



# SLOVENSKI STANDARD

## SIST EN 50143:1998

01-februar-1998

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**Cables for signs and luminous-discharge-tube installations operating from a no-load rated output voltage exceeding 1 kV but not exceeding 10 kV**

Cables for signs and luminous-discharge-tube installations operating from a no-load rated output voltage exceeding 1 000 V but not exceeding 10 000 V

Leitungen für Leuchtröhrengeräte und Leuchtröhren-Anlagen mit einer Leerlaufspannung von über 1 000 V, aber nicht über 10 000 V

Câbles pour installations d'enseignes et de tubes à décharges lumineuses fonctionnant avec une tension à vide supérieure à 1 000 V mais ne dépassant pas 10 000 V

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**Ta slovenski standard je istoveten z: EN 50143:1997**

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**ICS:**

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EUROPEAN STANDARD

**EN 50143**

NORME EUROPÉENNE

EUROPÄISCHE NORM

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Descriptors: Electrical equipment, electric cable, electric conductor, insulated cable, discharge lamp

English version

**Cables for signs and luminous-discharge-tube installations operating from a no-load rated output voltage exceeding 1 kV but not exceeding 10 kV**

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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, with the support of CENELEC BTTF 60-2, Electrical discharge lamp installations.

The text of the draft was submitted to the Unique Acceptance Procedure and was approved by CENELEC as EN 50143 on 1996-12-09.

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) 1997-12-01
- latest date by which the national standards conflicting with the EN have to be withdrawn (dow) 1997-12-01

Annexes designated "normative" are part of the body of the standard.  
In this standard, all annexes are normative.

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**1. SCOPE****1.1 General**

EN 50143 applies to single core cables of rated voltage  $U_0/U$  up to and including 5/10 kV used with electric signs and high-voltage luminous-discharge-tube installations. These cables are for use in installations complying with EN 50107.

The particular types of cables are specified in clauses 6-9 of this standard.

**1.2 Object**

The objects of this European standard are:

- to standardise cables that are safe and reliable when properly used, in relation to the technical requirements of the installation of which they form a part.
- to state the characteristics and manufacturing requirements which have a direct or indirect bearing on safety.
- to specify methods for checking conformity with these requirements.

**2. NORMATIVE REFERENCES**

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

EN 50107:	Signs and luminous-discharge-tube installations operating from a no-load rated output voltage exceeding 1000 V but not exceeding 10000 V
EN 60811:	Common test methods for insulating and sheathing materials of electric cables
HD 21:	PVC insulated cables of rated voltage up to 450/750 V
HD 22:	Rubber insulated cables of rated voltage up to 450/750 V
HD 383:	Conductors of insulated cables
HD 405:	Tests on electric cables under fire conditions
HD 602:	Test on gases evolved during the combustion of materials from cables. Determination of degree of acidity (corrosivity) of gases by measuring pH and conductivity
HD 606:	Measurement of smoke density of electric cables burning under defined conditions

### 3. DEFINITIONS

#### 3.1 Definitions relating to insulating and sheathing compounds

##### 3.1.1 Thermoplastic Polyvinyl Chloride compound - PVC

Combinations of materials suitably selected, proportioned and treated, of which the characteristic constituent is polyvinyl chloride.

##### 3.1.2 Thermoplastic Polyethylene - PE

Combinations of materials suitably selected, proportioned and treated, of which the characteristic component is polyethylene or polyethylene and certain of its copolymers.

##### 3.1.3 Cross-linked Ethylene Propylene Rubber - EPR

A compound based on ethylene propylene rubber or similar (EPM or EPDM) which when cross-linked meets the requirements given for the particular cable.

##### 3.1.4 Cross-linked Silicone Rubber - SiR

A compound based on a linear poly-siloxane polymer which when cross-linked meets the requirements given for the particular cable.

##### 3.1.5 Ethylene Copolymer - EVA

Thermoplastic or cross-linked materials in which the characteristic constituent is a copolymer of ethylene such as EVA, EEA, EMA, compounded so as to comply with the requirements given for the particular cable.

#### 3.2 Type designation of compound

The category in which a compound is placed according to its properties as determined by a specific tests. The type designation is not directly related to the composition of the compound.

#### 3.3 Definitions relating to the tests

**NOTE** Test classified as Sample (S) or Routine (R) are required as part of any Type Approval Schemes.

##### 3.3.1 Type tests (Symbol T)

Tests required to be made before supplying a type of cable covered by this EN on a general commercial basis, in order to demonstrate satisfactory performance characteristics to meet the intended application. These tests are of such a nature that, after they have been made, they need not be repeated unless changes are made in the cable material, design or type of manufacturing process which might change the performance characteristics.

**3.3.2 Sample test (Symbol S)**

Tests made on samples of completed cable, or components taken from a completed cable adequate to verify that the finished product meets the design specifications.

**3.3.3 Routine Test (Symbol R)**

Tests made on all production cable lengths to demonstrate their integrity.

**3.4 Rated Voltage**

The rated voltage of a cable is the reference voltage for which the cable is designed, and which serves to define the electrical tests.

The rated voltage is expressed by the combination of the following values  $U_0/U$ , expressed in volts.

$U_0$  is the r.m.s value between any insulated conductor and "earth" (metal covering of the cable or the surrounding medium):

$U$  is the r.m.s value between any two phase-conductors of a system of single core cables.

In an alternating current system, the rated voltage of a cable shall be at least equal to the nominal voltage of the system for which it is intended.

## 4. GENERAL REQUIREMENTS FOR THE CONSTRUCTION OF CABLES

**4.1 Conductors****4.1.1 Material**

The conductors shall consist of tinned annealed copper.

**4.1.2 Construction**

The classes of the conductors relevant to the various types of cables are given in clauses 6-9.

**4.1.3 Check of construction**

Compliance with the requirements of sub-clauses 4.1.1 and 4.1.2, including the requirements of HD 383, shall be checked by inspection and by measurement.

**4.1.4 Electrical resistance**

The resistance of each conductor at 20°C shall be in accordance with the requirements of HD 383 for the given class of conductor.

Compliance shall be checked by the test given in sub-clause 2.1 of HD 21.2 or HD 22.2 as appropriate.



## 4.2 Insulation

### 4.2.1 Material

The insulation shall be a compound as specified for each type of cable in clauses 6 to 9.

The test requirements for these compounds are specified for the particular cable.

Operating and short-circuit temperature are stated in the particular specifications for each compound.

### 4.2.2 Application to the conductor

The insulation may consist of one or more bonded layers. The insulation shall be so applied that it fits closely on the conductor and it shall be possible to remove the insulation without damage to the remaining insulation to the conductor or to the tin coating. If required, compliance shall be checked by inspection and by manual test. The insulation shall be applied by an extrusion process, cross-linked where required, and shall form a compact and homogeneous body.

### 4.2.3 Thickness [standards.iteh.ai](http://standards.iteh.ai)

The mean value of the thickness of insulation shall not be less than the specified value for each type and size of cable.

However, the thickness at any one place may be less than the specified value provided that the difference does not exceed 0,1 mm + 10% of the specified value.

Compliance shall be checked by the test given in sub-clause 1.9 of HD 21.2 or HD 22.2 as appropriate.

## 4.3 Metallic coverings

### 4.3.1 Type of metallic layers

The following types of metallic layers may be specified:

- (a) metallic tape screen
- (b) metallic braid screen
- (c) metallic sheath

Detailed constructions of metallic coverings are given for the particular cable.

Test methods are given in Annex A of this standard.

### 4.3.2 Application

The metallic layers may be applied over a separate tape which is specified for the particular cable.

#### 4.4 Oversheath

##### 4.4.1 Material

The oversheath shall be a compound of the type specified for each type of cable in clauses 6 to 9.

The test requirements for these compounds are specified for the particular cable.

##### 4.4.2 Application

The oversheath shall be extruded.

A separator, consisting of a film or tape, may be placed beneath the oversheath of a metallic screen cable.

##### 4.4.3 Thickness

The mean value of the thickness of the oversheath shall not be less than the specified value for each type and size of cable.

However, the thickness at any place may be less than the specified value provided that the difference does not exceed 0,1 mm + 15% of the specified value.

Compliance shall be checked by the test given in sub-clause 1.10 of HD 21.2 or HD 22.2 as appropriate.

##### 4.4.4 Overall Dimensions

The mean overall dimensions of the cable shall be within the limits specified in the tables for each type and size of cable in clauses 6 to 9.

The difference between any two values of the overall diameter of sheathed circular cables at the same cross-section (ovality) shall not exceed 15% of the upper limit specified for the mean overall diameter.

Compliance shall be checked by the test given in sub-clause 1.11 of HD 21.2 or HD 22.2 as appropriate.

#### 4.5 Non-metallic components of halogen free cables

All non-metallic components shall be halogen free. This shall be checked by the test specified in HD 602 unless otherwise specified for the particular cable.

## 5. CABLE TYPES

### 5.1 General

Cables to this EN shall be one of the following types with a rated voltage, except for Type K, of 5/10 kV. The rated voltage for Type K shall be 2.5/5 kV.

Type A	-	Rubber insulated lead sheathed
Type B	-	Silicone rubber insulated cable, unscreened, unsheathed
Type C1	-	Silicone rubber insulated cable, unscreened, PVC sheathed
Type C2	-	Silicone rubber insulated cable, unscreened, zero halogen sheathed
Type D1	-	Silicone rubber insulated cable, screened and PVC sheathed
Type D2	-	Silicone rubber insulated cable, screened and zero halogen sheathed
Type E	-	PVC insulated cable, screened with drain wire and with PVC sheath
Type F	-	PVC insulated cable, unscreened, PVC sheathed
Type G	-	PVC insulated cable, unscreened, unsheathed
Type H	-	Cable with a composite insulation of polyethylene and PVC
Type K	-	Cable with a reduced thickness composite insulation of polyethylene and PVC

### 5.2 Requirements

The cables shall meet the general requirements of clause 4 and the requirements given in clauses 6 to 9 for the particular cable.

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## 6. RUBBER INSULATED LEAD SHEATHED CABLES (Type A)

### 6.1 Construction

#### 6.1.1 Conductor

Number of conductors: 1

The conductor shall comply with the requirements of HD 383 for Class 1 conductors. The conductor shall be tinned. The conductor shall not be required to pass the tinning test.

#### 6.1.2 Insulation

The insulation shall be rubber compound of type EI 7 to Table I of HD 22.1 applied around the conductor by extrusion.

The insulation thickness shall comply with the specified value given in Table 1, column 2.

#### 6.1.3 Proofed tape

Proofed tape, where required, shall be of closely woven textile without selvage proofed on one side with rubber or rubber-like materials. The thickness of the tape shall be approximately 0,14 mm and it shall be applied with a suitable overlap, over the insulated core.

#### 6.1.4 Lead sheath

The core may be taped in accordance with sub-clause 6.1.3, or untaped, at the manufacturer's discretion. The taped or untaped core shall be surrounded by a close fitting lead alloy sheath, which shall form a continuous tube free from flaw or defects of any kind, and which shall be readily removable without damage to the insulation.

The lead alloy sheath shall be made from lead alloy complying with the requirements of Annex B.

The thickness of the lead sheath, at any point, when measured in accordance with sub-clause 1.2 of Annex A of this EN, shall not be less than the value given in Table 1, column 3 by more than (5% plus 0,1mm).

#### 6.1.5 Overall diameter

The mean overall diameter shall be within the limits in Table 1.

### 6.2 Tests

Compliance with the requirements of sub-clause 6.1 shall be checked by inspection and by the tests given in Table 2.

### 6.3 Maximum continuous conductor temperature

For Type A cable the maximum continuous conductor temperature in operation is 90°C.