SLOVENSKI STANDARD
SIST EN 60249-1:2001/A4:2001

01-marec-2001

Amendment to clauses 3 and 4 of EN

Base materials for printed circuits -- Part 1: Test methods

Basismaterialien für gedruckte Schaltungen -- Teil 1: Prüfverfahren

Matériaux de base pour circuits imprimés -- Partie 1: Méthodes d'essai

Ta slovenski standard je istoveten z: **EN 60249-1:1993/A4:1994**

ICS:

31.180	Tiskana vezja (TIV) in tiskane ploġ e Printed circuits and boards

SIST EN 60249-1:2001/A4:2001 **en**

EUROPEAN STANDARD

NORME EUROPEENNE

EUROPÄISCHE NORM

EN 60249-1/A4

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Descriptors: Base material for printed circuits, copper-clad, requirements, testing, properties, material testing

Amendment A4 to the English version of EN 60249-1,

Base materials for printed circuits
Part 1: Test methods
(IEC 249-1:1982/A4:1993)

Matériaux de base pour circuits imprimés
Partie 1: Méthodes d'essai
(CEI 249-1:1982/A4:1993)

Basismaterialien für gedruckte Schaltungen
Teil 1: Prüfverfahren
(IEC 249-1:1982/A4:1993)

This amendment A4 modifies the European Standard EN 60249-1:1993. It was approved by CENELEC on 1993-12-08. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this amendment 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 amendment 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, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

CENELEC

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

Central Secretariat: rue de Stassart 35, B-1050 Brussels

Ref. No. EN 60249-1:1993/A4:1994 E

FOREWORD

At the request of the 76th Technical Board of CENELEC, amendment 4:1993 to the International Standard IEC 249-1:1982 was submitted to the CENELEC members for formal vote.

The text of the International Standard was approved by CENELEC as amendment A4 to EN 60249-1 on 8 December 1993.

The following dates were fixed:

- latest date of publication of an identical national standard	(dop)	1995-03-15
- latest date of withdrawal of conflicting national standards	(dow)	1995-03-15

ENDORSEMENT NOTICE

The text of amendment 4:1993 to the International Standard IEC 249-1:1982 was approved by CENELEC as an amendment to the European Standard without any modification.

NORME INTERNATIONALE
INTERNATIONAL STANDARD

CEI
IEC
249-1

1982

AMENDEMENT 4
AMENDMENT 4

1993-05

Comprenant les amendements 1 (octobre 1984), 2 (octobre 1989) et 3 (janvier 1991)
Incorporating Amendments 1 (October 1984), 2 (October 1989) and 3 (January 1991)

Amendement 4

Matériaux de base pour circuits imprimés

Partie 1:
Méthodes d'essai

Amendment 4

Base materials for printed circuits

Part 1:
Test methods

Bureau Central de la Commission Electrotechnique Internationale 3, rue de Varembé Genève, Suisse

Commission Electrotechnique Internationale
International Electrotechnical Commission
Международная Электротехническая Комиссия

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FOREWORD

This amendment has been prepared by IEC technical committee 52: Printed circuits.

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

Amendments	Six Months' Rule/DIS	Reports on Voting
4	52(CO)376 52(CO)377 52(CO)379 52(CO)390	52(CO)385 52(CO)386 52(CO)388 52(CO)394
3	52(CO)345 52(CO)352	52(CO)354 52(CO)366
2	52(CO)297 52(CO)319	52(CO)305 52(CO)305A 52(CO)330
1	52(CO)227	52(CO)233

Full information on the voting for the approval of this amendment can be found in the Voting Report indicated in the above table.

The text of Amendment No. 4 can be distinguished by a vertical line in the margin.

Pages 27 and 29

Replace the existing text of subclauses 3.1.2, 3.1.3, 3.2, 3.3.2 and 3.3.3 by the following:

3.1.2 *Procedure*

The sheet or panel shall be placed unrestrained on a flat horizontal surface with its predominantly convex surface upward. The maximum vertical distance at the edge between the flat horizontal surface and the concave side of the material shall be determined using a taper gauge or feeler gauge.

The result shall be expressed as a percentage of the length of the side of the sheet or panel, corresponding to the measured value.

The value obtained on materials metal-clad on one side only shall be followed by "pos" if the metal-clad face is convex, or "neg" if the metal-clad face is concave.

3.1.3 Report

The report shall state:

1) the maximum bow in percentage with the designation of the length of the side of the sheet or panel referring to the percentage value including any reference to "pos" or "neg";
2) the dimensions of the sheet or panel and the copper foil thickness on both sides.

3.2 *Bow after heating*

Replace the present wording of subclause 3.2 by:

3.2 *Bow after etching and heating*

3.2.1 *Object*

To measure the deviation from flatness of a copper-clad sheet in a direction parallel to its edges (see IEC 194) after etching and heating simulating printed board processing steps.

3.2.2 *General*

This test is not applicable to sheets thinner than 0,8 mm.

3.2.3 *Test specimen*

The test specimen shall be a square of 300 mm side length cut from a sample of the metal-clad base material under test.

Three specimens shall be used.

3.2.4 *Procedure*

3.2.4.1 *Etching*

The specimen shall be etched according to the appropriate method of 1.3 to form a pattern of parallel conductors with 0,4 mm width and 0,4 mm spacings. For base materials with copper foils on both sides the conductors on one side shall be at right angles to the conductors on the other side.

3.2.4.2 *Heating*

The etched specimen shall be placed unrestrained on a flat horizontal surface and shall be subjected to dry heat as specified in 3.1 of IEC 68-2-2 but at the temperature indicated in the relevant material specification and for a duration of 45 $^{+5}_{0}$ min.

3.2.4.3 *Conditioning*

The specimen shall be maintained under the standard atmospheric conditions for referee tests specified in 5.2 of IEC 68-1: (23 ± 1) °C and (50 ± 2) % relative humidity, for at least 18 h.

3.2.4.4 *Measurement*

Bow shall be measured as described in 3.1.2.

3.2.5 *Report*

As in 3.1.3, except item 1), the average of three absolute values obtained.

3.3.2 *Procedure*

The sheet or panel shall be placed unrestrained on a flat horizontal surface with its predominantly convex surface upward and with three corners of the lower side in contact with the surface. The vertical distance from the flat horizontal surface to the fourth corner of the concave side of the material shall be measured using a taper gauge or feeler gauge.

The result shall be expressed as a percentage of the diagonal measurement of the sheet or panel.

3.3.3 *Report*

The report shall state:

1) the twist, in percentage;
2) the dimensions of the sheet or panel, and the copper foil thickness on both sides.

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3.4 *Twist after heating*

Replace the present wording of subclause 3.4 by:

3.4 *Twist after etching and heating*

3.4.1 *Object*

To measure the deviation from flatness of a copper-clad sheet along the diagonals (see IEC 194) after etching and heating simulating printed board processing steps.

3.4.2 *General*

This test is not applicable to sheets thinner than 0,8 mm.

3.4.3 *Test specimen*

The test specimen shall be as described in 3.2.3.

3.4.4 *Procedure*

Etching, heating and conditioning shall be as described in 3.2.4.1, 3.2.4.2 and 3.2.4.3. Twist shall be measured as described in 3.3.2.

3.4.5 *Report*

The report shall be as described in 3.3.3.

3.5.1 *Test specimen*

Change the first sentence to read as follows:

The test specimen shall be a sample of the sheet under test, with a minimum thickness of 0,8 mm and of any convenient size, printed by . . .

At the end of this subclause add:

NOTE - Materials thinner than 0,8 mm should be built up to sufficient rigidity by a suitable technique, for example sticking.

Page 37

Subclause 3.6.4, line 4:

Replace "1,1,1 – trichloroethane" *by* "the solvent".

Last sentence:

Replace the present wording by "The solvent used for the test shall be agreed between purchaser and supplier".

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3.10 *Solderability*

Delete the title and text of this subclause.

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3.11.4.3 *Test sequence*

Replace the present item 7) by:

7) process step 2 – heating as specified in 3.1 of IEC 68-2-2, but at the temperature indicated in the relevant material specification and for a duration of $(30\ ^{+5}_{0})$ min.

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Add the following new subclause:

3.15 *Rectangularity of cut panels*