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INTERNATIONAL STANDARD



BASIC SAFETY PUBLICATION

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

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

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CONTENTS

FOREWORD	3
INTRODUCTION	6
1 Scope	7
2 Normative references	7
3 Terms and definitions	7
4 Burner/supply arrangement.....	8
4.1 Requirements	8
4.2 Apparatus and fuel.....	8
4.2.1 Burner	8
4.2.2 Flow control.....	8
4.2.3 Copper block	9
4.2.4 Thermocouple.....	9
4.2.5 Temperature/time indicating/recording devices	9
4.2.6 Laboratory fumehood/chamber	9
5 Production of the test flame	10
5.1 Selection of the method	10
5.2 Method A	10
5.3 Method B (alternative).....	10
6 Confirmation of the test flame	10
6.1 Principle	10
6.2 Frequency of confirmatory tests	10
6.3 Procedure	11
7 Recommended arrangements for use of the test flame	11
Annex A (normative) Burner details, arrangements and confirmatory test.....	13
A.1 Burner construction.....	13
A.2 Gas supply arrangement.....	19
A.3 The copper block	20
A.4 Confirmatory test	20
Annex B (informative) Examples of test arrangements	23
Bibliography.....	23
Figure 1 – Flame dimensions	12
Figure A.1 – General assembly	14
Figure A.2 – Pre-mixed Burner details (1)	15
Figure A.3 – Pre-mixed Burner details (2)	16
Figure A.4 – Pre-mixed Burner details (3)	17
Figure A.5 – Pre-mixed Burner details (4)	18
Figure A.6 – Example of supply arrangement for burner.....	19
Figure A.7 – Copper block	20
Figure A.8 – Confirmatory test arrangement.....	21
Figure B.1 – Examples of test arrangements	22

INTERNATIONAL ELECTROTECHNICAL COMMISSION

FIRE HAZARD TESTING –

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

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

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

CDV	Report on voting
89/1327/CDV	89/1354/RVC

Full information on the voting for the approval of this International Standard can be found in the report on voting indicated in the above table.

This document has been drafted in accordance with the ISO/IEC Directives, Part 2.

This third edition of IEC 60695-11-2 cancels and replaces the second edition published in 2013. It constitutes a technical revision.

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

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

- addition of an alternative production of the test flame;
- deletion of Annex B.

In this standard, the following print types are used:

- **terms defined within Clause 3: in bold type**

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

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 11-30: *Test flames – History and development from 1979 to 1999*
- Part 11-40: *Test flames – Confirmatory tests – Guidance*

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- replaced by a revised edition, or
- amended.

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 publication using a colour printer.

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, reasonable foreseeable abnormal use, malfunction, and/or failure. The IEC has developed IEC 60695-1-10 [1]¹, together with its companion, IEC 60695-1-11 [2], 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 risk assessment.

IEC 60695-11-2 provides a description of the apparatus required to produce a 1 kW test flame, and provides a description of the principle of a confirmation procedure to check that the effective power output of the flame is as intended. Guidance on confirmatory tests for test flames is given in IEC TS 60695-11-40 [3].

This part of IEC 60695 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.

¹ Numbers in square brackets refer to the bibliography.

FIRE HAZARD TESTING –

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

1 Scope

This part of IEC 60695 gives the requirements for the production and confirmation of a nominal 1 kW propane/air **pre-mixed-test flame** for use in fire hazard testing.

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 [4] and ISO/IEC Guide 51 [5].

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 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 60584-1:1995, *Thermocouples – Part 1: ~~Reference tables~~ EMF specifications and tolerances*

~~IEC 60584-2:1982, *Thermocouples – Part 2: Tolerances*~~
~~Amendment 1:1989~~

ISO/IEC 13943:2008, *Fire safety – Vocabulary*

INTERNATIONAL STANDARD

NORME INTERNATIONALE



BASIC SAFETY PUBLICATION

PUBLICATION FONDAMENTALE DE SÉCURITÉ

Fire hazard testing –

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

Essais relatifs aux risques du feu –

Partie 11-2: Flammes d'essai – Flamme à prémélange de 1 kW nominal – Appareillage, configuration pour l'essai de vérification et préconisations

CONTENTS

FOREWORD	3
INTRODUCTION	5
1 Scope	6
2 Normative references	6
3 Terms and definitions	6
4 Burner/supply arrangement.....	7
4.1 Requirements	7
4.2 Apparatus and fuel.....	7
4.2.1 Burner	7
4.2.2 Flow control	7
4.2.3 Copper block	8
4.2.4 Thermocouple.....	8
4.2.5 Temperature/time indicating/recording devices	8
4.2.6 Laboratory fumehood/chamber	8
5 Production of the test flame	8
5.1 Selection of the method	8
5.2 Method A	9
5.3 Method B (alternative).....	9
6 Confirmation of the test flame	9
6.1 Principle	9
6.2 Frequency of confirmatory tests	9
6.3 Procedure	10
7 Recommended arrangements for use of the test flame	10
Annex A (normative) Burner details, arrangements and confirmatory test.....	12
A.1 Burner construction.....	12
A.2 Gas supply arrangement	17
A.3 The copper block	18
A.4 Confirmatory test	18
Bibliography.....	20
Figure 1 – Flame dimensions	11
Figure A.1 – General assembly	13
Figure A.2 – Burner details (1).....	13
Figure A.3 – Burner details (2).....	14
Figure A.4 – Burner details (3).....	15
Figure A.5 – Burner details (4).....	16
Figure A.6 – Example of supply arrangement for burner.....	17
Figure A.7 – Copper block	18
Figure A.8 – Confirmatory test arrangement.....	19

INTERNATIONAL ELECTROTECHNICAL COMMISSION

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SOMMAIRE

AVANT-PROPOS	23
INTRODUCTION.....	25
1 Domaine d'application	26
2 Références normatives	26
3 Termes et définitions	26
4 Configuration d'alimentation du brûleur.....	27
4.1 Exigences	27
4.2 Appareillage et combustible	27
4.2.1 Brûleur	27
4.2.2 Régulation de débit.....	28
4.2.3 Bloc de cuivre.....	28
4.2.4 Couple thermoélectrique.....	28
4.2.5 Dispositifs d'indication et/ou d'enregistrement de température et de temps	28
4.2.6 Hotte de laboratoire	28
5 Production de la flamme d'essai	29
5.1 Sélection de la méthode.....	29
5.2 Méthode A	29
5.3 Méthode B (variante)	29
6 Vérification de la flamme d'essai	30
6.1 Principe	30
6.2 Fréquence des essais de vérification	30
6.3 Procédure	30
7 Configurations recommandées pour l'utilisation de la flamme d'essai	31
Annexe A (normative) Détails du brûleur, configurations et essai de vérification	32
A.1 Montage du brûleur.....	32
A.2 Configuration de l'alimentation en gaz	37
A.3 Le bloc de cuivre	38
A.4 Essai de vérification.....	38
Bibliographie.....	40
Figure 1 – Dimensions de la flamme	31
Figure A.1 – Montage général.....	33
Figure A.2 – Détails du brûleur (1)	33
Figure A.3 – Détails du brûleur (2)	34
Figure A.4 – Détails du brûleur (3)	35
Figure A.5 – Détails du brûleur (4)	36
Figure A.6 – Exemple de configuration d'alimentation du brûleur	37
Figure A.7 – Bloc de cuivre	38
Figure A.8 – Configuration pour l'essai de vérification.....	39

COMMISSION ÉLECTROTECHNIQUE INTERNATIONALE

ESSAIS RELATIFS AUX RISQUES DU FEU –

**Partie 11-2: Flammes d'essai – Flamme à prémélange de 1 kW nominal –
Appareillage, configuration pour l'essai de vérification et préconisations**

AVANT-PROPOS

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

Le texte de cette Norme internationale est issu des documents suivants:

CDV	Rapport de vote
89/1327/CDV	89/1354/RVC

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

Ce document a été rédigé selon les Directives ISO/IEC, Partie 2.

Cette troisième édition de l'IEC 60695-11-2 annule et remplace la deuxième édition parue en 2013. Cette édition constitue une révision technique.

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

Cette édition inclut les modifications techniques majeures suivantes par rapport à l'édition précédente:

- ajout d'une variante pour la production de la flamme d'essai;
- suppression de l'Annexe B.

Dans cette norme, les caractères suivants sont utilisés:

- **termes définis à l'Article 3: en gras**

Une liste de toutes les parties de la série IEC 60695, publiées sous le titre général *Essais relatifs aux risques du feu*, peut être consultée sur le site web de l'IEC.

La Partie 11 comprend les parties suivantes:

- Partie 11-2: *Flammes d'essai – Flamme à prémélange de 1 kW nominal – Appareillage, configuration pour l'essai de vérification et préconisations*
- Partie 11-3: *Flammes d'essai – Flamme de 500 W – Appareillage et méthodes d'essai de vérification*
- Partie 11-4: *Flammes d'essai – Flamme de 50 W – Appareillage et méthodes d'essai de vérification*
- Partie 11-5: *Flammes d'essai – Méthode d'essai au brûleur-aiguille – Appareillage, dispositif d'essai de vérification et lignes directrices*
- Partie 11-10: *Flammes d'essai – Méthodes d'essai horizontal et vertical à la flamme de 50 W*
- Partie 11-11: *Flammes d'essai – Détermination du flux de chaleur caractéristique pour l'allumage à partir d'une flamme source sans contact*
- Partie 11-20: *Flammes d'essai – Méthode d'essai à la flamme de 500 W*
- Partie 11-30: *Flammes d'essai – Historique et développement de 1979 à 1999*
- Partie 11-40: *Flammes d'essai – Essais de confirmation – Guide*

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INTRODUCTION

Il est nécessaire de prendre en considération le risque d'incendie et les dangers potentiels associés au feu dans la conception de tout produit électrotechnique. A cet égard, la conception des composants, des circuits et des produits ainsi que le choix des matériaux ont pour objectif de réduire à des niveaux acceptables les risques potentiels d'incendie dans les conditions de fonctionnement normal, d'utilisation anormale raisonnablement prévisible, de dysfonctionnement et/ou de défaillance. L'IEC a établi l'IEC 60695-1-10 [1]¹, avec sa norme associée, l'IEC 60695-1-11 [2], afin de fournir des préconisations sur les méthodes de réalisation correspondantes.

L'IEC 60695-1-10 et l'IEC 60695-1-11 ont pour principaux objectifs de fournir des préconisations sur les éléments suivants:

- a) éviter l'allumage provoqué par un composant alimenté électriquement, et
- b) limiter la propagation du feu à l'enveloppe du produit électrotechnique lui-même en cas d'allumage.

Les objectifs secondaires de ces documents comprennent la limitation de toute propagation de la flamme au-delà de l'enveloppe du produit et la réduction le plus possible des effets préjudiciables des effluents du feu tels que la chaleur, la fumée et les produits de combustion toxiques ou corrosifs.

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 des risques d'incendie.

L'IEC 60695-11-2 fournit une description de l'appareillage exigé pour produire une flamme d'essai de 1 kW, et une description du principe d'une procédure de confirmation pour vérifier que la flamme produite satisfait aux exigences. Des préconisations relatives aux essais de vérification des flammes d'essai sont données dans l'IEC TS 60695-11-40 [3].

La présente partie de l'IEC 60695 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 ce qui concerne la sécurité et la santé et de déterminer l'applicabilité des limitations réglementaires avant usage.

¹ Les chiffres entre crochets font référence à la bibliographie.

ESSAIS RELATIFS AUX RISQUES DU FEU –

Partie 11-2: Flamme d'essai – Flamme à prémélange de 1 kW nominal – Appareillage, configuration pour l'essai de vérification et préconisations

1 Domaine d'application

La présente partie de l'IEC 60695 spécifie les exigences pour la production et la validation d'une **flamme de type à prémélange** à base de propane/air de 1 kW nominal pour utilisation dans les essais relatifs aux risques du feu.

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 IEC 104 [4] et le Guide ISO/IEC 51 [5].

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 ou les conditions d'essai de la présente publication fondamentale de sécurité s'appliqueront seulement si elles servent spécifiquement de référence ou sont intégrées dans les publications correspondantes.

2 Références normatives

Les documents suivants cités dans le texte constituent, pour tout ou partie de leur contenu, des exigences du présent document. 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).

IEC 60584-1, *Couples thermoélectriques - Partie 1: Spécifications et tolérances en matière de FEM*

ISO/IEC 13943:2008, *Sécurité au feu – Vocabulaire*