
Materiali za izoliranje, oplaščenje in prevleke nizkonapetostnih energetskih kablov – 2-1. del: Omrežene elastomerne snovi za oplaščenje

Insulating, sheathing and covering materials for low voltage energy cables – Part 2-1: Cross-linked elastomeric sheathing compounds

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EUROPEAN STANDARD

EN 50363-2-1

NORME EUROPÉENNE

EUROPÄISCHE NORM

November 2005

ICS 29.035.20

English version

**Insulating, sheathing and covering materials
for low voltage energy cables
Part 2-1: Cross-linked elastomeric sheathing compounds**

Matériaux pour enveloppe isolante,
gainage et revêtement pour les câbles
d'énergie basse tension
Partie 2-1 : Mélanges élastomères
réticulés pour gaine

Isolier-, Mantel- und
Umhüllungswerkstoffe für
Niederspannungskabel und -leitungen
Teil 2-1: Vernetzte, elastomere
Mantelmischungen

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This European Standard was approved by CENELEC on 2005-11-01. 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 Central Secretariat 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 Central Secretariat has the same status as the official versions.

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

CENELEC

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

Central Secretariat: rue de Stassart 35, B - 1050 Brussels

Foreword

This European Standard was prepared by the Technical Committee CENELEC TC 20, Electric cables.

The text of the draft was submitted to the formal vote and was approved by CENELEC as EN 50363-2-1 on 2005-11-01.

EN 50363 (in all its parts) supersedes the equivalent information at present in HD 21.1 S4, HD 21.14 S1, HD 22.1 S4, HD 22.10 S1, HD 22.14 S2 and prHD 21.15 S1. The existing information in these HDs will be deleted at the next maintenance review.

EN 50363-2-1 should be read in conjunction with EN 50363-0.

The following dates were fixed:

- latest date by which the EN has to be implemented
at national level by publication of an identical
national standard or by endorsement (dop) 2006-11-01
- latest date by which the national standards conflicting
with the EN have to be withdrawn (dow) 2007-11-01

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1 Scope

This part of EN 50363 specifies the requirements for the physical properties of the cross-linked elastomeric sheathing compounds given in Table 1. The relevant test methods are given in EN 60811 series and EN 50396.

NOTE This part of EN 50363 is to be read in conjunction with EN 50363-0.

Table 1 – Types of cross-linked elastomeric sheathing compound

Type	Maximum cable operating temperature °C	General application
EM 2	60	Ordinary duty oil-resisting and flame retardant – PCP or equivalent synthetic elastomer
EM 3	60	Ordinary duty – EPR compound or other equivalent synthetic elastomer
EM 4	110	Ordinary duty – EVA or equivalent synthetic elastomer
EM 6	90	Ordinary duty and including use down to -40 °C – EPR or equivalent synthetic elastomer; for cables insulated with EI 6
EM 7	90	Ordinary duty CSP or equivalent synthetic elastomer; for cables insulated with EI 7
EM 9	180	Ordinary duty Silicone rubber

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2 Normative references

For the purposes of this part of EN 50363, the requirements of EN 50363-0, Clause 2 apply with regard to normative references.

3 Definitions

For the purposes of this part of EN 50363, the definitions given in EN 50363-0, Clause 3, apply.

4 Properties

Each compound shall meet the particular requirements listed in Table 2, when using the test methods referenced in columns 4 and 5.

NOTE For cross-references to the latest editions of the test method standards see Table 2 of EN 50363-0.

Table 2 – Requirements for the tests for crosslinked elastomeric sheathing compounds

1	2	3	4	5	6	7	8	9	10	11
Ref No	Test ^a	Unit	Test method described in EN 60811 ^b		Type of compound					
			Section	Clause	EM 2	EM 3	EM 4	EM 6	EM 7	EM 9
1	Mechanical properties									
1.1	Properties before ageing		1-1	9.2						
1.1.1	Values to be obtained for the tensile strength: - median, min.	N/mm ²			10,0	7,0	6,5	7,0	10,0	5,0
1.1.2	Values to be obtained for the elongation at break: - median, min.	%			300	250	200	200	250	150
1.2	Properties after ageing in air oven		1-2	8.1						
1.2.1	Ageing conditions: - temperature	°C			70 ± 2	80 ± 2	150 ± 2	120 ± 2	120 ± 2	200 ± 2
	- duration of treatment	h			10 x 24	10 x 24	10 x 24	3 x 24	7 x 24	10 x 24
1.2.2	Value to be obtained for the tensile strength: - median, min. - variation, max.	N/mm ² %			-	-	-	7,0	-	4,0
1.2.3	Values to be obtained for the elongation at break: - median, min. - variation, max.	% %			250 - 25 °	- ± 30	- ± 30	200 -	- ± 40	120 -
1.2.4	Continued ageing conditions: - temperature - total duration of treatment	°C h			- -	- -	- -	120 ± 2 10 x 24	- -	- -
1.2.5	Value to be obtained for the tensile strength: - variation, max.	%			-	-	-	± 20	-	-
1.2.6	Values to be obtained for the elongation at break: - variation, max.	%			-	-	-	± 30	-	-

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Table 2 – Requirements for the tests for crosslinked elastomeric sheathing compounds (continued)

1	2	3	4	5	6	7	8	9	10	11
Ref No	Test ^a	Unit	Test method described in EN 60811 ^b		Type of compound					
			Section	Clause	EM 2	EM 3	EM 4	EM 6	EM 7	EM 9
1.3	Properties after ageing in the air bomb		1-2	8.2						
1.3.1	Ageing conditions:									
	- temperature	°C			-	-	150 ± 2	-	-	-
	- duration of treatment	h			-	-	7 x 24	-	-	-
1.3.2	Value to be obtained for the tensile strength:									
	- median, min.	N/mm ²			-	-	6,0	-	-	-
	- variation, max.				-	-	-	-	-	-
1.3.3	Values to be obtained for the elongation at break:									
	- median, min.				-	-	-	-	-	-
	- variation, max.	%					- 30 °	-	-	-
1.4	Properties after immersion in mineral oil		2-1	10						
1.4.1	Test conditions:									
	- oil temperature	°C			100 ± 2	-	-	-	100 ± 2	-
	- duration of immersion in oil	h			24	-	-	-	24	-
1.4.2	Values to be obtained for the tensile strength:									
	- variation, max.	%			± 40	-	-	-	± 40	-
1.4.3	Value to be obtained for the elongation at break:									
	- variation, max.	%			± 40	-	-	-	± 40	-
2	Hot set test		2-1	9						
2.1	Conditions of treatment:									
	- temperature	°C			200 ± 3	200 ± 3	200 ± 3	250 ± 3	200 ± 3	250 ± 3
	- time under load	min			15	15	15	15	15	15
	- mechanical stress	N/cm ²			20	20	20	20	20	20

Table 2 – Requirements for the tests for crosslinked elastomeric sheathing compounds (continued)

1	2	3	4	5	6	7	8	9	10	11
Ref No	Test ^a	Unit	Test method described in EN 60811 ^b		Type of compound					
			Section	Clause	EM 2	EM 3	EM 4	EM 6	EM 7	EM 9
2.2	Test requirements: - max. elongation under load - max. elongation after unloading	% %			100 25	100 25	100 25	100 25	100 25	100 25
3	Pressure test at high temperature		3-1	8.2						
3.1	Test conditions: - force exerted by the blade ^d - duration of heating under load - temperature	N h °C	3-1 3-1	8.2.4 8.2.5			e 0,5 150 ± 2			
3.2	Result to be obtained: - median of the depth of indentation, maximum	%					50			
4	Bending test at low temperature		1-4	8.2						
4.1	Test conditions: - temperature - period of application of low temperature	°C h	1-4 1-4	8.2.3	- 35 ± 2 e	- 35 ± 2 e	- 15 ± 2 e	- 50 ± 3 e	- 30 ± 2 e	- 35 ± 2 e
4.2	Result to be obtained				f	f	f	f	f	f
5	Elongation test at low temperature		1-4	8.4						
5.1	Test conditions: - temperature - period of application of low temperature	°C h	1-4 1-4	8.4.4 & 8.4.5	- 35 ± 2 e	- 35 ± 2 e	- 15 ± 2 e	- 50 ± 3 e	- 30 ± 2 e	- 35 ± 2 e
5.2	Result to be obtained: - elongation without break, min.	%			30	30	30	30	30	30

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