

# FINAL VERSION

# VERSION FINALE

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**Explosive atmospheres –  
Part 18: Equipment protection by encapsulation “m”**

**Atmosphères explosives –  
Partie 18: Protection du matériel par encapsulage "m"**

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## INTERNATIONAL ELECTROTECHNICAL COMMISSION

### EXPLOSIVE ATMOSPHERES –

#### Part 18: Equipment protection by encapsulation “m”

#### FOREWORD

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**This Consolidated version of IEC 60079-18 bears the edition number 4.1. It consists of the fourth edition (2014-12) [documents 31/1152/FDIS and 31/1168/RVD] and its amendment 1 (2017-08) [documents 31/1323/FDIS and 31/1336/RVD]. The technical content is identical to the base edition and its amendment.**

**This Final version does not show where the technical content is modified by amendment 1. A separate Redline version with all changes highlighted is available in this publication.**

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

This fourth 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*.

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

Explanation of the significance of the changes	Clause	Type		
		Minor and editorial changes	Extension	Major technical changes
Definitions deleted and moved to IEC 60079-0	3	X		
Heading modified /added to clarify which requirements are additional requirements for “ma” level of protection only	4	X		
Thermal conductivity added	5.2		X	
Note added that it is not a requirement of this standard that conformity to the manufacturer’s specification of the compound needs to be verified	5.3.2	X		
Clarification added	6.2.2	X		
Clarification added	7.1	X		
For the determination of faults options added and clarification given	7.2		X	
Additional information included in Figure 1	7.4.1	X		
“Varnish and similar coatings are not considered to be solid insulation.” was added in this section and deleted in the definition on 3.8	7.4.2	X		
For rigid, multi-layer printed wiring boards with through connections additional standards added	7.4.3.1		X	
Protection against inadmissible temperatures and damage to the cells	7.8.3			C1
Electrical protective devices clarified and additional possibilities added	7.9.2		X	
Thermal protective devices clarified and additional possibilities added	7.9.3		X	
2/3 voltage limitation deleted	7.9.3		X	
Determination of the maximum temperature for “Da” fixed	8.2.2			C2
Stabilization of the temperature	8.2.2			C3
Thermal endurance to heat	8.2.3.1		X	
Temperature fixed as reference service temperatures and tests given as alternatives	8.2.3.1.1		X	
For the dielectric strength test procedure alternative possibilities added	8.2.4.1		X	
Alternative test methods for the required pressure test for Group I and Group II electrical equipment added	8.2.6		X	
Sealing test for build-in protective devices	8.2.8		X	
For the dielectric strength test procedure alternative possibilities added	9.2		X	
Marking	10	X	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 Clause 7.8.3 modified and additional requirements added for cells or batteries

C2 The flexibility given in IEC 60079-0 is replaced by a min. requirement. For level of protection "ma" equipment, designed for EPL "Da" the maximum surface temperature shall be determined with the equipment mounted in accordance with the manufacturer's instructions, and surrounded on all available surfaces by dust with a layer thickness of at least 200 mm

C3 The increase of the temperature during the test can be a very slow process. The final temperature shall be considered to have been reached when the rate of rise of temperature does not exceed 1 K/24 h

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

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 the base publication and its amendment 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
- amended.

## 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 equipment, parts of electrical equipment and Ex components with the type of protection encapsulation “m” intended for use in explosive gas atmospheres or explosive dust atmospheres.

This part applies only for encapsulated electrical equipment, encapsulated parts of electrical equipment and encapsulated Ex components (hereinafter always referred to as “m” equipment) where the rated voltage does not exceed 11 kV.

The application of electrical equipment in atmospheres, which may contain explosive gas as well as combustible dust simultaneously, may require additional protective measures.

This standard does not apply to dusts of explosives, which do not require atmospheric oxygen for combustion, or to pyrophoric substances

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

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

#### 2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. 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 60079-26, *Explosive atmospheres – Part 26: Equipment with equipment protection level (EPL) Ga*

IEC 60079-31, *Explosive atmospheres – Part 31: Equipment dust ignition protection by enclosure “t”*

IEC 60127 (all parts), *Miniature fuses*