Irish Standard
I.S. EN 61249-2-27:2013

Materials for printed boards and other interconnecting structures -- Part 2-27: Reinforced base materials clad and unclad - Bismaleimide/triazine modified with non-halogenated epoxide woven glass laminate sheets of defined flammability (vertical burning test), copper-clad (IEC 61249-2-27:2012 (EQV))

I.S. EN 61249-2-27:2013

Incorporating amendments/corrigenda issued since publication:

The National Standards Authority of Ireland (NSAI) produces the following categories of formal documents:

I.S. xxx: Irish Standard – national specification based on the consensus of an expert panel and subject to public consultation.

S.R. xxx: Standard Recommendation - recommendation based on the consensus of an expert panel and subject to public consultation.

SWiFT xxx: A rapidly developed recommendatory document based on the consensus of the participants of an NSAI workshop.

This document replaces:	*This document is based on:* EN 61249-2-27:2013	*Published:* 22 March, 2013

This document was published
under the authority of the NSAI and comes into effect on:

22 April, 2013

ICS number:
31.180

NSAI
1 Swift Square,
Northwood, Santry
Dublin 9

T +353 1 807 3800
F +353 1 807 3838
E standards@nsai.ie

W NSAI.ie

Sales:
T +353 1 857 6730
F +353 1 857 6729
W standards.ie

Údarás um Chaighdeáin Náisiúnta na hÉireann

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 61249-2-27

March 2013

ICS 31.180

English version

Materials for printed boards and other interconnecting structures - Part 2-27: Reinforced base materials clad and unclad - Bismaleimide/triazine modified with non-halogenated epoxide woven glass laminate sheets of defined flammability (vertical burning test), copper-clad

(IEC 61249-2-27:2012)

Matériaux pour circuits imprimés et autres structures d'interconnexion -
Partie 2-27 : Matériaux de base renforcés, plaqués et non plaqués -
Feuilles stratifiées en tissu de verre de type époxyde non-halogéné modifié, et bismaléimide-triazine, d'inflammabilité définie (essai de combustion verticale), plaquées cuivre
(CEI 61249-2-27:2012)

Materialien für Leiterplatten und andere Verbindungsstrukturen -
Teil 2-27: Kaschierte und unkaschierte verstärkte Basismaterialien -
Kupferkaschierte mit E-Glasgewebe verstärkte Laminattafeln auf der Basis von Bismaleinimid/Triazin-Harz, modifiziert mit halogenfreiem Epoxidharz, mit definierter Brennbarkeit (Brennprüfung mit vertikaler Prüflingslage)
(IEC 61249-2-27:2012)

This European Standard was approved by CENELEC on 2013-01-03. 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 CEN-CENELEC Management Centre or to any CENELEC member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Bulgaria, Croatia, Cyprus, the Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

CENELEC

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

Management Centre: Avenue Marnix 17, B - 1000 Brussels

Foreword

The text of document 91/1050/FDIS, future edition 1 of IEC 61249-2-27, prepared by IEC TC 91 "Electronics assembly technology" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN 61249-2-27:2013.

The following dates are fixed:

• latest date by which the document has to be implemented at national level by publication of an identical national standard or by endorsement	(dop)	2013-10-03
• latest date by which the national standards conflicting with the document have to be withdrawn	(dow)	2016-01-03

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CENELEC [and/or CEN] shall not be held responsible for identifying any or all such patent rights.

Endorsement notice

The text of the International Standard IEC 61249-2-27:2012 was approved by CENELEC as a European Standard without any modification.

In the official version, for Bibliography, the following notes have to be added for the standards indicated:

ISO 9000:2005	NOTE	Harmonized as EN ISO 9000:2005 (not modified).
ISO 14001:2004	NOTE	Harmonized as EN ISO 14001:2004 (not modified).

Annex ZA
(normative)

Normative references to international publications with their corresponding European publications

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. 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.

Publication	Year	Title	EN/HD	Year
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 or without coatings - Section 1: Copper foils (for the manufacture of copper-clad base materials)	EN 61249-5-1	1996
IEC/PAS 61249-6-3	2011	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	-	-

This page is intentionally left BLANK.

CONTENTS

FOREWORD 4
1 Scope 6
2 Normative references 6
3 Materials and construction 6
3.1 General 6
3.2 Resin system 6
3.3 Reinforcement 7
3.4 Metal foil 7
4 Internal marking 7
5 Electrical properties 7
6 Non-electrical properties of the copper-clad laminate 8
6.1 Appearance of the copper-clad sheet 8
6.1.1 General 8
6.1.2 Indentations (pits and dents) 8
6.1.3 Wrinkles 8
6.1.4 Scratches 8
6.1.5 Raised areas 9
6.1.6 Surface waviness 9
6.2 Appearance of the unclad face 9
6.3 Laminate thickness 9
6.4 Bow and twist 10
6.5 Properties related to the copper foil bond 10
6.6 Punching and machining 10
6.7 Dimensional stability 11
6.8 Sheet sizes 11
6.8.1 Typical sheet sizes 11
6.8.2 Tolerances for sheet sizes 11
6.9 Cut panels 11
6.9.1 Cut panel sizes 11
6.9.2 Size tolerances for cut panels 11
6.9.3 Rectangularity of cut panels 12
7 Non-electrical properties of the base material after complete removal of the copper foil 12
7.1 Appearance of the dielectric base material 12
7.2 Flexural strength 13
7.3 Flammability 13
7.4 Water absorption 13
7.5 Measling 14
7.6 Glass transition temperature and cure factor 14
8 Quality assurance 14
8.1 Quality system 14
8.2 Responsibility for inspection 15
8.3 Qualification inspection 15
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 16
Annex A (informative) Engineering information 17
Annex B (informative) Common laminate constructions 19
Annex C (informative) Guideline for qualification and conformance inspection 20
Bibliography 21

Table 1 – Electrical properties 7
Table 2 – Indentations 8
Table 3 – Nominal thickness and tolerance of metal-clad laminate 9
Table 4 – Bow and twist 10
Table 5 – Pull-off and peel strength 10
Table 6 – Dimensional stability 11
Table 7 – Size tolerance for cut panels 12
Table 8 – Rectangularity of cut panels 12
Table 9 – Flexural strength 13
Table 10 – Flammability 13
Table 11 – Water absorption 14
Table 12 – Measling 14
Table 13 – Glass transition temperature and cure factor 14
Table B.1 – Thickness 19
Table C.1 – Qualification and conformance testing 20

INTERNATIONAL ELECTROTECHNICAL COMMISSION

MATERIALS FOR PRINTED BOARDS AND OTHER INTERCONNECTING STRUCTURES –

Part 2-27 Reinforced base materials clad and unclad – Bismaleimide/triazine modified with non-halogenated epoxide woven glass laminate sheets of defined flammability (vertical burning test), copper-clad

FOREWORD

1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as “IEC Publication(s)”). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
2) The formal decisions or agreements of IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC National Committees.
3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
5) IEC itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.
6) All users should ensure that they have the latest edition of this publication.
7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
9) Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights.

International Standard IEC 61249-2-27 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
91/1050/FDIS	91/1063/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.

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

The committee has decided that the contents of this publication will remain unchanged until the stability 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.

MATERIALS FOR PRINTED BOARDS AND OTHER INTERCONNECTING STRUCTURES –

Part 2-27 Reinforced base materials clad and unclad – Bismaleimide/triazine modified with non-halogenated epoxide woven glass laminate sheets of defined flammability (vertical burning test), copper-clad

1 Scope

This part of IEC 61249 gives requirements for properties of bismaleimide/triazine modified with non-halogenated epoxide woven E-glass reinforced laminated sheets of defined flammability (vertical burning test), copper-clad in thicknesses of 0,03 mm up to 1,60 mm. The flammability rating is achieved through the use of non-halogenated inorganic and/or organic compounds acting as fire retardants. These fire retardants are contained as part of polymeric structure or in addition to it. The glass transition temperature is defined to be 160 °C minimum.

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 may be supplied.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. 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 61249-5-1:1995, *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 61249-6-3:2011, *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 Materials and construction

3.1 General

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

3.2 Resin system

Bismaleimide/triazine modified with non-halogenated epoxide resulting in a laminate with a glass transition temperature of 160 °C minimum. The maximum total halogens contained in the resin plus reinforcement matrix is 1 500 ppm with a maximum chlorine of 900 ppm and maximum bromine being 900 ppm.