

**PLAHVATUSOHTLIKUD KESKKONNAD. OSA 18:
SEADMETE KAITSE KAPSELDUSEGA "M"**

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

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

See Eesti standard EVS-EN 60079-18:2015 sisaldab Euroopa standardi EN 60079-18:2015 ingliskeelset teksti.	This Estonian standard EVS-EN 60079-18:2015 consists of the English text of the European standard EN 60079-18:2015.
Standard on jõustunud sellekohase teate avaldamisega EVS Teatajas	This standard has been endorsed with a notification published in the official bulletin of the Estonian Centre for Standardisation.
Euroopa standardimisorganisatsioonid on teinud Euroopa standardi rahvuslikele liikmetele kättesaadavaks 24.04.2015.	Date of Availability of the European standard is 24.04.2015.
Standard on kättesaadav Eesti Standardikeskusest.	The standard is available from the Estonian Centre for Standardisation.

Tagasisidet standardi sisu kohta on võimalik edastada, kasutades EVS-i veebilehel asuvat tagasiside vormi või saates e-kirja meiliaadressile standardiosakond@evs.ee.

ICS 29.260.20

Standardite reprodutseerimise ja levitamise õigus kuulub Eesti Standardikeskusele

Andmete paljundamine, taastekitamine, kopeerimine, salvestamine elektroonsesse süsteemi või edastamine ükskõik millises vormis või millisel teel ilma Eesti Standardikeskuse kirjaliku loata on keelatud.

Kui Teil on küsimusi standardite autorikaitse kohta, võtke palun ühendust Eesti Standardikeskusega:

Aru 10, 10317 Tallinn, Eesti; koduleht www.evs.ee; telefon 605 5050; e-post info@evs.ee

The right to reproduce and distribute standards belongs to the Estonian Centre for Standardisation

No part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying, without a written permission from the Estonian Centre for Standardisation.

If you have any questions about copyright, please contact Estonian Centre for Standardisation:

Aru 10, 10317 Tallinn, Estonia; homepage www.evs.ee; phone +372 605 5050; e-mail info@evs.ee

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)

This European Standard was approved by CENELEC on 2015-01-15. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CENELEC member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Bulgaria, Croatia, Cyprus, the Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.



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

CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels

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	-
---------------	---	---	--------------	---

This document is a preview generated by EVS

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.

CONTENTS

FOREWORD	5
1 Scope	8
2 Normative references	8
3 Terms and definitions	9
4 General	10
4.1 Level of protection (equipment protection level (EPL))	10
4.2 Additional requirements for levels of protection “ma” and “mb”	10
4.3 Additional requirements for level of protection “ma”	10
4.4 Rated voltage and prospective short circuit current	11
5 Requirements for compounds	11
5.1 General	11
5.2 Specification	11
5.3 Properties of the compound	11
5.3.1 Water absorption	11
5.3.2 Dielectric strength	11
6 Temperatures	12
6.1 General	12
6.2 Determination of the limiting temperatures	12
6.2.1 Maximum surface temperature	12
6.2.2 Temperature of the compound	12
6.3 Temperature limitation	12
7 Constructional requirements	12
7.1 General	12
7.2 Determination of faults	13
7.2.1 Fault examination	13
7.2.2 Components considered as not subject to fail	13
7.2.3 Isolating components	14
7.2.4 Infallible separation distances	14
7.3 Free space in the encapsulation	15
7.3.1 Group III “m” equipment	15
7.3.2 Group I and Group II “m” equipment	16
7.4 Thickness of the compound	17
7.4.1 “m” equipment	17
7.4.2 Windings for electrical machines	19
7.4.3 Rigid, multi-layer printed wiring boards with through connections	19
7.5 Switching contacts	20
7.5.1 General	20
7.5.2 Level of protection “ma”	21
7.5.3 Level of protection “mb”	21
7.5.4 Level of protection “mc”	21
7.6 External connections	21
7.6.1 General	21
7.6.2 Additional requirements for “ma” equipment	21
7.7 Protection of bare live parts	21
7.8 Cells and batteries	21
7.8.1 General	21

7.8.2	Prevention of gassing	22
7.8.3	Protection against inadmissible temperatures and damage to the cells or batteries	22
7.8.4	Reverse current	22
7.8.5	Current limitation	23
7.8.6	Protection against the polarity inversion and deep discharge of the cells	23
7.8.7	Charging of cells or batteries	23
7.8.8	Requirements for control safety devices for cells or batteries	24
7.9	Protective devices	24
7.9.1	General	24
7.9.2	Electrical protective devices	25
7.9.3	Thermal protective devices	25
7.9.4	Built-in protective devices	26
8	Type tests	26
8.1	Tests on the compound	26
8.1.1	Water absorption test	26
8.1.2	Dielectric strength test	26
8.2	Tests on the apparatus	26
8.2.1	Test sequence	26
8.2.2	Maximum temperature	27
8.2.3	Thermal endurance test	27
8.2.4	Dielectric strength test	28
8.2.5	Cable pull test	28
8.2.6	Pressure test for Group I and Group II electrical equipment	29
8.2.7	Test for resettable thermal protective device	30
8.2.8	Sealing test for built-in protective devices	30
9	Routine verifications and tests	30
9.1	Visual inspections	30
9.2	Dielectric strength test	30
10	Marking	31
Annex A (informative)	Basic requirements for compounds for “m” equipment	32
Annex B (informative)	Allocation of test samples	33
Bibliography		34
Figure 1	– Dimensional key for thickness through the compound	18
Figure 2	– Minimum distances for multi-layer printed wiring boards	20
Figure 3	– Fitting of blocking diodes	23
Figure A.1	– Basic requirements for compounds for “m” equipment	32
Table 1	– Distances through the compound	15
Table 2	– Minimum thickness of compound adjacent to free space for Group III “m” equipment	16
Table 3	– Minimum thickness of compound adjacent to free space for Group I and Group II “m” equipment	17
Table 4	– Thickness of the compound	19