BS EN 60695-9-1:2013

BSI Standards Publication

Fire hazard testing

Part 9–1: Surface spread of flame — General guidance

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National foreword

This British Standard is the UK implementation of EN 60695-9-1:2013. It is identical to IEC 60695-9-1:2013. It supersedes BS EN 60695-9-1:2005 which is withdrawn.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.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

Published by BSI Standards Limited 2013

ISBN 978 0 580 84012 8
ICS 13.220.40; 29.020

Compliance with a British Standard cannot confer immunity from legal obligations.

This British Standard was published under the authority of the Standards Policy and Strategy Committee on 30 September 2013.

Amendments/corrigenda issued since publication

Date	Text affected

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 60695-9-1

August 2013

ICS 13.220.40; 29.020

Supersedes EN 60695-9-1:2005

English version

Fire hazard testing - Part 9-1: Surface spread of flame - General guidance

(IEC 60695-9-1:2013)

Essais relatifs aux risques du feu - Partie 9-1: Propagation des flammes en surface - Lignes directrices générales (CEI 60695-9-1:2013)

Prüfungen zur Beurteilung der Brandgefahr - Teil 9-1: Flammenausbreitung auf Oberflächen - Allgemeiner Leitfaden (IEC 60695-9-1:2013)

CENELEC

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

Management Centre: Avenue Marnix 17, B - 1000 Brussels

Ref. No. EN 60695-9-1:2013 E

Foreword

The text of document 89/1159/FDIS, future edition 3 of IEC 60695-9-1, prepared by IEC/TC 89 "Fire hazard testing" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN 60695-9-1:2013.

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)	2014-03-03
• latest date by which the national standards conflicting with the document have to be withdrawn	(dow)	2016-06-03

This document supersedes EN 60695-9-1:2005.

EN 60695-9-1:2013 includes the following significant technical changes with respect to EN 60695-9-1:2005:

a) an expanded scope;

b) updated references;

c) updated terms and definitions.

This European Standard is to be used in conjunction with EN 60695-9-2.

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 60695-9-1:2013 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 60332 series	NOTE	Harmonised in EN 60332 series.
IEC 61197	NOTE	Harmonised as EN 61197.
ISO 2719	NOTE	Harmonised as EN ISO 2719.

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.

Publication	Year	Title	EN/HD	Year
IEC 60695-4	-	Fire hazard testing - Part 4: Terminology concerning fire tests for electrotechnical products	EN 60695-4	-
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 2592	-	Determination of flash and fire points - Cleveland open cup method	EN ISO 2592	-
ISO 13943	2008	Fire safety - Vocabulary	EN ISO 13943	2010

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INTRODUCTION

Fires are responsible for creating hazards to life and property as a result of the generation of heat (thermal hazard), and also toxic effluent, corrosive effluent and smoke (non-thermal hazard). Fire hazard increases with the burning area leading in some cases to flashover and a fully developed fire. This is a typical fire scenario in buildings.

The surface spread of flame beyond the area of ignition occurs as a result of the creation of a pyrolysis front on the surface of the material, ahead of the flame front, arising from the heating by the flame and external heat sources. The pyrolysis front is the boundary between pyrolysed material and unpyrolysed material on the surface of the material. Combustible vapours are generated within the region of pyrolysed material, which mix with air and ignite, creating the flame front.

The surface spread of flame rate is the distance travelled by the flame front divided by the time required to travel that distance. The surface spread of flame rate depends on the heat supplied externally and/or by the flame of the burning material ahead of the burning zone and on the ease of ignition. The ease of ignition is a function of the minimum ignition temperature, thickness, density, specific heat, and thermal conductivity of the material. The heat supplied by the flame depends on the heat release rate, specimen orientation, air flow rate and air flow direction relative to the surface spread of flame direction. In general, materials show one of the following types of surface spread of flame behaviour:

a) non-propagation: there is no flame propagation beyond the area of ignition;

b) decelerating propagation: flame propagation stops before reaching the end of the surface of the material; and

c) propagation: flame propagates beyond the area of ignition and eventually affects the entire surface of the material.

Properties of the materials that are used to describe the surface spread of flame behaviour are associated with surface preheating and pyrolysis, generation of vapours, mixing of the vapours with air, ignition, combustion of the mixture and generation of heat and combustion products. Flame retardants and surface treatments are used to modify the surface spread of flame behaviour. Factors that need to be considered for the assessment of the surface spread of flame behaviour of materials are:

1) the fire scenario (including such parameters as surface orientation, ventilation and the nature of the ignition source);

2) measurement techniques (see 5.5); and

3) the use and interpretation of results obtained (see 6).

FIRE HAZARD TESTING –

Part 9-1: Surface spread of flame – General guidance

1 Scope

This part of IEC 60695provides guidance for the assessment of surface spread of flame for electrotechnical products and the materials from which they are formed. It provides:

- an explanation of the principles of flame spread for both liquids and solids,
- guidance for the selection of test methods,
- guidance on the use and interpretation of test results, and
- informative references

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 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*

ISO 2592, *Determination of flash and fire points – Cleveland open cup method*

3 Terms and definitions

For the purposes of this document, terms and definitions given in IEC 60695-4 and in ISO 13943:2008, some of which are reproduced below for the user's convenience, apply.

3.1
combustion
exothermic reaction of a substance with an oxidizing agent