



# SLOVENSKI STANDARD

## oSIST prEN 50655-1:2023

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### Električni kabli - Pribor - Značilnosti materialov - 1. del: Identifikacija materiala za smolne zmesi

Electric cables - Accessories - Material characterization - Part 1: Fingerprinting for resinous compounds

Kabel und isolierte Leitungen - Garnituren - Materialcharakterisierung - Teil 1: Fingerprintprüfungen für Reaktionsharzmassen

Câbles électriques - Accessoires - Caractérisation des matériaux - Partie 1: Essais d'identification pour les composés résineux

Ta slovenski standard je istoveten z: prEN 50655-1

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29.035.20	Plastični in gumeni izolacijski materiali	Plastics and rubber insulating materials
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EUROPEAN STANDARD  
NORME EUROPÉENNE  
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**DRAFT**  
**prEN 50655-1**

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ICS 29.035.20

Will supersede EN 50655-1:2017

English Version

## Electric cables - Accessories - Material characterization - Part 1: Fingerprinting for resinous compounds

Câbles électriques - Accessoires - Caractérisation des  
matériaux - Partie 1: Essais d'identification pour les  
composés résineux

Kabel und isolierte Leitungen - Garnituren -  
Materialcharakterisierung - Teil 1: Fingerprintprüfungen für  
Reaktionsharzmassen

This draft European Standard is submitted to CENELEC members for enquiry.  
Deadline for CENELEC: 2023-03-31.

It has been drawn up by CLC/TC 20.

If this draft becomes a European Standard, 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.

This draft European Standard was established by CENELEC 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 CEN-CENELEC Management Centre has the same status as the official versions.

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Recipients of this draft are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

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

**CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels**

1	<b>Contents</b>	Page
2		
3	<b>1 Scope .....</b>	<b>6</b>
4	<b>2 Normative references .....</b>	<b>6</b>
5	<b>3 Terms and definitions .....</b>	<b>6</b>
6	<b>4 Fingerprinting .....</b>	<b>7</b>
7	<b>4.1 General .....</b>	<b>7</b>
8	<b>4.2 Sampling .....</b>	<b>7</b>
9	<b>4.3 Preparation and conditioning .....</b>	<b>8</b>
10	<b>4.4 Sequence of tests .....</b>	<b>8</b>
11	<b>4.5 Test report .....</b>	<b>8</b>
12	<b>Annex A (informative) Health and safety .....</b>	<b>13</b>
13		
14	<b>Tables</b>	
15	<b>Table 1 — Fingerprinting tests — Test methods and requirements for Polyurethane resins ...</b>	<b>9</b>
16	<b>Table 2 — Fingerprinting tests — Test methods and requirements for Polybutadiene resins</b>	<b>10</b>
17	<b>Table 3 — Fingerprinting tests — Test methods and requirements for Epoxy resins .....</b>	<b>11</b>
18	<b>Table 4 — Fingerprinting tests — Test methods and requirements for Silicone resins .....</b>	<b>12</b>
19		

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20 **European foreword**

21 This document (prEN 50655-1:2022) has been prepared by CLC/TC 20 “*Electric cables*”.

22 This document is currently submitted to the Enquiry.

23 The following dates are fixed:

- latest date by which the existence of this document has to be announced at national level (doa) dor + 6 months
- latest date by which this document has to be implemented at national level by publication of an identical national standard or by endorsement (dop) dor + 12 months
- latest date by which the national standards conflicting with this document have to be withdrawn (dow) dor + 36 months (to be confirmed or modified when voting)

24 This document will supersede EN 50655-1:2017.

25 EN 50655 series will consist of the following:

- 26 – EN 50655-1, *Electric cables - Accessories - Material characterization - Part 1: Fingerprinting for*  
27 *resinous compounds;*
- 28 – EN 50655-2, *Electric cables - Accessories - Material characterization - Part 2: Fingerprinting for heat*  
29 *shrinkable components for low and medium voltage applications up to 20,8/36 (42) kV;*
- 30 – EN 50655-3, *Electric cables - Accessories - Material characterization - Part 3: Fingerprinting for cold*  
31 *shrinkable components for low and medium voltage applications up to 20,8/36 (42) kV.*

prEN 50655-1:2022 (E)

32 **Introduction**

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

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

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## 39 1 Scope

40 This document specifies the test methods and requirements of tests for fingerprinting (as defined in 3.9) of  
41 solvent-free polymerizable, reacting resinous compound intended to be used for electrical insulation and/or  
42 mechanical protection in cable accessories covered by EN 50393, HD 629.1 and HD 629.2, for low and  
43 medium voltage up to 20,8/36 (42) kV.

44 Fingerprinting testing of materials does not have a mandatory link to type testing of accessories. It is  
45 regarded as stand-alone tests, but it may be carried out in combination with the accessory type tests.

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

## 47 2 Normative references

48 The following documents, in whole or in part, are normatively referenced in this document and are  
49 indispensable for its application. For dated references, only the edition cited applies. For undated  
50 references, the latest edition of the referenced document (including any amendments) applies.

51 EN 60455-1, *Resin based reactive compounds used for electrical insulation - Part 1: Definitions and  
52 general requirements (IEC 60455-1)*

53 EN 60455-2, *Resin based reactive compounds used for electrical insulation - Part 2: Methods of test  
54 (IEC 60455-2)*

55 EN ISO 291, *Plastics - Standard atmospheres for conditioning and testing (ISO 291)*

56 EN ISO 868, *Plastics and ebonite - Determination of indentation hardness by means of a durometer (Shore  
57 hardness) (ISO 868)*

58 EN ISO 1183-1, *Plastics - Methods for determining the density of non-cellular plastics - Part 1: Immersion  
59 method, liquid pycnometer method and titration method (ISO 1183-1)*

60 EN ISO 2555, *Plastics - Resins in the liquid state or as emulsions or dispersions - Determination of  
61 apparent viscosity using a single cylinder type rotational viscometer method (ISO 2555)*

62 IEC 60050-461, *International Electrotechnical Vocabulary - Part 461: Electric cables*

## 63 3 Terms and definitions

64 For the purposes of this document, the terms and definitions given in IEC 60050-461 and EN 60455-1 and  
65 the following apply.

### 66 3.1 67 resinous compound

68 compound for cable accessories made by the mixture of at least two components (resin and reactive  
69 component)

70 Note 1 to entry: For some applications, additional components such as filler may be needed.

### 71 3.2 72 resin

73 liquid organic material that cures as a result of polymerization by means of reactive component  
74 (e.g. hardener or accelerator) without releasing additional volatile products

### 75 3.3 76 reactive component

77 substance or compound of substances which causes, when added to resin, hardening of resin by cross-  
78 linking of molecules or accelerates hardening of resin

## prEN 50655-1:2022 (E)

- 79 **3.4**  
80 **pot life**  
81 time available to mix the components of the resinous compound together and pour or inject the compound  
82 into the cable accessory, such that it continues to flow smoothly and cohesively
- 83 **3.5**  
84 **“use before” date**  
85 **shelf-life**  
86 date until which a resinous compound, when stored under specified conditions of temperature and humidity,  
87 retains specified properties
- 88 **3.6**  
89 **density**  
90 ratio of mass to volume
- 91 **3.7**  
92 **exotherm peak temperature**  
93 highest temperature that is reached during the hardening process of a defined volume of a resinous  
94 compound after mixing at a defined temperature
- 95 **3.8**  
96 **hardness**  
97 measurement of the resistance of a material to indentation by means of durometers or by penetration of a  
98 needle (soft material)
- 99 **3.9**  
100 **fingerprinting**  
101 tests made to establish and subsequently confirm the properties of materials or components used in cable  
102 accessories
- 103 **3.10**  
104 **type test** <https://standards.iteh.ai/catalog/standards/sist/71324c04-aa29-4854-8be9->  
105 tests made on materials or components of a cable accessory in order to demonstrate satisfactory  
106 performance characteristics to meet the intended application
- 107 **3.11**  
108 **deviation**  
109 variation of a property between the initial test values and the test values measured on new samples at a  
110 later date
- 111 **3.12**  
112 **initial test**  
113 tests made to establish the properties of materials or components used in cable accessories
- 114 **4 Fingerprinting**
- 115 **4.1 General**
- 116 Tests shall be carried out based on the category of the resinous compound.
- 117 **4.2 Sampling**
- 118 Samples for fingerprinting shall be taken from material stored under conditions prescribed by the supplier.  
119 The fingerprinting test of resinous compound shall be carried out
- 120 a) **either** as a stand-alone test. Samples used for the initial test shall be taken from material available as  
121 agreed between supplier and user,
- 122 b) **or** in combination with an accessory type test. Samples used for the initial test shall be taken from the  
123 same batch as those used in the accessory type test. In the event that no material from the same batch



124 is available, the samples used for the initial test shall be taken from material available as agreed  
125 between supplier and user.

## 126 **4.3 Preparation and conditioning**

### 127 **4.3.1 General**

128 For all tests, unless otherwise specified, conditioning shall be carried out in accordance with EN ISO 291  
129 using atmosphere 23/50.

### 130 **4.3.2 Individual components prior to mixing**

131 Components (resin and reactive component) shall be individually prepared, conditioned and tested in  
132 accordance with the relevant test method as specified in stage 1 of the sequence of tests given in Tables 1  
133 to 4. Filler, when supplied as a separate item, shall not be tested as a component.

134 If the components are delivered in double chamber bags or bottles, each chamber or bottle must be  
135 completely emptied. The components must be homogenized separately in a beaker for 3 minutes with a  
136 spatula (except for the hardener of Polyurethane resins). If the components are delivered in cans, they also  
137 have to be homogenized for 3 minutes with a spatula (except for the hardener of Polyurethane resins).

### 138 **4.3.3 Resin just after mixing (curing stage)**

139 Mixing of the components have to be done in a beaker with a spatula with a mixing time according to the  
140 supplier's instructions and then tested as specified in stage 2 of the sequence of tests given in Tables 1 to  
141 4. In the case no information regarding mixing is given, mixing time shall be 3 minutes.

### 142 **4.3.4 Cured resinous compound (original)**

143 Compounds shall be prepared according to supplier's instructions and cured for 24 h at room temperature  
144 unless otherwise specified in the test method. The specimens shall be post-cured at  $(80 \pm 2)$  °C for 24 h  
145 unless otherwise specified in the test method and then cooled in a desiccator for 24 h at room temperature.

146 Tests shall then be carried out as specified in stage 3 of the sequence of tests given in Tables 1 to 4.

## 147 **4.4 Sequence of tests**

148 Sequences of tests shall be carried out on the resinous compound in the following three stages, in  
149 accordance with Tables 1 to 4:

- 150 – Stage 1: individual components prior to mixing;
- 151 – Stage 2: resinous compound just after mixing (curing stage);
- 152 – Stage 3: cured resinous compound (original).

## 153 **4.5 Test report**

154 The test report shall include the following data:

- 155 1) resinous compound category and identification;
- 156 2) name of supplier / manufacturer
- 157 3) batch number or identification;
- 158 4) marking and labelling according to material safety data sheet (MSDS);
- 159 5) test methods and results;
- 160 6) major test parameters, including conditioning and calibration, if any;
- 161 7) processing conditions to mix the compound;
- 162 8) copy of technical data sheet (TDS) and MSDS.

Table 1 — Fingerprinting tests — Test methods and requirements for Polyurethane resins

Number	Property	Test method	Units	Max. acceptable deviation <sup>a</sup>	Comments
<b>Stage 1 – Individual components prior to mixing</b>					
1	Viscosity	EN ISO 2555 <sup>b</sup>	Pa.s	±40 %	Resin only
<b>Stage 2 – Resinous compound just after mixing (curing stage)</b>					
2	Pot life	EN 60455-2	min	±30 %	Test with 0,3 l at 23 °C, reach 50 Pa.s; in the case measurement is done acc. EN ISO 2555 use spindle 7 and 50 min <sup>-1</sup>
3	Exothermic temperature rise Exothermic peak temperature	EN 60455-2	°C	± 10 K	
4	Curing in presence of water, physical structure	EN 60455-2		no deviation	Only for category W
<b>Stage 3 – Cured resinous compound (original)</b>					
5	Density	EN ISO 1183-1	g/cm <sup>3</sup>	± 10 %	
6	Hardness (Shore 00, A, D)	EN ISO 868		± 10	Shore 00 acc. EN ISO 868; valid durometer range: 30-90; values must be taken from side-up of sample; sample thickness (10 +/- 1) mm; take value after 15 s
<sup>a</sup> From value for original batch of compound. <sup>b</sup> Use spindle 2 and 10 min <sup>-1</sup> for viscosities up to 4 Pa.s, take value after 200 s Use spindle 3 and 10 min <sup>-1</sup> for viscosities >4 Pa.s up to 10 Pa.s, take value after 500 s Use spindle 4 and 10 min <sup>-1</sup> for viscosities >10 Pa.s up to 20 Pa.s, take value after 500 s Use spindle 5 and 10 min <sup>-1</sup> for viscosities >20 Pa.s up to 40 Pa.s, take value after 500 s Use spindle 7 and 50 min <sup>-1</sup> for viscosities > 40 Pa s, take value after 500 s					