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Essais relatifs aux risques du feu –

**Partie 2-11:
Essais au fil incandescent/chauffant –
Méthode d'essai d'inflammabilité
pour produits finis**

Fire hazard testing –

**Part 2-11:
Glowing/hot-wire based test methods –
Glow-wire flammability test method
for end-products**

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International Electrotechnical Commission
Telefax: +41 22 919 0300

e-mail: inmail@iec.ch

3, rue de Varembeé Geneva, Switzerland
IEC web site: <http://www.iec.ch>



Commission Electrotechnique Internationale
International Electrotechnical Commission
Международная Электротехническая Комиссия

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For price, see current catalogue*

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method for end-products

CORRIGENDUM

Page 6

3 Définitions

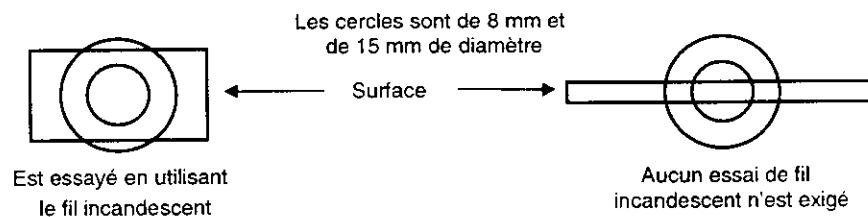
Remplacer, à la page 8, le texte et la figure existants de la définition 3.1 par le nouveau texte et la nouvelle figure suivants:

3.1

petites pièces

pièces, où chaque surface est contenue dans un cercle de 15 mm de diamètre, ou dont certaines surfaces dépassent du cercle de 15 mm de diamètre et lorsqu'il n'est pas possible de disposer un cercle de 8 mm de diamètre sur l'une de ces surfaces

NOTE Lors de la vérification d'une surface, les projections de la surface et les trous qui ne sont pas supérieurs de 2 mm à la plus grande dimension ne sont pas pris en compte.



IEC 2897/2000

3 Definitions

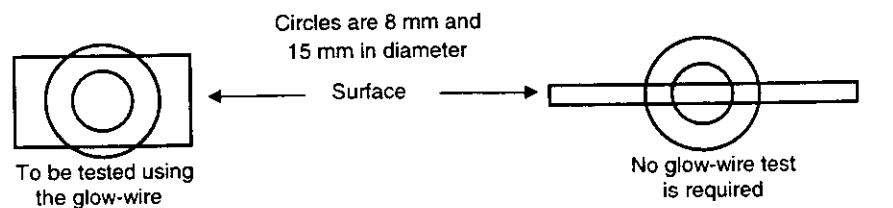
Replace, on page 9, the existing text and figure of definition 3.1 by the following new text and figure:

3.1

small parts

parts, where each surface lies completely within a circle of 15 mm diameter or where some of the surface lies outside the 15 mm diameter circle but in such a way that it is not possible to place a circle of 8 mm diameter on any of this remaining surface

NOTE When checking a surface, projections on the surface and holes which are not greater than 2 mm on the largest dimensions are disregarded.



IEC 2897:2000

INTERNATIONAL ELECTROTECHNICAL COMMISSION

FIRE HAZARD TESTING –

**Part 2-11: Glowing/hot-wire based test methods –
Glow-wire flammability test method for end-products**

FOREWORD

- 1) The IEC (International Electrotechnical Commission) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of the IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, the IEC publishes International Standards. Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. The IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
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- 5) The IEC provides no marking procedure to indicate its approval and cannot be rendered responsible for any equipment declared to be in conformity with one of its standards.
- 6) Attention is drawn to the possibility that some of the elements of this International Standard may be the subject of patent rights. The IEC shall not be held responsible for identifying any or all such patent rights.

International Standard IEC 60695-2-11 has been prepared by IEC technical committee 89: Fire hazard testing.

The first edition of IEC 60695-2-11 cancels and replaces the first edition of IEC 60695-2-1/1 published in 1994. It also constitutes a technical revision.

This standard has the status of a basic safety standard in accordance with IEC Guide 104.

The text of this standard is based on the following documents:

FDIS	Report on voting
89/413/FDIS	89/432/RVD

Full information on the voting for the approval of this standard can be found in the report on voting indicated in the above table.

This publication has been drafted in accordance with the ISO/IEC Directives, Part 3.

This standard is to be used in conjunction with IEC 60695-2-10.

Annex A is for information only.

IEC 60695-2, under the general heading *Fire hazard testing – Part 2: Glowing/hot-wire based test methods*, consists of the following parts:

- Part 2-10: Glowing/hot-wire based test methods – Glow-wire apparatus and common test procedure
- Part 2-11: Glowing/hot-wire based test methods – Glow-wire flammability test method for end-products
- Part 2-12: Glowing/hot-wire based test methods – Glow-wire flammability test method for materials
- Part 2-13: Glowing/hot-wire based test methods – Glow-wire ignitability test method for materials

The committee has decided that the contents of this publication will remain unchanged until 2006. At this date, the publication will be

- reconfirmed;
- withdrawn;
- replaced by a revised edition; or
- amended.

FIRE HAZARD TESTING –

Part 2-11: Glowing/hot-wire based test methods – Glow-wire flammability test method for end-products

1 Scope

This part of IEC 60695 specifies the details of the glow-wire test to be applied to end-products for fire hazard testing.

For the purpose of this standard, end-product means electrotechnical equipment, its subassemblies, and components.

One of the responsibilities of a technical committee is, wherever applicable, to make use of basic safety publications in the preparation of its publications.

2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this part of IEC 60695. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this part of IEC 60695 are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies. Members of IEC and ISO maintain registers of currently valid International Standards.

IEC 60695-2-2:1991, *Fire hazard testing – Part 2: Test methods – Section 2: Needle-flame test*

IEC 60695-2-10:2000, *Fire hazard testing – Part 2-10: Glowing/hot-wire based test methods – Glow-wire apparatus and common test procedure*

ISO/IEC 13943:2000, *Fire safety – Vocabulary*

3 Definitions

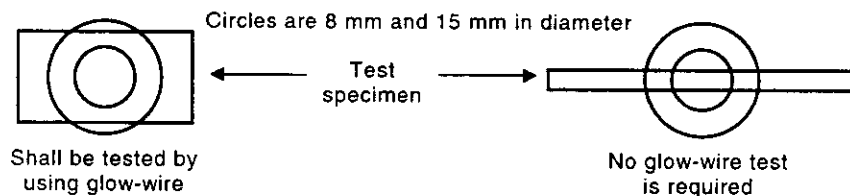
For the purpose of this part of IEC 60695, the definitions given in ISO/IEC 13943, as well as the following definition, apply.

3.1

small parts

parts, where each surface lies completely within a circle of 15 mm diameter, or where any part of the surface lies outside a 15 mm diameter circle and it is not possible to fit a circle of 8 mm diameter on any of the surfaces

NOTE When checking a surface, projections on the surface and holes which are not greater than 2 mm on the largest dimensions are disregarded.



IEC 1868/2000

4 Description of test considerations and test specimen selection

If possible, the test specimen should be a complete end-product. The test specimen shall be chosen so that the conditions of the test will not be significantly different from those occurring in normal use with regard to shape, ventilation, effect of thermal stresses and, possibly, of flames occurring in, or of burning or glowing particles falling in the vicinity of, the test specimen.

If the test cannot be made on a complete end-product, or unless otherwise specified by the relevant specification, it is acceptable to

- a) cut a piece containing the part under examination from it, or.
- b) cut an aperture in the complete end-product to allow the glow-wire access, or
- c) remove the part under examination in its entirety and test it separately.

Technical committees should define in their relevant specifications what may be removed to achieve access. A small aperture may affect the results by leading to the ignition of the surroundings, by reducing the temperature of the glow-wire or by restricting the availability of oxygen, whereas too large an aperture may permit more oxygen than would normally be available.

If, during the test, any part of the equipment containing the test specimen is ignited by extraneous heat from the glow-wire and so influences the thermal conditions at the test specimen, the test shall be invalid.

The test is carried out to ensure that, under defined conditions, the glow-wire does not cause ignition of parts, and that a part, if ignited, has a limited duration of burning without spreading fire by flames or by burning or glowing particles falling from the test specimen.

If the test specimen emits flames during the application of the glow-wire, the fire hazard created may necessitate further tests using other ignition sources such as the needle-flame applied to those parts which are reached by the emitted flames.

The glow-wire test shall not be used for small parts for which reference may need to be made to other test methods, for example, the needle-flame test in IEC 60695-2-2.

5 Description of the test apparatus

The description of the test apparatus is given in clause 5 of IEC 60695-2-10.

To evaluate the possibility of spread of fire, for example, by burning or glowing particles falling from the test specimen, a specified layer as described in 5.3 of IEC 60695-2-10, or the material or components normally surrounding or situated underneath the test specimen, is placed underneath the test specimen. The distances between the test specimen and the specified layer representing the surrounding material or components, shall be equal to those when the test specimen is mounted in the electrotechnical product.

If the test specimen is a complete free-standing equipment, it is placed in its normal position of use on the specified layer as described in clause 5.3 of IEC 60695-2-10 extending for at least 100 mm outside the base of the equipment in all directions.

If the test specimen is a complete wall-mounted equipment, it is fixed in its normal position of use 200 mm \pm 5 mm above the specified layer as described in 5.3 of IEC 60695-2-10.

6 Severities

The test temperature shall be chosen from the following values of table 1.

Table 1 – Test severities

Preferred test temperatures °C	Tolerances K
550	± 10
650	± 10
750	± 10
850	± 15
960	± 15

If required by the relevant specification, other test temperatures may be used.

NOTE See annex A for guidance.

7 Verification of the temperature measuring system

The verification of the temperature measuring system is specified in 6.2 of IEC 60695-2-10.

8 Conditioning

If not otherwise specified in the relevant specification, the test specimen and the specified layer to be used is conditioned for 24 h in an atmosphere having a temperature between 15 °C and 35 °C and a relative humidity between 45 % and 75 %.

9 Initial measurements

The test specimen shall be examined visually and, when specified in the relevant specification, the mechanical/electrical parameters measured.

10 Test procedure

See clause 8 of IEC 60695-2-10.

10.1 In addition to clause 8 of IEC 60695-2-10, and, if not otherwise specified, the test specimen shall be so arranged that the tip of the glow-wire is applied to the part of the surface of the test specimen which is likely to be subjected to thermal stresses in normal use. The glow-wire shall be maintained as close to the horizontal as is practicable.

In cases where the test shall be made at more than one point on the same test specimen, care shall be taken that any deterioration caused by previous tests will not affect the result of the test to be made.

In cases where the areas subjected to thermal stresses during normal use of the equipment are not specified in detail, the tip of the glow-wire is applied at a place where the section is thinnest, but preferably not less than 15 mm from the upper edge of the test specimen.

Clamping the test specimen onto the test apparatus shall not introduce excessive internal mechanical stresses in the test specimen during the test.

10.2 If not otherwise specified by the relevant specification, the test is made on one test specimen.

11 Observations and measurements

During application of the glow-wire (t_a), and during a further period of 30 s, the test specimen, the parts surrounding the test specimen and the specified 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 test specimen or the specified 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;
- c) the maximum height of any flame rounded up to the next 5 mm but disregarding the start of the ignition, which may produce a high flame for a period of approximately 1 s;
- d) if a test specimen passes the test by virtue of most of the flaming material being withdrawn with the glow-wire, then this shall be reported in the test report;
- e) any ignition of the specified layer placed underneath the test specimen.

NOTE The height of the flame is the vertical distance measured between the upper edge of the glow-wire, when applied to the test specimen, and the visible tip of the flame, when viewed in subdued light.

The mechanical/electrical parameters shall be measured when specified in the relevant specification.

12 Evaluation of test results

Unless otherwise specified in the relevant specification, the test specimen is considered to have passed the glow-wire test if there is no flaming or glowing, or if all of the following situations apply:

- a) if flames or glowing of the test specimen extinguish within 30 s after removal of the glow-wire, i.e. $t_e \leq t_a + 30$ s; and
- b) when the specified layer of wrapping tissue is used there shall be no ignition of the wrapping tissue.

13 Information to be given in the relevant specification

- a) The type and description of the test specimen (see clause 4).
- b) The method of preparation (see clause 4).
- c) Any conditioning of the test specimens (see clause 8).
- d) The number of test specimens (see clause 10.3).
- e) The surface to be tested and the point of application of the glow-wire (see clause 10.1).
- f) The specified layer to be used to evaluate the effect of flaming particles (see clause 5).
- g) The test temperature (see table 1).
- h) Whether the tests shall be made at more than one point on the same test specimen (see clause 10.1).
- i) Whether the criteria specified are sufficient to check compliance with the safety requirements, or whether other criteria – for example on t_i , t_e , the height of flame – should be introduced (see clause 11).
- j) The mechanical/electrical parameters to be measured (see clauses 9 and 11).

Annex A (informative)

Guidance for glow-wire test

The appropriate test temperature should be chosen by estimating the risk of failure due to inadequate response to abnormal heat, to ignition and to spread of fire, and the consequences to be expected as a result of such a failure.

To assist the technical committees in describing adequately the application of the glow-wire test associated with the test temperatures shown in table 1, the following suggestions are made.

Table A.1 – Guidance for glow-wire test

Kind of equipment	Parts made of insulation material	
	Parts in contact with, or retaining in position, current-carrying parts	Enclosures and covers not retaining current-carrying parts in position
Equipment for attended use	650 °C	650 °C
Equipment for unattended use but under less stringent conditions	750 °C	750 °C
Equipment for attended use but under more stringent conditions	750 °C	750 °C
Equipment for unattended use continuously loaded	850 °C	850 °C
Equipment for unattended use continuously loaded but under more stringent conditions	960 °C	960 °C
Fixed accessories in installation	750 °C	650 °C
Equipment to be used near the central supply point of a building	960 °C	750 °C
To ensure a minimum level of resistance to ignition of, and/or spread of fire by, parts liable to contribute to a fire hazard, and which are not subjected to other tests in this respect (in order to eliminate highly combustible material)	550 °C	550 °C