



NSAI
Standards

Irish Standard
EN 61249-2-35:2009

"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 61249-2-35:2008

EN 61249-2-35:2009

Incorporating amendments/corrigenda issued since publication:

This document replaces:

*This document is based on:
EN 61249-2-35:2009*

*Published:
11 March, 2009*

This document was published
under the authority of the NSAI
and comes into effect on:
9 June, 2009

*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

Price Code:
I

Údarás um Chaighdeáin Náisiúnta na hÉireann

EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN 61249-2-35

March 2009

ICS 31.180

English version

**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 61249-2-35:2008)**

Matériaux pour circuits imprimés
et autres structures d'interconnexion -
Partie 2-35: Matériaux de base renforcés,
plaqués et non plaqués -
Feuilles stratifiées en tissu de verre
de type E époxyde modifié,
plaquées cuivre, d'inflammabilité définie
(essai de combustion verticale)
pour les assemblages sans plomb
(CEI 61249-2-35:2008)

Materialien für Leiterplatten
und andere Verbindungsstrukturen -
Teil 2-35: Kaschierte und unkaschierte
verstärkte Basismaterialien -
Kupferkaschierte mit E-Glasgewebe
verstärkte Laminattafeln auf der Basis
von modifiziertem Epoxidharz
mit definierter Brennbarkeit
(Brennprüfung mit vertikaler Prüflingslage)
für bleifreie Bestückungstechnik
(IEC 61249-2-35:2008)

This European Standard was approved by CENELEC on 2009-02-01. 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 Central Secretariat 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 Central Secretariat has the same status as the official versions.

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

CENELEC

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

Central Secretariat: avenue Marnix 17, B - 1000 Brussels

Foreword

The text of document 91/810/FDIS, future edition 1 of IEC 61249-2-35, prepared by IEC TC 91, Electronics assembly technology, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 61249-2-35 on 2009-02-01.

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) 2009-11-01
- latest date by which the national standards conflicting with the EN have to be withdrawn (dow) 2012-02-01

Annex ZA has been added by CENELEC.

Endorsement notice

The text of the International Standard IEC 61249-2-35:2008 was approved by CENELEC as a European Standard without any modification.

In the official version, for Bibliography, the following note has to be added for the standard indicated:

IEC 60194

NOTE Harmonized as EN 60194:2006 (not modified).

Annex ZA
(normative)

**Normative references to international publications
with their corresponding European publications**

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.

NOTE When an international publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
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 and without coatings - Section 1: Copper foils (for the manufacture of copper-clad base materials)	EN 61249-5-1	1996
ISO 9000	- ¹⁾	Quality management systems - Fundamentals and vocabulary	EN ISO 9000	2005 ²⁾
ISO 11014-1	- ¹⁾	Safety data sheet for chemical products - Part 1: Content and order of sections	-	-
ISO 14001	- ¹⁾	Environmental management systems - Requirements with guidance for use	EN ISO 14001	2004 ²⁾

¹⁾ Undated reference.

²⁾ Valid edition at date of issue.

This page is intentionally left BLANK.



INTERNATIONAL STANDARD

NORME INTERNATIONALE

**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**

**Matériaux pour circuits imprimés et autres structures d'interconnexion –
Partie 2-35: Matériaux de base renforcés, plaqués et non plaqués – Feuilles
stratifiées en tissu de verre de type E époxyde modifié, plaquées cuivre,
d'inflammabilité définie (essai de combustion verticale) pour les assemblages
sans plomb**





THIS PUBLICATION IS COPYRIGHT PROTECTED

Copyright © 2008 IEC, Geneva, Switzerland

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from either IEC or IEC's member National Committee in the country of the requester.

If you have any questions about IEC copyright or have an enquiry about obtaining additional rights to this publication, please contact the address below or your local IEC member National Committee for further information.

Droits de reproduction réservés. Sauf indication contraire, aucune partie de cette publication ne peut être reproduite ni utilisée sous quelque forme que ce soit et par aucun procédé, électronique ou mécanique, y compris la photocopie et les microfilms, sans l'accord écrit de la CEI ou du Comité national de la CEI du pays du demandeur.

Si vous avez des questions sur le copyright de la CEI ou si vous désirez obtenir des droits supplémentaires sur cette publication, utilisez les coordonnées ci-après ou contactez le Comité national de la CEI de votre pays de résidence.

IEC Central Office
3, rue de Varembé
CH-1211 Geneva 20
Switzerland
Email: inmail@iec.ch
Web: www.iec.ch

About the IEC

The International Electrotechnical Commission (IEC) is the leading global organization that prepares and publishes International Standards for all electrical, electronic and related technologies.

About IEC publications

The technical content of IEC publications is kept under constant review by the IEC. Please make sure that you have the latest edition, a corrigenda or an amendment might have been published.

- Catalogue of IEC publications: www.iec.ch/searchpub

The IEC on-line Catalogue enables you to search by a variety of criteria (reference number, text, technical committee,...). It also gives information on projects, withdrawn and replaced publications.

- IEC Just Published: www.iec.ch/online_news/justpub

Stay up to date on all new IEC publications. Just Published details twice a month all new publications released. Available on-line and also by email.

- Electropedia: www.electropedia.org

The world's leading online dictionary of electronic and electrical terms containing more than 20 000 terms and definitions in English and French, with equivalent terms in additional languages. Also known as the International Electrotechnical Vocabulary online.

- Customer Service Centre: www.iec.ch/webstore/custserv

If you wish to give us your feedback on this publication or need further assistance, please visit the Customer Service Centre FAQ or contact us:

Email: csc@iec.ch

Tel.: +41 22 919 02 11

Fax: +41 22 919 03 00

A propos de la CEI

La Commission Electrotechnique Internationale (CEI) est la première organisation mondiale qui élabore et publie des normes internationales pour tout ce qui a trait à l'électricité, à l'électronique et aux technologies apparentées.

A propos des publications CEI

Le contenu technique des publications de la CEI est constamment revu. Veuillez vous assurer que vous possédez l'édition la plus récente, un corrigendum ou amendement peut avoir été publié.

- Catalogue des publications de la CEI: www.iec.ch/searchpub/cur_fut-f.htm

Le Catalogue en-ligne de la CEI vous permet d'effectuer des recherches en utilisant différents critères (numéro de référence, texte, comité d'études,...). Il donne aussi des informations sur les projets et les publications retirées ou remplacées.

- Just Published CEI: www.iec.ch/online_news/justpub

Restez informé sur les nouvelles publications de la CEI. Just Published détaille deux fois par mois les nouvelles publications parues. Disponible en-ligne et aussi par email.

- Electropedia: www.electropedia.org

Le premier dictionnaire en ligne au monde de termes électroniques et électriques. Il contient plus de 20 000 termes et définitions en anglais et en français, ainsi que les termes équivalents dans les langues additionnelles. Egalement appelé Vocabulaire Electrotechnique International en ligne.

- Service Clients: www.iec.ch/webstore/custserv/custserv_entry-f.htm

Si vous désirez nous donner des commentaires sur cette publication ou si vous avez des questions, visitez le FAQ du Service clients ou contactez-nous:

Email: csc@iec.ch

Tél.: +41 22 919 02 11

Fax: +41 22 919 03 00



INTERNATIONAL STANDARD

NORME INTERNATIONALE

**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**

**Matériaux pour circuits imprimés et autres structures d'interconnexion –
Partie 2-35: Matériaux de base renforcés, plaqués et non plaqués – Feuilles
stratifiées en tissu de verre de type E époxyde modifié, plaquées cuivre,
d'inflammabilité définie (essai de combustion verticale) pour les assemblages
sans plomb**

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

COMMISSION
ELECTROTECHNIQUE
INTERNATIONALE

PRICE CODE
CODE PRIX

T

ICS 31.180

ISBN 2-8318-1018-2

CONTENTS

FOREWORD	4
1 Scope	6
2 Normative references	6
3 Materials and construction	6
3.1 Resin system	6
3.2 Metal foil	7
3.3 Reinforcement	7
4 Internal marking	7
5 Electrical properties	7
6 Non-electrical properties of the copper-clad laminate	7
6.1 Appearance of the copper-clad sheet	7
6.1.1 Indentations (pits and dents)	8
6.1.2 Wrinkles	8
6.1.3 Scratches	8
6.1.4 Raised areas	8
6.1.5 Surface waviness	9
6.2 Appearance of the unclad face	9
6.3 Laminate thickness	9
6.4 Bow and twist	9
6.5 Properties related to the copper foil bond	10
6.6 Punching and machining	11
6.7 Dimensional stability	11
6.8 Sheet sizes	11
6.8.1 Typical sheet sizes	11
6.8.2 Tolerances for sheet sizes	12
6.9 Cut panels	12
6.9.1 Cut panel sizes	12
6.9.2 Size tolerances for cut panels	12
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	14
7.5 Measling	14
7.6 Glass transition temperature and cure factor	15
7.7 Decomposition temperature	15
7.8 Thermal resistance	15
7.9 Z-axis expansion	15
8 Quality assurance	16
8.1 Quality system	16
8.2 Responsibility for inspection	16
8.3 Qualification inspection	16
8.4 Quality conformance inspection	16
8.5 Certificate of conformance	16

8.6 Safety data sheet.....	17
9 Packaging and marking.....	17
10 Ordering information	17
Annex A (informative) Engineering information	18
Annex B (informative) Common laminate constructions.....	20
Annex C (informative) Guideline for qualification and conformance inspection.....	22
Bibliography.....	23
 Table 1 – Electrical properties	7
Table 2 – Nominal thickness and tolerance of metal-clad laminate.....	9
Table 3 – Bow and twist	10
Table 4 – Pull-off and peel strength	10
Table 5 – Dimensional stability	11
Table 6 – Size tolerances for cut panels	12
Table 7 – Rectangularity of cut panels.....	12
Table 8 – Flexural strength.....	13
Table 9 – Flammability	14
Table 10 – Water absorption	14
Table 11 – Measling	15
Table 12 – Glass transition temperature and cure factor	15
Table 13 – Decomposition temperature	15
Table 14 – Thermal resistance	15
Table 15 – Z-axis expansion.....	16

INTERNATIONAL ELECTROTECHNICAL COMMISSION

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

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 provides no marking procedure to indicate its approval and cannot be rendered responsible for any equipment declared to be in conformity with an IEC Publication.
- 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 61249-2-35 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
91/810/FDIS	91/832/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 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

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

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

1 Scope

This part of IEC 61249 gives requirements for properties of modified brominated epoxide woven E-glass laminate sheet 0,05 mm up to 3,2 mm, of defined flammability (vertical burning test), copper-clad. The glass transition temperature is defined to be 150 °C to 200 °C.

Its flame resistance is defined in terms of the flammability requirements of 7.3.

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 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 61189-2:2006, *Test methods for electrical materials, printed boards and other interconnection structures and assemblies – Part 2: Test method for interconnection structures*

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

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

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

ISO 14001, *Environmental management systems – Requirements 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 Resin system

Majority di-functional epoxide, modified epoxide, woven E-glass laminate with a glass transition temperature of 150 °C to 200 °C. 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 7.3.



This is a free preview. Purchase the entire publication at the link below:

[Product Page](#)

-
- ④ Looking for additional Standards? Visit Intertek Inform Infostore
 - ④ Learn about LexConnect, All Jurisdictions, Standards referenced in Australian legislation
-