



**NSAI**  
Standards

Irish Standard  
I.S. EN 60695-11-3:2012

# Fire hazard testing -- Part 11-3: Test flames - 500 W flames - Apparatus and confirmational test methods (IEC 60695-11-3:2012 (EQV))

## I.S. EN 60695-11-3:2012

*Incorporating amendments/corrigenda issued since publication:*

The National Standards Authority of Ireland (NSAI) produces the following categories of formal documents:

I.S. xxx: Irish Standard – national specification based on the consensus of an expert panel and subject to public consultation.

S.R. xxx: Standard Recommendation - recommendation based on the consensus of an expert panel and subject to public consultation.

SWiFT xxx: A rapidly developed recommendatory document based on the consensus of the participants of an NSAI workshop.

<i>This document replaces:</i>	<i>This document is based on:</i> EN 60695-11-3:2012	<i>Published:</i> 19 October, 2012
This document was published under the authority of the NSAI and comes into effect on:  30 October, 2012		ICS number: 13.220.40 29.020
<b>NSAI</b> 1 Swift Square, Northwood, Santry Dublin 9	T +353 1 807 3800 F +353 1 807 3838 E standards@nsai.ie  W NSAI.ie	<b>Sales:</b> T +353 1 857 6730 F +353 1 857 6729 W standards.ie
Údarás um Chaighdeáin Náisiúnta na hÉireann		

EUROPEAN STANDARD

**EN 60695-11-3**

NORME EUROPÉENNE

EUROPÄISCHE NORM

October 2012

ICS 13.220.40; 29.020

English version

**Fire hazard testing -  
Part 11-3: Test flames - 500 W flames -  
Apparatus and confirmational test methods  
(IEC 60695-11-3:2012)**

Essais relatifs aux risques du feu -  
Partie 11-3: Flammes d'essai -  
Flamme de 500 W -  
Appareillage et méthodes d'essai  
de vérification  
(CEI 60695-11-3:2012)

Prüfungen zur Beurteilung  
der Brandgefahr -  
Teil 11-3: Prüfflammen -  
500-W-Prüfflamme -  
Prüfeinrichtungen und Prüfverfahren  
zur Bestätigung  
(IEC 60695-11-3:2012)

This European Standard was approved by CENELEC on 2012-09-17. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CENELEC member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Bulgaria, Croatia, Cyprus, the Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

**CENELEC**

European Committee for Electrotechnical Standardization  
Comité Européen de Normalisation Electrotechnique  
Europäisches Komitee für Elektrotechnische Normung

**Management Centre: Avenue Marnix 17, B - 1000 Brussels**

## **Foreword**

The text of document 89/1113/FDIS, future edition 1 of IEC 60695-11-3, prepared by IEC/TC 89 "Fire hazard testing" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN 60695-11-3:2012.

The following dates are fixed:

- latest date by which the document has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2013-06-17
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2015-09-17

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CENELEC [and/or CEN] shall not be held responsible for identifying any or all such patent rights.

This standard covers the Principle Elements of the Safety Objectives for Electrical Equipment Designed for Use within Certain Voltage Limits (LVD - 2006/95/EC).

## **Endorsement notice**

The text of the International Standard IEC 60695-11-3:2012 was approved by CENELEC as a European Standard without any modification.

In the official version, for Bibliography, the following notes have to be added for the standards indicated:

IEC 60695-11-2:2003	NOTE	Harmonised as EN 60695-11-2:2003 (not modified).
IEC 60695-11-4:2011	NOTE	Harmonised as EN 60695-11-4:2011 (not modified).

## Annex ZA (normative)

### Normative references to international publications with their corresponding European publications

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.

NOTE When an international publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 60584-1	1995	Thermocouples - Part 1: Reference tables	EN 60584-1	1995
IEC 60584-2 + A1	1982 1989	Thermocouples - Part 2: Tolerances	EN 60584-2	1993 <sup>1)</sup>
IEC Guide 104	1997 <sup>2)</sup>	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 13943	2008	Fire safety - Vocabulary	EN ISO 13943	2010
ASTM B187/B187M-06	-	Standard Specification for Copper, Bus Bar, - Rod, and Shapes and General Purpose Rod, Bar, and Shapes	-	-

<sup>1)</sup> EN 60584-2 includes A1 to IEC 60584-2.

<sup>2)</sup> Superseded by IEC Guide 104:2010.

*This page is intentionally left BLANK.*

## CONTENTS

FOREWORD .....	4
INTRODUCTION .....	6
1 Scope .....	7
2 Normative references .....	7
3 Terms and definitions .....	8
4 Method A – Production of a standardized 500 W nominal test flame based on existing hardware .....	8
4.1 Requirements .....	8
4.2 Apparatus and fuel .....	8
4.2.1 Burner .....	8
4.2.2 Flowmeter .....	8
4.2.3 Manometer .....	9
4.2.4 Control valve .....	9
4.2.5 Copper block .....	9
4.2.6 Thermocouple .....	9
4.2.7 Temperature/time indicating/recording devices .....	9
4.2.8 Fuel gas .....	9
4.2.9 Laboratory fumehood/chamber .....	9
4.3 Production of the test flame .....	10
4.4 Confirmation of the test flame .....	10
4.4.1 Principle .....	10
4.4.2 Procedure .....	10
4.4.3 Verification .....	11
5 Method C – Production of a standardized 500 W nominal test flame based on non-adjustable hardware .....	11
5.1 Requirements .....	11
5.2 Apparatus and fuel .....	11
5.2.1 Burner .....	11
5.2.2 Flowmeters .....	11
5.2.3 Manometers .....	12
5.2.4 Control valves .....	12
5.2.5 Copper block .....	12
5.2.6 Thermocouple .....	12
5.2.7 Temperature/time indicating/recording devices .....	12
5.2.8 Fuel gas .....	12
5.2.9 Air supply .....	12
5.2.10 Laboratory fumehood/chamber .....	13
5.3 Production of the test flame .....	13
5.4 Confirmation of the test flame .....	13
5.4.1 Principle .....	13
5.4.2 Procedure .....	13
5.4.3 Verification .....	14
6 Classification and designation .....	14
Annex A (normative) Test arrangements – Method A .....	17
Annex B (normative) Test arrangement – Method C .....	21

Annex C (informative) Recommended arrangements for the use of either of the test flames.....	26
Annex D (informative) Test arrangements for tests on equipment .....	27
Annex E (informative) Test arrangements for tests on material .....	28
Bibliography.....	29
 Figure 1 – Flame dimensions .....	 15
Figure 2 – Copper block.....	15
Figure 3 – Flame height gauge .....	16
Figure A.1 – General assembly and details .....	18
Figure A.2 – Supply arrangement for burner (example) .....	19
Figure A.3 – Confirmatory test arrangement.....	20
Figure B.1 – Burner, method C – General assembly.....	21
Figure B.2 – Burner details – Burner barrel, O-ring, air manifold and air supply tube.....	22
Figure B.3 – Burner details – Gas supply tube and gas jet .....	23
Figure B.4 – Burner details – Burner base and elbow block.....	23
Figure B.5 – Supply arrangement for burner (example) .....	24
Figure B.6 – Confirmatory test arrangement.....	25
Figure D.1 – Examples of test arrangements.....	27
Figure E.1 – Examples of test arrangements.....	28



## INTERNATIONAL ELECTROTECHNICAL COMMISSION

---

### **FIRE HAZARD TESTING –**

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

#### 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.
- 2) The formal decisions or agreements of IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC National Committees.
- 3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
- 4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
- 5) IEC itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.
- 6) All users should ensure that they have the latest edition of this publication.
- 7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
- 8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
- 9) Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights.

International Standard IEC 60695-11-3 has been prepared by IEC technical committee 89: Fire hazard testing.

This first edition of IEC 60695-11-3 cancels and replaces the second edition of IEC/TS 60695-11-3 published in 2004. It constitutes a technical revision and now has the status of an International Standard.

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

The main changes with respect to the previous edition are the integration of minor editorial and technical changes throughout the text.

**I.S. EN 60695-11-3:2012**

60695-11-3 © IEC:2012

– 5 –

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

FDIS	Report on voting
89/1113/FDIS	89/1117/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.

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.

IEC 60695-11 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

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

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

## INTRODUCTION

The best method for testing electrotechnical products with regard to fire hazard is to duplicate exactly the conditions occurring in practice. In most instances, this is not possible. Accordingly, for practical reasons, the testing of electrotechnical products with regard to fire hazard is best conducted by simulating as closely as possible the actual effects occurring in practice.

Work initiated by ACOS resulted in a series of standards that make available standardized test flames covering a range of powers for the use of all product committees needing such test flames. A needle flame is described in IEC 60695-11-5, a 50 W flame is described in IEC 60695-11-4, and a 1 kW flame is described in IEC 60695-11-2.

This international standard provides a description of the apparatus required to produce either of two 500 W test flames, and also provides a description of a calibration procedure to check that the test flame produced meets given requirements. Guidance on confirmatory tests for test flames is given in IEC 60695-11-40.

Four 500 W test flame methods were originally specified in Edition 1 of IEC/TS 60695-11-3, with the intention that users would determine a ranking preference. This process has resulted in two of these flame methods, B and D, being withdrawn, as shown below:

500 W test flame method	Flame type	Gas	Approximate flame height / mm
A	Pre-mixed	Methane	125
B	Withdrawn		
C	Pre-mixed	Methane or propane	125
D	Withdrawn		

Method A was first published in 1994 and was based on existing hardware. The flame is produced by burning methane, and the method makes use of a more tightly specified version of a burner that was used in some countries for many years.

Method C is based on non-adjustable hardware that has been specifically developed to produce a highly repeatable and stable test flame. The flame is produced by burning either methane or propane.

Both methods have been developed as technical enhancements of previous technology.

## **FIRE HAZARD TESTING –**

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

#### **1 Scope**

This part of IEC 60695-11 provides detailed requirements for the production of either of two 500 W nominal, pre-mixed type test flames. The approximate overall height of each flame is 125 mm.

Two methods of producing a test flame are described: Method A uses methane. Method C can use either methane or propane.

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 60584-1:1995, *Thermocouples – Part 1: Reference tables*

IEC 60584-2 am.1 ed.1:1989, Amendment 1, *Thermocouples – Part 2: Tolerances*

IEC Guide 104:1997, *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/IEC 13943:2008, *Fire safety – Vocabulary*

ASTM-B187/B187M-06, *Standard Specification for Copper, Bus Bar, Rod, and Shapes and General Purpose Rod, Bar, and Shapes*

This is a free preview. Purchase the entire publication at the link below:

[Product Page](#)

- 
- Looking for additional Standards? Visit Intertek Inform Infostore
  - Learn about LexConnect, All Jurisdictions, Standards referenced in Australian legislation
-