

Materials for printed boards and other interconnecting structures —

Part 2-7: Reinforced base materials clad and unclad — Epoxide woven E-glass laminated sheet of defined flammability (vertical burning test), copper-clad

The European Standard EN 61249-2-7:2002 has the status of a British Standard

ICS 31.180

National foreword

This British Standard is the official English language version of EN 61249-2-7:2002, including Corrigendum September 2005. It is identical with IEC 61249-2-7:2002. It supersedes BS EN 60249-2-5:1994 and BS EN 60249-2-12:1994 which are withdrawn.

The UK participation in its preparation was entrusted to Technical Committee EPL/501, Electronic assembly technology, which has the responsibility to:

- aid enquirers to understand the text;
- present to the responsible international/European committee any enquiries on the interpretation, or proposals for change, and keep the UK interests informed;
- monitor related international and European developments and promulgate them in the UK.

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Cross-references

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This British Standard, having been prepared under the direction of the Electrotechnical Sector Policy and Strategy Committee, was published under the authority of the Standards Policy and Strategy Committee on 19 August 2002

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Incorporates Corrigendum September 2005

English version

Materials for printed boards and other interconnecting structures
Part 2-7: Reinforced base materials clad and unclad -
Epoxide woven E-glass laminated sheet of defined flammability
(vertical burning test), copper-clad
(IEC 61249-2-7:2002)

Matériaux pour circuits imprimés
et autres structures d'interconnexion
Partie 2-7: Matériaux de base renforcés,
plaqués et non plaqués -
Feuille stratifiée tissée de verre E avec
de la résine époxyde, d'inflammabilité
définie (essai de combustion verticale),
plaquée cuivre
(CEI 61249-2-7:2002)

Materialien für Leiterplatten
und andere Verbindungsstrukturen
Teil 2-7: Kaschierte und unkaschierte
verstärkte Basismaterialien -
Kupferkaschierte mit Glasgewebe
verstärkte Epoxidharz-Laminattafel
mit definierter Brennbarkeit
(Brennprüfung mit vertikaler Prüflingslage)
(IEC 61249-2-7:2002)

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CENELEC

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

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Foreword

The text of document 91/276/FDIS, future edition 1 of IEC 61249-2-7, prepared by IEC TC 91, Electronics assembly technology, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 61249-2-7 on 2002-06-01.

This European Standard supersedes EN 60249-2-5:1994 + corrigendum March 1994 + A3:1994 + corrigendum March 1994 + A4:1995 + A5:2000 and EN 60249-2-12:1994 + A2:1994 + A3:1995 + A4:2000.

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) | 2003-03-01 |
| – latest date by which the national standards conflicting with the EN have to be withdrawn | (dow) | 2005-06-01 |

Annexes designated "normative" are part of the body of the standard.

Annexes designated "informative" are given for information only.

In this standard, annex ZA is normative and annexes A, B and C are informative.

Annex ZA has been added by CENELEC.

Endorsement notice

The text of the International Standard IEC 61249-2-7:2002 was approved by CENELEC as a European Standard without any modification.

CONTENTS

1	Scope	4
2	Normative references	4
3	Materials and construction	4
3.1	Insulating base	4
3.2	Metal foil	5
3.3	Reinforcement	5
4	Internal marking	5
5	Electrical properties	5
6	Non-electrical properties of the copper-clad laminate	6
6.1	Appearance of the copper-clad sheet	6
6.2	Appearance of the unclad face	7
6.3	Laminate thickness	7
6.4	Bow and twist	8
6.5	Properties related to the copper foil bond	9
6.6	Punching and machining	9
6.7	Dimensional stability	10
6.8	Sheet sizes	10
6.9	Cut panels	10
7	Non-electrical properties of the base material after removal of the copper foil	11
7.1	Appearance of the dielectric base material	11
7.2	Flexural strength	12
7.3	Flammability	12
7.4	Water absorption	13
7.5	Measling	13
7.6	Glass transition temperature and cure factor	14
8	Quality assurance	14
8.1	Quality system	14
8.2	Responsibility for inspection	14
8.3	Qualification inspection	14
8.4	Quality conformance inspection	15
8.5	Certificate of conformance	15
8.6	Safety data sheet	15
9	Packaging and marking	15
10	Ordering information	15
	Annex A (informative) Engineering information	17
	Annex B (informative) Common laminate constructions	19
	Annex C (informative) Guideline for qualification and conformance inspection	20
	Annex ZA (normative) Normative references to international publications with their corresponding European publications	21

MATERIALS FOR PRINTED BOARDS AND OTHER INTERCONNECTING STRUCTURES –

Part 2-7: Reinforced base materials clad and unclad – Epoxide woven E-glass laminated sheet of defined flammability (vertical burning test), copper-clad

1 Scope

This part of IEC 61249 gives requirements for properties of epoxide woven E-glass laminated sheet 0,05 mm up to 3,2 mm, of defined flammability (vertical burning test), copper-clad. The flammability rating is achieved through the use of brominated fire retardants contained as an integral part of the polymeric structure. The glass transition temperature is defined to be 120 °C minimum.

Some property requirements may have several classes of performance. The class desired must 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 61189-2:1997, *Test methods for electrical materials, interconnection structures and assemblies – Part 2: Test methods for materials for interconnection structures*

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

ISO 9000:2000, *Quality management systems – Fundamentals and vocabulary*

ISO 11014-1:1994, *Safety data sheet for chemical products – Part 1: Content and order of sections*

ISO 14001:1996, *Environmental management systems – Specification 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 Insulating base

Majority difunctional epoxide woven E-glass laminate with a glass transition temperature of 120 °C minimum.

Contrast agents may be added to enhance processing such as automated optical inspection (AOI).

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 electrodeposited of defined ductility.

3.3 Reinforcement

Woven E-glass: woven E-glass fabric (for the manufacture of prepreg and copper-clad materials).

4 Internal marking

None required

5 Electrical properties

The electrical property requirements are shown in table 1.

Table 1 – Electrical properties

Property	Test method (IEC 61189-2)	Requirement
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	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	2E10	$\leq 5,4$
Dissipation factor after damp heat and recovery	2E10	$\leq 0,035$
Electric strength (less than 0,5 mm thickness)	2E11	$\geq 30\text{ kV/mm}$
Arc resistance	2E14	$\geq 60\text{ s}$
Dielectric breakdown (greater than, or equal to 0,5 mm thickness)	2E15	$\geq 40\text{ kV}$
Surface resistance at 125 °C	2E07	$\geq 1\,000\text{ M}\Omega$
Volume resistivity at 125 °C	2E07	$\geq 1\,000\text{ M}\Omega\text{m}$

6 Non-electrical properties of the copper-clad laminate

6.1 Appearance of the copper-clad sheet

The copper-clad face shall be substantially free from defects that may have an impact on the material fitness for use for the intended purpose.

For the following specific defects, the requirements given shall apply when inspection is made in accordance with IEC 61189-2, method 2M18.

6.1.1 Indentations (pits and dents)

The size of an indentation, usually the length, shall be determined and given a point value to be used as measure of the quality.

Size mm	Point value for each indentation
0,13 – 0,25	1
0,26 – 0,50	2
0,51 – 0,75	4
0,76 – 1,00	7
over 1,00	30

The total point count for any 300 mm × 300 mm area shall be calculated to determine the class of the material.

Class A	29 maximum
Class B	17 maximum
Class C	5 maximum
Class D	0
Class X	to be agreed upon by user and supplier

The required class of material shall be specified in the purchase order. Class A applies unless otherwise specified.

6.1.2 Wrinkles

There shall be no wrinkles in the copper surface.

6.1.3 Scratches

Scratches deeper than 20 % of the nominal thickness of the foil thickness are not permitted. For thick foil the maximum scratch depth shall not exceed 10 µm.

Scratches with a depth less than 5 % of the nominal thickness of the foil shall not be counted unless this depth is 10 µm or more.

Scratches with a depth between 5 % and 20 % of the nominal thickness of the foil are permitted to a total length of 100 mm for a 300 mm × 300 mm area.