SLOVENSKI STANDARD
oSIST prEN IEC 60079-10-1:2019

01-september-2019

Eksplozivne atmosfere - 10-1. del: Razvrstitev prostorov - Eksplozivne plinske atmosfere

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

Explosionsgefährdete Bereiche - Teil 10-1: Einteilung der Bereiche - Gasexplosionsgefährdete Bereiche

Atmosphères explosives - Partie 10-1: Classement des emplacements - Atmosphères explosives gazeuses

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COMMITTEE DRAFT FOR VOTE (CDV)

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IEC SC 31J : CLASSIFICATION OF HAZARDOUS AREAS AND INSTALLATION REQUIREMENTS	
SECRETARIAT: Croatia	SECRETARY: Mr Marino Kelava
OF INTEREST TO THE FOLLOWING COMMITTEES: TC 18,SC 61D	PROPOSED HORIZONTAL STANDARD: ☐ Other TC/SCs are requested to indicate their interest, if any, in this CDV to the secretary.
FUNCTIONS CONCERNED: ☐ EMC ☒ ENVIRONMENT	☐ QUALITY ASSURANCE ☒ SAFETY
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TITLE:

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

PROPOSED STABILITY DATE: 2025

NOTE FROM TC/SC OFFICERS:

CONTENTS

185 INTERNATIONAL ELECTROTECHNICAL COMMISSION

186 _____

187

188 # EXPLOSIVE ATMOSPHERES –

189

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

192

193 ## FOREWORD

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

231 This bilingual version (2016-01) corresponds to the English version, published in 2015-09.

232 This third edition of IEC 60079-10-1 cancels and replaces the second edition, published in
233 2015, and constitutes a technical revision. The significant technical changes with respect to
234 the previous edition are as follows:

235

Changes	Clause	Type		
		Minor and editorial changes	Extension	Major technical changes
Deleting item e) from the Scope exemptions	1			X
Introducing new terms and the definitions	3		X	
Introducing new clause **4.4.1 Zone of negligible extent**	4		X	X
Introducing new clause **5.3.1 Fuel gas installations**	5	X	X	X
Introducing **Figure 1 – Dilution volume**	7		X	
Upgrading **Table A.1** with UFL and its column 15 heading with the 'source of data'	Annex A		X	X
Updating the flow-chart in **Figure B.1**	Annex B			X
Updating equations for evaporation rate with the recent source modifications	Annex B		X	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	Annex B			X
Restructuring **Table C.1**	Annex C			X
Abolishing safety factor ***k*** and deleting it from the horizontal axis of the charts in **Figures C.1** and **D.1**	Annex C, D			X
Imposing limitations to the use of the chart in **Figure D.1**	Annex D		X	X
Updating and corrections in **Annex E**	Annex E			X
Upgrading **Annex G** on Flammable mists	Annex G		X	X
Introducing new clause **J.3 Room circulation airflow rates for releases arising from an enclosure with a fan**	Annex J		X	X
Introducing new items in **Table K.1**	Annex K		X	
Introducing new items in the Bibliography	Bibliography		X	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.

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

FDIS	Report on voting
31J/253/FDIS	31J/256/RVD

253
254 Full information on the voting for the approval of this standard can be found in the report on
255 voting indicated in the above table.

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

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

258 A list of all parts of the IEC 60079 series, under the general title *Explosive atmospheres*, can
259 be found on the IEC website.

260 The committee has decided that the contents of this publication will remain unchanged until
261 the stability date indicated on the IEC website under "http://webstore.iec.ch" in the data
262 related to the specific publication. At this date, the publication will be

263 • reconfirmed,
264 • withdrawn,
265 • replaced by a revised edition, or
266 • amended.

267

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 design, construction, operation and maintenance 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 normality dealt with in this standard (see 3.7.3, 3.7.4 and 4.5);

d) rooms used for medical purposes;

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 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 except where a zone is so small that if ignition did occur it would have negligible consequences (see 3.3.8 and 4.4.1).

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*

3 Terms and definitions

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

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, dust, fibres, or flyings, which, after ignition, permits self-sustaining flame propagation

[SOURCE: IEC 60079-0:2013, 3.30]

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, C_2H_2; monovinyl acetylene, CAS no. 689-97-4, C_4H_4; 1-propyl nitrate (vapour), CAS no. 627-13-4, $CH_3 (CH_2)_2 NO_3$; isopropyl nitrate (vapour), CAS no. 1712-64-7, $(CH_3)_2 CH ONO_2$; ethylene oxide (vapour), CAS no. 75-21-8, $(CH_2)_2 O$; hydrazine (vapour), CAS no. 302-01-2, $H_4 N_2$.

[SOURCE: IEC 60079-0:2013, 3.32, 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 can be expected to be present, in quantities such that special precautions for the construction, installation and use of equipment are required

3.3.2
non-hazardous area (on account of explosive gas atmospheres)
area in which an explosive gas atmosphere is not expected to be present in quantities such that special precautions for the construction, installation and use of equipment are required

3.3.3
zones
hazardous area classification based on the frequency of the occurrence and duration of the explosive atmosphere

3.3.4
zone 0
an area in which an explosive gas atmosphere is present continuously or for long periods or frequently

Note 1 to entry: Both “long” and “frequently” are the terms which are intended to describe a very high likelihood of a potentially explosive atmosphere in the area. In that respect, those terms do not necessarily need to be quantified.

3.3.5
zone 1
area in which an explosive gas atmosphere is likely to occur occasionally in normal operation

3.3.6
zone 2
an area in which an explosive gas atmosphere is not likely to occur in normal operation but, if it does occur, it will exist for a short period only

Note 1 to entry: Indications of the frequency of the occurrence and duration of the explosive atmosphere can be taken from codes or standards relating to specific industries or applications.

[SOURCE: IEC 60050-426:2009, 426-03-05]

3.3.7
extent of zone
distance in any direction from the source of release to where a gas/air mixture will be diluted by air to a concentration below the lower flammable limit

3.3.8
zone NE
a zone of negligible extent such that if ignition did occur it would have negligible consequences

Note 1 to entry: A zone NE would also imply a negligible release rate.

Note 2 to entry: Zones of negligible extent could be Zone 0 NE, Zone 1 NE or Zone 2 NE.

3.4
releases

3.4.1
source of release
a point or location from which a flammable gas, vapour, mist or liquid may be released into the atmosphere so that an explosive gas atmosphere could be formed

[SOURCE: IEC 60050-426:2009, 426-03-06, modified (addition of "mist")]

3.4.2
continuous grade of release
release which is continuous or is expected to occur frequently or for long periods

Note 1 to entry: Both “frequently” and “long” are the terms which are intended to describe a very high likelihood of a potential release. In that respect, those terms do not necessarily need to be quantified.

3.4.3
primary grade of release
release which can be expected to occur periodically or occasionally during normal operation

3.4.4
secondary grade of release
release which is not expected to occur in normal operation and, if it does occur, is likely to do so only infrequently and for short periods

405 **3.4.5**
406 **release rate**
407 quantity of flammable gas, liquid, vapour or mist emitted per unit time from the source of
408 release

409 **3.5**
410 **ventilation and dilution**

411 **3.5.1**
412 **ventilation**
413 movement of air and its replacement with fresh air due to the effects of wind, temperature
414 gradients, or artificial means (for example, fans or extractors)

415 Note 1 to entry: Fresh air is intended to be synomonous with the term 'clean air' used in IEC 60079-13. Both terms
416 mean air that is essentially free of flammable gas or vapour.

417 **3.5.2**
418 **dilution**
419 the mixing of flammable vapour or gas with air which, over time, will reduce the flammable
420 concentration

421 **3.5.3**
422 **dilution volume**
423 the volume in the vicinity of a source of release where the concentration of flammable gas or
424 vapour is not diluted to a safe level

425 Note 1 to entry: In certain instances, the volumes under 3.5.3 and 3.5.5 could be the same.

426 **3.5.4**
427 **background concentration**
428 the mean concentration of flammable substance within the volume under consideration
429 outside of the release plume or jet

430 **3.5.5**
431 **volume under consideration**
432 the volume served by the ventilation in the vicinity of the release being considered

433 Note 1 to entry: For an enclosed space this could be an entire room or part of a larger space where the
434 considered ventilation will dilute the gas or vapour from a given source of release. Outdoors, this is the volume
435 around a source of release where an explosive mixture could form. In congested outdoor places this volume could
436 be dictated by the partial enclosure provided by the surrounding objects.

437 **3.6**
438 **properties of flammable substance**

439 **3.6.1**
440 **flammable substance**
441 substance which is itself flammable, or is capable of producing a flammable gas, vapour or
442 mist

443 **3.6.2**
444 **flammable liquid**
445 liquid capable of producing a flammable vapour under any foreseeable operating conditions

446 Note 1 to entry: An example of a foreseeable operating condition is one in which the flammable liquid is handled
447 at temperatures close to or above its flash point.

448 Note 2 to entry: This definition is used for the classification of hazardous areas and may be different from the
449 definition of flammable liquids used for other purposes e.g. codes for classification of flammable liquids for
450 transport.