



SLOVENSKI STANDARD

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SIST EN 60079-25:2004

Električne naprave za eksplozivne plinske atmosfere - 25. del: Lastnovarni sistemi (IEC 60079-25:2010)

Explosive atmospheres - Part 25: Intrinsically safe systems (IEC 60079-25:2010)

Explosionsfähige Atmosphäre - Teil 25: Eigensichere Systeme (IEC 60079-25:2010)

Atmosphères explosives - Partie 25: Systèmes électriques de sécurité intrinsèque (IEC 60079-25:2010)

[SIST EN 60079-25:2010](https://standards.iteh.ai/catalog/standards/sist/cbdde78f-0776-4eb0-9d3f-2a1/sist-en-60079-25-2010)

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29.260.20	Električni aparati za eksplozivna ozračja	Electrical apparatus for explosive atmospheres
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EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN 60079-25

October 2010

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Supersedes EN 60079-25:2004

English version

**Explosive atmospheres -
Part 25: Intrinsically safe electrical systems
(IEC 60079-25:2010)**

Atmosphères explosives -
Partie 25: Systèmes électriques de
sécurité intrinsèque
(CEI 60079-25:2010)

Explosionsfähige Atmosphäre -
Teil 25: Eigensichere Systeme
(IEC 60079-25:2010)

This European Standard was approved by CENELEC on 2010-10-01. 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, Croatia, 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

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Foreword

The text of document 31G/202/FDIS, future edition 2 of IEC 60079-25, prepared by SC 31G, Intrinsically-safe apparatus, of IEC TC 31, Equipment for explosive atmospheres, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 60079-25 on 2010-10-01.

This European Standard supersedes EN 60079-25:2004.

The significant changes with respect to EN 60079-25:2004 are:

- extension of the scope from Group II to Groups I, II and III;
- introduction of level of protection "ic";
- addition of requirements for cables and multi-core cables;
- reference to EN 60079-11 regarding the termination of intrinsically safe circuits;
- requirements for the assessment of an expanded and clarified intrinsically safe system regarding level of protection "ic", simple apparatus and faults in multi-core cables;
- introduction of predefined systems and merging of the system requirements for FISCO from EN 60079-27;
- addition of requirements for simple intrinsically safe systems containing both lumped inductance and lumped capacitance;
- addition of a method for testing the electrical parameters of cables;
- additional information for the use of simple apparatus in systems.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN and CENELEC shall not be held responsible for identifying any or all such patent rights.

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) 2011-07-01
- latest date by which the national standards conflicting with the EN have to be withdrawn (dow) 2013-10-01

This European Standard has been prepared under a mandate given to CENELEC by the European Commission and the European Free Trade Association and covers essential requirements of EC Directive 94/9/EC. See Annex ZZ.

Annexes ZA and ZZ have been added by CENELEC.

Endorsement notice

The text of the International Standard IEC 60079-25:2010 was approved by CENELEC as a European Standard without any modification.

In the official version, for Bibliography, the following note has to be added for the standard indicated:

IEC 60529 NOTE Harmonized as EN 60529.

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 60060-1	-	High-voltage test techniques - Part 1: General definitions and test requirements	EN 60060-1	-
IEC 60079-0	-	Explosive atmospheres - Part 0: Equipment - General requirements	EN 60079-0	-
IEC 60079-11	2006	Explosive atmospheres - Part 11: Equipment protection by intrinsic safety "i"	EN 60079-11	2007
IEC 60079-14	2007	Explosive atmospheres - Part 14: Electrical installations design, selection and erection	EN 60079-14	2008
IEC 60079-15	-	Explosive atmospheres - Part 15: Equipment protection by type of protection "n"	EN 60079-15	-
IEC 60079-27	2008	Explosive atmospheres - Part 27: Fieldbus intrinsically safe concept (FISCO)	EN 60079-27	2008
IEC 61158-2	-	Industrial communication networks - Fieldbus specifications - Part 2: Physical layer specification and service definition	EN 61158-2	-
IEC 61241-0	-	Electrical apparatus for use in the presence of combustible dust - Part 0: General requirements	EN 61241-0	-
IEC 61241-11	-	Electrical apparatus for use in the presence of combustible dust - Part 11: Protection by intrinsic safety 'iD'	EN 61241-11	-

Annex ZZ (informative)

Coverage of essential requirements of the directive 94/9/EC

This European Standard has been prepared under a mandate given to CENELEC by the European Commission and the European Free Trade Association and within its scope the standard covers only the following essential safety requirements out of those given in Annex II of the EC Directive 94/9/EC:

Compliance with this standard provides one means of conformity with the specified essential requirements of the Directive concerned.

WARNING: Other requirements and other EC Directives may be applicable to the products falling within the scope of this standard.

ESR	Equivalent requirement in EN 60079-25:2010
1.0.1	fundamental basis of standard
1.0.2	Fundamental principle of intrinsic safety technique applied throughout this standard and apparatus standard EN 60079-11 and EN 60079-0
1.0.3	Requirement primarily met by apparatus standard EN 60079-11 and the maintenance requirements specified in EN 60079-14 and EN 60079-17.
1.0.4	EN 60079-0 Clause 5, Subclauses 6.1, 6.2, 7.2 and 7.3
1.0.5	Clause 14, EN 60079-0 Clause 29 and Foreword
1.0.6 a	Clause 4
1.1.1	EN 60079-0 Clause 8.1
1.1.3	EN 60079-0 Clause 7, 8, 12
1.2.1	The system and apparatus standards represent the latest state of the art
1.2.2	Requirement met by apparatus standard, EN 60079-0 Clause 13 and clause 13.2 of this standard
1.2.4	Clause 5 also covers Group III, details in EN 60079-0 and EN 60079-11
1.2.6	Covered by EN 60079-11
1.3.1	Sparks and hot surfaces covered in Clause 13 and in EN 60079-11. Other potential ignition sources covered in EN 60079-0
1.3.2	EN 60079-0, Subclause 7.4
1.3.3 to 1.3.5	EN 60079-0
1.4	EN 60079-0 and EN 60079-11
2.0.1 and 2.0.2	'ia' apparatus and systems in accordance with EN 60079-11 and this standard meet the 'two fault' criterion (M1) and 'ib' apparatus and systems in accordance with EN 60079-11 and this standard meet the 'one fault' criterion (M2) and the other criterions
2.1.1 and 2.1.2	'ia' apparatus and systems in accordance with EN 60079-11/EN 61241-11 and this standard meet the 'two fault' criterion (1G and 1D) and the other criterions
2.2.1 and 2.2.2	'ib' apparatus and systems in accordance with EN 60079-11/EN 61241-11 and this standard meet the 'one fault' criterion (2G and 2D) and the other criterions
2.3.1 and 2.3.2	'ic' apparatus and systems in accordance with EN 60079-11/EN 61241-11 and this standard meet the 'safe in normal operation' criterion (3G and 3D) and the other criterions



IEC 60079-25

Edition 2.0 2010-02

INTERNATIONAL STANDARD

NORME INTERNATIONALE

Explosive atmospheres –
Part 25: Intrinsically safe electrical systems

Atmosphères explosives –
Partie 25: Systèmes électriques de sécurité intrinsèque

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

EXPLOSIVE ATMOSPHERES –**Part 25: Intrinsically safe electrical systems**

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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- 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 60079-25 has been prepared by subcommittee 31G: Intrinsically safe apparatus, of IEC technical committee 31: Equipment for explosive atmospheres.

This second edition cancels and replaces the first edition published in 2003 and constitutes a thorough technical revision.

The significant changes with respect to the previous edition are listed below:

- extension of the scope from Group II to Groups I, II and III;
- introduction of level of protection "ic";
- addition of requirements for cables and multi-core cables;
- reference to IEC 60079-11 regarding the termination of intrinsically safe circuits
- requirements for the assessment of an expanded and clarified intrinsically safe system regarding level of protection "ic", simple apparatus and faults in multi-core cables;

- introduction of predefined systems and merging of the system requirements for FISCO from IEC 60079-27;
- addition of requirements for simple intrinsically safe systems containing both lumped inductance and lumped capacitance;
- addition of a method for testing the electrical parameters of cables;
- additional information for the use of simple apparatus in systems.

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

FDIS	Report on voting
31G/202/FDIS	31G/203/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 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 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 [SIST EN 60079-25:2010](#)
- amended. <https://standards.iteh.ai/catalog/standards/sist/cbdde78f-0776-4eb0-9d3f-00ffab8432a1/sist-en-60079-25-2010>

ITEH STANDARD PREVIEW

(standards.iteh.ai)

EXPLOSIVE ATMOSPHERES –

Part 25: Intrinsically safe electrical systems

1 Scope

This part of IEC 60079 contains the specific requirements for construction and assessment of intrinsically safe electrical systems, type of protection “i”, intended for use, as a whole or in part, in locations in which the use of Group I, II or III apparatus is required.

NOTE 1 This standard is intended for use by the designer of the system who may be a manufacturer, a specialist consultant or a member of the end-user’s staff.

This standard supplements and modifies the general requirements of IEC 60079-0 and the intrinsic safety standard IEC 60079-11. Where a requirement of this standard conflicts with a requirement of IEC 60079-0 or IEC 60079-11, the requirement of this standard takes precedence.

This standard supplements IEC 60079-11, the requirements of which apply to electrical apparatus used in intrinsically safe electrical systems.

The installation requirements of Group II or Group III systems designed in accordance with this standard are specified in IEC 60079-14.

NOTE 2 Group I installation requirements are presently not provided in IEC 60079-14.

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 60060-1, *High-voltage test techniques – Part 1: General definitions and test requirements*

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

IEC 60079-11:2006, *Explosive atmospheres – Part 11: Equipment protection by intrinsic safety “i”*

IEC 60079-14:2007, *Explosive atmospheres – Part 14: Electrical installations design, selection and erection*

IEC 60079-15, *Electrical apparatus for explosive gas atmospheres – Part 15: Construction, test and marking of type of protection “n” electrical apparatus*

IEC 60079-27:2008, *Explosive atmospheres – Part 27: Fieldbus intrinsically safe concept (FISCO)*

IEC 61158-2, *Industrial communication networks – Fieldbus specifications – Part 2: Physical layer specification and service definition*

IEC 61241-0, *Electrical apparatus for use in the presence of combustible dust – Part 0: General requirements*

IEC 61241-11, *Electrical apparatus for use in the presence of combustible dust – Part 11: Protection by intrinsic safety 'iD'*

3 Terms, definitions and abbreviations

3.1 Terms and definitions

For the purposes of this document, the following terms and definitions, specific to intrinsically safe electrical systems, apply. They supplement the terms and definitions which are given in IEC 60079-0 and IEC 60079-11.

3.1.1

intrinsically safe electrical system

assembly of interconnected items of electrical apparatus, described in a descriptive system document, in which the circuits or parts of circuits, intended to be used in an explosive atmosphere, are intrinsically safe circuits

3.1.2

certified intrinsically safe electrical system

intrinsically safe electrical system conforming to 3.1.1 for which a certificate has been issued confirming that the electrical system complies with IEC 60079-25

3.1.3

uncertified intrinsically safe electrical system

intrinsically safe electrical system conforming to 3.1.1 for which the knowledge of the electrical parameters of the items of certified intrinsically safe electrical apparatus, certified associated apparatus, simple apparatus and the knowledge of the electrical and physical parameters of the interconnecting wiring permit the unambiguous deduction that intrinsic safety is preserved

3.1.4

descriptive system document

document in which the items of electrical apparatus, their electrical parameters and those of the interconnecting wiring are specified

3.1.5

system designer

person who is responsible for the descriptive system document, has the necessary competence to fulfil the task and who is empowered to enter into the commitments on behalf of his employer

3.1.6

maximum cable capacitance

C_c

maximum capacitance of the interconnecting cable that can be connected into an intrinsically safe circuit without invalidating intrinsic safety

3.1.7

maximum cable inductance

L_c

maximum inductance of the interconnecting cable that can be connected into an intrinsically safe circuit without invalidating intrinsic safety

3.1.8**maximum cable inductance to resistance ratio** L_c/R_c

maximum value of the ratio inductance (L_c) to resistance (R_c) of the interconnecting cable that can be connected into an intrinsically safe circuit without invalidating intrinsic safety

3.1.9**linear power supply**

power source from which the available output current is determined by a resistor; the output voltage decreases linearly as the output current increases.

3.1.10**non-linear power supply**

power supply where the output voltage and output current have a non-linear relationship

NOTE For example, a supply with a constant voltage output that can reach a constant current limit controlled by semiconductors.

3.2 Abbreviations

FISCO	Fieldbus Intrinsically Safe Concept
FNICO	Fieldbus Non-Incendive Concept

4 Descriptive system document

A descriptive system document shall be created for all systems. The descriptive system document shall provide an adequate analysis of the safety achieved by the system.

NOTE Annex E comprises examples of typical diagrams, which illustrate the requirements of the descriptive system document.

The minimum requirements are as follows:

- block diagram of the system listing all the items of apparatus within the system including simple apparatus and the interconnecting wiring. An example of such a diagram is shown in Figure E.1;
- a statement of the group subdivision (for Groups II and III), the level of protection for each part of the system, the temperature classification, and the ambient temperature rating in accordance with Clauses 5, 6 and 7;
- the requirements and permitted parameters of the interconnecting wiring in accordance with Clause 8;
- details of the earthing and bonding points of the systems in accordance with Clause 11. When surge protection devices are used, an analysis in accordance with Clause 12 shall also be included;
- where applicable, the justification of the assessment of apparatus as simple apparatus in accordance with IEC 60079-11 shall be included;
- where the intrinsically safe circuit contains several pieces of intrinsically safe apparatus the analysis of the summation of their parameters shall be available. This shall include all simple apparatus and certified intrinsically safe apparatus;
- a unique identification of the descriptive system document shall be created;
- the system designer shall sign and date the document.

NOTE The descriptive system's drawing is not the same as the Control Drawing referred to in IEC 60079-11.

5 Grouping and classification

Intrinsically safe electrical systems shall be placed in a Group I, Group II or Group III as defined in IEC 60079-0. Groups II and III intrinsically safe electrical systems as a whole or parts thereof shall be given a further subdivision of the Group as appropriate.

Apparatus within Groups II and III intrinsically safe electrical system, intended for use in explosive gas or dust atmospheres, shall be given a temperature class or maximum surface temperature in accordance with IEC 60079-0, IEC 60079-11, IEC 61241-0 and IEC 61241-11 as applicable.

NOTE 1 In Group II and Group III intrinsically safe electrical systems, or parts thereof, the subdivisions A, B, C may be different from those of the particular intrinsically safe electrical apparatus and associated electrical apparatus included in the system.

NOTE 2 Different parts of the same intrinsically safe electrical system may have different subdivisions (A, B, C). The apparatus used may have different temperature classes and different ambient temperature ratings.

6 Levels of protection

6.1 General

Each part of an intrinsically safe electrical system intended for use in an explosive atmosphere will have a level of protection of “ia”, “ib” or “ic” in accordance with IEC 60079-11. The complete system need not necessarily have a single level of protection.

NOTE 1 For example, where an instrument is primarily an “ib” instrument but which is designed for the connection of an “ia” sensor, such as a pH measuring instrument with its connected probe, the part of the system up to the instrument is “ib” and the sensor and its connections “ia”.

NOTE 2 An “ia” field instrument powered via an “ib” associated apparatus would be considered as an “ib” system.

NOTE 3 A system may be “ib” in normal operation with external power, but when power is removed under defined safety circumstances (ventilation failure) then the system could become “ia” under back up battery power. The level of protection will be clearly defined for foreseeable circumstances.

Clause 13 contains details of the required assessment.

6.2 Level of protection “ia”

Where the requirements applicable to electrical apparatus of level of protection “ia” (see IEC 60079-11) are satisfied by an intrinsically safe system or part of a system considered as an entity, then that system or part of a system shall be placed in level of protection “ia”.

6.3 Level of protection “ib”

Where the requirements applicable to electrical apparatus of level of protection “ib” (see IEC 60079-11) are satisfied by an intrinsically safe system or part of a system considered as an entity, then that system or part of a system shall be placed in level of protection “ib”.

6.4 Level of protection “ic”

Where the requirements applicable to electrical apparatus level of protection “ic” (see IEC 60079-11) are satisfied by an intrinsically safe system or part of a system considered as an entity, then the system or part of a system shall be placed in level of protection “ic”.