



Materials for printed boards and other interconnecting structures - Part 2-52: Reinforced base materials clad and unclad - Thermosetting hydrocarbon resin system, woven e-glass reinforced laminate sheets of defined flammability (vertical burning test), copper-clad

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Materials for printed boards and other interconnecting structures - Part 2-52: Reinforced base materials clad and unclad - Thermosetting hydrocarbon resin system, woven E-glass reinforced laminate sheets of defined flammability (vertical burning test), copper-clad

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

**MATERIALS FOR PRINTED BOARDS AND OTHER INTERCONNECTING
STRUCTURES –****Part 2-52: Reinforced base materials clad and unclad-Thermosetting
hydrocarbon resin system, woven E-glass reinforced laminate sheets of
defined flammability (vertical burning test), copper-clad**

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International Standard IEC 61249-2-52 has been prepared by subcommittee XX: TITLE, of IEC technical committee TC:91.

The text of this International Standard is based on the following documents:

FDIS	Report on voting
XX/XX/FDIS	XX/XX/RVD

145 Full information on the voting for the approval of this International Standard can be found in
146 the report on voting indicated in the above table.

147 This document has been drafted in accordance with the ISO/IEC Directives, Part 2.

148 The committee has decided that the contents of this document will remain unchanged until the
149 stability date indicated on the IEC website under "http://webstore.iec.ch" in the data related to
150 the specific document. At this date, the document will be

- 151 • reconfirmed,
- 152 • withdrawn,
- 153 • replaced by a revised edition, or
- 154 • amended.

155

156 The National Committees are requested to note that for this document the stability date
157 is 2031..

158 THIS TEXT IS INCLUDED FOR THE INFORMATION OF THE NATIONAL COMMITTEES AND WILL BE
159 DELETED AT THE PUBLICATION STAGE.

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MATERIALS FOR PRINTED BOARDS AND OTHER INTERCONNECTING STRUCTURES –

Part 2-52: Reinforced base materials clad and unclad-Thermosetting hydrocarbon resin system, woven E-glass reinforced laminate sheets of defined flammability (vertical burning test), copper-clad

1 Scope

This part of IEC 61249 gives requirements for properties of Thermosetting hydrocarbon resin system, woven E-glass reinforced laminate sheets of defined flammability (vertical burning test), copper-clad in thicknesses of 0,05 mm up to 3,20 mm.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 methods for materials and other interconnection structures*

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

IEC/PAS 61249-6-3, *Specification for finished fabric woven from E-glass for printed boards*

ISO 11014:2009, *Safety data sheet for chemical products – Content and order of sections*

3 Terms and definitions

No terms and definitions are listed in this document.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at <http://www.electropedia.org/>
- ISO Online browsing platform: available at <http://www.iso.org/obp>

4 Materials and Construction

4.1 General

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

4.2 Resin system

The primary resin is polyolefin resin or its modification, copolymers, derivatives. Filler, accessory ingredient may be added to improve performance.

4.3 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.

4.4 Reinforcement

Woven E-glass as specified in IEC/PAS 61249-6-3, woven E-glass fabric (for the manufacture of prepreg and copper clad materials). Low permittivity E-glass maybe used to improve dielectric performance.

5 Internal marking

Not specified.

6 Electrical properties

The requirements for electrical properties are shown in Table 1.

Table 1 – Electrical properties

Property	Test method IEC 61189-2	Requirements
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	$\geq 5\,000\text{ M}\Omega \cdot \text{m}$
Volume resistivity after damp heat and recovery	2E04	$\geq 10\,000\text{ M}\Omega \cdot \text{m}$
Permittivity at 10GHz, as received ^a	IPC-TM650-2.5.5.5	Type A: ≤ 2.75 Type B: $> 2.75, \leq 6.0$ Type C: > 6.0
Permittivity at 10GHz, as received ^a	IEC 61189-2-721	As agreed upon by user and supplier
Dissipation factor at 10GHz, as received	IEC 61189-2-721	$\leq 0,005$
Thermal coefficient of Permittivity absolute value at 10GHz, $-40^\circ\text{C} \sim 150^\circ\text{C}$	IEC 61189-2-721	$\leq 600\text{ ppm}/^\circ\text{C}$
Electric strength(only for material thicknesses $< 0,5\text{ mm}$)	2E02	$\geq 30\text{ kV/mm}$
Arc resistance (only for material thicknesses $\geq 0,5\text{ mm}$ thickness)	2E14	$\geq 60\text{ s}$
Dielectric breakdown (only for material thicknesses $\geq 0,5\text{ mm}$ thickness)	2E15	$\geq 40\text{ kV}$
Surface resistance at 125°C	2E03	$\geq 1\,000\text{ M}\Omega$
Volume resistivity at 125°C	2E03	$\geq 1\,000\text{ M}\Omega \cdot \text{m}$
^a Dielectric Permittivity Tolerance can be chosen as the following tolerance: a) $\pm 0,02$; b) $\pm 0,04$; c) $\pm 0,05$; d) $\pm 0,25$; e) $\pm 0,50$. To be agreed upon by user and supplier.		

7 Non-electrical properties of the copper-clad laminate

7.1 Appearance of the copper-clad sheet

7.1.1 General

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

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

7.1.2 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, see Table 2.

Table 2 – Indentations

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

7.1.3 Wrinkles

There shall be no wrinkles in the copper surface.

7.1.4 Scratches

Scratches deeper than 20 % of the nominal thickness of the foil thickness are not allowed.

Scratches with a depth less than 5 % of the nominal thickness of the foil shall not be counted.

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.

7.1.5 Raised areas

Raised areas are usually impressions caused by defects in the press plates used during manufacture but may also be caused by blisters or inclusions of foreign particles under the foil.

Raised areas caused by blisters or inclusions are not permitted.

Raised areas caused by impressions of defects in press plates are permitted to the following extent:

Class A and X material Maximum height 15 µm and maximum length 15 mm