IEC 60079-25

Edition 3.1 2025-09

INTERNATIONAL STANDARD

CONSOLIDATED VERSION

Explosive atmospheres -
Part 25: Intrinsically safe electrical systems

ICS 29.260.20

ISBN 978-2-8327-0750-0

CONTENTS

INTERNATIONAL ELECTROTECHNICAL COMMISSION

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FOREWORD

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6) All users should ensure that they have the latest edition of this publication.
7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
9) IEC draws attention to the possibility that the implementation of this document may involve the use of (a) patent(s). IEC takes no position concerning the evidence, validity or applicability of any claimed patent rights in respect thereof. As of the date of publication of this document, IEC had not received notice of (a) patent(s), which may be required to implement this document. However, implementers are cautioned that this may not represent the latest information, which may be obtained from the patent database available at https://patents.iec.ch [and/or] www.iso.org/patents. IEC shall not be held responsible for identifying any or all such patent rights.

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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.

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		Type		
Changes	**Clause**	**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	

		Type		
Changes	**Clause**	**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 in the data related to the specific document. At this date, the document will be

– reconfirmed,

– withdrawn, or

– revised.

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*

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