

**SLOVENSKI
STANDARD**

SIST HD 628 S1:1998

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Test methods for accessories for power cables with rated voltage from 3,6/6 kV($U_m = 7,2$ kV) up to and including 20,8/36 kV($U_m = 42$ kV)

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ICS 29.060.20

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English version

**Test methods for accessories for power cables with
rated voltage from 3,6/6 kV ($U_m = 7,2$ kV) up to and
including 20,8/36 kV ($U_m = 42$ kV)**

Méthodes d'essais des accessoires des
câbles d'énergie de tensions assignées
de 3,6/6 (7,2) kV à 20,8/36 (42) kV

Prüfverfahren für Kabelgarnituren für
Starkstromkabel mit einer
Nennspannung von 3,6/6 (7,2) kV bis
20,8/36 (42) kV

This Harmonization Document was approved by CENELEC on 1996-07-02. 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.

Up-to-date lists and bibliographical references concerning such national implementation 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, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

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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

HD 628 was prepared by WG11 of CENELEC TC20, and agreed at the Rotterdam meeting of TC20 (March 1995) to go forward to the Formal Vote (3MV).

This HD has been written as part of a series of standards to satisfy the Public Procurement Directive, and is complementary to HD 620 and 621, which cover cables rated from 3,6/6(7,2) kV to 20,8/36(42) kV, inclusive.

The standard defines the test methods which may be called up for joints, stop ends, separable connectors, indoor and outdoor terminations when used with either extruded insulation power cables or paper insulated power cables covered by HD 620 or HD 621. The test methods align as far as is practically possible with the equivalent IEC document (IEC 1442).

Requirements to be met by the accessories to which the test methods relate are given in HD 629.1 and HD 629.2.

This draft was submitted to the CENELEC Formal Vote (3MV) in December 1995 and was approved by CENELEC as HD 628 S1 on 1996-07-02.

The following dates were fixed:

- latest date by which the existence of the HD has to be announced at national level (doa) 1996-12-01
- latest date by which the HD has to be implemented at national level by publication of a harmonised national standard or by endorsement (dop) 1997-06-01
- latest date by which the national standards conflicting with the HD have to be withdrawn (dow) 1997-06-01

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**TEST METHODS FOR ACCESSORIES FOR POWER CABLES WITH
RATED VOLTAGE FROM 3,6/6kV ($U_m = 7,2$ kV) UP TO
AND INCLUDING 20,8/36kV ($U_m = 42$ kV)**

1. Scope

This standard specifies the test methods to be used for type testing accessories for power cables with rated voltage from 3,6/6 (7,2)kV up to and including 20,8/36(42) kV. Test methods are specified for accessories for extruded insulation cables and paper cables to HD 620 and HD 621.

2. Normative References

This Harmonization Document 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 Harmonisation Document only when incorporated in it by amendment or revision. For undated references, the latest edition of the publication referred to applies.

- | | |
|--------------|---|
| EN 60694 | Common specifications for high-voltage switchgear and controlgear standards (IEC 694) |
| EN 60811-1-2 | Insulating and sheathing materials of electric cables - Common test methods
Part 1: General application
Section 2: Thermal ageing methods |
| EN 60811-1-4 | Insulating and sheathing materials of electric cables - Common test methods
Part 1: General application
Section 2: Tests at low temperature |
| HD 48 | Impulse tests on cables and their accessories (IEC 230) |
| HD 588.1 | High-voltage test techniques
Part 1: General definitions and test requirements (IEC 60-1) |
| HD 620 | Distribution cables with extruded insulation for rated voltage from 3,6/6 (7,2) kV to 20,8/36 (42) kV |
| HD 621 | Medium voltage impregnated paper insulated distribution cables |
| IEC 270 | Partial discharge measurements |
| IEC 885-2 | Electrical test methods for electric cables
Part 2: Partial discharge tests |
| IEC 986 | Guide to the short-circuit temperature limits of electric cables with a rated voltage from 1,8/3 (3,6) kV to 18/30 (36) kV |

3. Test Installations and Conditions

- 3.1 The test methods described in this standard are intended to be used for type tests.
- 3.2 Test arrangements and number of test samples are given in the relevant standard.

- 3.3 The test conditions are specified in clauses 4 to 21 of this standard. When not, they shall be as specified in relevant standards.
- 3.4 Unless otherwise stated, the testing parameters and the requirements are given in the relevant standard.
- 3.5 For transition joints (either extruded insulation to extruded insulation or extruded insulation to paper insulation) the testing parameters (voltage and conductor temperature) are those of the lower rated cable.
- 3.6 The tests shall be started not less than 24 hours after the installation of the accessories on the cable test loops, unless otherwise specified by the manufacturer. The time interval shall be recorded in the test report.
- 3.7 Cable screens, and armour if any, shall be bonded and earthed at one end only to prevent circulating currents.
- 3.8 All parts of an accessory which are normally earthed shall be connected to the cable screen. Any supporting metalwork shall also be earthed.
- 3.9 Ambient temperature shall be $(20 \pm 15)^{\circ}\text{C}$

4. AC Withstand Voltage Test

4.1 Dry test

4.1.1 Installation

The set(s) of accessories shall be erected with all associated metalwork and fittings. The accessories shall be clean and dry before applying the test voltage.

4.1.2 Method

Unless otherwise specified, the test shall be made at ambient temperature and the procedure for voltage application shall be as specified in Section 5 of HD 588.1.

4.2 Wet Test

4.2.1 Installation

The terminations shall be erected in a vertical position, unless they are to be specifically installed in another orientation, with the relative spacing as under service conditions, according to manufacturer's instructions.

4.2.2 Method

Unless otherwise specified, the wet test method is as described in HD 588.1 sub-clause 9.1 and shall be carried out at ambient temperature.

4.3 Stop ends in water

4.3.1 Installation

The stop ends shall be installed in a water tank of such dimensions as to have a height of water of $(1,00^{+0,02})$ m over its top surface. The water shall be at ambient temperature.

4.3.2 Method

Unless otherwise specified, the procedure for voltage application shall be as specified in HD 588.1.

5. DC Withstand Voltage Test

5.1 Installation

The set(s) of accessories shall be erected with all associated metalwork and fittings. The accessories shall be clean and dry before applying the test voltage.

5.2 Method

A voltage of negative polarity shall be applied to the cable conductor. The test shall be made at ambient temperature and the procedure for voltage application shall be as specified in HD 588.1 clause 4.

6. Impulse Withstand Voltage Test

6.1 Installation

For preparation of the test installation, involving metal enclosures and terminal boxes, reference shall be made to the relevant standard.

In the case of three-core accessories (e.g. 3 single-core terminations in an enclosure), one phase shall be tested at a time with the other two phases earthed.

6.2 Method

The test shall be conducted in accordance with HD 48

6.3 Test at elevated temperature

Installation and the measurement of temperature are given in clause 8 of this standard.

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The cable conductor shall be heated and stabilised for at least 2 h at a temperature:

- 5K to 10K above the maximum cable conductor temperature in normal operation given in the particular section of HD 620 for extruded insulation cables;
- 0K to 5K above the maximum cable conductor temperature in normal operation given in the particular section of HD 621 for paper insulated cables,

before carrying out and during the impulse test.

7. Partial Discharge Test

This test is only required for accessories for extruded insulation single-core cables and three-core cables with individually semi-conducting screened cores. It is not required for accessories incorporating paper insulated cables.

7.1 Method

The test shall be conducted in accordance with IEC 270 and IEC 885-2.

The partial discharge shall be measured at the test voltage given in the relevant standard.

7.2 Test at elevated temperature

Installation and the measurement of temperature are given in clause 8 of this standard.

The cable conductor shall be heated and stabilised for at least 2 h at a temperature:

- 5K to 10K above the maximum cable conductor temperature in normal operation given in the particular section of HD 620,

before carrying out and during the partial discharge test.

8. Tests at Elevated Temperature

8.1 Installation and connection

The accessories shall be erected and supported where necessary and provided with connections to permit heating current to be circulated.

Where terminations or separable connectors are to be tested, the connection between either lugs or bushings shall have an electrical cross-section equivalent to that of the cable conductor.

Where branch joints are to be tested, only the main cable shall carry the heating current.

Three-core accessories may be connected for either single-phase or three-phase heating current. Single-phase or three-phase voltage in accordance with requirements shall be superimposed on the heating current. In the case of a magnetic covering a three-phase heating current shall be applied.

Accessories for belted cables shall be subjected to three-phase voltage.

8.2 Measurement of temperature

8.2.1 Cable conductor temperature

It is recommended that one of the methods described in Annex A is used to determine the actual conductor temperature.

8.2.2 Thermocouple position

Two thermocouples shall be attached to the cable sheath as shown in the Figures 1 to 6 :

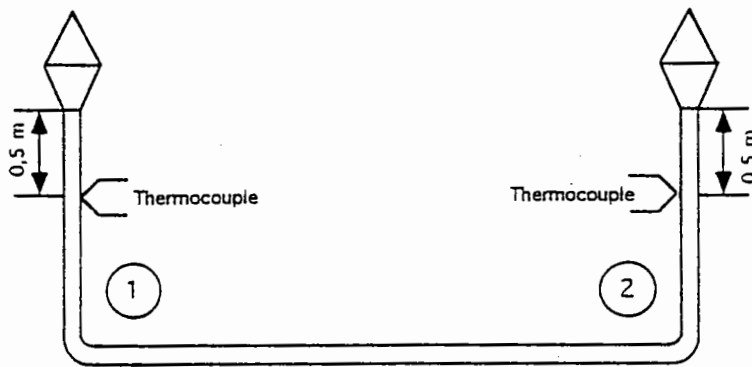


Figure 1: Terminations tested in air



Figure 2: Joints tested in air

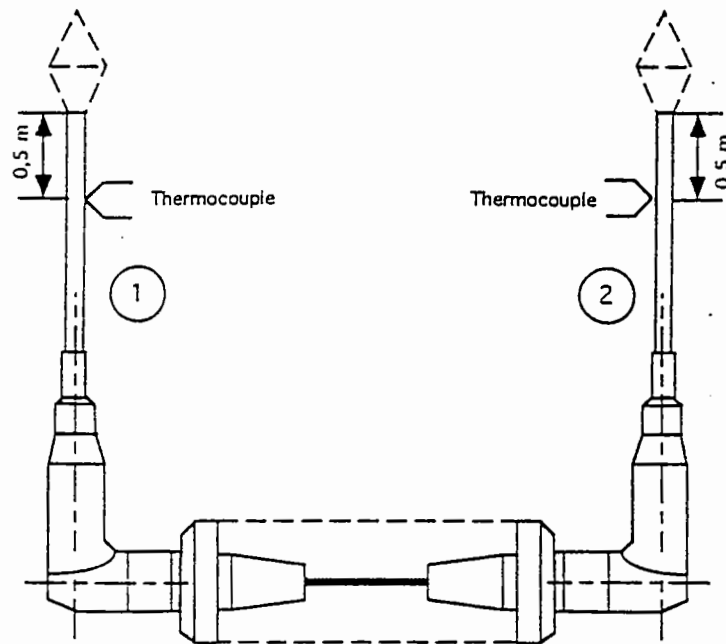


Figure 3: Separable connectors tested in air

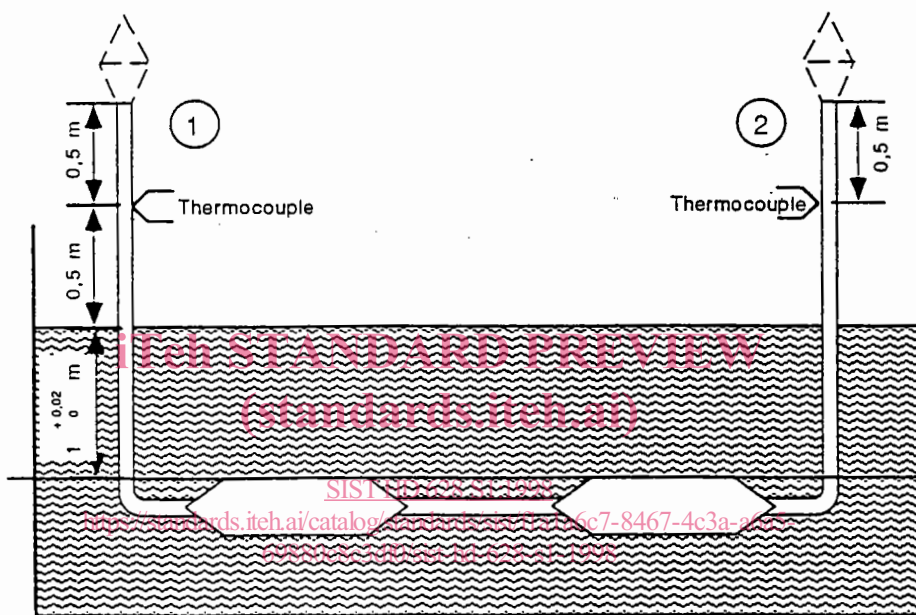


Figure 4: Joints tested under water

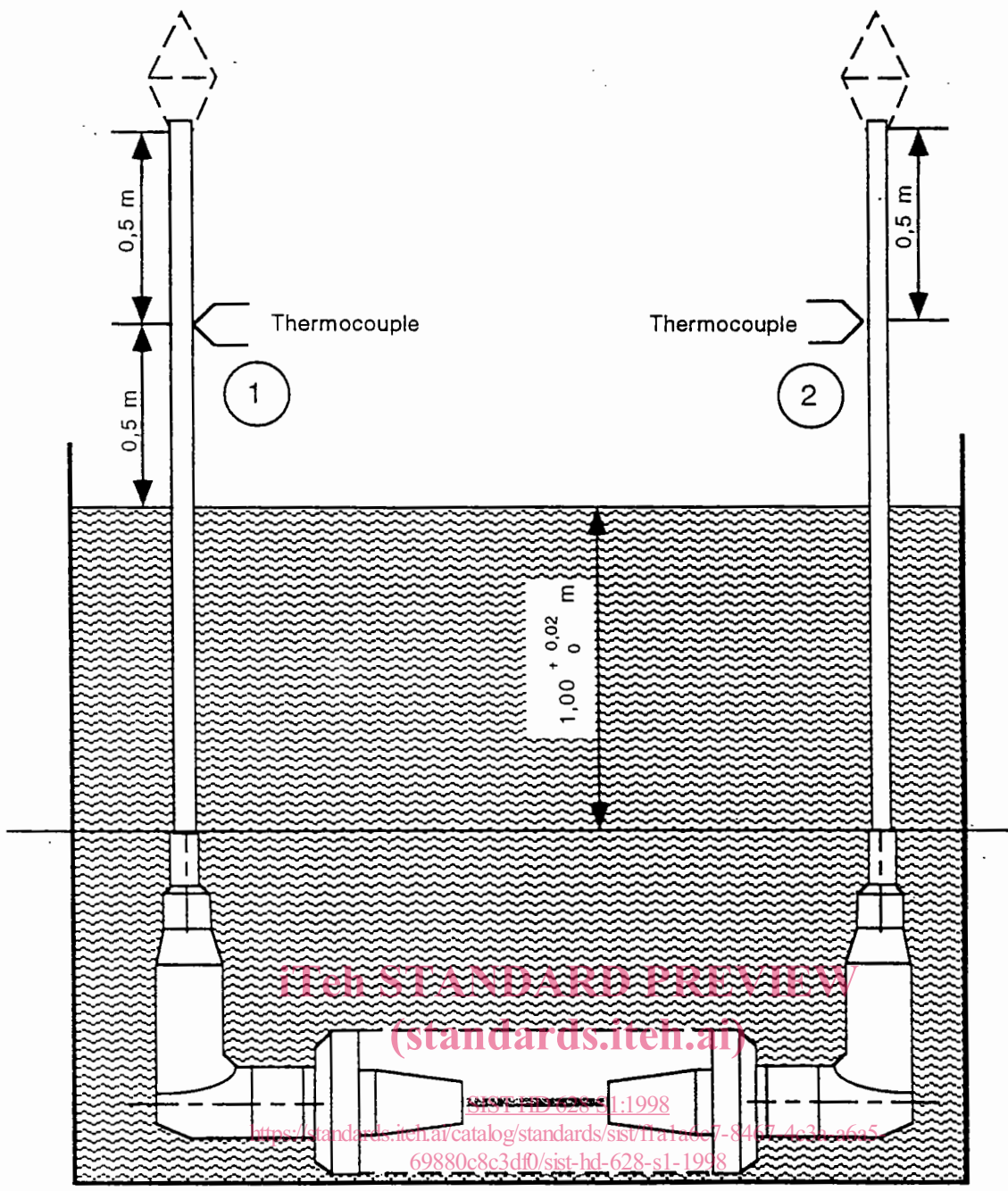


Figure 5: Separable connectors tested under water