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**Materiali za izoliranje, oplaščenje in prevleke nizkonapetostnih energetskih kablov – 10-1. del: Razne mase za oplaščenje – Omreženi polivinilklorid (XLPVC)**

Insulating, sheathing and covering materials for low voltage energy cables - Part 10-1: Miscellaneous sheathing compounds - Cross-linked polyvinyl chloride (XLPVC)

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**Insulating, sheathing and covering materials  
for low voltage energy cables  
Part 10-1: Miscellaneous sheathing compounds –  
Cross-linked polyvinyl chloride (XLPVC)**

Matériaux pour enveloppe isolante,  
gainage et revêtement pour les câbles  
d'énergie basse tension  
Partie 10-1: Mélanges divers pour gaine -  
Polychlorure de vinyle réticulé (XLPVC)

Isolier-, Mantel- und  
Umhüllungswerkstoffe für  
Niederspannungskabel und -leitungen  
Teil 10-1: Diverse Mantelmischungen -  
Vernetztes Polyvinylchlorid (XLPVC)

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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.

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## 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 50363-10-1 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 50363-10-1 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 test requirements for the physical properties of the harmonised cross-linked PVC sheathing compound given in Table 1. The relevant test methods are given in EN 60811 series.

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

**Table 1 - Types of XLPVC sheathing compound**

| Type | Maximum cable operating temperature<br>°C | General application                                      |
|------|-------------------------------------------|----------------------------------------------------------|
| XM 1 | 70                                        | Cords requiring high flexibility, for example iron cords |

## 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 XLPVC sheathing compounds**

| 1        | 2                                                   | 3                  | 4                                              | 5       | 6                |
|----------|-----------------------------------------------------|--------------------|------------------------------------------------|---------|------------------|
| Ref No   | Test <sup>a</sup>                                   | Unit               | Test method described in EN 60811 <sup>b</sup> |         | Type of compound |
|          |                                                     |                    | Section                                        | Clause  | XM 1             |
| <b>1</b> | <b>Mechanical properties</b>                        |                    |                                                |         |                  |
| 1.1      | Properties before ageing                            |                    | 1-1                                            | 9.2     |                  |
| 1.1.1    | Values to be obtained for the tensile strength:     |                    |                                                |         |                  |
|          | - median, min.                                      | N/mm <sup>2</sup>  |                                                |         | 10,0             |
| 1.1.2    | Values to be obtained for the elongation at break:  |                    |                                                |         |                  |
|          | - median, min.                                      | %                  |                                                |         | 150              |
| 1.2      | Properties after ageing in air oven                 |                    | 1-2                                            | 8.1.3.1 |                  |
| 1.2.1    | Ageing conditions:                                  |                    |                                                |         |                  |
|          | - temperature                                       | °C                 |                                                |         | 100 ± 2          |
|          | - duration of treatment                             | h                  |                                                |         | 7 x 24           |
| 1.2.2    | Value to be obtained for the tensile strength:      |                    |                                                |         |                  |
|          | - median, min.                                      | N/mm <sup>2</sup>  |                                                |         | 10,0             |
|          | - variation, max.                                   | %                  |                                                |         | ± 25             |
| 1.2.3    | Values to be obtained for the elongation at break:  |                    |                                                |         |                  |
|          | - median, min.                                      | %                  |                                                |         | 150              |
|          | - variation, max.                                   | %                  |                                                |         | ± 20             |
| <b>2</b> | <b>Loss of mass test</b>                            |                    | 3-2                                            | 8.2     |                  |
| 2.1      | Ageing conditions:                                  |                    |                                                |         |                  |
|          | - temperature                                       | °C                 |                                                |         | 100 ± 2          |
|          | - duration of treatment                             | h                  |                                                |         | 7 x 24           |
| 2.2      | Values to be obtained for the loss of mass, max.    | mg/cm <sup>2</sup> |                                                |         | 2,0              |
| <b>3</b> | <b>Heat shock test</b>                              |                    | 3-1                                            | 9.2     |                  |
| 3.1      | Test conditions:                                    |                    |                                                |         |                  |
|          | - temperature                                       | °C                 |                                                |         | 150 ± 2          |
|          | - duration of treatment                             | h                  |                                                |         | 1,0              |
| 3.2      | Result to be obtained                               |                    |                                                |         | <sup>c</sup>     |
| <b>4</b> | <b>Pressure test at high temperature</b>            |                    | 3-1                                            | 8.2     |                  |
| 4.1      | Test conditions:                                    |                    |                                                |         |                  |
|          | - force exerted by the blade (k value) <sup>d</sup> |                    | 3-1                                            | 8.2.4   | <sup>e</sup>     |
|          | - duration of heating under load                    | h                  | 3-1                                            | 8.2.5   | <sup>e</sup>     |
|          | - temperature                                       | °C                 |                                                |         | 90 ± 2           |

**Table 2 – Requirements for the tests for XLPVC sheathing compounds**  
(continued)

| 1                                                                                                                                                                                                                                                                                                          | 2                                                                    | 3                 | 4                                              | 5      | 6                |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------|-------------------|------------------------------------------------|--------|------------------|
| Ref No                                                                                                                                                                                                                                                                                                     | Test <sup>a</sup>                                                    | Unit              | Test method described in EN 60811 <sup>b</sup> |        | Type of compound |
|                                                                                                                                                                                                                                                                                                            |                                                                      |                   | Section                                        | Clause | XM 1             |
| 4.2                                                                                                                                                                                                                                                                                                        | Result to be obtained:<br>- median of the depth of indentation, max. | %                 |                                                |        | 50               |
| <b>5</b>                                                                                                                                                                                                                                                                                                   | <b>Bending test at low temperature</b>                               |                   | 1-4                                            | 8.2    |                  |
| 5.1                                                                                                                                                                                                                                                                                                        | Test conditions:                                                     |                   |                                                |        |                  |
|                                                                                                                                                                                                                                                                                                            | - temperature                                                        | °C                |                                                |        | - 15 ± 2         |
|                                                                                                                                                                                                                                                                                                            | - period of application of low temperature                           | H                 | 1-4                                            | 8.2.3  | <sup>e</sup>     |
| 5.2                                                                                                                                                                                                                                                                                                        | Result to be obtained                                                |                   |                                                |        | <sup>c</sup>     |
| <b>6</b>                                                                                                                                                                                                                                                                                                   | <b>Thermal stability</b>                                             |                   | 3-2                                            | 9      |                  |
| 6.1                                                                                                                                                                                                                                                                                                        | Test condition:                                                      |                   |                                                |        |                  |
|                                                                                                                                                                                                                                                                                                            | - temperature                                                        | °C                |                                                |        | 200 ± 0,5        |
| 6.2                                                                                                                                                                                                                                                                                                        | Value to be obtained, min.                                           | min               |                                                |        | 60               |
| <b>7</b>                                                                                                                                                                                                                                                                                                   | <b>Hot set test</b>                                                  |                   | 2-1                                            | 9      |                  |
| 7.1                                                                                                                                                                                                                                                                                                        | Conditions of treatment:                                             |                   |                                                |        |                  |
|                                                                                                                                                                                                                                                                                                            | - temperature                                                        | °C                |                                                |        | 200 ± 3          |
|                                                                                                                                                                                                                                                                                                            | - time under load                                                    | min               |                                                |        | 15               |
|                                                                                                                                                                                                                                                                                                            | - mechanical stress                                                  | N/cm <sup>2</sup> |                                                |        | 10               |
| 7.2                                                                                                                                                                                                                                                                                                        | Test requirements:                                                   |                   |                                                |        |                  |
|                                                                                                                                                                                                                                                                                                            | - max. elongation under load                                         | %                 |                                                |        | 100              |
|                                                                                                                                                                                                                                                                                                            | - max. elongation after unloading                                    | %                 |                                                |        | 25               |
| <sup>a</sup> Information on other tests is given in EN 50363-0, Clause 5.<br><sup>b</sup> Unless stated otherwise.<br><sup>c</sup> No cracks.<br><sup>d</sup> The standard shows how to convert the given k value into a force in Newtons.<br><sup>e</sup> See test method referred to in columns 4 and 5. |                                                                      |                   |                                                |        |                  |