

**SLOVENSKI
STANDARD**

SIST HD 605 S1:1998/A1:1998

prva izdaja
februar 1998

Electric cables - Additional test methods - Amendment A1

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ICS 29.060.20

Referenčna številka
SIST HD 605 S1:1998/A1:1998(en)

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UDC 621.315.2:620.1
ICS 29.060.20

Descriptors: Electric cable, test, dimension measuring, mechanical test, physical test, chemical test, electrical test, test of fire behaviour, thermal endurance test, classification, test conditions

English version

Electric cables - Additional test methods

Câbles électriques - Méthodes d'essai
supplémentaires

Elektrokabel - Ergänzende Prüfverfahren

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This amendment A1 modifies the Harmonization Document HD 605 S1:1994; it was approved by CENELEC on 1995-11-28. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for implementation of this amendment 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 amendment 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.

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 amendment was prepared by the Technical Committee CENELEC TC 20, Electric cables.

This amendment rationalises all those test methods which are additional to those in EN 60811, HD 405 and HD 605, and which were originally planned to be included in Part 2 of each of HD 620 (Distribution cables with extruded insulation for rated voltages from 3,6/6 (7,2) kV to 20,8/36 (42) kV) and HD 622 (Power cables having rated voltages from 3,6/6 (7,2) kV to 20,8/36 (42) kV with special fire performance for use in power stations). Consequently there is no Part 2 for either HD 620 or HD 622.

By decision of the Technical Board (D68/047) national committees are only required to implement in their national language the nationally applicable parts of HD 620 and HD 622. Therefore not all test methods in this amendment to HD 605 apply to both the other HDs, nor are they all called up by any particular nationally applicable part.

The text of the draft was submitted to the formal vote and was approved by CENELEC as amendment A1 to HD J605 S1:1994 on 1995-11-28.

The following dates were fixed:

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

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REFERENCES

Amendment No. 1 to HD 605 incorporates by dated or undated reference, provisions from other publications. These 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 Amendment No. 1 to HD 605 only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

EN 60811	Common test methods for insulating and sheathing materials of electric cables
HD 48	Impulse tests on cables and their accessories
HD 620	Distribution cables with extruded insulation for rated voltages from 3,6/6(7,2)kV up to and including 20,8/36(42)kV
HD 622	Power cables having rated voltages from 3,6/6(7,2)kV up to and including 20,8/36(42)kV with special fire performance for use in power stations
IEC 502	Extruded solid dielectric insulated power cables for rated voltages from 1kV up to 30kV
IEC 840	Tests for power cables with extruded insulation for rated voltages above 30kV ($U_m = 36kV$) up to 150kV ($U_m = 170kV$)
IEC 885	Electrical test methods for electric cables
ISO 4892	Methods of exposure to laboratory light sources (xenon arc lamp, enclosed carbon arc lamp, open flame carbon arc lamp, fluorescent tube lamps)

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2.1.10 Irregularities of semi-conducting layers and insulation

2.1.10.1 Method 1 - Irregularities of semi-conducting conductor screen and insulation

(a) Procedure

A sample of 30cm of core, from which the outer sheath, metallic and semi-conducting core screen have been removed, shall be subjected to the following treatment in order to make it transparent.

It shall be placed for one or two hours in an oven at 80°C.

It shall then be immersed into silicone oil at a temperature of about 120°C.

The sample, completely transparent, shall then be examined with normal or corrected vision under adequate lighting.

Observed irregularities shall be located on the outer surface of the core and duly marked.

The sample shall then be cooled to ambient temperature, and slices or a spiral cut out at the marked places.

With a measuring projector (precision : 0.01mm), dimensions of the irregularities shall be measured.

(b) Requirements

<https://standards.iteh.ai/catalog/standards/sist/88c7c588-6872-4714-8f28-30214cf18511/HD-605-S1-1998-A1-1996>

(i) Irregularities of semi-conducting conductor screen
(figure 2.1.10.1(i))

The semi-conducting conductor screen shall be as far as possible free from irregularities; in any case, there shall be no pronounced irregularities.

Sporadic irregularities may be allowed if the following requirements are complied with:

- irregularities of the semi-conducting conductor screen may not penetrate by more than 0.080mm into the insulation;
- when the height H of the irregularities is not less than 0.040mm, the ratio (B)/(H) must be greater or equal to 3 where:

(B) = base of the irregularity

(H) = height of the irregularity

- irregularities where (H) is less than 0.040 mm are not taken into consideration.

- (ii) Irregularities of the insulation into the semi-conducting conductor screen
(figure 2.1.10.1(ii))

Irregularities of the insulation shall not penetrate into the semi-conducting conductor screen by more than 0.20 mm.

- (iii) Irregularities inside the insulation
(figure 2.1.10.1(iii))

Sporadic irregularities may be allowed if the following requirements are complied with:

- irregularities of dimension (L) less than or equal to 0.20mm have been authorised;
- irregularities of dimension (L) greater than or equal to 0.05mm but less than or equal to 0.20mm are observed, but examination of a second sample shows no irregularity greater than or equal to 0.05mm;

- the maximum dimension (L) of an irregularity is less than 0.05mm.

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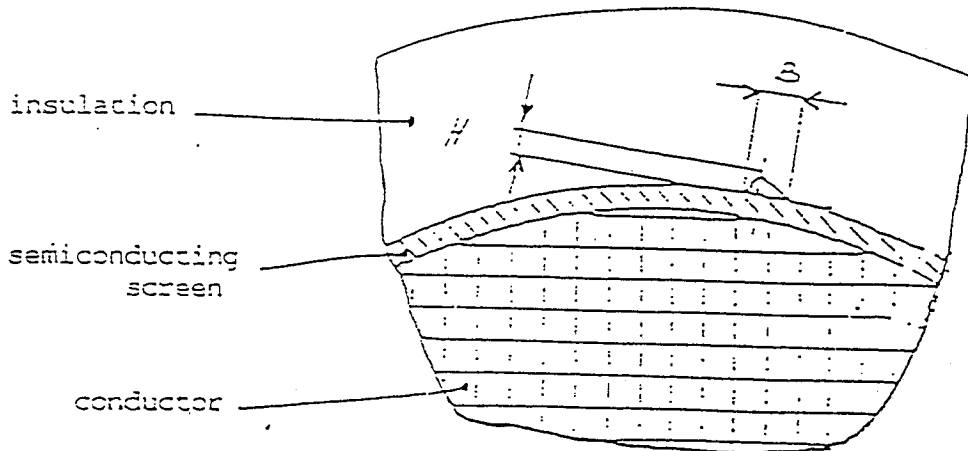


FIGURE 2.1.10.1(ii) - IRREGULARITY OF THE SEMI-CONDUCTING CONDUCTOR INTO THE INSULATION

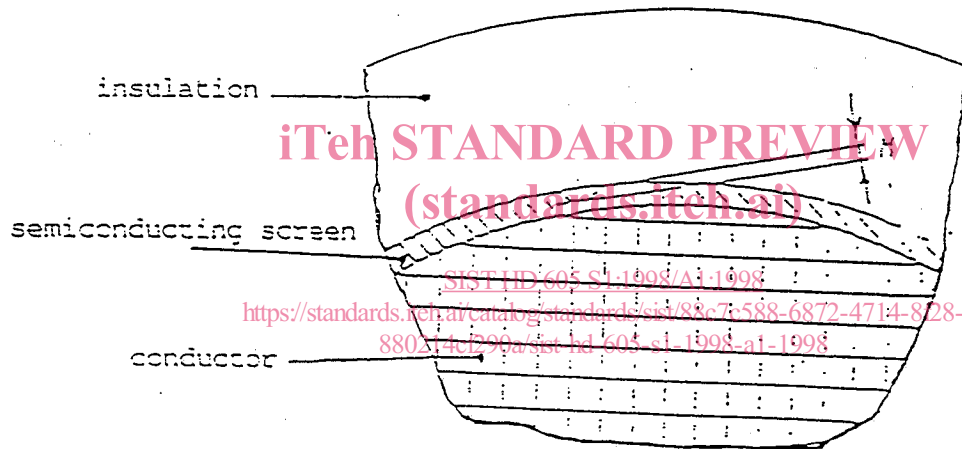


FIGURE 2.1.10.1(iii) - IRREGULARITY PENETRATING THE SEMI-CONDUCTING CONDUCTOR SCREEN

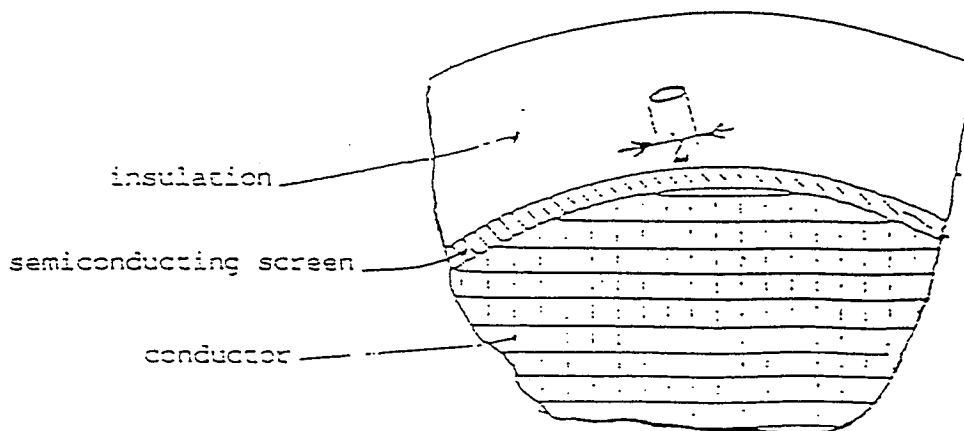


FIGURE 2.1.10.1(iii) - IRREGULARITY INSIDE THE INSULATION

2.1.10.2 Method 2 - Irregularities of semi-conducting conductor screen and insulation

(a) Scope

This standard specifies the tests of irregularities of the surface of extruded inner semi-conducting layers and in insulation of XLPE insulated power cables with rated voltages U_0/U 6/10 to 18/30kV.

(b) Measuring equipment

- (i) Electrical air oven with natural air flow
- (ii) Beaker
- (iii) Silicone oil
- (iv) Measuring microscope or profile projector of at least 10x magnification, with rotating holding device for the test piece, which shall allow for a reading of 0.01mm
- (v) Illumination.

(c) Preparation of test pieces

From one end of the cable a test piece of 300mm in length must be taken. The outer semi-conducting layer of the test piece will be removed. The test piece may be stored for one to two hours in the air oven ((b)(i)) at approximately 80°C. The beaker ((b) (ii)) shall be filled with silicone oil ((b) (iii)) and heated to approximately 130°C.

(d) Measuring procedure

The test piece shall be inserted into the heated silicone oil until the XLPE insulation reaches its full transparency. The test piece shall then be visually inspected with the assistance of the lamp ((b) (v)) and, if necessary, any irregularities on the surface of the test piece shall be marked. The test piece shall then cool down to room temperature.

In order to measure the irregularities the test piece shall be cut into discs or spirals at the points marked. The measurement of the irregularities shall be carried out by means of the measuring equipment ((b) (iv)) in such a manner that,

- the largest extension (b) of an irregularity in the insulation (figure 2.1.10.2(a));
- the largest extension (t) of an irregularity in the inner semi-conducting layer (figure 2.1.10.2(b));
- the largest extension (h) of an irregularity in the inter-facial area semi-conducting layer/insulation into the insulation and its basis diameter (d) (figure 2.1.10.2(c))

must be ascertained.

(e) Evaluation of test results

The results are acceptable if the measured values are within the limits given in the particular specifications.

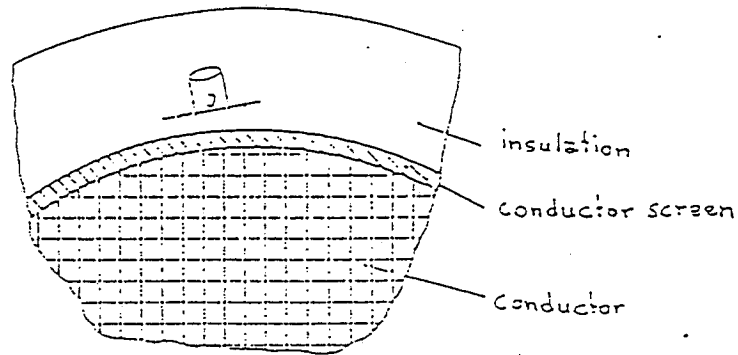


FIGURE 2.1.10.2(a) : IRREGULARITIES IN THE INSULATION

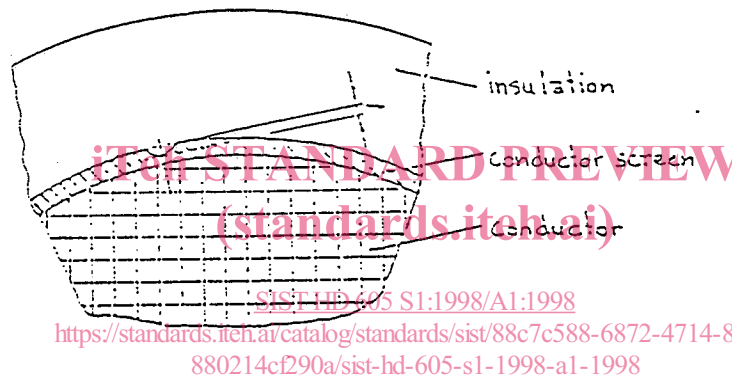


FIGURE 2.1.10.2(b) : IRREGULARITIES EXTENDED INTO THE CONDUCTOR SCREEN

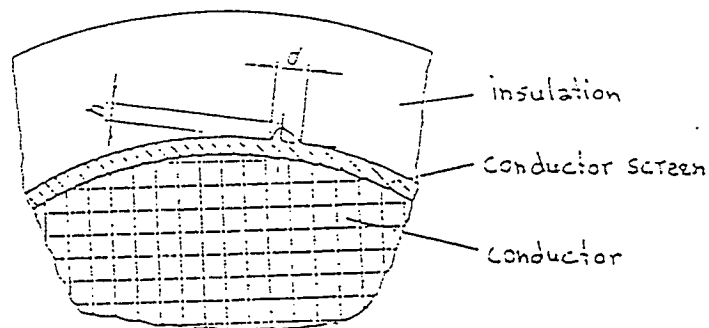


FIGURE 2.1.10.2(c) : IRREGULARITIES OF THE CONDUCTOR SCREEN EXTENDED INTO THE INSULATION