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Part 2-10: Glowing/Hot-wire based test methods - Glow-wire apparatus and common test procedure

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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Fire hazard testing - Part 2-10: Glowing/Hot-wire based test methods - Glow-wire apparatus and common test procedure

FOREWORD

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This commented version (CMV) of the official standard IEC 60695-2-10:2026 edition 4.0 allows the user to identify the changes made to the previous IEC 60695-2-10:2021 edition 3.0. Furthermore, comments from IEC TC 89 experts are provided to explain the reasons of the most relevant changes, or to clarify any part of the content.

A vertical bar appears in the margin wherever a change has been made. Additions are in green text, deletions are in strikethrough red text. Experts' comments are identified by a blue-background number. Mouse over a number to display a pop-up note with the comment.

This publication contains the CMV and the official standard. The full list of comments is available at the end of the CMV.

IEC 60695-2-10 has been prepared by IEC technical committee 89: Fire hazard testing. It is an International Standard.

This fourth edition cancels and replaces the third edition published in 2021. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

a) Revision of 4.3 to add reference to new Annex D;
b) Addition of new normative Annex D on "Use of pyrometer for glow-wire test";
c) Revision of Clause 3 references to align with ISO 13943:2017.

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

FDIS	Report on voting
89/1650/FDIS	89/1657/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/standardsdev/publications.

It has the status of a basic safety publication in accordance with IEC GUIDE 104:2019 [1].

This International Standard is to be used in conjunction with IEC 60695-2-11, IEC 60695-2-12, and IEC 60695-2-13.

A list of all parts in the IEC 60695 series, published under the general title *Fire hazard testing*, 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.

INTRODUCTION

In the design of any electrotechnical product, the risk of fire and the potential hazards associated with fire need to be considered. In this respect the objective of component, circuit, and product design, as well as the choice of materials, is to reduce to acceptable levels the potential risks of fire during normal operating conditions, reasonably foreseeable abnormal use, malfunction, and/or failure. IEC 60695-1-10 [2] was developed, together with its companion, IEC 60695-1-11 [3], to provide guidance on how this is accomplished.

The primary aims of IEC 60695-1-10 [2] and IEC 60695-1-11 [3] are to provide guidance on how:

a) to prevent ignition caused by an electrically energized component part; and

b) to confine any resulting fire within the bounds of the enclosure of the electrotechnical product in the event of ignition .

Secondary aims of these documents include the minimization of any flame spread beyond the product's enclosure and the minimization of harmful effects of fire effluents such as heat, smoke, toxicity and/or corrosivity.

Fires involving electrotechnical products can also be initiated from external non-electrical sources. Considerations of this nature should be dealt with in the overall fire risk assessment.

In electrotechnical equipment, overheated metal parts can act as ignition sources. In glow-wire tests, a glowing wire is used to simulate such an ignition source.

This part of IEC 60695 gives recommendations with regard to the glow-wire test apparatus and describes a common test procedure for tests applicable to end products and materials to be used with IEC 60695-2-11 which describes a glow-wire flammability test for end products (GWEPT), IEC 60695-2-12 which describes a glow-wire flammability index test for materials (GWFI), and IEC 60695-2-13 which describes a glow-wire ignition temperature test method for materials (GWIT).

1 Scope

This part of IEC 60695 specifies the glow-wire apparatus and common test procedure to simulate the effects of thermal stresses which may be produced by heat sources such as glowing elements or overloaded resistors, for short periods, in order to assess the fire hazard by a simulation technique.

The test procedure described in this document is a common test procedure intended for the small-scale tests in which a standardized electrically heated wire is used as a source of ignition.

It is a common part of the test procedures applied to end products and to solid electrical insulating materials or other solid combustible materials.

A detailed description of each particular test procedure is given in IEC 60695-2-11, IEC 60695-2-12 and IEC 60695-2-13.

This basic safety publication focusing on safety test method(s) is primarily intended for use by technical committees in the preparation of safety publications in accordance with the principles laid down in IEC GUIDE 104:2019 [1] and ISO/IEC Guide 51 [4].

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 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.

ISO 4046-4:2016, *Paper, board, pulps and related terms - Vocabulary - Part 4: Paper and board grades and converted products*

ISO 13943:2017, *Fire safety - Vocabulary*

IEC 60584-1, *Thermocouples - Part 1: EMF specifications and tolerances*

IEC 60695-2-11, *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*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 13943:2017, some of which are reproduced below for the user's convenience, and the following 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

3.1
combustible
capable of being ignited and burned

[SOURCE: ISO 13943:2017, 3.52]

3.2
combustion
exothermic reaction of a substance with an oxidizing agent

Note 1 to entry: Combustion generally emits fire effluent accompanied by flame (3.6) and/or glowing.

[SOURCE: ISO 13943:2017, 3.55]

3.3
draught-free environment
space in which the results of experiments are not significantly affected by the local air speed

Note 1 to entry: A qualitative example is a space in which a wax candle flame (3.6) remains essentially undisturbed. Quantitative examples are small-scale fire tests (3.5) in which a maximum air speed of 0,1 m × s^{-1} or 0,2 m × s^{-1} is sometimes specified.

[SOURCE: ISO 13943:2017, 3.83]

3.4
fire hazard
potential for harm associated with fire

Note 1 to entry: Alternatively, fire hazard can be a physical object or condition with a potential for an undesirable consequence from fire.

[SOURCE: ISO 13943:2017, 3.131]

3.5
fire test
test that measures fire behaviour or exposes an item to the effects of a fire

Note 1 to entry: The results of a fire test can be used to quantify fire severity or determine the fire resistance or reaction to fire of the test specimen.

[SOURCE: ISO 13943:2017, 3.157]

3.6
flame
rapid, self-sustaining, sub-sonic propagation of combustion (3.2) in a gaseous medium, usually with emission of light

[SOURCE: ISO 13943:2017, 3.159]