



BSI Standards Publication

Materials for printed boards and other interconnecting structures —

Part 2-38: Reinforced base materials, clad and unclad — Non-halogenated epoxide woven E-glass laminate sheets of defined flammability (vertical burning test), copper-clad for lead-free assembly

National foreword

This British Standard is the UK implementation of EN 61249-2-38:2009. It is identical to IEC 61249-2-38:2008.

The UK participation in its preparation was entrusted to Technical Committee EPL/501, Electronic assembly technology.

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

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ISBN 978 0 580 58820 4

ICS 31.180

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This British Standard was published under the authority of the Standards Policy and Strategy Committee on 30 June 2009

Amendments issued since publication

Amd. No.	Date	Text affected
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EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN 61249-2-38

March 2009

ICS 31.180

English version

**Materials for printed boards and other interconnecting structures -
Part 2-38: Reinforced base materials, clad and unclad -
Non-halogenated epoxide woven E-glass laminate sheets
of defined flammability (vertical burning test),
copper-clad for lead-free assembly
(IEC 61249-2-38:2008)**

Matériaux pour circuits imprimés
et autres structures d'interconnexion -
Partie 2-38: Matériaux de base renforcés,
plaqués et non plaqués -
Feuilles stratifiées en tissu de verre
de type E époxyde non halogénées,
plaquées cuivre, d'inflammabilité définie
(essai de combustion verticale)
pour les assemblages sans plomb
(CEI 61249-2-38:2008)

Materialien für Leiterplatten
und andere Verbindungsstrukturen -
Teil 2-38: Kaschierte und unkaschierte
verstärkte Basismaterialien -
Kupferkaschierte mit E-Glasgewebe
verstärkte Laminattafeln auf der Basis
von halogenfreiem Epoxidharz
mit definierter Brennbarkeit
(Brennprüfung mit vertikaler Prüflingslage)
für bleifreie Bestückungstechnik
(IEC 61249-2-38:2008)

This European Standard was approved by CENELEC on 2009-02-01. 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 Central Secretariat or to any CENELEC member.

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CENELEC

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

Central Secretariat: avenue Marnix 17, B - 1000 Brussels

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Ref. No. EN 61249-2-38:2009 E

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Foreword

The text of document 91/812/FDIS, future edition 1 of IEC 61249-2-38, prepared by IEC TC 91, Electronics assembly technology, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 61249-2-38 on 2009-02-01.

The following dates were fixed:

- latest date by which the EN has to be implemented
at national level by publication of an identical
national standard or by endorsement (dop) 2009-11-01
- latest date by which the national standards conflicting
with the EN have to be withdrawn (dow) 2012-02-01

Annex ZA has been added by CENELEC.

Endorsement notice

The text of the International Standard IEC 61249-2-38:2008 was approved by CENELEC as a European Standard without any modification.

In the official version, for Bibliography, the following note has to be added for the standard indicated:

IEC 60194 NOTE Harmonized as EN 60194:2006 (not modified).

Annex ZA (normative)

Normative references to international publications with their corresponding European publications

The following referenced documents are indispensable for the application 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.

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 61189-2	2006	Test methods for electrical materials, printed boards and other interconnection structures and assemblies - Part 2: Test methods for materials for interconnection structures	EN 61189-2	2006
IEC 61249-5-1	1995	Materials for interconnection structures - Part 5: Sectional specification set for conductive foils and films with and without coatings - Section 1: Copper foils (for the manufacture of copper-clad base materials)	EN 61249-5-1	1996
ISO 9000	- ¹⁾	Quality management systems - Fundamentals and vocabulary	EN ISO 9000	2005 ²⁾
ISO 11014-1	- ¹⁾	Safety data sheet for chemical products - Part 1: Content and order of sections	-	-
ISO 14001	- ¹⁾	Environmental management systems - Requirements with guidance for use	EN ISO 14001	2004 ²⁾

¹⁾ Undated reference.

²⁾ Valid edition at date of issue.

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MATERIALS FOR PRINTED BOARDS AND OTHER INTERCONNECTING STRUCTURES –

Part 2-38: Reinforced base materials, clad and unclad – Non-halogenated epoxide woven E-glass laminate sheets of defined flammability (vertical burning test), copper-clad for lead-free assembly

1 Scope

This part of IEC 61249 gives requirements for properties of di-functional non-halogenated epoxide woven E-glass laminate sheet 0,05 mm up to 3,2 mm, of defined flammability (vertical burning test), copper-clad. The glass transition temperature is defined to be 120 °C minimum.

Its flame resistance is defined in terms of the flammability requirements of 7.3.

Some property requirements may have several classes of performance. The class desired should be specified on the purchase order otherwise the default class of material will be supplied.

2 Normative references

The following referenced documents are indispensable for the application 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 61189-2:2006, *Test methods for electrical materials, printed boards and other interconnection structures and assemblies – Part 2: Test method for interconnection structures*

IEC 61249-5-1:1995, *Materials for interconnection structures – Part 5 : Sectional specification set for conductive foils and films with and without coatings – Section 1: Copper foils (for the manufacture of copper-clad base materials)*

ISO 9000, *Quality management systems – Fundamentals and vocabulary*

ISO 11014-1, *Safety data sheet for chemical products – Part 1: Content and order of sections*

ISO 14001, *Environmental management systems – Requirements with guidance for use*

3 Materials and construction

The sheet consists of an insulating base with metal-foil bonded to one side or both.

3.1 Resin system

Majority di-functional non-halogenated epoxide, modified non-halogenated epoxide, woven E-glass laminate with a glass transition temperature of 120 °C minimum. The flammability rating is achieved through the use of non-halogenated flame retardants reacted into the polymer. Inorganic fillers may be used. Contrast agents may be added to enhance processing such as automated optical inspection (AOI).

The maximum total halogens contained in the resin plus reinforcement matrix is $1\,500 \times 10^{-6}$ with a maximum chlorine of 900×10^{-6} and maximum bromine being 900×10^{-6} .

Its flame resistance is defined in terms of the flammability requirements of 7.3.

3.2 Metal foil

Copper as specified in IEC 61249-5-1, copper foil (for the manufacture of copper-clad materials). The preferred foils are electro-deposited of defined ductility.

3.3 Reinforcement

Woven E-glass as specified in the future IEC 61249-6-3, Woven E-glass fabric (for the manufacture of prepreg and copper clad materials).

4 Internal marking

Not specified.

5 Electrical properties

The electrical property requirements are shown in Table 1.

Table 1 – Electrical properties

Property	Test method (IEC 61189-2)	Requirements
Resistance of foil	2E12	As specified in IEC 61249-5-1
Surface resistance after damp heat while in the humidity chamber (optional)	2E03	$\geq 10\,000\text{ M}\Omega$
Surface resistance after damp heat and recovery	2E03	$\geq 50\,000\text{ M}\Omega$
Volume resistivity after damp heat while in the humidity chamber (optional)	2E04	$\geq 5\,000\text{ M}\Omega\text{m}$
Volume resistivity after damp heat and recovery	2E04	$\geq 10\,000\text{ M}\Omega\text{m}$
Relative permittivity after damp heat and recovery (1 MHz)	2E10	$\leq 5,4$
Dissipation factor after damp heat and recovery (1 MHz)	2E10	$\leq 0,035$
Electric strength (only for material thickness less than 0,5 mm)	2E11	$\geq 30\text{ kV/mm}$
Arc resistance	2E14	$\geq 60\text{ s}$
Dielectric breakdown (only for material thicknesses $\geq 0,5\text{mm}$)	2E15	$\geq 40\text{ kV}$
Surface resistance at 125 °C	2E07	$\geq 1\,000\text{ M}\Omega$
Volume resistivity at 125 °C	2E07	$\geq 1\,000\text{ M}\Omega\text{m}$