IEC TS 60695-11-11

Edition 2.0 2016-02

TECHNICAL SPECIFICATION

SPECIFICATION TECHNIQUE

colour inside

BASIC SAFETY PUBLICATION

PUBLICATION FONDAMENTALE DE SÉCURITÉ

Fire hazard testing – Part 11-11: Test flames – Determination of the characteristic heat flux for ignition from a non-contacting flame source

Essais relatifs aux risques du feu – Partie 11-11: Flammes d'essai – Détermination du flux de chaleur caractéristique pour l'allumage à partir d'une flamme source sans contact

IEC TS 60695-11-11:2016-02(en-fr)

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COMMISSION ELECTROTECHNIQUE INTERNATIONALE

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CONTENTS

INTERNATIONAL ELECTROTECHNICAL COMMISSION

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FIRE HAZARD TESTING –

Part 11-11: Test flames – Determination of the characteristic heat flux for ignition from a non-contacting flame source

FOREWORD

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- the required support cannot be obtained for the publication of an International Standard, despite repeated efforts, or
- the subject is still under technical development or where, for any other reason, there is the future but no immediate possibility of an agreement on an International Standard.

Technical specifications are subject to review within three years of publication to decide whether they can be transformed into International Standards.

IEC TS 60695-11-11, which is a technical specification, has been prepared by IEC technical committee 89: Fire hazard testing.

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

This second edition of IEC TS 60695-11-11 cancels and replaces the first edition published in 2008. It constitutes a technical revision.

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

a) Fix of editiorials throughout the text;

b) Introduction updated;

c) Normative references updated;

d) Results of recent round-robin testing incorporated; and

e) Informative Annex C "Precision data" added.

The text of this technical specification is based on the following documents:

Enquiry draft	Report on voting
89/1227/DTS	89/1248/RVC

Full information on the voting for the approval of this technical specification 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.

This technical specification is to be used in conjunction with IEC 60695-11-4.

A list of all the parts in the IEC 60695 series, under the general title *Fire hazard testing*, can be found on the IEC website.

Part 11 consists of the following parts:

Part 11-2: Test flames – 1 kW nominal pre-mixed flame – Apparatus, confirmatory test arrangement and guidance

Part 11-3: Test flames – 500 W flames – Apparatus and confirmational test methods

Part 11-4: Test flames – 50 W flame – Apparatus and confirmational test method

Part 11-5: Test flames – Needle-flame test method – Apparatus, confirmatory test arrangement and guidance

Part 11-10: Test flames – 50 W horizontal and vertical flame test methods

Part 11-11: Test flames – Determination of the characteristic heat flux for ignition from a non-contacting flame source

Part 11-20: Test flames – 500 W flame test methods

Part 11-21: Test flames – 500 W vertical flame test method for tubular polymeric materials

Part 11-30: Test flames – History and development from 1979 to 1999

Part 11-40: Test flames – Confirmatory tests – Guidance

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

- transformed into an International standard,
- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

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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 equipment design as well as the choice of materials is to reduce the risk of fire to a tolerable level even in the event of reasonably foreseeable (mis)use, malfunction or failure. IEC 60695-1-10, together with its companion, IEC 60695-1-11, provide guidance on how this is to be accomplished.

Fires involving electrotechnical products can be initiated from external non-electrical sources. Considerations of this nature are dealt with in an overall fire hazard assessment.

The aim of the IEC 60695 series of standards is to save lives and property by reducing the number of fires or reducing the consequences of the fire. This can be accomplished by

– trying to prevent ignition caused by an electrically energised component part and, in the event of ignition, to confine any resulting fire within the bounds of the enclosure of the electrotechnical product.
– trying to minimise flame spread beyond the product's enclosure and to minimise the harmful effects of fire effluents including heat, smoke, and toxic or corrosive combustion products.

This technical specification is to be used to measure and describe the properties of materials used for electrotechnical products and sub-assemblies in response to heat from a non-contacting flame source under controlled laboratory conditions and is to not be used to describe or appraise the fire hazard or fire risk of materials, products, or assemblies under actual fire conditions. However, results of this test can be used as elements of a fire hazard assessment which takes into account all of the factors which are pertinent to an assessment of the fire hazard of a particular end use. A test specimen cut from end-product or sub-assembly can be tested by this test method.

This technical specification 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 to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.

Test methods to determine flammability by contact of flame have been developed and standardized already, such as IEC 60695-11-10 [1][1] and IEC 60695-11-20 [2][1] and ISO 4589-2 [3][1].

This is the first test method to determine the characteristic heat flux for ignition (CHFI) of materials used for electrotechnical products and sub-assemblies from a non-contacting flame source. CHFI characterizes ignition behaviour in terms of incident heat flux. This test method simulates the fire behaviour of materials used for electrotechnical products where a flame source exists close to, but does not contact with these items. An example is a candle flame near an electrotechnical product.

1 Numbers in square brackets refer to the bibliography.

FIRE HAZARD TESTING –

Part 11-11: Test flames – Determination of the characteristic heat flux for ignition from a non-contacting flame source

1 Scope

This part of IEC 60695, which is a technical specification describes a test method used to determine the characteristic heat flux for ignition (CHFI) from a non-contacting flame source for materials used in electrotechnical products and sub-assemblies. It provides a relationship between ignition time and incident heat flux. A test specimen cut from an end-product or sub-assembly can be tested by this test method.

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 60695-11-4, *Fire hazard testing – Part 11-4: Test flames – 50 W flame – Apparatus and confirmational test method*

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

ISO/IEC Guide 51:1999, *Safety aspects – Guidelines for their inclusion in standards*

ISO 291, *Plastics – Standard atmospheres for conditioning and testing*

ISO 293, *Plastics – Compression moulding of test specimens of thermoplastic materials*

ISO 294 (all parts), *Plastics – Injection moulding of test specimens of thermoplastic materials*

ISO 295, *Plastics – Compression moulding of test specimens of thermosetting materials*

ISO 13943:2008, *Fire safety – Vocabulary*

ISO 14934-4:2014, *Fire tests – Calibration of heat flux meters – Part 4: Guidance on the use of heat flux meters in fire tests*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 13943:2008, some of which are reproduced below for the user's convenience, as well as the following apply.

3.1

average ignition time, $\bar{t}_{ig}$

arithmetic mean of three ignition times measured at a given heat flux