

# INTERNATIONAL STANDARD

CONSOLIDATED VERSION

**Explosive atmospheres -  
Part 25: Intrinsically safe electrical systems**



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IEC Secretariat  
3, rue de Varembe  
CH-1211 Geneva 20  
Switzerland

Tel.: +41 22 919 02 11  
[info@iec.ch](mailto:info@iec.ch)  
[www.iec.ch](http://www.iec.ch)

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## CONTENTS

FOREWORD .....	4
1 Scope .....	9
2 Normative references .....	9
3 Terms and definitions .....	9
4 Descriptive system document .....	11
5 Grouping and temperature classification .....	11
6 Levels of Protection .....	12
6.1 General .....	12
6.2 Level of Protection “ia” .....	12
6.3 Level of Protection “ib” .....	12
6.4 Level of Protection “ic” .....	12
7 Non-intrinsically safe circuits .....	12
8 Interconnecting wiring / cables used in an intrinsically safe system .....	12
8.1 General .....	12
8.2 Cables containing a single intrinsically safe circuit .....	13
8.3 Cables containing more than one intrinsically safe circuit .....	13
9 Requirements of single and multi-circuit cables .....	13
9.1 General .....	13
9.2 Dielectric strength .....	13
9.2.1 Cables containing a single intrinsically safe circuit .....	13
9.2.2 Cables containing more than one intrinsically safe circuit .....	13
9.3 Intrinsic safety parameters of cables .....	14
9.4 Conducting screens .....	14
9.5 Types of multi-circuit cables .....	14
9.5.1 General .....	14
9.5.2 Type A cable .....	14
9.5.3 Type B cable .....	14
9.5.4 Type C cable .....	14
10 Enclosures .....	15
11 Earthing and bonding of intrinsically safe systems .....	15
12 Assessment of an intrinsically safe system .....	15
12.1 General .....	15
12.2 Systems containing only apparatus certified to IEC 60079-11 .....	16
12.3 Systems containing apparatus not separately evaluated to IEC 60079-11 .....	16
12.4 Systems containing a single power source .....	16
12.5 Systems containing more than one power source .....	16
12.5.1 General .....	16
12.5.2 Systems containing linear and non-linear sources of power .....	17
12.6 Simple apparatus .....	19
12.7 Assessment of capacitance, inductance and cable L/R .....	19
12.7.1 General .....	19
12.7.2 Unspecified Parameters .....	19
12.7.3 Output Parameter adjustments for Level of Protection .....	20
12.7.4 Effect of combined lumped capacitance and inductance .....	20
12.7.5 Determination of L/R .....	20
12.8 Faults in multi-circuit cables .....	21

12.9	Type verifications and type tests .....	21
13	Predefined systems .....	21
Annex A (informative)	Assessment of a simple intrinsically safe system.....	22
Annex B (informative)	Assessment of circuits with more than one power source .....	24
Annex C (informative)	Interconnection of non-linear and linear intrinsically safe circuits .....	27
C.1	General.....	27
C.2	Assessment of the output characteristics of the power sources .....	27
C.3	Assessment of interconnection possibilities and resultant output characteristics .....	30
C.4	Determination of intrinsic safety and the use of graphs .....	33
C.5	Verification against IEC 60079-11 .....	35
C.6	Illustration of the procedure .....	35
C.7	Limit curves for universal source characteristic .....	39
Annex D (informative)	Verification of inductive parameters .....	50
Annex E (informative)	Example format for a descriptive system document .....	52
Annex F (informative)	Use of simple apparatus in systems .....	54
F.1	General.....	54
F.2	Use of apparatus with 'simple apparatus' .....	55
Annex G (normative)	FISCO systems.....	56
G.1	General.....	56
G.2	System requirements .....	56
G.2.1	General .....	56
G.3	Additional requirements of "ic" FISCO systems .....	57
Annex H (normative)	2-WISE systems .....	59
H.1	General.....	59
H.2	Wiring systems .....	59
H.3	Powered 2-WISE systems .....	59
H.4	Communication only 2-WISE systems .....	60
H.5	Descriptive system document.....	61
Bibliography	.....	62
Figure 1	– Systems analysis .....	19
Figure B.1	– Power sources connected in series .....	25
Figure B.2	– Power sources connected in parallel.....	26
Figure B.3	– Power sources not deliberately connected .....	26
Figure C.1	– Equivalent circuit and output characteristic of resistive circuits .....	28
Figure C.2	– Output characteristic and equivalent circuit of a source with trapezoidal characteristic .....	30
Figure C.3	– Current and/or voltage addition for interconnections .....	33
Figure C.4	– Example of an interconnection.....	35
Figure C.5	– Sum characteristics for the circuit as given in Figure C.4 .....	37
Figure C.6	– Current and/or voltage addition for the example given in Figure C.4 .....	38
Figure C.7	– Limit curve diagram for universal source characteristic – Group IIC .....	44
Figure C.8	– Limit curve diagram for universal source characteristic – Group IIB .....	49
Figure D.1	– Typical inductive circuit .....	51
Figure E.1	– Typical block diagram for IS system descriptive system document .....	53

Figure G.1 – Typical system .....	58
Figure H.1 – DC-powered 2-WISE system.....	60
Figure H.2 – Communication only 2-WISE system .....	61
Table A.1 – Simple system analysis .....	23
Table C.1 – Parameters necessary to describe the output characteristic.....	28
Table C.2 – Assignment of diagrams to equipment Groups and inductances .....	34

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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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This consolidated version of the official IEC Standard and its amendment has been prepared for user convenience.

IEC 60079-25 edition 3.1 contains the third edition (2020-06) [documents 31G/318/FDIS and 31G/321/RVD], its corrigenda 1 (2020-10) and 2 (2022-11), and its amendment 1 (2025-09) [documents 31G/426/FDIS and 31G/432/RVD].

In this Redline version, a vertical line in the margin shows where the technical content is modified by amendment 1. Additions are in green text, deletions are in strikethrough red text. A separate Final version with all changes accepted is available in this publication.

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

This third edition cancels and replaces the second edition published in 2010 and constitutes a technical revision.

The significance of the changes between IEC 60079-25, Edition 2 (2010) and IEC 60079-25, Edition 3 (2019) are as listed below:

Changes	Clause	Type		
		Minor and editorial changes	Extension	Major technical changes
References to 'electrical systems' changed to 'systems' and note added that installation requirement for Group I are being considered.	1	X		
Normative references updated to remove references that were outdated or not mentioned in the body of the standard.	2	X		
Reference to IEC Electropedia and ISO Online Browsing platform added, abbreviations dropped from title. Definition of 'system designer' deleted, definitions of 'certified intrinsically safe electrical system', and 'uncertified intrinsically safe electrical system' dropped.	3	X		
'Intrinsically safe electrical system' changed to 'intrinsically safe system'.	3.1	X		
Definition for 'multi-circuit cable' added.	3.2	X		
'Maximum' changed to 'total' on definitions of cable capacitance and cable inductance.	3.4, 3.5	X		
'Maximum' deleted on definition of cable inductance to resistance ratio.	3.6	X		
FISCO changed to definition from abbreviation.	3.9	X		
The requirement for the system designer to sign and date the document dropped, editorial changes for clarity made, and a reference to Annex E made to show typical descriptive system documents.	4	X		
Title of clause changed to 'Grouping and temperature classification', ambient temperature range added to things to be included in the system document and reworded for clarity.	5		X	
Notes moved and reworded among the clauses.	6.1, 6.2, 6.3, 6.4	X		
Changed from 'Ambient temperature rating' which was moved to Clause 5, and new section renamed 'Non-intrinsically safe circuits' added.	7		X	
Clause reorganized into sections and some rewording done for clarity.	8	X		
Title changed to 'Requirements of single and multi-circuit cables'.	9	X		
Requirement for insulation thickness moved into this clause, and it now applies to all cables.	9.1		X	
Title changed to 'Dielectric strength' and consolidation of requirements for single circuit and multi-circuit cables. Requirement for dielectric testing changed to twice the circuit voltage with a minimum of 500VAC.	9.2		X	

Changes	Clause	Type		
		Minor and editorial changes	Extension	Major technical changes
Dielectric strength requirements for single circuit cables consolidated here.	9.2.1	X		
Dielectric strength requirements for multi- circuit cables consolidated here.	9.2.2	X		
Multi-circuit cables shall not be used for intrinsically safe circuits with voltages exceeding 90 V.	9.2.2			C1
Title changed to 'Intrinsic safety parameters of cables'	9.3	X		
Title changed to 'Enclosures'	10	X		
Most of the old Clause 12 moved to IEC 60079-14.	11			C2
This clause was Clause 13 in the previous edition, and the entire clause has been re-arranged for clarity and easier reading.	12	X		
This General clause has been re-written in list format to make it easier to understand, and analysis of single and multiple power supplies moved to 12.4 and 12.5 respectively.	12.1		X	
This clause added to clarify fault applications in assemblies of certified equipment.	12.2		X	
This clause added to provide guidance on how to handle non-certified items in larger assemblies.	12.3		X	
Analysis of single power source information consolidated here and amplified.	12.4		X	
Analysis of multiple power sources information consolidated in this clause. Information added for clarity.	12.5		X	
The circuit analysis example dropped in text for simple apparatus, new Annex F added with more information.	12.6	X		
Section added to provide more information on determining capacitance, inductance and L/R that was moved from Annex A.	12.7		X	
Requirements for Type A, B, and C cables reworded for clarity.	12.8	X		
Information on evaluation of capacitance and inductance moved to 12.7.	Annex A	X		
Changed from normative to informative	Annex B	X		
Reordered and rewritten for greater clarity.	Annex C	X		
Annex updated for clarity.	Annex E	X		
The former Annex F on surge protection has been removed.	Annex F			C3
Annex G in the previous edition was on testing of cable parameters and has been removed from this edition. Annex G is now FISCO systems.	Annex G	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. More guidance may be found by referring to the Redline Version of the standard.

**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, or a reduction in level of existing requirement.

**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 for equipment that was fully compliant with the previous standard. Therefore, these will not have to be considered for products in conformity with the preceding edition.

**Major technical changes**

addition of technical requirements  
 increase of technical requirements

These are changes to technical requirements (addition, increase of the level or removal) made in a way that a product in conformity with the preceding edition will not always be able to fulfil the requirements given in the later edition. These changes have to be considered for products in conformity with the preceding edition. For these changes additional information is provided in clause B) below.

NOTE These changes represent current technological knowledge. However, these changes should not normally have an influence on equipment already placed on the market.

**B) Information about the background of 'Major Technical Changes'**

B1 – A limitation of 90 V for multi-circuit system has been added since for this voltage level a dielectric test of at least 500 V AC or 700 V DC is normally used to validate the insulation.

B2 – Most of the earthing and bonding requirements have been removed and moved to IEC 60079-14, and the surge protection requirements that were in the old Clause 12 were added here in Clause 11. The rest of the old Clause 12 was also removed and moved to IEC 60079-14.

B3 – The former Annex F on surge protection has been removed and will be covered in IEC 60079-14. Annex F is now Simple Apparatus, which was Annex H in the previous edition.

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

FDIS	Report on voting
31G/318/FDIS	31G/321/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 in the IEC 60079 series, published under the general title *Explosive atmospheres*, can be found on the IEC website.

The committee has decided that the contents of this document and its amendment will remain unchanged until the stability date indicated on the IEC website under [webstore.iec.ch](http://webstore.iec.ch) in the data related to the specific document. At this date, the document will be

- reconfirmed,
- withdrawn, or
- revised.

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## 1 Scope

This part of IEC 60079 contains the specific requirements for design, construction and assessment of intrinsically safe 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 Ex Equipment is required.

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

This document 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.

The installation requirements of Group II or Group III systems designed in accordance with this **standard** document are specified in IEC 60079-14. Where a specific requirement of IEC 60079-14 is applied by this document, the same requirements can be applied for Group I.

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

## 2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 60079-0, *Explosive atmospheres – Part 0: Equipment – General requirements*

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

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

IEC TS 60079-47, *Explosive atmospheres – Part 47: Equipment protection by 2-wire intrinsically safe ethernet concept (2-WISE)*

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

## 3 Terms and definitions

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

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>