IEC 61249-4-15

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INTERNATIONAL STANDARD

NORME INTERNATIONALE

Materials for printed boards and other interconnecting structures – Part 4-15: Sectional specification set for prepreg materials, unclad (for the manufacture of multilayer boards) – Multifunctional epoxide woven E-glass prepreg of defined flammability (vertical burning test) for lead-free assembly

Matériaux pour cartes imprimées et autres structures d'interconnexion – Partie 4-15: Série de spécifications intermédiaires pour matériaux préimprégnés, non plaqués (pour la fabrication des cartes multicouches) – Tissu de verre époxyde préimprégné multifonctionnel de type E d'inflammabilité définie (essai de combustion verticale) destiné aux assemblages sans plomb

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CONTENTS

FOREWORD 4
1 Scope 6
2 Normative references 6
3 Materials and construction 6
3.1 Reinforcement 6
3.2 Resin system 7
4 Properties 7
4.1 Properties related to the appearance of the prepreg 7
4.1.1 Dewetted areas (fish eyes) 7
4.1.2 Broken filaments 7
4.1.3 Distortion 7
4.1.4 Creases 7
4.1.5 Edge conditions 7
4.2 Properties related to B-stage prepreg 7
4.2.1 Resin content 8
4.2.2 Treated weight 8
4.2.3 Resin flow 8
4.2.4 Scaled flow thickness 8
4.2.5 Melting viscosity 8
4.2.6 Gel time 9
4.2.7 Volatile content 9
4.3 Properties related to prepreg after curing 9
4.3.1 Electric strength 9
4.3.2 Flammability 9
4.3.3 Relative permittivity and dissipation factor 10
4.3.4 Cured thickness 10
4.3.5 Glass transition temperature (Tg) 10
4.3.6 Decomposition temperature (Td) 10
4.3.7 Thermal resistance 10
4.3.8 Z-axis expansion 10
5 Delivery form 11
5.1 Rolls 11
5.2 Sheets 11
5.3 Cut panels 11
6 Quality assurance 11
6.1 Quality system 11
6.2 Responsibility for inspection 11
6.3 Qualification inspection 11
6.4 Quality conformance inspection 12
6.5 Certificate of conformance 12
6.6 Safety data sheet 12
7 Packaging and marking 12
8 Shelf life 12
9 Ordering information 13
Bibliography 14

AVA Documents
Document Sharing Hub

Full document details: IEC 61249-4-15 2009

Table 1 – Flammability, vertical burning test 9
Table 2 – Decomposition temperature requirements 10
Table 3 – Thermal resistance requirements 10
Table 4 – Z-axis expansion requirements 11

Documents
Document Sharing Hub
Full document details: IEC 61249-4-15 2009

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MATERIALS FOR PRINTED BOARDS AND OTHER INTERCONNECTING STRUCTURES –

Part 4-15: Sectional specification set for prepreg materials, unclad (for the manufacture of multilayer boards) – Multifunctional epoxide woven E-glass prepreg of defined flammability (vertical burning test) for lead-free assembly

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International Standard IEC 61249-4-15 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
91/851/FDIS	91/863/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.

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This bilingual version, published in 2010-01, corresponds to the English version.

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

The French version of this standard has not been voted upon.

A list of all parts of the IEC 61249 series, under the general title *Materials for printed boards and other interconnecting structures*, can be found on the IEC website.

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

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MATERIALS FOR PRINTED BOARDS AND OTHER INTERCONNECTING STRUCTURES –

Part 4-15: Sectional specification set for prepreg materials, unclad (for the manufacture of multilayer boards) – Multifunctional epoxide woven E-glass prepreg of defined flammability (vertical burning test) for lead-free assembly

1 Scope

This part of IEC 61249 gives requirements for properties of prepreg that are mainly intended to be used as bonding sheets in connection with laminates according IEC 61249-2-35 when manufacturing multilayer boards according to IEC 62326-4. Multilayer boards comprised of these materials are suitable for lead-free assembly processes. This material may also be 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 of the prepreg according to the supplier's instructions, the glass transition temperature is defined to be 150 °C and 200 °C.

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 methods for materials for interconnection structures*

IEC 61249-2-35, *Materials for printed boards and other interconnecting structures – Part 2-35: Reinforced base materials, clad and unclad – Modified epoxide woven E-glass laminate sheets of defined flammability (vertical burning test), copper-clad for lead-free assembly*

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

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

3 Materials and construction

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

3.1 Reinforcement

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

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3.2 Resin system

Majority di-functional epoxide and modified epoxide with a glass transition temperature after curing according to the manufacturer's instructions of 150 °C to 200 °C. The curing agent shall not be dicyandiamide. The flammability rating is achieved through the use of bromine reacted into the polymer. Inorganic fillers may be used. 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 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 of method 2V01 (under consideration) of IEC 61189-2 will apply as soon as this test will be available.

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 mm × 300 mm area of the prepreg.

4.1.2 Broken filaments

When judging the presence of broken filaments, not only are their size and frequency of occurrence important for assessing acceptability, but the flow characteristic of the prepreg shall also be taken into consideration. The acceptance conditions for broken filaments shall be as agreed upon between user and supplier.

4.1.3 Distortion

When the prepreg will 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 of 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

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testing as well as the nominal performance levels are as agreed upon between 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 characteristic marked (a) in combination with one characteristic marked (b). One or both of the optional characteristics (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 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 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 user and supplier.

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

4.2.4 Scaled flow thickness

When tested in accordance with test method 2M26 of IEC 61189-2, the nominal scaled flow and the tolerance shall be as agreed upon between user and supplier.

4.2.5 Melting viscosity

When tested in accordance with test method 2C09 of IEC 61189-2, the nominal melt viscosity shall be as agreed upon between user and supplier.

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