
Preskusne metode in zahteve za pribor, ki se uporablja na distribucijskih kabljih za naznačene napetosti 0,6/1,0 (1,2) kV

Test methods and requirements for accessories for use on distribution cables of rated voltage 0,6/1,0 (1,2) kV

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English version

**Test methods and requirements for accessories
for use on distribution cables of rated voltage 0,6/1,0 (1,2) kV**

Méthodes et prescriptions d'essai
pour les accessoires de câbles
de distribution de tension assignée
0,6/1,0 (1,2) kV

Prüfverfahren und Prüfanforderungen
für die Garnituren von Verteilerkabeln
mit einer Nennspannung von
0,6/1,0 (1,2) kV

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This European Standard was approved by CENELEC on 2005-10-01. 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.

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

This European Standard exists 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 Central Secretariat has the same status as the official versions.

CENELEC members are the national electrotechnical committees of Austria, Belgium, 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 European Standard was prepared by the Technical Committee CENELEC TC 20, Electric cables.

The text of the draft was submitted to the formal vote and was approved by CENELEC as EN 50393 on 2005-10-01.

This European Standard supersedes HD 623 S1:1996 and its amendment A1:2001.

This European Standard is the first revision of HD 623 S1:1996 and includes the first amendment A1:2001 and the changes proposed by the CLC/TC 20 WG 11, Harmonisation of joints, accessories and terminations of electric cables.

CLC/TC 20, at its meeting in Stockholm (May 2002), agreed that HD 623 should be converted to an EN. This European Standard has been written as part of a series of standards to satisfy the Public Procurement Directive, and is complementary to HD 603, which covers cables rated at 0,6/1,0 (1,2) kV for use by distributors of electrical power.

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) 2006-11-01
- latest date by which the national standards conflicting with the EN have to be withdrawn (dow) 2008-10-01

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1 Scope

This European Standard details the performance requirements and the test methods for type tests for cable accessories for use on cables of rated voltage 0,6/1,0 (1,2) kV as defined in HD 603.

Formerly, approvals for such products have been achieved on the basis of national standards and specifications and/or the demonstration of satisfactory service performance. The publication of this European standard does not invalidate existing approvals. However, products approved to such earlier standards or specifications shall not claim approval to this European Standard unless specifically tested to it.

After they have been successfully made, these tests need not be repeated unless changes are made in the cable accessory materials, design or manufacturing process which might affect the performance characteristics.

Joints, stop ends and outdoor terminations for extruded solid dielectric insulated cables and transition joints between extruded solid dielectric insulated and impregnated paper insulated cables are included. Joints, stop ends and outdoor terminations for impregnated paper insulated cables are not included.

The service operating conditions of accessories shall be compatible with the service operating conditions of the cable.

Accessories for special applications such as submarine cables, shipboard application or hazardous situations (explosive environments, fire resistant cables or seismic conditions) are not included.

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 60228		Conductors of insulated cables
EN 61180-1		High-voltage test techniques for low-voltage equipment – Part 1: Definitions, test and procedures requirements
EN 61238-1		Compression and mechanical connectors for power cables for rated voltages up to 36 kV ($U_m = 42$ kV) – Part 1: Test methods and requirements
HD 603		Distribution cables of rated voltage 0,6/1 kV
HD 631	series ¹⁾	Electrical cables – Accessories – Material characterization
IEC 60050-461		International Electrotechnical Vocabulary – Chapter 461: Electric cables
IEC 60055-2		Paper-insulated metal-sheathed cables for rated voltages up to 18/30 kV (with copper or aluminium conductors and excluding gas-pressure and oil-filled cables) – Part 2: General and construction requirements
IEC 60287	series	Electric cables – Calculation of the current rating

¹⁾ At draft stage.

3 Definitions

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

3.1 joint

accessory suitable for use in air or underground which makes a connection between two or more insulated power cables to form a continuous circuit

3.1.1

type I joint

joint where impact withstand, impulse voltage withstand and metallic screen short-circuit current withstand tests are not required

3.1.2

type II joint

joint tested for impact withstand but not for impulse voltage withstand or metallic screen short-circuit current withstand

3.1.3

type III joint

joint tested for impulse voltage withstand and metallic screen short-circuit current withstand but not for impact withstand

3.2

rigid joint

1) joint which incorporates a resin encapsulant capable of being poured or injected at ambient temperature and which cures to a solid state by an irreversible chemical reaction without the application of external heat

or

2) joint which incorporates a non-setting encapsulant within a rigid housing

3.3

non-rigid joint

joint which incorporates polymeric tapes, heat or cold-shrinkable components or pre-moulded parts without a rigid housing

3.4

transition joint

accessory making a connection between cables having extruded solid dielectric insulation and impregnated paper insulation

[IEV 461-11-04 modified]

3.5

stop end

accessory providing a means of insulating an energised cable end

[IEV 461-10-07 modified]

3.5.1

type I stop end

stop end tested for impact withstand but not for impulse voltage withstand

3.5.2

type II stop end

stop end tested for impulse voltage withstand but not for impact withstand

3.6

cable crutch

position at which the laid up cores of a multicore cable separate into individual cores

3.7

outdoor termination

termination intended for use where it is directly exposed to either solar radiation or weathering or both
[IEV 461-10-14]

3.7.1

type I termination

termination where impulse voltage withstand is not required

3.7.2

type II termination

termination tested for impulse voltage withstand

3.8

type tests

tests required before supplying a type of cable accessory covered by this European Standard, 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 successfully made, they need not be repeated unless changes are made in the cable accessory materials, design or type of manufacturing process which might change the performance characteristics

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4 Components <https://standards.iteh.ai/catalog/standards/sist/b4d8bee6-40d9-4727-8c4a-19eb43089abb/sist-en-50393-2006>

4.1 Connectors

Connectors used within the accessory shall comply with EN 61238-1, where applicable, or with another relevant standard or specification.

4.2 Materials

Component material characterization is not a pre-requirement for compliance with this performance standard. If material characterization is required, the relevant part of HD 631 shall be used.

5 Electrical characteristics

5.1 Rated voltage

The rated voltage of the joints, stop ends and outdoor terminations shall be

$$U_0/U (U_m) = 0,6/1,0 (1,2) \text{ kV}$$

where

U_0 is the rated power frequency voltage between phase conductor and earth or metallic screen for which the cable accessory is designed;

U is the rated power frequency voltage between phase conductors for which the cable accessory is designed;

U_m is the maximum value of the "highest system voltage" between phase conductors for which the cable accessory may be used.

5.2 Current rating

The continuous current rating of a joint or outdoor termination shall be in accordance with the appropriate cable(s) specified in HD 603 and shall be suitable for operation at the temperatures stated in Table 1 for continuous duty and under short-circuit conditions.

Table 1 – Maximum rated conductor temperatures

Rating	Insulation type	
	Extruded solid dielectric	Impregnated paper
Continuous	^a	80 °C
Short circuit	^a	160 °C
^a For cables with extruded insulation, the maximum rated temperatures for continuous duty and short circuit duty are given in the particular section of HD 603. In the absence of current ratings in HD 603, reference shall be made to IEC 60287, or to the cable manufacturer.		

6 Requirements

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Joint, stop ends and outdoor terminations complying with this European Standard shall meet the following requirements.

6.1 General

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Compliance will be gained for a range of accessories of the same design and materials for a given cable type and for a range of conductor cross-sections (copper and aluminium), providing the appropriate samples have successfully undergone the appropriate test sequence in Table 3, 4 or 5.

The range of compliance shall include the cable conductor cross-sections tested, together with the intermediate cross-sections.

Any successful test sequence carried out on only one cable cross-section shall give compliance for that cross-section only.

Compliance with this European Standard for an accessory for a particular type of cable insulation extends to other types of insulation according to Table 2.

Table 2 – Summary of compliance with different cable insulations

Cable insulation	Range of approval
XLPE	XLPE, EPR, HEPR, PVC
EPR, HEPR	EPR, HEPR, PVC
PVC	PVC

NOTE It should be noted that adhesion between the cable insulation and the accessory filling compound is critical for the performance of some joint designs.

Compliance obtained for a cable with one type of sheathing material shall not be extended to an otherwise identical cable incorporating a different sheathing material.

Compliance obtained by testing on a non water-blocked type of cable shall be extended to a water-blocked cable that is otherwise of the same design. The converse shall not apply.

Joints and stop ends shall normally be designed and tested to withstand a height of water of 1 m (10 kPa (0,1 bar)).

For special applications and in situations subject to a high water table or prone to flooding, this height of water may be insufficient to ensure the satisfactory performance of the moisture seals. In such cases, upon agreement between manufacturer and user, the accessories shall be tested using an increased water height of 10 m (100 kPa (1,0 bar)). The chosen water height shall be recorded in the test report.

Testing at one water height will achieve compliance for that pressure only. Testing at both 1 m and 10 m water heights will achieve compliance for those water heights and all intermediate pressures.

6.2 Joints and stop ends

Compliance for branch joints for a given range of cable cross-sections may be extended to straight joints and stop ends for the same range of cable cross-sections, if it can be shown that the construction is similar and the seals are of the same type and not inferior to those of the branch joints tested.

6.3 Transition joints

Satisfactory completion of the test sequence in Table 3 shall extend the compliance to a similar design of transition joint suitable for an alternative type of extruded solid dielectric insulated cable if the following conditions are met:

The impregnated paper insulated cable side of the joint shall be identical in design.

Prior compliance shall have been obtained for the alternative extruded solid dielectric insulated cable in a straight or branch joint as relevant and satisfactory performance of the moisture seals shall have been proven by examination according to 8.8.

6.4 Packaging, marking and labelling, and information provided by manufacturer

6.4.1 Packaging

Packaging shall be adequate to ensure that any stated shelf life is maintained when the accessory is stored under covered, dry conditions within the stated ambient air temperatures, such that the performance of the components forming part of the total accessory is unaffected.

6.4.2 Marking and labelling

Individual accessory kits shall contain the following information in the relevant national language(s):

- on the outside of the packaging:
 - (a) manufacturer's name or logo;
 - (b) type of jointing materials, the application, and whether or not suitable for crossed cores;
 - (c) batch number(s), where relevant;
 - (d) product reference;
 - (e) defined storage conditions and expiry date, if any;
 - (f) if relevant, the manufacturing date;
 - (g) health and safety marking and handling instructions where relevant;
 - (h) reference to compliance with this European Standard;

- inside the packaging:
 - (i) list of contents;
 - (j) installation instructions, including drawings or other information specific to the accessory.

Where practicable, joint shells or outer coverings shall be permanently and legibly marked with a reference that will enable the range of cables for which the joint is suitable to be identified from the manufacturer's literature.

If conductor connectors are included, they shall be permanently and legibly marked with the conductor type and cross-section, or a reference number that will enable this information to be obtained from the manufacturer's literature.

6.4.3 Health and safety

The manufacturer shall make available such information as will enable the purchaser to use and dispose of any materials in a safe manner in accordance with relevant legislation.

7 Type tests

7.1 General

Written reports on type tests proving compliance with this European Standard shall be made available by the manufacturer. The principal details of the test arrangements shall be given in the test report, including, for example, cross-sections of conductors, model and type of connector, minimum clearance between joint and shell.

The test reports shall be signed by a representative of the body carrying out the tests. This may be the manufacturer or a recognised certification body.

Should a cable fail beyond any part of an accessory, the test shall be declared void without discrediting the accessory. Tests may be repeated using a new accessory (reverting to the beginning of the test sequence) or alternatively by repair of the cable (continuing testing from the point of suspension).

7.2 Test samples

The number of samples required for each test sequence shall be in accordance with Tables 6a to 6d.

Cables used for testing shall comply with HD 603 and shall be identified in the test report with respect to

- rated voltage;
- material, shape and cross-section of conductors;
- details of construction (insulation and sheath, number of cores, water-blocking, etc.);
- principal cable dimensions.

The connecting components used in a joint or termination shall comply with 4.1.

Accessories to be tested shall be correctly identified in accordance with 6.4.2.

Accessories shall be assembled in the manner specified in the manufacturer's instructions, using the components supplied in the kit. A joint designed for crossed cores shall be so assembled.

Accessories shall be dry and clean, but neither the cable nor the accessories shall be subjected to any form of conditioning which may modify the electrical, thermal or mechanical performance of the test assemblies.