



# SLOVENSKI STANDARD

## SIST HD 631.4 S1:2009

01-marec-2009

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Electrical cables - Accessories - Material characterisation -- Part 4: Fingerprinting for cold shrinkable components for low and medium voltage applications up to 20,8/36 (42) kV

Kabel und isolierte Leitungen - Garnituren - Materialcharakterisierung -- Teil 4: Fingerprint-Prüfungen für kaltschrumpfende Komponenten für Nieder- und Mittelspannungsanwendungen bis 20,8/36 (42) kV

Câbles électriques - Accessoires - Caractérisation des matériaux -- Partie 4: Essais d'identification des composants rétractables à froid pour les applications basse et moyenne tension jusqu'à 20,8/36 (42) kV

Ta slovenski standard je istoveten z: HD 631.4 S1:2008

### ICS:

29.060.20      Kabli      Cables

SIST HD 631.4 S1:2009      en,fr,de

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HARMONIZATION DOCUMENT  
DOCUMENT D'HARMONISATION  
HARMONISIERUNGSDOKUMENT

**HD 631.4 S1**

July 2008

ICS 29.035.20; 29.060.20

English version

**Electrical cables -  
Accessories -  
Material characterisation -  
Part 4: Fingerprinting for cold shrinkable components  
for low and medium voltage applications up to 20,8/36 (42) kV**

Câbles électriques -  
Accessoires -  
Caractérisation des matériaux -  
Partie 4: Essais d'identification  
des composants rétractables à froid  
pour les applications basse  
et moyenne tension  
jusqu'à 20,8/36 (42) kV

Kabel und isolierte Leitungen -  
Garnituren -  
Materialcharakterisierung -  
Teil 4: Fingerprint-Prüfungen  
für kaltschrumpfende Komponenten  
für Nieder-  
und Mittelspannungsanwendungen  
bis 20,8/36 (42) kV

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This Harmonization Document was approved by CENELEC on 2008-06-01. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for implementation of this Harmonization Document at national level.

Up-to-date lists and bibliographical references concerning such national implementations may be obtained on application to the Central Secretariat or to any CENELEC member.

This Harmonization Document exists in three official versions (English, French, German).

CENELEC members are the national electrotechnical committees of Austria, Belgium, Bulgaria, Cyprus, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and the 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 Harmonization Document was prepared by a task force under the direction of WG 11 of CENELEC TC 20, Electric cables.

As agreed at the Bruges meeting (June 2007), the text of the draft was submitted to the formal vote and was approved by CENELEC as HD 631.4 S1 on 2008-06-01.

The following dates were fixed:

- latest date by which the existence of the HD has to be announced at national level (doa) 2008-12-01
- latest date by which the HD has to be implemented at national level by publication of a harmonized national standard or by endorsement (dop) 2009-06-01
- latest date by which the national standards conflicting with the HD have to be withdrawn (dow) 2011-06-01

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  
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- 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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## 1 Scope

This Harmonization Document specifies the test methods and requirements for fingerprinting (as defined in 3.11) of cold shrinkable components intended to be used in cable accessories for low and medium voltage, as defined in EN 50393, 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 may 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, external protection and sealing. Components are supplied as single layer items or as multi-layer items.

Components are generally supplied pre-expanded or with a system allowing expansion prior to installation.

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 50393	Test methods and requirements for accessories for use on distribution cables of rated voltage 0,6/1,0 (1,2) kV
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
EN ISO 11358	Plastics - Thermogravimetry (TG) of polymers - General principles (ISO 11358)
IEC 60050-461	International Electrotechnical Vocabulary (IEV) - Chapter 461: Electric cables
ISO 2781	Rubber, vulcanized - Determination of density

## 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

#### **cold shrinkable**

property of an elastomeric component previously expanded to recover to its original shape at ambient temperature after removal of the means of support

**3.2****cold shrinkable component**

elastomeric extruded tubing or moulded part (single- or multi-layer) pre-expanded on a support or expanded prior to installation, which tends to recover to its original dimensions when the support is removed

**3.3****multi-layer component**

component which consists of minimum two or more different materials bonded together

**3.4****conductive component**

component whose material has a defined electrical conductivity

**3.5****stress control or stress grading component**

component whose material has defined electrical characteristics to control electrical field

**3.6****insulating component**

component whose material has defined electrical characteristics to withstand electrical stress

**3.7****oil barrier component**

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

**3.8****anti-tracking component**

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

**3.9****sealant component**

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

**3.10****external protection component**

component providing protection against the environment

**3.11****fingerprinting**

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

**3.12****deviation**

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

**3.13****initial test**

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

### 3.14

#### **mechanically assembled cold shrinkable components**

mechanical superposition of at least two cold shrinkable components on one support

### 3.15

#### **support**

device that serves to retain a cold shrinkable component in its expanded state and that is removed to allow recovery

## 4 Fingerprinting

### 4.1 General

Tests shall be carried out on cold 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 on cold 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 batch as those used in the accessory type test with or without sealant. In the event that no material from the same batch 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

Original components shall be individually prepared and conditioned in accordance with relevant test method conditions. For multi-layer components, the material samples shall be taken from individual layers.

### 4.4 Tests

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

### 4.5 Test report

The test report shall include the following data:

- 1 part number or identification;
- 2 batch 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;
- 6 expansion date (mm/yy) of component.



Table 1 - Test methods and requirements

Material / Component property	Test method	Unit	Requirements	
			Deviation	Comments
Support dimensions: - Inner diameter - Outer diameter		mm	± 5 % ± 5 %	
Weight <sup>a</sup>		g	± 7,5 %	
Shrink test <sup>b</sup>				
Density	ISO 2781	g/cm <sup>3</sup>	± 5 %	For multi-layer components each individual layer shall be measured.
Thermogravimetric analysis (TGA) <sup>c</sup>  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	For multi-layer components each individual layer shall be measured.
<sup>a</sup> Components of mechanically assembled cold shrinkable component shall be weighed separately.				
<sup>b</sup> A suitable test method and requirements are under consideration.				
<sup>c</sup> 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.				