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INTERNATIONAL STANDARD

NORME INTERNATIONALE

Electrical relays – Tests and measurements – Part 36: Fire hazard

Relais électriques – Essais et mesures – Partie 36: Danger d'incendie

IEC 63522-36:2025-02(en-fr)

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ELECTRICAL RELAYS –
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FOREWORD

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IEC 63522-36 has been prepared by IEC technical committee 94: Electrical relays. It is an International Standard.

The text of this International Standard is based on the following documents:

Draft	Report on voting
94/1074/FDIS	94/1119/RVD

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

The language used for the development of this International Standard is English.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/publications.

A list of all parts of IEC 63522 series, published under the general title *Electrical relays – Tests and measurements*, can be found on the IEC website.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under webstore.iec.ch in the data related to the specific document. At this date, the document will be

- reconfirmed,
- withdrawn, or
- revised.

ELECTRICAL RELAYS –
TESTS AND MEASUREMENTS –

Part 36: Fire hazard

1 Scope

This part of IEC 63522 is used for testing all kinds of electrical relays and for evaluating their ability to perform under expected conditions of transportation, storage, and all aspects of operational use.

NOTE Examples for electrical relays in the sense of this document include electromechanical relays, reed relays, reed contacts, reed switches, solid state relays, time relays and technology combinations of these.

This document defines a standard test method to measure fire hazards of all materials susceptible to fire hazards.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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.

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

IEC 60695-2-11:2021, *Fire hazard testing – Part 2-11: Glowing/hot-wire based test methods – Glow-wire flammability test method for end products (GWEPT)*

IEC 60695-2-12, *Fire hazard testing – Part 2-12: Glowing/hot-wire based test methods – Glow-wire flammability index (GWFI) test method for materials*

IEC 60695-2-13, *Fire hazard testing – Part 2-13: Glowing/hot-wire based test methods – Glow-wire ignition temperature (GWIT) test method for materials*

IEC 60695-11-5, *Fire hazard testing – Part 11-5: Test flames – Needle-flame test method – Apparatus, confirmatory test arrangement and guidance*

IEC 63522-0, *Electrical relays – Tests and measurements – Part 0: Testing – General and guidance*[1]

[1] Under preparation. Stage at the time of publication: IEC CDV 63522-0:2024.

3 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 63522-0 apply.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

- IEC Electropedia: available at https://www.electropedia.org/
- ISO Online browsing platform: available at https://www.iso.org/obp

4 Test procedure

4.1 General

The fire hazard test ensures that under defined conditions the relay will not cause ignition of parts, or that a combustible part ignited by the test has a limited duration or extent of burning without spreading fire by flames or burning/glowing particles falling from the specimen.

The testing shall be conducted in accordance with one or both of the following tests:

a) Glow-wire test as described in IEC 60695-2-10, IEC 60695-2-11, IEC 60695-2-12, and IEC 60695-2-13 as appropriate;

b) Needle flame test as described in IEC 60695-11-5.

4.2 Glow-wire test

4.2.1 Purpose

The glow-wire test is simulating the effect of thermal stress which can be produced by heat sources such as glowing parts and overloaded components, in order to assess the risk of fire.

4.2.2 Procedure

4.2.2.1 Preconditioning

If not otherwise specified in the relevant specification, the preconditioning shall be done as below.

a) Glow-wire flammability test for end-products: IEC 60695-2-11.

b) Glow-wire flammability index (GWFI) test for materials: IEC 60695-2-12.

c) Glow-wire ignition temperature (GWIT) test for materials: IEC 60695-2-13.

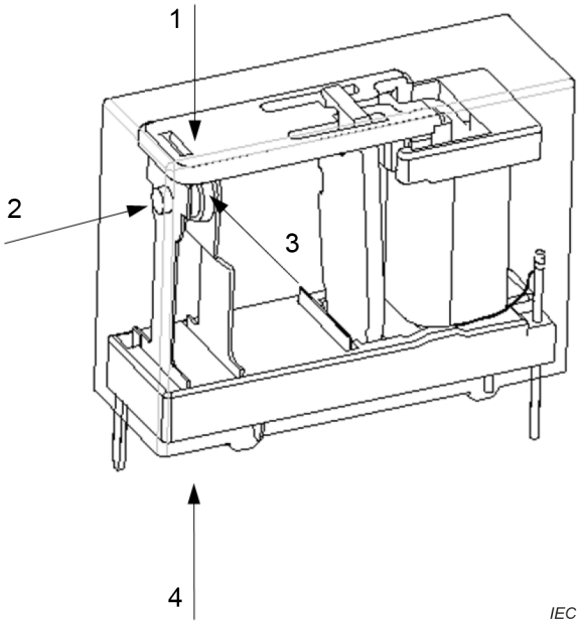
4.2.2.2 Glow-wire flammability test for end-products

Glow-wire flammability test method for end-products is according to IEC 60695-2-11.

It is preferred to select the following positions for the glow-wire test points of end products and the schematic diagram (or picture) of the position of glow-wire can be added in the test report.

a) The position on the relay case close to the contacts (for an example see Figure 1).

b) The position on the relay base close to the contact terminals (for an example see Figure 1). The position of bottom side for PCB relays is not mandatory.



Key

1, 2 and 3	on the relay case close to the contacts
4	on the relay base close to the contact terminals

Figure 1 – An example to show the test points on relay

4.2.2.3 Glow-wire flammability index (GWFI) test for materials

Glow-wire flammability index (GWFI) test method for materials is according to IEC 60695-2-12.

4.2.2.4 Glow-wire ignition temperature (GWIT) test for materials

Glow-wire ignition temperature (GWIT) test method for materials is according to IEC 60695-2-13.

4.2.3 Conditions to be specified

The following details shall be adopted.

a) The glow-wire is heated to the test temperature specified in the relevant product standard. This temperature shall be chosen according to the purpose from one of the temperatures shown in IEC 60695-2-11:2021, Table 1. The minimum test temperature is 650 °C.

b) Test specimens

Glow-wire test specimens for end-products shall apply to IEC 60695-2-11. When the relay is either too small (see definition of small parts in IEC 60695-2-11) or of an inconvenient shape to carry out the test, the test is made using a specimen of the respective material from which the relay is manufactured.

Glow-wire test specimens for material shall apply to IEC 60695-2-12 and IEC 60695-2-13. The dimensions of the planar sections of the test specimens shall be at least 60 mm in length and 60 mm in width (measured inside the clamping areas) and shall be provided in all thicknesses under consideration. The preferred values include 0,4 mm ± 0,05 mm, 0,75 mm ± 0,1 mm, 1,5 mm ± 0,15 mm, 3,0 mm ± 0,2 mm, or 6,0 mm ± 0,4mm and the test specimen shall have a thickness equal to the nearest preferred value that is no thicker than the relevant part.

For complex parts with various thickness, both the maximum and the minimum thickness shall be considered and all the preferred value involved in this range shall be tested.

c) Number of test specimens

   Number of test specimens shall apply to IEC 60695-2-11, IEC 60695-2-12 and IEC 60695-2-13.

d) Test apparatus are described in IEC 60695-2-10 and in IEC 60695-11-5. Positioning of the test apparatus apply to IEC 60695-2-11.

4.3 Needle flame test

4.3.1 Purpose

The purpose of the needle flame test is to assess the fire hazards of electrotechnical equipment, its subassemblies and components, and of solid insulating materials and other combustible materials through simulation of the effect of small flames which may result from fault conditions within the equipment.

4.3.2 Procedure

If not otherwise specified in the relevant specification, the preconditioning of test specimens shall be done according to IEC 60695-11-5.

The test procedure is specified in IEC 60695-11-5. At the beginning of the test, the test flame shall be positioned so that at least the tip of the flame is in contact with the surface of the specimen which is most likely to be affected by flames resulting from normal use or from fault conditions. During the test, the burner shall not be moved. The test flame is removed immediately after the specified time.

4.3.3 Conditions to be specified

The needle flame test is carried out in accordance with IEC 60695-11-5, and the following details shall be adopted:

a) The duration of application of the test flame on the specimen is (30 + 1) s. For relay volumes up to 1 000 mm^3 a reduction to (10 + 1) s may be chosen, however;

b) The test specimen shall be compliant with IEC 60695-11-5;

c) The test apparatus are described in IEC 60695-11-5.

5 Evaluation

5.1 General

5.1.1 Glow-wire test evaluation

5.1.1.1 Glow-wire flammability test for end-products

Glow-wire flammability test criteria for end-products are according to IEC 60695-2-11.

5.1.1.2 Glow-wire flammability index (GWFI) test for materials

Glow-wire flammability index (GWFI) criteria for materials are according to IEC 60695-2-12.

5.1.1.3 Glow-wire ignition temperature (GWIT) test for materials

Glow-wire ignition temperature (GWIT) criteria for materials are according to IEC 60695-2-13.

5.1.2 Needle flame test evaluation

According to the evaluation of test results in IEC 60695-11-5, and after the test, the white pinewood board shall not show traces of burning; changes in colour of the white pinewood board are ignored.