EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 60079-18

April 2015

ICS 29.260.20

Supersedes EN 60079-18:2009

English Version

Explosive atmospheres - Part 18: Equipment protection by encapsulation "m" (IEC 60079-18:2014)

Atmosphères explosives - Partie 18: Protection du matériel par encapsulage "m" (IEC 60079-18:2014)

Explosionsgefährdete Bereiche - Teil 18: Geräteschutz durch Vergusskapselung "m" (IEC 60079-18:2014)

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European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

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Foreword

The text of document 31/1152/FDIS, future edition 4 of IEC 60079-18, prepared by IEC/TC 31 "Equipment for explosive atmospheres" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN 60079-18:2015.

The following dates are fixed:

• latest date by which the document has to be implemented at national level by publication of an identical national standard or by endorsement	(dop)	2015-10-24
• latest date by which the national standards conflicting with the document have to be withdrawn	(dow)	2018-01-16

This document supersedes EN 60079-18:2009.

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

This document has been prepared under a mandate given to CENELEC by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive.

For the relationship with EU Directive see informative Annex ZZ, which is an integral part of this document.

Endorsement notice

The text of the International Standard IEC 60079-18:2014 was approved by CENELEC as a European Standard without any modification.

IEC 60079-1	NOTE	Harmonized as EN 60079-1.
IEC 60079-2	NOTE	Harmonized as EN 60079-5.
IEC 60079-5	NOTE	Harmonized as EN 60079-5.
IEC 60079-6	NOTE	Harmonized as EN 60079-6.
IEC 60079-10-1	NOTE	Harmonized as EN 60079-10-1.
IEC 60079-10-2	NOTE	Harmonized as EN 60079-10-2.
IEC 60079-14	NOTE	Harmonized as EN 60079-14.
IEC 60079-28	NOTE	Harmonized as EN 60079-28.
IEC 60086-1	NOTE	Harmonized as EN 60086-1.
IEC 60622	NOTE	Harmonized as EN 60622.
IEC 60604-1	NOTE	Harmonized as EN 60604-1.
IEC 60747-5-5	NOTE	Harmonized as EN 60747-5-5.
IEC 61951-1	NOTE	Harmonized as EN 61951-1.
IEC 61951-2	NOTE	Harmonized as EN 61951-2.
ISO 13849-1	NOTE	Harmonized as EN ISO 13849-1.

Annex ZA
(normative)

Normative references to international publications with their corresponding European publications

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.

NOTE 1 When an International Publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

NOTE 2 Up-to-date information on the latest versions of the European Standards listed in this annex is available here: www.cenelec.eu.

Publication	Year	Title	EN/HD	Year
IEC 60079-0 (mod)	-	Explosive atmospheres -- Part 0: Equipment - General requirements	EN 60079-0	-
			+A11	2013
IEC 60079-7	-	Explosive atmospheres -- Part 7: Equipment protection by increased safety "e"	EN 60079-7	-
IEC 60079-11	-	Explosive atmospheres -- Part 11: Equipment protection by intrinsic safety "i"	EN 60079-11	-
IEC 60079-15	-	Explosive atmospheres -- Part 15: Equipment protection by type of protection "n"	EN 60079-15	-
IEC 60079-26	-	Explosive atmospheres -- Part 26: Equipment with equipment protection level (EPL) Ga	EN 60079-26	-
IEC 60079-31	-	Explosive atmospheres -- Part 31: Equipment dust ignition protection by enclosure "t"	EN 60079-31	-
IEC 60127	series	Miniature fuses -- Part 1: Definitions for miniature fuses and general requirements for miniature fuse-links	EN 60127	series
IEC 60243-1	-	Electric strength of insulating materials - Test methods -- Part 1: Tests at power frequencies	EN 60243-1	-
IEC 60691	-	Thermal-links - Requirements and application guide	EN 60691	-
IEC 60730-2-9 (mod)	-	Automatic electrical controls for household and similar use - Part 2-9: Particular requirements for temperature sensing controls	EN 60730-2-9	-
			+AA	
IEC 60738-1	-	Thermistors - Directly heated positive temperature coefficient -- Part 1: Generic specification	EN 60738-1	-
IEC 61140	-	Protection against electric shock - Common aspects for installation and equipment	EN 61140	-
IEC 61558-1	-	Safety of power transformers, power supplies, reactors and similar products -- Part 1: General requirements and tests	EN 61558-1	-
			+EN 61558-1:2005/corrigendum Aug. 2006	2006
IEC 61558-2-6	-	Safety of transformers, reactors, power supply units and similar products for supply voltages up to 1 100 V -- Part 2-6: Particular requirements and tests for safety isolating transformers and power supply units incorporating safety isolating transformers	EN 61558-2-6	-

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	EN 62326-4-1	-

Annex ZZ
(informative)

Coverage of Essential Requirements of EC Directives

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 requirements out of those given in Annex II of the EC Directive 94/9/EC:

- ER 1.0.1, ER 1.0.2 (partly), ER 1.0.4 (partly), ER 1.0.5 (partly)
- ER 1.1 (partly)
- ER 1.2.4, ER 1.2.8 (partly)
- ER 1.3.1 (partly) ER 1.3.3 (partly), ER 1.3.4 (partly)
- ER 1.4.1 (partly), ER 1.4.2 (partly)
- ER 1.5.1, ER 1.5.2
- ER 1.6.4 (partly),
- ER 2.0.1 (partly)
- ER 2.0.2.1 (partly), ER 2.0.2.3 (partly)
- ER 2.1.1.1 (partly), ER 2.1.1.2 (partly)
- ER 2.1.2.1 (partly), ER 2.1.2.2 (partly) ER 2.1.2.3 (partly)
- ER 2.2.1.1 (partly), ER 2.2.1.2 (partly)
- ER 2.2.2.1 (partly), ER 2.2.2.2 (partly)
- ER 2.3.1.1, ER 2.3.1.2
- ER 2.3.2.1, ER 2.3.2.2

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

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

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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EXPLOSIVE ATMOSPHERES –

Part 18: Equipment protection by encapsulation “m”

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

This fourth edition cancels and replaces the third edition of IEC 60079-18 (2009), and 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:

		Type		
Explanation of the significance of the changes	**Clause**	**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

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

FDIS	Report on voting
31/1152/FDIS	31/1168/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 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 publication will remain unchanged until the stability date indicated on the IEC website 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*