
Električni kabli – Pribor – Značilnosti materialov – 3. del: Fingerprinting za toplotno skrčljive sestavne dele za uporabo v srednjenapetostnih sistemih od 3,6/6(7,2) kV do vključno 20,8/36(42) kV

Electric cables - Accessories - Material characterisation - Part 3: Fingerprinting for heat shrinkable components for medium voltage applications from 3,6/6(7,2) kV up to 20,8/36(42) kV

Electric cables - Accessories - Material characterisation
Part 3: Fingerprinting for heat shrinkable components for medium voltage applications from 3,6/6(7,2) kV up to 20,8/36(42) kV

Câbles électriques - Accessoires -
Caractérisation des matériaux
Partie 3: Cartographie des composants
thermorétractables pour les applications
moyenne tension de 3,6/6(7,2) kV
à 20,8/36(42) kV

Kabel und isolierte Leitungen - Garnituren -
Materialcharakterisierung
Teil 3: Fingerprintprüfungen
für wärmeschrumpfende Komponenten
für Mittelspannungsanwendungen
von 3,6/6(7,2) kV bis 20,8/36(42) kV

This draft Harmonization Document is submitted to CENELEC members for CENELEC enquiry.
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It has been drawn up by CENELEC TC 20.

If this draft becomes a Harmonization Document, CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for implementation of this Harmonization Document on a national level.

This draft Harmonization Document was established by CENELEC in three official versions (English, French, German).

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CENELEC

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

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Foreword

This draft Harmonization Document was prepared by a Task Force under the direction of WG 11 of CENELEC TC 20, Electric cables. As agreed at the Athens meeting (May 2006) it is submitted to CENELEC enquiry (5MP).

This is Part 3 of HD 631, Electric cables - Accessories - Material characterisation.

HD 631 will have 4 parts

Part 1 - Fingerprinting and type tests for resinous compounds,

Part 2 - Fingerprinting and type tests for heat shrinkable components for low voltage applications,

Part 3 - Fingerprinting for heat shrinkable components for medium voltage applications from 3,6/6(7,2) kV up to 20,8/36(42) kV,

Part 4 - Fingerprinting for cold shrinkable components for low and medium voltage applications up to 20,8/36(42) kV.

Fingerprinting of sealant components which are delivered as non-heat shrinkable items, but that have an important interfacing role, is under consideration.

NOTE It has been assumed in the preparation of this document that the execution of its provisions will be entrusted to appropriately qualified and experienced people, for whose use it has been produced.

WARNING This Harmonization Document calls for the use of substances and/or procedures that may be injurious to health if adequate precautions are not taken. It refers only to technical suitability and does not absolve the user from legal obligations relating to health and safety at any stage.

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Draft for EN 631.3 S1:2006

1 Scope

This Harmonization Document specifies the test methods and requirements for fingerprinting (as defined in 3.9) of heat shrinkable components intended to be used in cable accessories for medium voltage, as defined in HD 629.1 and HD 629.2.

Fingerprinting of materials does not have a mandatory link to type testing of accessories. It shall be regarded as a stand-alone test, but can be carried out in combination with the accessory type tests.

Component basic functions can be: conductive, stress control or stress grading, insulating, oil barrier, anti-tracking and sealing. Components are supplied as single layer items or as multi-layer items which combine two or more functions.

NOTE Information on health and safety is given in Annex A.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN ISO 1183 series	Plastics - Methods for determining the density of non-cellular plastics
EN ISO 11358	Plastics - Thermogravimetry (TG) of polymers - General principles
HD 629.1	Test requirements on accessories for use on power cables of rated voltage from 3,6/6(7,2) kV up to 20,8/36(42) kV Part 1: Cables with extruded insulation
HD 629.2	Test requirements on accessories for use on power cables of rated voltage from 3,6/6(7,2) kV up to 20,8/36(42) kV Part 2: Cables with impregnated paper insulation
ISO 11357-3	Plastics - Differential scanning calorimetry (DSC) Part 3: Determination of temperature and enthalpy of melting and crystallization
IEC 60050-461	International Electrotechnical Vocabulary (IEV) Chapter 461: Electric cables

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply together with those given in IEC 60050-461.

3.1

heat shrinkable

property of a polymeric component previously expanded to recover to its original shape when heated above an appropriate temperature

3.2

heat shrinkable components

expanded polymeric extruded tubings or moulded parts (single or multi-layer), which undergo thermally activated recovery when heated

3.3

multi-layer component

component which consists of minimum two different materials bonded together

3.4

tubing

tube of heat shrinkable polymeric material cut to a predetermined length

3.5

moulded part

formed piece of heat shrinkable polymeric material shaped to fit a specific configuration

3.6

conductive component

component which has a defined electrical conductivity

3.7

stress control or stress grading component

component which has defined electrical characteristics to control electrical field

3.8

insulating component

component which has defined electrical characteristics to withstand electrical stress

3.9

oil barrier component

component which has defined material characteristics to prevent migration of cable impregnation compound

3.10

anti-tracking component

component which has defined material characteristics to resist formation of conductive paths by surface electrical activity

3.11

sealant component

component which, when used in conjunction with heat shrink components, forms a barrier along interfaces. It can be in the form of mastic, putty, grease or adhesive

3.12

fingerprinting

tests made to establish and subsequently confirm the properties of materials or components used in cable accessories

3.13

deviation

variation of a property between the initial test values and test values measured on new samples at a later date

3.14

initial test

tests made to establish the properties of materials or components used in cable accessories

4 Fingerprinting

4.1 General

Tests shall be carried on heat shrinkable components as defined in Table 1.

4.2 Sampling

Samples for fingerprinting shall be taken from material stored under conditions prescribed by the supplier. The fingerprinting test of heat shrinkable components shall be carried out either

- a) as a stand-alone test. Samples used for the initial test shall be taken from material available with or without sealant as agreed between supplier and user, or
- b) in combination with an accessory type test. Samples used for the initial test shall be taken from the same kit as those used in the accessory type test with or without sealant. In the event that no material from the same kit is available, the samples used for the initial test shall be taken from material available as agreed between supplier and user.

4.3 Preparation and conditioning

After full recovery in an air circulating oven at $(200 \pm 5) ^\circ\text{C}$ for 20_{-5}^{+5} min, original components shall be individually prepared and conditioned in accordance with relevant test methods. For multilayer components the material samples shall be taken from individual layers.

4.4 Tests

Components shall be tested in accordance with the tests methods specified in Table 1.

4.5 Test report

The test report shall include the following data:

- 1 part number or identification;
- 2 lot number and/or manufacturing date;
- 3 test methods and results;
- 4 copy of the technical data sheet (TDS) and material safety data sheet (MSDS), if any (refer to Annex A);
- 5 major test parameters, including conditioning and calibration.

Table 1 - Test methods and requirements

Material / Component property	Test method	Unit	Requirements	
			Deviation	Comments
Dimensions after full recovery ^a - Inner diameter (d ₁) - Wall thickness (W _c)	Annex B	mm mm	(+0/-10) % (-0/+15) %	
Density	EN ISO 1183 series	g/cm ³	± 5 %	Measured without sealant and for multi layer each individual layer shall be measured.
Differential scanning - Calorimetry (DSC) ^b	ISO 11357-3	°C	± 5 K	Measured without sealant and for multi layer each individual layer shall be measured.
Thermogravimetric analysis (TGA) ^b Polymer: - Weight loss - Mean temperature Carbon black: - Weight loss - Mean temperature Filler: - Weight loss - Mean temperature	EN ISO 11358	% °C % °C % °C	± 10 % ± 15 K ± 10 % ± 15 K ± 10 % ± 15 K	Measured without sealant and for multi layer each individual layer shall be measured.
^a Test to be performed on the component as received. For multi-layer components the value for each layer shall be recorded separately, where relevant. For nominal value refer to product data sheet.				
^b Test sequence and conditions shall be clearly recorded in the test report. The same sequence and conditions shall be used when the test is re-conducted.				

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