
Materiali za izoliranje in oplaščenje električnih in optičnih kablov - Splošne preskusne metode - 1-3. del: Področje uporabe - Metode za ugotavljanje gostote - Preskušanje vpijanja vode - Preskus krčenja (IEC 60811-1-3:1993)

Insulating and sheathing materials of electric and optical cables - Common test methods - Part 1-3: General application - Methods for determining the density - Water absorption tests - Shrinkage test

Isolier- und Mantelwerkstoffe für Kabel und isolierte Leitungen - Allgemeine Prüfverfahren - Teil 1-3: Allgemeine Anwendung - Dichtebestimmung - Wasseraufnahmeprüfungen - Schrumpfungsprüfung

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Matériaux d'isolation et de gainage des câbles électriques et des câbles optiques - Méthodes d'essais communes - Partie 1-3: Application générale - Méthodes de détermination de la masse volumique - Essais d'absorption d'eau - Essai de rétraction

Ta slovenski standard je istoveten z: EN 60811-1-3:1995

ICS:

29.035.01	Izolacijski materiali na splošno	Insulating materials in general
29.060.20	Kabli	Cables

SIST EN 60811-1-3:1999**en**

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EUROPEAN STANDARD
NORME EUROPÉENNE
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EN 60811-1-3

April 1995

CLC/TC20

ICS 29.060.20

Supersedes HD 505.1.3 S2:1991

Descriptors: Electric cable, insulated cable, electrical insulation, sheath, density, water absorption test, shrinkage

English version

**Insulating and sheathing materials of electric cables
Common test methods
Part 1: General application
Section 3: Methods for determining the density
Water absorption tests - Shrinkage test
(IEC 811-1-3:1993)**

Matériaux d'isolation et de gainage des câbles électriques
Méthodes d'essais communes
Partie 1: Application générale
Section 3: Méthodes de détermination de la masse volumique - Essais d'absorption d'eau - Essai de rétraction
(CEI 811-1-3:1993)

Isolier- und Mantelwerkstoffe für Kabel und isolierte Leitungen
Allgemeine Prüfverfahren
Teil 1: Allgemeine Anwendung
Hauptabschnitt 3: Dichtebestimmung Wasseraufnahmeprüfungen
Schrumpfungsprüfung
(IEC 811-1-3:1993)

This European Standard was approved by CENELEC on 1995-03-06. 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.

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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

The text of the International Standard IEC 811-1-3:1993, prepared by SC 20A, High-voltage cables, of IEC TC 20, Electric cables, was submitted to the Unique Acceptance Procedure and was approved by CENELEC as EN 60811-1-3 on 1995-03-06 without any modification.

This European Standard supersedes HD 505.1.3 S2:1991.

Where reference is made to HD 505.1.3 S2:1991 in another standard, users should refer to this EN 60811-1-3 for the current information.

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) 1996-03-01
- latest date by which the national standards conflicting
with the EN have to be withdrawn (dow) 1996-12-01

Endorsement notice

The text of the International Standard IEC 811-1-3:1993 was approved by CENELEC as a European Standard without any modification.

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NORME
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CEI
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Deuxième édition
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**Matériaux d'isolation et de gainage
des câbles électriques –
Méthodes d'essais communes –**

Partie 1:

Application générale –
Section 3: Méthodes de détermination
de la masse volumique –
Essais d'absorption d'eau –
Essai de rétraction

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**Insulating and sheathing materials
of electric cables –
Common test methods –**

Part 1:

General application –
Section 3: Methods for determining
the density –
Water absorption tests – Shrinkage test

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International Electrotechnical Commission
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INTERNATIONAL ELECTROTECHNICAL COMMISSION

**INSULATING AND SHEATHING MATERIALS
OF ELECTRIC CABLES –
COMMON TEST METHODS –**

**Part 1: General application –
Section 3: Methods for determining the density –
Water absorption tests –
Shrinkage test**

FOREWORD

- 1) The IEC (International Electrotechnical Commission) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of the IEC is to promote international cooperation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, the IEC publishes International Standards. 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. The IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
- 2) The formal decisions or agreements of the IEC on technical matters, prepared by technical committees on which all the National Committees having a special interest therein are represented, express, as nearly as possible, an international consensus of opinion on the subjects dealt with.
- 3) They have the form of recommendations for international use published in the form of standards, technical reports or guides and they are accepted by the National Committees in that sense.
- 4) In order to promote international unification, IEC National Committees undertake to apply IEC International Standards transparently to the maximum extent possible in their national and regional standards. Any divergence between the IEC Standard and the corresponding national or regional standard shall be clearly indicated in the latter.

International Standard IEC 811-1-3 has been prepared by sub-committee 20A: High-voltage cables, of IEC technical committee 20: Electric cables.

This second edition cancels and replaces the first edition published in 1985, its corrigendum (1986), amendment 1 (1990) and amendment 2 (1993). This second edition constitutes a technical revision.

The text of this standard is based on the first edition, the amendments 1 and 2 and on the following documents:

DIS	Report on voting
20A(CO)152	20A(CO)162

Full information on the voting for the approval of this standard can be found in the report on voting indicated in the above table.

INSULATING AND SHEATHING MATERIALS OF ELECTRIC CABLES – COMMON TEST METHODS –

Part 1: General application – Section 3: Methods for determining the density – Water absorption tests – Shrinkage test

1 Scope

This section of IEC 811-1 specifies the test methods to be used for testing polymeric insulating and sheathing materials of electric cables for power distribution and telecommunications including cables used on ships.

This section three of part 1 gives the methods for determining the density, water absorption tests and shrinkage test which apply to the most common types of insulating and sheathing compounds (elastomeric, PVC, PE, PP, etc.).

1.1 Normative reference

The following normative documents (which), through reference in this text, constitute provisions of this section of IEC 811-1. At the time of publication, the edition indicated was valid. All normative documents are subject to revision, and parties to agreements based on this section of IEC 811-1 are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 1183: 1987, *Plastics – Methods for determining the density and relative density of non-cellular plastics*

2 Test values

Full test conditions (such as temperatures, durations, etc.) and full test requirements are not specified in this standard; it is intended that they should be specified by the standard dealing with the relevant type of cable.

Any test requirements which are given in this standard may be modified by the relevant cable standard to suit the needs of a particular type of cable.

3 Applicability

Conditioning values and testing parameters are specified for the most common types of insulating and sheathing compounds and of cables, wires and cords.

4 Type tests and other tests

The test methods described in this standard are intended, in the first instance, to be used for type tests. In certain tests, where there are essential differences between the conditions for type tests and those for more frequent tests, such as routine tests, these differences are indicated.

5 Pre-conditioning

All the tests shall be carried out not less than 16 h after the extrusion or vulcanization (or cross-linking), if any, of the insulating or sheathing compounds.

If the test is carried out at ambient temperature, the test pieces shall be kept for at least 3 h at a temperature of $(23 \pm 5) ^\circ\text{C}$.

6 Test temperature

Unless otherwise specified, tests shall be carried out at ambient temperature.

7 Median value

When several test results have been obtained and ordered in an increasing or decreasing succession, the median value is the middle value if the number of available values is odd, and is the mean of the two middle values if the number is even.

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8 Methods for determining the density

8.1 Suspension method (general method)

8.1.1 Testing equipment

- 1) Ethanol (ethyl-alcohol) of analytical grade or another suitable liquid for densities below 1 g/ml.
- 2) Zinc chloride solution for densities equal to or greater than 1 g/ml.
- 3) Distilled water.
- 4) Mixing cylinder.
- 5) Thermostat.
- 6) Hydrometer calibrated at $23 ^\circ\text{C}$.
- 7) Thermometer graduated in tenths of a degree Celsius.

8.1.2 Procedure

9.1.2.1 From the insulation or the sheath to be tested, a sample shall be taken perpendicularly to the conductor axis and cut into small pieces of 1 mm to 2 mm edge length. The density shall be determined by putting the sample in suspension in a liquid which does not react with the material to be tested.