IEC 60695-2-11

Edition 2.0 2014-02

REDLINE VERSION

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BASIC SAFETY PUBLICATION

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

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

ICS 13.220.40, 29.020

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CONTENTS

INTERNATIONAL ELECTROTECHNICAL COMMISSION

FIRE HAZARD TESTING –

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

FOREWORD

1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of 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, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). 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. 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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This Redline version provides you with a quick and easy way to compare all the changes between this standard and its previous edition. A vertical bar appears in the margin wherever a change has been made. Additions and deletions are displayed in red, with deletions being struck through.

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

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

FDIS	Report on voting
89/1197/FDIS	89/1206/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 2.

It has the status of a basic safety publication in accordance with IEC Guide 104 and ISO/IEC Guide 51.

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

This second edition of IEC 60695-2-11 cancels and replaces the first edition of IEC 60695-2-11 published in 2000. It constitutes a technical revision.

The main changes with respect to the previous edition are listed below:

– The Introduction has been added to provide background and how it relates to the Scope.
– The Scope has been modified for greater clarity and reference to basic safety publications.
– Numerous terms and definitions relevant to this Standard have been added to Clause 3.
– The application of “small parts” and “insignificant mass” have been introduced and clarified.
– The different types of specimens, how to specify them, and limitations of the test method have been further clarified in Clause 4.
– Clarified in Clause 5 the distance to specified layer when unknown.
– The information from Clause 6 has been moved into the test procedure in Clause 8.
– The conditioning of the specified layer and the laboratory ambient test conditions were clarified in Clause 7.
– Measurement of the maximum flame height was removed from Clause 9.
– The reference to this test as “GWEPT” was introduced along with an applicable title change.
– Annex A has been revised to reflect current practice by prominent product committees.

The committee has decided that the contents of this publication will remain unchanged until the stability date indicated on the IEC web site under "http://webstore.iec.ch" in the data related to the specific publication. At this date, the publication will be

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IMPORTANT – The 'colour inside' logo on the cover page of this publication indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this document using a colour printer.

INTRODUCTION

The purpose of this Introduction is to provide background regarding the basic guidance that prompted the preparation of this International Standard and how it relates to the Scope.

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 within the design of component, circuit, and product design, as well as the choice of the materials, is to reduce to acceptable levels the potential risks of fire during normal operating conditions, reasonable foreseeable abnormal use, malfunction, and/or failure. IEC Technical Committee 89 has developed IEC 60695-1-10, together with its companion, IEC 60695-1-11, to provide guidance on how this is to be accomplished.

The primary aims of IEC 60695-1-10 and IEC 60695-1-11 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 hazard 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.

IEC 60695-2-10 describes a glow-wire test apparatus and common test procedure, IEC 60695-2-12 describes a glow-wire flammability index (GWFI) test method for materials, and IEC 60695-2-13 describes a glow-wire ignition temperature (GWIT) test method for materials.

This standard is used to assess the reaction of end products to heat caused by contact with an electrically heated wire under controlled laboratory conditions. This may be useful for the evaluation of end products that may be exposed to excess thermal stress such as a fault current flowing through a wire, overloading of components, and/or poor electrical connections. It should not be used to solely describe or appraise the fire hazard or fire risk of products, or assemblies under actual fire conditions. However, results of this test may be used as elements of a fire hazard assessment which takes into account all of the factors which are pertinent to a particular end use.

This international standard may involve hazardous materials, operations, and equipment. It does not purport to address all of the safety problems associated with its use. It is the responsibility of the user of this international standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.

FIRE HAZARD TESTING –

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

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~~ a test method on an end product. It is intended to simulate the effects of thermal stresses produced by an electrically heated source to represent a fire hazard.

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

This test method is used to check that, under defined test conditions, an end product exposed to an electrically heated source has either a limited ability to ignite or, if it ignites, a limited ability to propagate flame. However, the fire hazard analysis, the flammability aspects and the flame spreading to other products are not covered by the present standard.

This basic safety publication is intended for use by technical committees in the preparation of standards in accordance with the principles laid down in IEC Guide 104 and ISO/IEC Guide 51.

One of the responsibilities of a technical committee is, wherever applicable, to make use of basic safety publications in the preparation of its publications. The requirements, test methods or test conditions of this basic safety publication will not apply unless specifically referred to or included in the relevant publications.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

~~IEC 60695-2-2:1991, *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*~~

IEC Guide 104, *The preparation of safety publications and the use of basic safety publications and group safety publications*

ISO/IEC Guide 51, *Safety aspects – Guidelines for their inclusion in standards*

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INTERNATIONAL STANDARD

NORME INTERNATIONALE

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BASIC SAFETY PUBLICATION

PUBLICATION FONDAMENTALE DE SÉCURITÉ

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

Essais relatifs aux risques du feu – Partie 2-11: Essais au fil incandescent/chauffant – Méthode d'essai d'inflammabilité pour produits finis (GWEPT)

IEC 60695-2-11:2014-02(EN-FR)

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COMMISSION ÉLECTROTECHNIQUE INTERNATIONALE

ESSAIS RELATIFS AUX RISQUES DU FEU –

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

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La Norme internationale CEI 60695-2-11 a été établie par le comité d'études 89 de la CEI: Essais relatifs aux risques du feu.

Le texte de cette norme est issu des documents suivants:

FDIS	Rapport de vote
89/1197/FDIS	89/1206/RVD

Le rapport de vote indiqué dans le tableau ci-dessus donne toute information sur le vote ayant abouti à l'approbation de cette norme.

Cette publication a été rédigée selon les Directives ISO/CEI, Partie 2.

Elle a le statut d'une publication fondamentale de sécurité, conformément au Guide CEI 104 et au Guide ISO/CEI 51.

Cette norme doit être utilisée conjointement avec la CEI 60695-2-10.

Cette deuxième édition de la CEI 60695-2-11 annule et remplace la première édition de la CEI 60695-2-11 publiée en 2000. Elle constitue une révision technique.

Les principales modifications apportées par rapport à l'édition précédente sont énumérées ci-dessous:

– L'introduction a été modifiée pour fournir le contexte et montrer la relation avec le domaine d'application.
– Modification du domaine d'application pour davantage de clarté, et pour faire référence aux publications fondamentales de sécurité.
– Ajout à l'Article 2 de nombreux termes et définitions applicables à la présente Norme.
– Introduction et clarification de l'application des "petites pièces" et de la "masse négligeable".
– Clarification supplémentaire à l'Article 4 des différents types d'éprouvettes, de la manière de les spécifier et des limitations de la méthode d'essai.
– Clarification à l'Article 5 de la distance par rapport à la sous-couche spécifiée, lorsqu'elle n'est pas connue.
– Transfert des informations de l'Article 6 dans la procédure d'essai de l'Article 8.
– Clarification à l'Article 7 du conditionnement de la sous-couche spécifiée et des conditions d'essai ambiantes de laboratoire.
– Suppression de la mesure de la hauteur de flamme maximale de l'Article 9.
– Introduction de la référence à cet essai comme essai "GWEPT", et modification du titre en conséquence.
– Révision de l'Annexe A, afin de refléter les pratiques en vigueur au sein des comités de produits clés.

Le comité a décidé que le contenu de cette publication ne sera pas modifié avant la date de stabilité indiquée sur le site web de la CEI sous "http://webstore.iec.ch" dans les données relatives à la publication recherchée. A cette date, la publication sera

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INTRODUCTION

La présente introduction a pour objet de fournir le contexte relatif aux lignes directrices de base à l'origine de l'élaboration de cette Norme internationale et sa relation avec le domaine d'application.

La conception de tout produit électrotechnique doit tenir compte du risque de feu et des dangers potentiels associés au feu. A cet égard, la conception des composants, circuits et produits ainsi que le choix des matériaux ont pour objectif de réduire à des niveaux acceptables les risques potentiels de feu dans les conditions de fonctionnement normal, d'utilisation anormale raisonnablement prévisible, de dysfonctionnement et/ou de défaillance. Le comité d'études 89 de la CEI a établi la CEI 60695-1-10, avec sa norme associée, la CEI 60695-1-11, afin de fournir des lignes directrices sur les méthodes de réalisation correspondantes.

La CEI 60695-1-10 et la CEI 60695-1-11 ont pour principaux objectifs de fournir des lignes directrices sur les éléments suivants:

a) éviter l'allumage provoqué par une partie de composant soumis à une alimentation électrique, et
b) confiner le feu résultant dans les limites de l'enveloppe du produit électrotechnique en cas d'allumage.

Les objectifs secondaires de ces documents comprennent la réduction de toute propagation de la flamme au-delà de l'enveloppe du produit et la réduction des effets préjudiciables des effluents du feu tels que la chaleur, la fumée, la toxicité et/ou la corrosivité.

Les feux impliquant des produits électrotechniques peuvent également être déclenchés par des sources externes non électriques. Il convient de tenir compte de ces éléments dans le cadre de l'évaluation globale du danger d'incendie.

Dans l'appareillage électrotechnique, les parties métalliques surchauffées peuvent agir comme sources d'allumage. Pour les essais au fil incandescent, un fil incandescent est utilisé pour simuler ce type de source d'allumage.

La CEI 60695-2-10 décrit l'appareillage d'essai au fil incandescent et la procédure d'essai commune, la CEI 60695-2-12 décrit une méthode d'essai d'indice d'inflammabilité au fil incandescent (GWFI, *glow-wire flammability index*) et la CEI 60695-2-13 décrit une méthode d'essai de température d'allumabilité au fil incandescent (GWIT, *glow-wire ignition temperature*) pour matériaux.

La présente norme permet d'évaluer la réaction des produits finis à la chaleur engendrée par le contact avec un fil chauffé électriquement dans des conditions contrôlées en laboratoire. Elle peut être utile pour l'évaluation de produits finis susceptibles d'être exposés à des contraintes thermiques excessives telles qu'un courant de défaut passant dans un fil, une surcharge de composants et/ou de mauvaises connexions électriques. Il convient de ne pas l'utiliser pour uniquement décrire ou évaluer le danger d'incendie ou le risque d'incendie de produits ou assemblages dans des conditions réelles d'incendie. Cependant, les résultats de cet essai peuvent servir d'éléments pour une évaluation du danger d'incendie qui prend en considération tous les facteurs appropriés à une utilisation finale particulière.

La présente norme internationale peut impliquer des matériaux, opérations et matériels dangereux. Elle n'a pas pour objet de traiter tous les problèmes de sécurité associés à son utilisation. Il incombe à l'utilisateur de la présente norme internationale d'établir des bonnes pratiques appropriées en termes de sécurité et de santé et de déterminer l'applicabilité des limitations réglementaires avant usage.

ESSAIS RELATIFS AUX RISQUES DU FEU –

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

1 Domaine d'application

La présente partie de la CEI 60695 spécifie une méthode d'essai applicable au produit fini. Elle est destinée à simuler l'effet de contraintes thermiques produites par une source chauffée électriquement afin de représenter un danger d'incendie.

La présente méthode d'essai permet de vérifier que, dans des conditions d'essai définies, un produit fini exposé à une source chauffée électriquement présente une aptitude limitée à s'enflammer ou, s'il s'enflamme, une aptitude limitée à propager la flamme. Cependant, la présente norme ne traite pas de l'analyse du danger d'incendie, des aspects d'inflammabilité et de propagation de flammes à d'autres produits.

La présente publication fondamentale de sécurité est destinée à être utilisée par les comités d'études dans le cadre de l'élaboration de normes conformément aux principes établis dans le Guide CEI 104 et le Guide ISO/CEI 51.

L'une des responsabilités d'un comité d'études consiste, le cas échéant, à utiliser les publications fondamentales de sécurité dans le cadre de l'élaboration de ses publications. Les exigences, les méthodes d'essai ou les conditions d'essai de la présente publication fondamentale de sécurité ne s'appliquent pas sauf référence spécifique ou inclusion dans les publications correspondantes.

2 Références normatives

Les documents suivants sont cités en référence de manière normative, en intégralité ou en partie, dans le présent document et sont indispensables pour son application. Pour les références datées, seule l'édition citée s'applique. Pour les références non datées, la dernière édition du document de référence s'applique (y compris les éventuels amendements).

CEI 60695-2-10, *Essais relatifs aux risques du feu – Partie 2-10: Essais au fil incandescent/chauffant – Appareillage et méthode commune d'essai*

Guide CEI 104, *Élaboration des publications de sécurité et utilisation des publications fondamentales de sécurité et publications groupées de sécurité*

Guide ISO/CEI 51, *Aspects liés à la sécurité – Principes directeurs pour les inclure dans les normes*