INTERNATIONAL STANDARD

IEC 61249-4-5

First edition
2005-09

Materials for printed boards and other interconnecting structures –

Part 4-5: Sectional specification set for prepreg materials, unclad – Polyimide, modified or unmodified, woven E-glass prepreg of defined flammability

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Part 4-5: Sectional specification for prepreg materials, unclad – Polyimide, modified or unmodified, woven E-glass prepreg of defined flammability

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International Standard IEC 61249-4-5 has been prepared by IEC technical committee 91: Electronics assembly technology.

The text of this standard is based on the following documents:

FDIS	Report on voting
91/527/FDIS	91/537/RVD

Full information on the voting for the approval of this standard can be found in the report on voting indicated in the above table.

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

IEC 61249-4 consists of the following parts, under the general title *Materials for printed boards and other interconnecting structures – Part 4: Sectional specification set for prepreg materials, unclad:*

Part 4-1: Epoxide woven E-glass prepreg of defined flammability[1]

Part 4-2: Multifunctional epoxide woven E-glass prepreg of defined flammability

Part 4-5: Polyimide, modified or unmodified, woven E-glass prepreg of defined flammability

Part 4-11: Non-halogenated epoxide, woven E-glass prepreg of defined flammability

Part 4-12: Non-halogenated multifunctional epoxide woven E-glass prepreg of defined flammability

The committee has decided that the contents of this publication will remain unchanged until the maintenance result date indicated on the IEC web site under "http://webstore.iec.ch" in the data related to the specific publication. At this date, the publication will be

- reconfirmed;
- withdrawn;
- replaced by a revised edition, or
- amended.

A bilingual version of this publication may be issued at a later date.

[1] Under consideration.

MATERIALS FOR PRINTED BOARDS AND OTHER INTERCONNECTING STRUCTURES –

Part 4-5: Sectional specification set for prepreg materials, unclad – Polyimide, modified or unmodified, woven E-glass prepreg of defined flammability

1 Scope

This part of IEC 61249 gives requirements for properties of prepreg that is mainly intended to be used as bonding sheets in connection with laminates according IEC 61249-2-11 when manufacturing multilayer boards according to IEC 62326-4. This material may be also used to bond other types of laminates.

Prepreg according to this standard is of defined flammability (vertical burning test). The flammability rating on fully cured prepreg is achieved through the use of brominated fire retardants contained as an integral part of the polymeric structure. After curing according to the supplier's instructions, the glass transition temperature is defined to be 170 °C minimum.

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, printed boards and other interconnecting structures and assemblies – Part 2: Test methods for materials for interconnection structures*
Amendment 1 (2000)

IEC 61249-2-11, *Materials for printed boards and other interconnecting structures – Part 2-11: Sectional specification set for reinforced base materials clad and unclad – Polyimide woven E-glass laminated sheet of defined flammability copper-clad*

IEC 61249-6-3, *Material for printed boards and other interconnecting structures – Part 6-3: Sectional specification set for reinforcement materials – Woven E-glass (for the manufacture of prepregs and copper-clad base materials*[2]

IEC 62326-4:1996, *Printed boards – Part 4: Rigid multilayer printed boards with interlayer connections - Sectional specification*

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 14001:2004, *Environmental management systems – Requirements with guidance for use*

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2 In preparation.

3 Materials and construction

The prepreg consists of a reinforcing E-glass fabric which is impregnated with polyimide resin and partially cured to the B-stage.

3.1 Reinforcement

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

3.2 Resin system

Polyimide, modified or unmodified, resulting in a cured laminate with a glass transition temperature of 170 °C minimum.

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

Its flame resistance is defined in terms of the flammability requirements of 4.3.2.

4 Properties

4.1 Properties related to the appearance of the prepreg

The prepreg 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 made in accordance with IEC 61189-2 method 2V01 (under consideration).

4.1.1 Dewetted areas (fish eyes)

Dewetted areas with a diameter >10 mm are not permissible.

Dewetted areas with a diameter ≤10 mm are permitted to an extent of a maximum 10 fish eyes in any 300 × 300 mm area of the prepreg.

4.1.2 Broken filaments

When judging the presence of broken filaments their sizes and frequency of occurrence are important for assessing acceptability but also the flow characteristic of the prepreg must be taken into consideration. The acceptance conditions for broken filaments shall be as agreed upon between the user and supplier.

4.1.3 Distortion

When the prepreg is tested in accordance with test method 2M29 (under consideration) of IEC 61189-2, the distortion or non-perpendicular orientation of the fill or weft yarns in the glass fabric shall not exceed 10 % measured over any 300 mm test distance.

4.1.4 Creases

Creases caused by handling of the prepreg where only a negligible loss of resin has occurred are permitted.

Creases where the glass yarns are exposed due to loss of resin are not permitted.

4.1.5 Edge conditions

Cut-to-size panels shall have even edges and shall not show loss of resin at the edge due to the cutting process more than 2 mm. Excessive occurrence of resin dust released during the cutting shall be removed before packaging for shipment.

4.2 Properties related to B-stage prepreg

A number of characteristics can describe thickness, reactivity and rheology of B stage prepreg. The choice of characteristics to be used as qualification and quality conformance testing as well as the nominal performance levels are as agreed upon between the user and supplier.

Several of the characteristics shown below are interrelated and should not be specified individually. Ordering requirements should preferably be restricted to the glass style, one characteristics marked (a) in combination with one characteristic marked (b). A maximum of one optional characteristic (c) of B stage prepreg may be included.

Glass style

Thickness parameter

- Resin content (a)
- Treated weight (a)

Reactivity/rheology parameter

- Resin flow (b)
- Scaled flow thickness (b)
- Melt viscosity (b)
- Cured thickness (b)

Optional parameter

- Volatile content (c)
- Gel time (c)

4.2.1 Resin content

When tested in accordance with test method 2C03 or 2C10 of IEC 61189-2, the nominal resin content shall be as agreed upon between the user and supplier.

The tolerance around the ordered nominal value shall be ±3 %, e.g. (45 ± 3) %.

4.2.2 Treated weight

When tested in accordance with test method 2C03 of IEC 61189-2, the nominal treated weight shall be as agreed upon between the user and supplier.

The tolerance around the ordered nominal value shall be ±3 %, e.g. (350 ± 10,5) g.

4.2.3 Resin flow

When tested in accordance with test method 2M09 of IEC 61189-2, the nominal resin flow shall be as agreed upon between the user and supplier.

The tolerance around the ordered nominal value shall be ±5 %, e.g. (25 ± 5) %.