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Fire hazard testing -
Part 2-22: Glowing/hot-wire based test methods - Results of the round robin tests for the development of IEC TS 60695-2-21:2023

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Fire hazard testing - Part 2-22: Glowing/hot-wire based test methods - Results of the round robin tests for the development of IEC TS 60695-2-21:2023

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It has the status of a basic safety publication in accordance with IEC Guide 104.

The text of this Technical Report is based on the following documents:

Draft	Report on voting
89/1645/DTR	89/1655/RVDTR

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 Technical Report 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 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– withdrawn, or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

Fires may create hazards to life and property as a result of the generation of heat (emission of heat on fire hazard), and as a result of the production of toxic effluent, corrosive effluent, and smoke (fire effluents on the fire hazard). Fires start with ignition and then can grow, leading in some cases to flash-over and a fully developed fire. Resistance to ignition is therefore one of the most important parameters of a material to be considered in the assessment of a fire hazard.

Most current fire hazard assessment techniques evaluate the resistance to ignition characteristics of a single material or component. These assessment techniques are able to drive the preselection and validation of materials and components but are not able to evaluate the possible interaction of materials or components in a complex environment such as in a finished unit once a fire event is initiated.

In a fault condition, a finished unit may be subject to the overheating of electrical connections and contacts. Such overheating can be caused by corrosion, poor crimp connections, incorrect assembly, erosion of contact surfaces, or mechanical fatigue. Insulating materials that are overheated can ignite and cause fire.

It is difficult to simulate the actual conditions of potential faults in finished units; therefore, all possible fire hazards should be considered at the design stage and subsequently during the preselection of materials and components.

The fire containment test described in IEC TS 60695-2-21:2023 [1] has been developed to verify if a finished unit is able to contain an internal fire event, generated by combustible parts ignited by a simulated overheated electrical connection.

This Technical Report summarizes the investigation and verification activities done for the development of IEC TS 60695-2-21:2023 [1].

1 Scope

This part of the IEC 60695 series, which is a Technical Report, summarizes the round robin tests performed by the IEC/TC 89/PT 60695-2-15, "Fire containment test on finished units" during the development of IEC TS 60695-2-21:2023 [1], *Fire containment test on finished units*.

This document aims to serve as knowledge retention, describing the methodologies, investigation, and verification techniques, as well as providing a compendium of the different verification results, of the development of IEC TS 60695-2-21:2023 [1] as new test method.

IEC/TC 89 and other IEC Technical Committees can benefit from this document, when developing new test methodologies or planning and executing round robin tests.

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 13943:2017, *Fire safety — Vocabulary*

3 Terms, definitions, and abbreviated terms

3.1 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 13943:2017 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

3.1.1
enclosure
external casing protecting the electrical and mechanical parts of apparatus

Note 1 to entry: The term excludes cables.

Note 2 to entry: For this document, the term enclosure means the enclosure of a finished unit.

[SOURCE: ISO 13943:2017 [2], 3.93, Modified - The domain <electrotechnical> has been deleted and Note to entry 2 has been added.]

3.1.2
finished unit
complete unit which is designed to stand alone, usable by an end-user and having a direct function for the end-user. It is intended to be placed on the market and/or taken into service as single unit

Note 1 to entry: Electrical installation products such as distribution boards, circuit protection devices, switchgear, control gear, cable management system and electrical accessories (wiring devices) are not considered to be finished units.

Note 2 to entry: For this document, the term enclosure and the term finished unit can be used interchangeably.