



SLOVENSKI STANDARD
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Eksplozivne atmosfere - 10-1. del: Razvrstitev prostorov - Eksplozivne plinske atmosfere (IEC 60079-10-1:2008)

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

Explosionsfähige Atmosphäre – Teil 10-1: Einteilung der Bereiche – Gasexplosionsgefährdete Bereiche

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

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EUROPEAN STANDARD
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EN 60079-10-1

March 2009

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Supersedes EN 60079-10:2003

English version

**Explosive atmospheres -
Part 10-1: Classification of areas -
Explosive gas atmospheres
(IEC 60079-10-1:2008)**

Atmosphères explosives -
Partie 10-1: Classement
des emplacements -
Atmosphères explosives gazeuses
(CEI 60079-10-1:2008)

Explosionsfähige Atmosphäre -
Teil 10-1: Einteilung der Bereiche -
Gasexplosionsgefährdete Bereiche
(IEC 60079-10-1:2008)

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This European Standard was approved by CENELEC on 2009-03-01. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CENELEC member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the Central Secretariat has the same status as the official versions.

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

CENELEC

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

Central Secretariat: avenue Marnix 17, B - 1000 Brussels

Foreword

The text of document 31J/159/FDIS, future edition 1 of IEC 60079-10-1, prepared by SC 31J, Classification of hazardous areas and installation requirements, of IEC TC 31, Equipment for explosive atmospheres, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 60079-10-1 on 2009-03-01.

This European Standard supersedes EN 60079-10:2003.

The significant technical changes with respect to EN 60079-10:2003 are as follows:

- introduction of Annex D which deals with explosion hazard from flammable mists generated by the release under pressure of high flash point liquids;
- introduction of Clause A.3 (release rate) which gives thermodynamic equations for release rate with a number of examples for estimating release rate of fluids and gases.

The following dates were fixed:

- latest date by which the EN has to be implemented
at national level by publication of an identical
national standard or by endorsement (dop) 2009-12-01
- latest date by which the national standards conflicting
with the EN have to be withdrawn (dow) 2012-03-01

Annexes ZA and ZB have been added by CENELEC.

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Endorsement notice

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The text of the International Standard IEC 60079-10-1:2008 was approved by CENELEC as a European Standard without any modification.

Annex ZA (normative)

Normative references to international publications with their corresponding European publications

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

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

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 60050-426	- ¹⁾	International Electrotechnical Vocabulary (IEV) - Part 426: Equipment for explosive atmospheres	-	-
IEC 60079-0	- ¹⁾	Explosive atmospheres - Part 0: Equipment - General requirements	EN 60079-0	- ¹⁾
IEC 60079-4	- ¹⁾	Electrical apparatus for explosive gas atmospheres - Part 4: Method of test for ignition temperature	-	-
IEC 60079-4A	- ¹⁾	Electrical apparatus for explosive gas atmospheres - Part 4: Method of test for ignition temperature First supplement to IEC 60079-4A:1966	-	-
IEC/TR 60079-20	- ¹⁾	Electrical apparatus for explosive gas atmospheres - Part 20: Data for flammable gases and vapours, relating to the use of electrical apparatus	-	-

¹⁾ Undated reference.

Annex ZB (informative)

ATEX Categories and Equipment Protection Levels (EPLs)

This European Standard has been written to incorporate the concept of Equipment Protection Levels (EPLs).

EPLs are analogous to the ATEX Categories, indeed the definitions are identical.

Wherever there is a reference to an EPL in the text it should be equated with the corresponding ATEX Category:

- EPL 'Ga' equates to ATEX Category 1G;
- EPL 'Gb' equates to ATEX Category 2G;
- EPL 'Gc' equates to ATEX Category 3G;
- EPL 'Da' equates to ATEX Category 1D;
- EPL 'Db' equates to ATEX Category 2D;
- EPL 'Dc' equates to ATEX Category 3D.

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

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

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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

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.
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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 first edition of IEC 60079-10-1 cancels and replaces the fourth edition of IEC 60079-10, published in 2002, and constitutes a technical revision.

The significant technical changes with respect to the previous edition are as follows:

- Introduction of Annex D which deals with explosion hazard from flammable mists generated by the release under pressure of high flash point liquids.
- Introduction of Clause A.3 (release rate) which gives thermodynamic equations for release rate with a number of examples for estimating release rate of fluids and gases.

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

FDIS	Report on voting
31J/159/FDIS	31J/160/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 maintenance result date indicated on the IEC web site 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.

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INTRODUCTION

In areas where dangerous quantities and concentrations of flammable gas or vapour may arise, protective measures are 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 a hazard.

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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 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 a hazardous area.

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) areas where a hazard may arise due to the presence of combustible dusts or fibres (refer to IEC 61241-10 / IEC 60079-10-2);
- d) catastrophic failures which are beyond the concept of abnormality dealt with in this standard (see Note 5);
- e) rooms used for medical purposes;
- f) domestic premises.

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 1 Flammable mists may form or be present at the same time as flammable vapours. 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 cases, the strict application of area classification for gases and vapours may not be appropriate as the basis for selection of equipment.

Information on flammable mists is provided in Annex D.

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.

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.

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 with judgement for other ignition sources.

2 Normative references

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

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

3 Terms and definitions

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

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NOTE Additional definitions applicable to explosive atmospheres can be found in the 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 propagation

[IEC 60079-0, definition 3.22]

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

[IEC 60079-0, definition 3.24]

NOTE 1 Although a mixture which has a concentration above the upper explosive limit (UEL) is not an explosive gas atmosphere, it can readily become so and, in certain cases for area classification purposes, it is advisable to consider it as an explosive gas atmosphere.

NOTE 2 There are some gases which are explosive with the concentration of 100 %.

3.3

hazardous area (on account of explosive gas atmospheres)

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

3.4

non-hazardous area (on account of explosive gas atmospheres)

an area in which an explosive gas atmosphere is not expected to be present in quantities such as to require special precautions for the construction, installation and use of equipment

3.5

zones

hazardous areas are classified into zones based upon the frequency of the occurrence and duration of an explosive gas atmosphere, as follows:

3.6

zone 0

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

3.7

zone 1

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

3.8

zone 2

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

[IEV 426-03-05]

NOTE Indications of the frequency of the occurrence and duration may be taken from codes relating to specific industries or applications.

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3.9

source of release

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

IEV 426-03-06, modified]

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3.10

grades of release

there are three basic grades of release, as listed below in order of decreasing frequency and likelihood of the explosive gas atmosphere being present:

- a) continuous grade;
- b) primary grade;
- c) secondary grade.

A source of release may give rise to any one of these grades of release, or to a combination of more than one

3.11

continuous grade of release

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

3.12

primary grade of release

release which can be expected to occur periodically or occasionally during normal operation

3.13

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

3.14**release rate**

quantity of flammable gas, vapour or mist emitted per unit time from the source of release

3.15**normal operation**

situation when the equipment is operating within its designed parameters

NOTE 1 Minor releases of flammable material may be part of normal operation. For example, releases from seals which rely on wetting by the fluid which is being pumped are considered to be minor releases.

NOTE 2 Failures (such as the breakdown of pump seals, flange gaskets or spillages caused by accidents) which involve urgent repair or shut-down are not considered to be part of normal operation nor are they considered to be catastrophic.

NOTE 3 Normal operation includes start-up and shut-down conditions.

3.16**ventilation**

movement of air and its replacement with fresh air due to the effects of wind, temperature gradients, or artificial means (for example, fans or extractors)

3.17**lower explosive limit (LEL)**

concentration of flammable gas, vapour or mist in air below which an explosive gas atmosphere will not be formed

[IEV 426-02-09]

3.18**upper explosive limit (UEL)**

concentration of flammable gas, vapour or mist in air, above which an explosive gas atmosphere will not be formed

[IEV 426-02-10]

3.19**relative density of a gas or a vapour**

density of a gas or a vapour relative to the density of air at the same pressure and at the same temperature (air is equal to 1,0)

3.20**flammable material (flammable substance)**

material which is flammable of itself, or is capable of producing a flammable gas, vapour or mist

3.21**flammable liquid**

liquid capable of producing a flammable vapour under any foreseeable operating conditions

NOTE An example of a foreseeable operating condition is one in which the flammable liquid is handled at temperatures close to or above its flash point.

3.22**flammable gas or vapour**

gas or vapour which, when mixed with air in certain proportions, will form an explosive gas atmosphere

3.23**flammable mist**

droplets of liquid, dispersed in air so as to form an explosive atmosphere