SLOVENSKI STANDARD
SIST EN 60695-2-1/2:1999

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Fire hazard testing - Part 2: Test methods - Section 1/sheet 2: Glow-wire flammability test on materials (IEC 60695-2-1/2:1994)

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Prüfungen zur Beurteilung der Brandgefahr -- Teil 2: Prüfverfahren -- Hauptabschnitt 1/Blatt 2: Prüfung mit dem Glühdraht zur Entflammbarkeit von Werkstoffen

Essais relatifs aux risques du feu -- Partie 2: Méthodes d'essai -- Section 1/feuille 2: Essai d'inflammabilité au fil incandescent sur matériaux

Ta slovenski standard je istoveten z: **EN 60695-2-1/2:1996**

ICS:

13.220.40	Sposobnost vžiga in obnašanje materialov in proizvodov pri gorenju	Ignitability and burning behaviour of materials and products
29.020	Elektrotehnika na splošno	Electrical engineering in general

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EN 60695-2-1/2

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Descriptors: Fire hazard, glow-wire flammability test

English version

Fire hazard testing
Part 2: Test methods
Section 1/sheet 2: Glow-wire flammability test on materials

(IEC 695-2-1/2:1994)

Essais relatifs aux risques du feu
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(CEI 695-2-1/2:1994)

Prüfungen zur Beurteilung der Brandgefahr
Teil 2: Prüfverfahren
Hauptabschnitt 1/Blatt 2: Prüfung mit dem Glühdraht zur Entflammbarkeit von Werkstoffen
(IEC 695-2-1/2:1994)

This European Standard 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 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, 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

The text of the International Standard IEC 695-2-1/2:1994, prepared by IEC TC 89, Fire hazard testing, was submitted to the formal vote and was approved by CENELEC as EN 60695-2-1/2 on 1995-11-28 without any modification.

Section 1 of EN 60695-2 supersedes HD 444.2.1 S1:1983 IEC 695-2-1:1980), clause 7 of HD 441 S1:1983 (IEC 707:1981) and clause 6 of HD 541 S1:1991 (IEC 829:1988, modified).

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) 1996-12-01
- latest date by which the national standards conflicting with the EN have to be withdrawn (dow) 1996-12-01

Annexes designated "normative" are part of the body of the standard.

In this standard, Annex ZA is normative.

Annex ZA has been added by CENELEC.

Contents

1 Scope

This sheet of IEC 695-2-1 specifies the details of the glow-wire test when applied to specimens of solid electrical insulating materials or other solid combustible materials for flammability testing.

The test results make it possible to provide a relative comparison of various materials according to their ability to extinguish flames on removal of the heated glow-wire and their ability not to produce flaming or glowing particles capable of spreading fire to a layer of wrapping tissue placed below.

The test method is not valid for determining the flammability of complete items of equipment, since the dimensions of the insulating systems or combustible parts, the design and heat transfer to adjacent metallic or non-metallic parts, etc., greatly influence the flammability of the materials used therein. In addition to this, it is not valid for determining fire behaviour and fire hazard of equipment.

2 Normative references and definitions

2.1 Normative reference

The following normative document contains provisions which, through reference in this text, constitute provisions of this sheet of IEC 695-2-1. At the time of publication, the edition indicated was valid. All normative documents are subject to revision, and parties to agreements based on this sheet of IEC 695-2-1 are encouraged to investigate the possibility of applying the most recent edition of the normative document indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

IEC 212:1971, *Standard conditions for use prior to and during the testing of solid electrical insulating materials.*

For more details see IEC 695-2-1/0.

2.2 Definitions

For the purpose of this International Standard, the following definitions apply:

flammability

the ability of a material or product to burn with a flame under specified test conditions (see **2.47** of IEC 695-4)

glow-wire flammability Index (GWFI)

the highest test temperature at which, during three subsequent tests, flames or glowing of the specimen extinguish within 30 s after removal of the glow-wire without ignition of the specified layer by burning drops or particles

3 Description of the test

The test is carried out on test specimens having a sufficiently large plane section with fixed dimensions, held in a vertical position.

The test specimens can be manufactured by compression moulding, transfer moulding, injection moulding, casting or be machined from sheets or parts having sufficiently large plane sections.

The dimensions of the plane section of the specimens shall be:

length	≥ 60 mm
width (inside clamps)	≥ 60 mm
thickness	(3,0 ± 0,2) mm.

A set of 10 specimens will in general be adequate to evaluate the flammability according to this test.

NOTE The flammability will usually vary depending on the thickness of the tested material. Therefore, in addition to the standard thickness specified, it may be helpful to obtain results for thicknesses of about 0,8 mm, 1,6 mm and 6,0 mm encountered in practice.

The test specimen is arranged so that its free plane surface is vertical. To evaluate the possibility of spread of fire by burning or glowing particles falling from the specimen, a specified layer is placed underneath the specimen. The tip of the electrically heated glow-wire is brought into contact with the free plane surface area of the specimen. By repeated tests with different test temperatures of the glow-wire, using a new specimen each time, the GWFI of the material under test is established.

4 Description of the test apparatus

The description of the test apparatus is given in IEC 695-2-1/0.

The layer to be placed underneath the specimen and the distance between the tip of the glow-wire, when applied to the specimen, shall be as specified in IEC 695-2-1/0.

5 Severities

The temperature of the tip of the glow-wire and the duration of its application to the specimen shall be chosen from the following table:

Test temperatures °C	Tolerances K
550	± 10
600	± 10
650	± 10
700	± 10
750	± 10
800	± 15
850	± 15
900	± 15
960	± 15
Duration of application: t_a = (30 ± 1) s	

6 Calibration and verification of the temperature measuring system

The calibration and verification of the temperature measuring system is specified in IEC 695-2-1/0.

7 Conditioning

The layer shall be conditioned as specified in IEC 695-2-1/0.

Before testing, the specimens shall be conditioned for 48 h at standard atmosphere B (48 h/23 °C/50 %) in accordance with IEC 212.

8 Initial measurements

The specimen shall be identified completely and examined visually.

The thickness of the specimen shall be measured and reported.

9 Test procedure

See IEC 695-2-1/0 for the *Warning note.*

9.1 The specimen shall be mounted or clamped so that heat losses due to the supporting or fixing means are insignificant.

The specimen shall be arranged so that:

— the plane area of the surface is vertical;

— the tip of the glow-wire is applied to the centre of the plane area of the surface.

9.2 See IEC 695-2-1/0.

9.3 The glow-wire is heated electrically to one of the test temperatures in clause **5**, which is considered just sufficiently high enough to cause ignition and is measured by means of the calibrated thermocouple. Before starting the test, care must be taken to ensure that this temperature and the heating current are constant for a period of at least 60 s and that heat radiation does not influence the specimen during this period or during the calibration by providing an adequate distance or by using an appropriate screen.

9.4 In addition to subclause **9.4** in IEC 695-2-1/0, the tip of the glow-wire is brought into contact with the specimen for (30 ± 1) s as specified in clause **5**.

9.5 The test shall be repeated with a new specimen unless the criteria specified in clause **11** are fulfilled. The test temperature shall be chosen higher or lower depending on whether ignition has occurred during the previous test.

10 Observations and measurements

During application of the glow-wire, and during a further period of 30 s, the specimen and the layer placed below it shall be observed and the following shall be reported:

a) the duration (t_i) from the beginning of tip application up to the time at which the specimen or the layer placed below it ignites;

b) the duration (t_e) from the beginning of tip application up to the time when flames extinguish during or after the period of application.

11 Evaluation of test results

The specimen is considered to withstand the test successfully if both of the following two conditions apply:

a) if flames or glowing of the specimen extinguish within 30 s after removal of the glow-wire, and

b) if there is no ignition of the wrapping tissue placed underneath the specimen.

If both these conditions are fulfilled, the test shall be repeated with a new specimen at a higher test temperature taken from the table in clause **5**.

If one or both of these conditions are not fulfilled, the test shall be repeated with a new specimen at a lower test temperature taken from the table in clause **5**.

The test shall be repeated two times at the highest test temperature at which the specimen withstood the test successfully.

The glow-wire flammability index (GWFI) to be determined is the highest test temperature at which, during three subsequent tests, both conditions a) and b) are fulfilled.

The GWFI shall be reported in the following manner:

for example, for a specimen of 3,0 mm thickness and a test temperature of 850 °C

GWFI: 850/3,0

12 Test report

The test report shall include the following information:

— test method by reference to IEC 695-2-1/2;

— complete identification of the tested material, including type and manufacturer (clause 8);

— description of the method for the preparation of the test specimens (clause 3);

— conditioning (clause 7);

— glow-wire flammability index (GWFI) (clause 11).

Annex ZA (normative)
Normative references to international publications with their corresponding European publications

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 (including amendments).

NOTE When an international publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

Publication	Year	Title	EN/HD	Year
IEC 212	1971	*Standard conditions for use prior to and during the testing of solid electrical insulating materials*	HD 437 S1	1984