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INTERNATIONAL STANDARD

NORME INTERNATIONALE

Explosive atmospheres –
Part 18: Equipment protection by encapsulation "m"

Atmosphères explosives –
Partie 18: Protection de l’appareil par encapsulage "m"

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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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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IEC 60079-18 has been prepared by IEC technical committee 31: Equipment for explosive atmospheres. It is an International Standard.

This fifth edition cancels and replaces the fourth edition published in 2014 and Amendment 1:2017. This edition constitutes a technical revision.

This International Standard is to be used in conjunction with IEC 60079-0, *Explosive atmospheres – Part 0: Equipment – General requirements*.

Users of this document are advised that interpretation sheets clarifying the interpretation of this document can be published. Interpretation sheets are available from the IEC webstore and can be found in the "history" tab of the page for each document.

This edition includes the following significant technical changes with respect to the previous edition:

		Type		
Explanation of the significance of the changes	**Clause**	**Minor and editorial changes**	**Extension**	**Major technical changes**
Specification has been extended for clarification. Curing conditions have been added	5.2b)			C1
Dielectric strength test according to ANSI/UL 746A has been added as alternative	5.3.2		X	
Restructure of Clause 6	6	X		
Deletion of the additional protective measures as they are given in IEC 60079-0	7.1	X		
For the Level of Protection "mc" faults need to be considered regarding the separation distances	7.2.1			C1
The NOTE was changed to an EXAMPLE for clarification of track failures	7.2.1	X		
Intermediate failure conditions for components are not considered	7.2.1	X		
Clarification made about faults	7.2.1	X		
Another possibility for the construction of transformer according to IEC 60079-7 EPL "eb" added	7.2.3		X	
Rating of component shall not be exceeded was added as clarification	7.5.1			C1
Additional enclosure changed to "arc chamber" housing	7.5.1, 7.5.2, 7.5.3	X		
Consideration of fault conditions has been added	7.5.2			C1
Additional requirements for "ma" Equipment deleted	Former 7.6.2	X		
NOTE 2 added for protection of bare live parts	7.7	X		
Note 1 and Note 2 have been changed to normative text for clarification	7.9.1	X		
Requirement regarding the thermal coupling moved from 7.9.3 to 7.9.1 as this is applicable for all temperature monitoring devices	7.9.1	X		
The surface temperature determination for EPL Da has been deleted, because this is given in IEC 60079-0	8.2.2	X		
Acceptance criteria for the Dielectric strength test aligned with the TC 31 Good Working Practice	8.2.4.2	X		

Explanation of the types of significant changes:

A) Definitions

1 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.

2 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.

3 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 item 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'

C1 It is recognized that the new requirements were, in many cases, already applied. The change is to ensure that they are uniformly and consistently applied.

The text of this International Standard is based on the following documents:

Draft	Report on voting
31/1858/FDIS	31/870/RVD

Full information on the voting for its approval can be found in the report on voting indicated in the above table.

The language used for the development of this International Standard is English.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/publications.

A list of all the 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 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.

EXPLOSIVE ATMOSPHERES –

Part 18: Equipment protection by encapsulation "m"

1 Scope

This part of IEC 60079 gives the specific requirements for the construction, testing and marking of electrical Ex Equipment, parts of electrical Ex Equipment and Ex Components with the Type of Protection encapsulation "m" (hereinafter referred to as "m" Equipment) intended for use in explosive gas atmospheres or explosive dust atmospheres.

For Levels of Protection "mb" and "mc", this document applies where the rated voltage does not exceed 11 kV AC_{RMS} or DC.

For Level of Protection "ma", this document applies where the rated voltage does not exceed 1 kV AC_{RMS} or DC.

This document does not take account of any hazard due to an emission of flammable or toxic gas from the dust.

This document supplements and modifies the general requirements of IEC 60079-0. Where a requirement of this document conflicts with a requirement of IEC 60079-0, the requirement of this document takes precedence.

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 60079-7, *Explosive atmospheres – Part 7: Equipment protection by increased safety "e"*

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

IEC 60079-15, *Explosive atmospheres – Part 15: Equipment protection by type of protection "n"*

IEC 60127 (all parts), *Miniature fuses*

IEC 60243-1, *Electric strength of insulating materials – Test methods – Part 1: Tests at power frequencies*

IEC 60691, *Thermal-links – Requirements and application guide*

IEC 60730-2-9, *Automatic electrical controls – Part 2-9: Particular requirements for temperature sensing controls*

IEC 60738-1, *Thermistors – Directly heated positive temperature coefficient – Part 1: Generic specification*

IEC 61140, *Protection against electric shock – Common aspects for installation and equipment*

IEC 61558-1, *Safety of transformers, reactors, power supply units and combinations thereof – Part 1: General requirements and tests*

IEC 61558-2-6, *Safety of transformers, reactors, power supply units and combinations thereof – Part 2-6: Particular requirements and tests for safety isolating transformers and power supply units incorporating safety isolating transformers for general applications*

IEC 62326-4-1, *Printed boards – Part 4: Rigid multilayer printed boards with interlayer connections – Sectional specification – Section 1: Capability detail specification – Performance levels A, B and C*

ANSI/UL 248 *(all parts), Standard for low-voltage fuses*

ANSI/UL 746A, *Polymeric Materials – Short Term Property Evaluations*

ANSI/UL 796, *Printed-Wiring Boards*

IPC-A-600, *Acceptability of Printed Boards*

IPC-6012, *Qualification and Performance Specification for Rigid Printed Boards*

3 Terms and definitions

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

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

- IEC Electropedia: available at https://www.electropedia.org/
- ISO Online browsing platform: available at https://www.iso.org/obp

NOTE Additional definitions applicable to explosive atmospheres can be found in IEC 60050-426.

3.1
encapsulation "m"
Type of Protection whereby parts that are capable of igniting an explosive atmosphere by either sparking or heating are fully enclosed in such a way as to avoid ignition of a dust layer or explosive atmosphere under operating or installation conditions

3.2
free surface
compound surface exposed to the explosive atmospheres and/or dust layers

Note 1 to entry: Unless a compound surface is in contact with and covered by a non-metallic or metallic enclosure, the compound surface is a free surface.

3.3
switching contact
mechanical contact, designed to make and break an electrical circuit