



BSI Standards Publication

Fire hazard testing

Part 9-2: Surface spread of flame —
Summary and relevance of test methods

National foreword

This British Standard is the UK implementation of EN 60695-9-2:2014. It is identical to IEC 60695-9-2:2014. It supersedes DD IEC/TS 60695-9-2:2005 which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee GEL/89, Fire hazard testing.

A list of organizations represented on this committee can be obtained on request to its secretary.

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**Fire hazard testing -
Part 9-2: Surface spread of flame -
Summary and relevance of test methods
(IEC 60695-9-2:2014)**

Essais relatifs aux risques du feu -
Partie 9-2: Propagation des flammes
en surface -
Résumé et pertinence des méthodes
d'essai
(CEI 60695-9-2:2014)

Prüfungen zur Beurteilung der
Brandgefahr -
Teil 9-2: Flammenausbreitung auf
Oberflächen -
Zusammenfassung und Anwendbarkeit
der Prüfverfahren
(IEC 60695-9-2:2014)

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Europäisches Komitee für Elektrotechnische Normung

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Foreword

The text of document 89/1202/FDIS, future edition 1 of IEC 60695-9-2, prepared by IEC/TC 89 "Fire hazard testing" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN 60695-9-2:2014.

The following dates are fixed:

- latest date by which the document has to be (dop) 2015-01-10
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publication of an identical national
standard or by endorsement
- latest date by which the national (dow) 2017-04-10
standards conflicting with the
document have to be withdrawn

This standard is to be used in conjunction with EN 60695-9-1.

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.

Endorsement notice

The text of the International Standard IEC 60695-9-2:2014 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 60695-11-10	NOTE	Harmonized as EN 60695-11-10.
IEC 60695-11-20	NOTE	Harmonized as EN 60695-11-20.
IEC 60332-1-1	NOTE	Harmonized as EN 60332-1-1.
IEC 60332-1-2	NOTE	Harmonized as EN 60332-1-2.
IEC 60332-1-3	NOTE	Harmonized as EN 60332-1-3.
IEC 60332-2-1	NOTE	Harmonized as EN 60332-2-1.
IEC 60332-2-2	NOTE	Harmonized as EN 60332-2-2.
IEC 60332-3-10	NOTE	Harmonized as EN 60332-3-10.
IEC 60332-3-21	NOTE	Harmonized as EN 60332-3-21.
IEC 60332-3-22	NOTE	Harmonized as EN 60332-3-22.
IEC 60332-3-23	NOTE	Harmonized as EN 60332-3-23.
IEC 60332-3-24	NOTE	Harmonized as EN 60332-3-24.
IEC 60332-3-25	NOTE	Harmonized as EN 60332-3-25.

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 60695-4	-	Fire hazard testing - Part 4: Terminology concerning fire tests for electrotechnical products	EN 60695-4	-
IEC 60695-9-1	-	Fire hazard testing - Part 9-1: Surface spread of flame - General guidance	EN 60695-9-1	-
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	-	-
ISO 13943	2008	Fire safety - Vocabulary	EN ISO 13943	2010

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INTRODUCTION

The risk of fire needs to be considered in any electrical circuit. The objective of component, circuit and equipment design, as well as the choice of materials, is to reduce the likelihood of fire, even in the event of foreseeable abnormal use, malfunction or failure.

Electrotechnical products, primarily as victims of fire, may nevertheless contribute to the fire. Fire hazard increases as the burning area increases, leading in some cases to flashover and a fully developed fire. This is a typical fire scenario in buildings. It is therefore useful to measure the rate and extent of the surface spread of flame.

This part of IEC 60695-9 describes surface spread of flame test methods in common use to assess electrotechnical products or materials used in electrotechnical products. It forms part of the IEC 60695-9 series which gives guidance to product committees wishing to incorporate test methods for surface spread of flame in product standards.

IEC 60695-9 consists of the following parts:

- Part 9-1: *Surface spread of flame – General guidance*
- Part 9-2: *Surface spread of flame – Summary and relevance of test methods.*

FIRE HAZARD TESTING –

Part 9-2: Surface spread of flame – Summary and relevance of test methods

1 Scope

This part of IEC 60695 presents a summary of published test methods that are used to determine the surface spread of flame of electrotechnical products or materials from which they are formed.

It represents the current state of the art of the test methods and, where available, includes special observations on their relevance and use.

The list of test methods is not to be considered exhaustive, and test methods that were not developed by IEC TC89 are not to be considered as endorsed by IEC TC89 unless this is specifically stated.

This summary cannot be used in place of published standards which are the only valid reference documents.

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 60695-4, *Fire hazard testing – Part 4: Terminology concerning fire tests for electrotechnical products*

IEC 60695-9-1, *Fire hazard testing – Part 9-1: Surface spread of flame – General guidance*

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*

ISO 13943:2008, *Fire Safety – Vocabulary*

3 Terms and definitions

For the purposes of this document, terms and definitions given in ISO 13943 and IEC 60695-4, some of which are reproduced below for the user's convenience, as well as the following additional definitions, apply:

3.1

burned length

maximum extent in a specified direction of the burned area

Note 1 to entry: The typical units are metres (m).

cf. **damaged length** (3.6)

[SOURCE: ISO 13943: 2008, definition 4.31]

3.2

char, noun

carbonaceous residue resulting from **pyrolysis** (3.26) or incomplete **combustion** (3.5)

[SOURCE: ISO 13943: 2008, definition 4.38]

3.3

char length

length of charred area

cf. **burned length** (3.1) and **damaged length** (3.6)

Note 1 to entry: In some standards, char length is defined by a specific test method.

[SOURCE: ISO 13943: 2008, definition 4.40]

3.4

combustible, noun

item capable of **combustion** (3.5)

[SOURCE: ISO 13943: 2008, definition 4.44]

3.5

combustion

exothermic reaction of a substance with an oxidizing agent

Note 1 to entry: Combustion generally emits fire effluent accompanied by **flames** (3.14) and/or glowing.

[SOURCE: ISO 13943: 2008, definition 4.46]

3.6

damaged length

maximum extent in a specified direction of the damaged area

cf. **char length** (3.3) and **burned length** (3.1)

[SOURCE: ISO 13943: 2008, definition 4.60]

3.7

extent of combustion

(electrotechnical) maximum length of a test specimen that has been destroyed by **combustion** (3.5) or **pyrolysis** (3.26), under specified test conditions, excluding any region damaged only by deformation

[SOURCE: ISO 13943: 2008, definition 4.91]

3.8

fire

⟨general⟩ process of **combustion** (3.5) characterized by the emission of heat and fire effluent and usually accompanied by smoke, flame (3.14), glowing or a combination thereof

Note 1 to entry: In the English language the term “fire” is used to designate three concepts, two of which, **fire** (3.9) and **fire** (3.10), relate to specific types of self-supporting combustion with different meanings and two of them are designated using two different terms in both French and German.

[SOURCE: ISO 13943: 2008, definition 4.96]

3.9

fire

⟨controlled⟩ self-supporting **combustion** (3.5) that has been deliberately arranged to provide useful effects and is limited in its extent in time and space

[SOURCE: ISO 13943: 2008, definition 4.97]

3.10

fire

⟨uncontrolled⟩ self-supporting **combustion** (3.5) that has not been deliberately arranged to provide useful effects and is not limited in its extent in time and space

[SOURCE: ISO 13943: 2008, definition 4.98]

3.11

fire hazard

physical object or condition with a potential for an undesirable consequence from **fire** (3.10)

[SOURCE: ISO 13943: 2008, definition 4.112]

3.12

fire retardant, noun

substance added, or a treatment applied, to a material in order to delay **ignition** (3.22) or to reduce the rate of **combustion** (3.5)

[SOURCE: ISO 13943: 2008, definition 4.123, modified by deletion of “cf. flame retardant”]

3.13

fire scenario

qualitative description of the course of a fire (3.10) with respect to time, identifying key events that characterise the studied fire and differentiate it from other possible fires

Note 1 to entry: It typically defines the **ignition** (3.22) and fire growth processes, the **fully developed fire** (3.20) stage, the fire decay stage, and the environment and systems that impact on the course of the fire.

[SOURCE: ISO 13943: 2008, definition 4.129]

3.14

flame, noun

zone in which there is rapid, self-sustaining, sub-sonic propagation of **combustion** (3.5) in a gaseous medium, usually with emission of light

[SOURCE: ISO 13943: 2008, definition 4.133 – modified by the addition of “zone in which there is”]

3.15**flame front**

boundary of flaming **combustion** (3.5) at the surface of a material or propagating through a gaseous mixture

[SOURCE: ISO 13943: 2008, definition 4.136]

3.16**flame retardant**, noun

substance added, or a treatment applied, to a material in order to suppress or delay the appearance of a **flame** (3.14) and/or reduce the **flame-spread rate** (3.18)

Note 1 to entry: The use of (a) flame retardant(s) does not necessarily suppress **fire** (3.8) or terminate **combustion** (3.5)..

[SOURCE: ISO 13943: 2008, definition 4.139]

3.17**flame spread**

propagation of a **flame front** (3.15)

[SOURCE: ISO 13943: 2008, definition 4.142]

3.18**flame-spread rate****burning rate (deprecated)****rate of burning (deprecated)**

distance travelled by a **flame front** (3.15) during its propagation, divided by the time of travel, under specified conditions

[SOURCE: ISO 13943: 2008, definition 4.143]

3.19**flashover**

⟨stage of fire⟩ transition to a state of total surface involvement in a **fire** (3.10) of combustible materials within an enclosure

[SOURCE: ISO 13943: 2008, definition 4.156]

3.20**fully developed fire**

state of total involvement of combustible materials in a **fire** (3.8)

[SOURCE: ISO 13943: 2008, definition 4.164]

3.21**heat release rate**

burning rate (deprecated)

rate of burning (deprecated)

rate of thermal energy production generated by combustion ()

Note 1 to entry: The typical units are watts (W).

[SOURCE: ISO 13943: 2008, definition 4.177]