 Dilution in a room	53
C.3.7 Criteria for availability of ventilation	55
C.4 Examples of ventilation arrangements and assessments.....	56
C.4.1 Introduction	56
C.4.2 Jet release in a large building.....	56
C.4.3 Jet release in a small naturally ventilated building	57
C.4.4 Jet release in a small artificially ventilated building.....	57
C.4.5 Release with low velocity.....	58
C.4.6 Fugitive emissions	59
C.4.7 Local ventilation-extraction	59
C.5 Natural Ventilation in buildings.....	60
C.5.1 General	60
C.5.2 Wind induced ventilation.....	60
C.5.3 Buoyancy induced ventilation.....	61
C.5.4 Combination of the natural ventilation induced by wind and buoyancy	63
Annex D (informative) Estimation of hazardous zones.....	65
D.1 General.....	65
D.2 Estimating types of the zones	65
D.3 Estimating the extent of the hazardous zone.....	65
Annex E (informative) Examples of hazardous area classification	68

E.1	General.....	68
E.2	Examples.....	68
E.3	Example case study for area classification.....	83
Annex F (informative)	Schematic approach to classification of hazardous areas.....	93
F.1	Schematic approach to classification of hazardous areas.....	93
F.2	Schematic approach to classification of hazardous areas.....	94
F.3	Schematic approach to classification of hazardous areas.....	95
F.4	Schematic approach to classification of hazardous areas.....	96
Annex G (informative)	Flammable mists.....	97
Annex H (informative)	Hydrogen.....	99
Annex I (informative)	Hybrid mixtures.....	101
I.1	General.....	101
I.2	Use of ventilation.....	101
I.3	Concentration limits.....	101
I.4	Chemical reactions.....	101
I.5	Energy/Temperature limits.....	101
I.6	Zoning requirements.....	101
Annex J (informative)	Useful equations in support to hazardous area classification.....	102
J.1	General.....	102
J.2	Dilution with air of a flammable substance release.....	102
J.3	Estimate of the time required to dilute a flammable substance release.....	102
Annex K (informative)	Industry codes and national standards.....	104
K.1	General.....	104
Bibliography.....		106
Figure A.1	– Preferred symbols for hazardous area zones.....	30
Figure A.2	– Gas/vapour at low pressure (or at high pressure in case of unpredictable release direction).....	33
Figure A.3	– Gas/vapour at high pressure.....	33
Figure A.4	– Liquefied gas.....	34
Figure A.5	– Flammable liquid (non boiling evaporative pool).....	34
Figure B.1	– Forms of release.....	40
Figure B.2	– Volumetric evaporation rate of liquids.....	45
Figure C.1	– Chart for assessing the degree of dilution.....	52
Figure C.2	– Self diffusion of an unimpeded high velocity jet release.....	57
Figure C.3	– Supply only ventilation.....	58
Figure C.4	– Supply and extraction ventilation.....	58
Figure C.5	– Local extraction ventilation.....	60
Figure C.6	– Volumetric flow rate of fresh air per m ² of equivalent effective opening area.....	63
Figure C.7	– Example of opposing ventilation driving forces.....	64
Figure D.1	– Chart for estimating hazardous area distances.....	66
Figure E.1	– Degree of dilution (Example No. 1).....	69
Figure E.2	– Hazardous distance (Example No. 1).....	70
Figure E.3	– Zone classification (Example No. 1).....	70
Figure E.4	– Degree of dilution (Example No. 2).....	72

Figure E.5 – Hazardous distance (Example No. 2)	73
Figure E.6 – Degree of dilution (Example No. 3)	75
Figure E.7 – Hazardous distance (Example No. 3)	76
Figure E.8 – Zones classification (Example No. 3)	76
Figure E.9 – Degree of dilution (Example No. 4)	78
Figure E.10 – Hazardous distance (Example No. 4)	79
Figure E.11 – Zones classification (Example No. 4)	79
Figure E.12 – Degree of dilution (Example No. 5)	82
Figure E.13 – Hazardous distance (Example No. 5)	83
Figure E.14 – Enclosed compressor handling natural gas	85
Figure E.15 – Example of area classification for a compressor facility handling natural gas (elevation).....	91
Figure E.16 – Example of area classification for a compressor facility handling natural gas (plan)	92
Figure F.1 – Schematic approach to classification	93
Figure F.2 – Schematic approach to classification for continuous grade releases.....	94
Figure F.3 – Schematic approach to classification for primary grade releases.....	95
Figure F.4 – Schematic approach to classification for secondary grade releases	96
Table A.1 – Hazardous area classification data sheet – Part I: Flammable substance list and characteristics	31
Table A.2 – Hazardous area classification data sheet – Part II: List of sources of release	32
Table B.1 – Suggested hole cross sections for secondary grade of releases.....	39
Table B.2 – Effect of hazardous zones on openings as possible sources of release.....	47
Table C.1 – Indicative outdoor ventilation velocities (u_w)	52
Table D.1 – Zones for grade of release and effectiveness of ventilation.....	65
Table E.1 – Compressor facility handling natural gas.....	86
Table E.2 – Hazardous area classification data sheet – Part I: Flammable substance list and characteristics	88
Table E.3 – Hazardous area classification data sheet – Part II: List of sources of release (1 of 2)	89
Table K.1 – Examples of codes and standards.....	105

INTERNATIONAL ELECTROTECHNICAL COMMISSION

EXPLOSIVE ATMOSPHERES –

Part 10-1: Classification of areas – Explosive gas atmospheres

FOREWORD

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International Standard IEC 60079-10-1 has been prepared by subcommittee 31J: Classification of hazardous areas and installation requirements, of IEC technical committee 31: Equipment for explosive atmospheres.

This second edition of IEC 60079-10-1 cancels and replaces the first edition, published in 2008, and constitutes a technical revision. The significant technical changes with respect to the previous edition are as follows:

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Changes	Clause	Type		
		Minor and editorial changes	Extension	Major technical changes
Complete restructuring and dividing into sections to identify possible methodologies for classifying hazardous areas and to provide further explanation on specific assessment factors	Main body of the text	X	X	X
Introducing new terms and the definitions	3		X	
Introducing clauses for alternative methods of area classification	5		X	X
Updating examples for presentation of hazardous area classification	Annex A		X	X
Updating calculations for release rate	Annex B		X	X
Complete re-write with a new approach based upon the degree of dilution instead of the degree of ventilation	Annex C		X	X
Introduced as a new Annex for zone extents	Annex D		X	
Updated with new examples to explain the methodology set forth in Annexes A, B, C and D	Annex E			X
Update of the flow chart illustrating the area classification procedure by dividing it into four sections	Annex F		X	
Introduced as a new Annex on hydrogen	Annex H		X	
Introduced as a new Annex on hybrid mixtures	Annex I		X	
Introduced as a new Annex with supplementary equations	Annex J		X	
Introduced as a new Annex for reference to national and industry codes with specific examples of hazardous area classification	Annex K		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.

Explanations:

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.

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.

Major technical changes

addition of technical requirements
increase of technical requirements

These are changes to technical requirements (addition, increase of the level or removal).

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
31J/253/FDIS	31J/256/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.

The contents of the corrigendum of November 2015 have been included in this copy.

IMPORTANT – The 'colour inside' logo on the cover page of this publication indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this document using a colour printer.

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INTRODUCTION

In areas where dangerous quantities and concentrations of flammable gas or vapour may arise, protective measures need to be applied in order to reduce the risk of explosions. This part of IEC 60079 sets out the essential criteria against which the ignition hazards can be assessed, and gives guidance on the design and control parameters which can be used in order to reduce such hazards.

EXPLOSIVE ATMOSPHERES –

Part 10-1: Classification of areas – Explosive gas atmospheres

1 Scope

This part of IEC 60079 is concerned with the classification of areas where flammable gas or vapour hazards may arise and may then be used as a basis to support the proper selection and installation of equipment for use in hazardous areas.

It is intended to be applied where there may be an ignition hazard due to the presence of flammable gas or vapour, mixed with air, but it does not apply to:

- a) mines susceptible to firedamp;
- b) the processing and manufacture of explosives;
- c) catastrophic failures or rare malfunctions which are beyond the concept of abnormality dealt with in this standard (see 3.7.3 and 3.7.4);
- d) rooms used for medical purposes;
- e) commercial and industrial applications where only low pressure fuel gas is used for appliances e.g. for cooking, water heating and similar uses, where the installation is compliant with relevant gas codes;
- f) domestic premises;
- g) where a hazard may arise due to the presence of combustible dusts or combustible flyings but the principles may be used in assessment of a hybrid mixture (refer also IEC 60079-10-2).

NOTE Additional guidance on hybrid mixtures is provided in Annex I.

Flammable mists may form or be present at the same time as flammable vapour. In such case the strict application of the details in this standard may not be appropriate. Flammable mists may also form when liquids not considered to be a hazard due to the high flash point are released under pressure. In these cases the classifications and details given in this standard do not apply. Information on flammable mists is provided in Annex G.

For the purpose of this standard, an area is a three-dimensional region or space.

Atmospheric conditions include variations above and below reference levels of 101,3 kPa (1 013 mbar) and 20 °C (293 K), provided that the variations have a negligible effect on the explosion properties of the flammable substances.

In any process plant, irrespective of size, there may be numerous sources of ignition apart from those associated with equipment. Appropriate precautions will be necessary to ensure safety in this context. This standard is applicable with judgement for other ignition sources.

This standard does not take into account the consequences of ignition of an explosive atmosphere.

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

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undated references, the latest edition of the referenced document (including any amendments) applies.

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

IEC 60079-14, *Explosive atmospheres – Part 14: Electrical installations design, selection and erection*