

INTERNATIONAL STANDARD



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

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CONTENTS

FOREWORD.....	6
INTRODUCTION.....	2
1 Scope.....	11
2 Normative references	12
3 Terms and definitions	12
4 General	17
4.1 Safety principles	17
4.2 Hazardous area classification objectives.....	18
4.3 Interior of equipment containing flammable materials.....	18
4.4 Explosion risk assessment.....	19
4.4.1 General	19
4.4.2 Zone of negligible extent.....	19
4.5 Catastrophic failures	20
4.6 Competence of personnel	20
5 Hazardous area classification methodology	20
5.1 General.....	20
5.2 Classification by sources of release method.....	21
5.3 Use of industry codes and national standards	22
5.3.1 General	22
5.3.2 Fuel gas installations.....	22
5.4 Simplified methods.....	22
5.5 Combination of methods	22
6 Release of flammable substance	23
6.1 General.....	23
6.2 Sources of release.....	23
6.3 Forms of release.....	24
6.3.1 General	24
6.3.2 Gaseous release	25
6.3.3 Liquefied under pressure release.....	25
6.3.4 Liquefied by refrigeration release.....	26
6.3.5 Aerosols Flammable mists release.....	26
6.3.6 Vapours release	26
6.3.7 Liquid release.....	26
7 Ventilation (or air movement) and dilution.....	27
7.1 General.....	27
7.2 Main types of ventilation	28
7.2.1 General	28
7.2.2 Natural ventilation.....	28
7.2.3 Artificial ventilation	29
7.2.4 Degree of dilution	30
8 Type of zone	31
8.1 General.....	31
8.2 Influence of grade of the source of release	32
8.3 Influence of dilution.....	32
8.4 Influence of availability of ventilation.....	32

9	Extent of zone	32
10	Documentation	33
10.1	General.....	33
10.2	Drawings, data sheets and tables	34
Annex A	(informative) Suggested presentation of hazardous areas	35
A.1	Hazardous area zones – Preferred symbols for zones.....	35
A.2	Hazardous area suggested shapes	38
Annex B	(informative) Estimation of sources of release.....	40
B.1	Symbols.....	40
B.2	Examples of grade of release.....	40
B.2.1	General	40
B.2.2	Sources giving a continuous grade of release	41
B.2.3	Sources giving a primary grade of release	41
B.2.4	Sources giving a secondary grade of release.....	41
B.3	Assessment of grades of release	41
B.4	Summation of releases	42
B.5	Hole size and source radius	43
B.6	Forms of release.....	45
B.7	Release rate	46
B.7.1	General	46
B.7.2	Estimation of release rate	47
B.7.3	Release rate of evaporative pools.....	49
B.8	Release from openings in buildings.....	52
B.8.1	General	52
B.8.2	Openings as possible sources of release	53
B.8.3	Openings classification	53
Annex C	(informative) Ventilation guidance.....	55
C.1	Symbols.....	55
C.2	General.....	56
C.3	Assessment of ventilation and dilution and its influence on hazardous area	57
C.3.1	General	57
C.3.2	Effectiveness of ventilation	57
C.3.3	Criteria for dilution	58
C.3.4	Assessment of ventilation velocity	58
C.3.5	Assessment of the degree of dilution	59
C.3.6	Dilution in a room	59
C.3.7	Criteria for availability of ventilation	63
C.4	Examples of ventilation arrangements and assessments.....	65
C.4.1	Introduction	65
C.4.2	Jet release in a large building.....	65
C.4.3	Jet release in a small naturally ventilated building	66
C.4.4	Jet release in a small artificially ventilated building.....	67
C.4.5	Release with low velocity	68
C.4.6	Fugitive emissions	68
C.4.7	Local ventilation-extraction	69
C.5	Natural Ventilation in buildings.....	69
C.5.1	General	69
C.5.2	Wind induced ventilation.....	70

C.5.3	Buoyancy induced ventilation.....	71
C.5.4	Combination of the natural ventilation induced by wind and buoyancy	73
Annex D (informative)	Estimation of hazardous zones areas	75
D.1	General.....	75
D.2	Estimating types of the zones	75
D.3	Estimating the extent of the hazardous zones area	76
Annex E (informative)	Examples of hazardous area classification	80
E.1	General.....	80
E.2	Examples.....	80
E.3	Example case study for hazardous area classification.....	105
Annex F (informative)	Schematic approach to classification of hazardous areas	115
F.1	Schematic approach to classification of hazardous areas.....	115
F.2	Schematic approach to classification of hazardous areas.....	116
F.3	Schematic approach to classification of hazardous areas.....	117
F.4	Schematic approach to classification of hazardous areas.....	118
Annex G (informative)	Flammable mists.....	119
Annex H (informative)	Hydrogen	122
Annex I (informative)	Hybrid mixtures	124
I.1	General.....	124
I.2	Use of ventilation	124
I.3	Concentration limits	124
I.4	Chemical reactions	124
I.5	Energy/temperature limits	124
I.6	Zoning requirements	124
Annex J (informative)	Useful equations in support to hazardous area classification	125
J.1	General.....	125
J.2	Dilution with air of a flammable substance release	125
J.3	Estimate of the time required to dilute a flammable substance release.....	125
Annex K (informative)	Industry codes and national standards	128
K.1	General.....	128
Bibliography.....		132
Figure 1 – Dilution Volume.....		31
Figure A.1 – Preferred symbols for hazardous area zones		35
Figure A.2 – Gas/ or vapour at low pressure (or at high pressure in case of unpredictable release direction).....		38
Figure A.3 – Gas/ or vapour at high pressure.....		38
Figure A.4 – Liquefied gas		39
Figure A.5 – Flammable liquid (non boiling evaporative pool).....		39
Figure B.1 – Forms of release.....		45
Figure B.2 – Specific volumetric evaporation rate of liquids		51
Figure C.1 – Chart for assessing the degree of dilution.....		60
Figure C.2 – Self diffusion of an unimpeded high velocity jet release		66
Figure C.3 – Supply only ventilation.....		67
Figure C.4 – Supply and extraction ventilation		68
Figure C.5 – Local extraction ventilation		69

Figure C.6 – Specific volumetric flow rate of fresh air per m² of equivalent effective opening area.....	73
Figure C.7 – Example of opposing ventilation driving forces.....	74
Figure D.1 – Chart for estimating hazardous area distances	78
Figure E.1 – Degree of dilution (Example No. 1)	81
Figure E.2 – Hazardous distance (Example No. 1)	83
Figure E.3 – Zone classification (Example No. 1).....	84
Figure E.4 – Degree of dilution (Example No. 2)	87
Figure E.5 – Hazardous distance (Example No. 2).....	87
Figure E.5 – Degree of dilution (Example No. 3)	90
Figure E.6 – Hazardous distance (Example No. 3)	92
Figure E.7 – Zones classification (Example No. 3)	94
Figure E.8 – Degree of dilution (Example No. 4)	95
Figure E.9 – Hazardous distance (Example No. 4)	97
Figure E.10 – Zones classification (Example No. 4)	99
Figure E.11 – Degree of dilution (Example No. 5)	102
Figure E.12 – Hazardous distance (Example No. 5)	104
Figure E.13 – Enclosed compressor handling natural gas	107
Figure E.14 – Example of hazardous area classification for a compressor facility handling natural gas (elevation).....	113
Figure E.15 – Example of hazardous area classification for a compressor facility handling natural gas (plan)	114
Figure F.1 – Schematic approach to classification.....	115
Figure F.2 – Schematic approach to classification for continuous grade releases.....	116
Figure F.3 – Schematic approach to classification for primary grade releases	117
Figure F.4 – Schematic approach to classification for secondary grade releases	118
Table A.1 – Hazardous area classification data sheet – Part I: Flammable substance list and characteristics	36
Table A.2 – Hazardous area classification data sheet – Part II: List of sources of release	37
Table B.1 – Suggested hole cross sections for secondary grade of releases.....	44
Table B.2 – Effect of hazardous zones on openings as possible sources of release	54
Table C.1 – Indicative outdoor ventilation velocities (u_w)	59
Table D.1 – Zones for grade of release and effectiveness of ventilation	75
Table E.1 – Compressor facility handling natural gas	107
Table E.2 – Hazardous area classification data sheet – Part I: Flammable substance list and characteristics	110
Table E.3 – Hazardous area classification data sheet – Part II: List of sources of release	111
Table K.1 – Examples of codes and standards.....	129

INTERNATIONAL ELECTROTECHNICAL COMMISSION

EXPLOSIVE ATMOSPHERES –

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

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This commented version (CMV) of the official standard IEC 60079-10-1:2020 edition 3.0 allows the user to identify the changes made to the previous IEC 60079-10-1:2015 edition 2.0. Furthermore, comments from IEC SC 31J experts are provided to explain the reasons of the most relevant changes.

A vertical bar appears in the margin wherever a change has been made. Additions are in green text, deletions are in strikethrough red text. Experts' comments are identified by a blue-background number. Mouse over a number to display a pop-up note with the comment.

This publication contains the CMV and the official standard. The full list of comments is available at the end of the CMV.

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 third edition of IEC 60079-10-1 cancels and replaces the second edition, published in 2015, 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
Deleting commercial and industrial applications for fuel gas from the Scope exemptions	1			C1
Updating editorial details and notes to the definitions	3		X	
Deletion of the previous edition clause 3.7.3 definition for catastrophic failure (dealt with in clause 4.5)			X	
Introduction of new Subclause 4.4.2 Zone of negligible extent	4.4.2		X	
Introduction of new clause 5.3.2 Fuel gas installations	5.3.2		X	
Renumbering of headings	7	X		
Introduction of Figure 1 – Dilution volume	7		X	
Upgrading Table A.1 with UFL and its column 15 heading with the 'source of data'	A.1	X		
Updating the flow-chart in Figure B.1	B.6		X	
Updating equations for evaporation rate to align with the recent source modifications	B.7.3		X	
Updating the chart in Figure B.2 according to the updated equations for evaporation rate and the ventilation velocity of 0,25 m/s	B.7.3		X	
Restructuring Table C.1	C.3.4		X	
Removal of safety factor k and deleting it from the horizontal axis of the chart in Figure C.1	C.3.5			C2
Revising equations (C.2) and (C.3)	C.5.2			C3
Revising equations (C.4) and (C.5)	C.5.3			C4
Revising the chart in Figure C.6 by changing the label on the horizontal axis	C.5.3			C5
Revising equation (C.6) and deleting equation (C.7)	C.5.4			C6
Removal of safety factor k and deleting it from the horizontal axis of the charts in Figure D.1	D.3			C7
Imposing limitations to the use of the chart in Figure D.1	D.3		X	
Updating and corrections in Annex E	Annex E		X	
Upgrading Annex G on Flammable mists	Annex G		X	
Introducing new items in Table K.1	Annex K		X	
Introducing new items in the Bibliography	Bibliography		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:

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.

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

B) Information about the background of changes

- C1 The previous edition item e) was: “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”. Industrial applications of any kind should not be exempted from the scope of this standard. See also new clause 5.3.2.
- C2 The factor *k* was initially intended to provide for additional safety for uncertainties in determining LFL for flammable substances, particularly gas mixtures. However, this was considered as unnecessary and confusing considering the derivation of the chart.
- C3 The equations are updated to align with BS 5925
- C4 The equations are updated to align with BS 5925
- C5 The chart is revised to match the new equation (C.4)
- C6 The equation is updated to align with BS 5925
- C7 See the explanation under C2

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/307/FDIS	31J/310/RVD

Full information on the voting for the approval of this International Standard can be found in the report on voting indicated in the above table.

This document 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 document will remain unchanged until the stability date indicated on the IEC website under "<http://webstore.iec.ch>" in the data related to the specific document. At this date, the document will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

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The contents of the corrigendum of March 2021 have been included in this copy.

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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.

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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~~ design, construction, operation and maintenance **1** 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~~ normality dealt with in this standard (see 3.7.3 and ~~3.7.4~~ 4.5);
- 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; **2**~~
- e) domestic premises;
- f) 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 to 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 document 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 document do not apply. Information on flammable mists is provided in Annex G.

For the purpose of this document, 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~~ site **3**, 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 but in some applications other safeguards may also need to be considered. E.g. larger distances may apply for naked flames when considering hot work permits. **4**

This document does not take into account the consequences of ignition of an explosive atmosphere except where a zone is so small that if ignition did occur it would have negligible consequences (see 3.3.8 and 4.4.2). **5**

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

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

This document contains no normative references.

3 Terms and definitions

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

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at <http://www.electropedia.org/>
- ISO Online browsing platform: available at <http://www.iso.org/obp>

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

3.1

explosive atmosphere

mixture with air, under atmospheric conditions, of flammable substances in the form of gas, vapour, or dust, ~~fibres, or flyings,~~ which, after ignition, permits self-sustaining ~~flame~~ propagation

[SOURCE: IEC 60079-0:20132017, ~~3.30~~ 3.38]

3.2

explosive gas atmosphere

mixture with air, under atmospheric conditions, of flammable substances in the form of gas or vapour, which, after ignition, permits self-sustaining flame propagation

Note 1 to entry: Although a mixture which has a concentration above the upper flammable limit (UFL) is not an explosive gas atmosphere, it can readily become so and, generally for hazardous area classification purposes, it is advisable to consider it as an explosive gas atmosphere.

Note 2 to entry: There are some gases and vapours which are explosive with the concentration of 100 % (e.g. acetylene, CAS no. 74-86-2, C₂H₂; monovinyl acetylene, CAS no. 689-97-4, C₄H₄; 1-propyl nitrate (vapour), CAS no. 627-13-4, CH₃ (CH₂)₂ NO₃; isopropyl nitrate (vapour), CAS no. 1712-64-7, (CH₃)₂ CH ONO₂; ethylene oxide (vapour), CAS no. 75-21-8, (CH₂)₂ O; hydrazine (vapour), CAS no. 302-01-2, H₄ N₂).

[SOURCE: IEC 60079-0:20132017, ~~3.32~~ 3.40, modified (addition of Notes to entry)]

3.3

hazardous areas and zones

3.3.1

hazardous area <on account of explosive gas atmospheres>

area in which an explosive gas atmosphere is present or ~~may~~ can be expected to be present, in quantities such ~~as to require~~ that special precautions for the construction, installation and use of equipment are required