SLOVENSKI STANDARD

SIST EN 60249-2-12:1995/A4:2002

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maj 2002

Base materials for printed circuits - Part 2: Specifications - Specification No.12: Thin epoxide woven glass fabric copper-clad laminated sheet of defined flammability, for use in the fabrication of multilayer printed boards

ICS 13.220.40; 31.180

Referenčna številka
SIST EN 60249-2-12:1995/A4:2002(en)

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 60249-2-12/A4

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ICS 31.180
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English version

Base materials for printed circuits
Part 2-12: Specifications: thin epoxide woven glass fabric copper-clad laminated sheet of defined flammability, for use in the fabrication of multilayer printed boards
(IEC 60249-2-12:1987/A4:2000)

Matériaux de base pour circuits imprimés
Partie 2-12: Spécifications: feuille de stratifié mince en tissu de verre époxyde, recouverte de cuivre, d'inflammabilité définie, destinée à la fabrication des cartes de câblages imprimés multicouches
(CEI 60249-2-12:1987/A4:2000)

Basismaterialien für gedruckte Schaltungen
Teil 2-12: Einzelbestimmungen: Dünne kupferkaschierte Epoxidharz-Glashartgewebetafeln definierter Brennbarkeit zur Herstellung von Mehrlagenleiterplatten
(IEC 60249-2-12:1987/A4:2000)

This amendment A4 modifies the European Standard EN 60249-2-12:1994; it was approved by CENELEC on 2000-08-01. 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, Czech Republic, 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 60249-2-12:1994/A4:2000 E

Foreword

The text of document 52/852/FDIS, future amendment 4 to IEC 60249-2-12:1987, prepared by IEC TC 52, Printed circuits, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as amendment A4 to EN 60249-2-12:1994 on 2000-08-01.

The following dates were fixed:

- latest date by which the amendment has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2001-05-01
- latest date by which the national standards conflicting with the amendment have to be withdrawn (dow) 2003-08-01

Endorsement notice

The text of amendment 4:2000 to the International Standard IEC 60249-2-12:1987 was approved by CENELEC as an amendment to the European Standard without any modification.

NORME INTERNATIONALE

INTERNATIONAL STANDARD

CEI
IEC
60249-2-12

1987

AMENDEMENT 4
AMENDMENT 4
2000-06

Comprenant l'amendement 2 (1993) et l'amendement 3 (1994)
Incorporating amendment 2 (1993) and amendment 3 (1994)

Amendement 4

Matériaux de base pour circuits imprimés –

Partie 2:
Spécifications – Spécification n° 12: Feuille de stratifié mince en tissu de verre époxyde, recouverte de cuivre, d'inflammabilité définie, destinée à la fabrication des cartes de câblages imprimés multicouches

Amendment 4

Base materials for printed circuits –

Part 2:
Specifications – Specification No. 12: Thin epoxide woven glass fabric copper-clad laminated sheet of defined flammability, for use in the fabrication of multilayer printed boards

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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.

This amendment incorporates amendment 2 (1993) and amendment 3 (1994).

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

FDIS	Report on voting
52/852/FDIS	52/869/RVD

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

A vertical line in the margin indicates the text of amendment 4.

Page 9

4 Electrical properties

Replace, in table I, the present property designation by:

Surface resistance after damp heat while in the humidity chamber (optional)
Surface resistance after damp heat and recovery
Volume resistivity after damp heat while in the humidity chamber (optional)
Volume resistivity after damp heat and recovery

Page 11

Add a new paragraph 5.1.3 as follows:

5.1.3 Surface waviness

When examined in accordance with test method 2M12 of IEC 61189-2, the surface waviness in both the machine and cross machine direction shall not exceed 5 µm.

5.3 Maximum bow and twist

Replace the sentence

"As agreed upon between purchaser and supplier." *by* "Not specified".

Page 13

Replace table III as follows:

Property	Test method (subclause of IEC 60249-1)	Requirement		
Pull-off strength	3.5	Not less than 60 N (13,4 lbf)		
		Thickness of the copper foil		
		18 µm*	35 µm*	70 µm* and 105 µm*
Peel strength after heat shock of 20 s	3.6.2.1 or 3.6.2.2 or 3.6.2.3	Not less than 1,1 N/mm (6,3 lbf/in)	Not less than 1,4 N/mm (8,0 lbf/in)	Not less than 1,8 N/mm (10,3 lbf/in)
		No blistering nor delamination		
Peel strength after dry heat at 125 °C	3.6.3	Not less than 1,1 N/mm (6,3 lbf/in)	Not less than 1,4 N/mm (8,0 lbf/in)	Not less than 1,8 N/mm (10,3 lbf/in)
		No blistering nor delamination		
Peel strength after exposure to solvent vapour. Solvents as agreed upon between purchaser and suppler	3.6.4	Not less than 1,1 N/mm (6,3 lbf/in)	Not less than 1,4 N/mm (8,0 lbf/in)	Not less than 1,8 N/mm (10,3 lbf/in)
		No blistering nor delamination		
Peel strength after simulated plating	3.6.5	Not less than 0,9 N/mm (5,1 lbf/in)	Not less than 1,1 N/mm (6,3 lbf/in)	Not less than 1,4 N/mm (8,0 lbf/in)
Peel strength at high temperature Temperature 260 °C (optional)	3.6.7	Not less than 0,06 N/mm (0,34 lbf/in)	Not less than 0,075 N/mm (0,43 lbf/in)	Not less than 0,09 N/mm (0,51 lbf/in)
Temperature 125 °C (optional)		Not less than 0,7 N/mm (4,0 lbf/in)	Not less than 0,9 N/mm (5,1 lbf/in)	Not less than 1,1 N/mm (6,3 lbf/in)
Blistering after 20 s heat shock	3.7.2.1 or 3.7.2.2 or 3.7.2.3	No blistering nor delamination		
* 18 µm (152 g/m², 0,5 oz/ft²); 35 µm (305 g/m², 1 oz/ft²) 70 µm (610 g/m², 2 oz/ft²); 105 µm (915 g/m², 3 oz/ft²)				
NOTE In case of difficulties due to breaking of foil or reading range of the force measuring device, the measurement of the peel strength at high temperature may be carried out using conductor widths larger than 3 mm.				

Page 13

5.5 Punching and machining

Replace the existing text by:

"Punching is not applicable. The laminate shall, in accordance with the manufacturer's recommendations, be capable of being sheared or drilled. Delamination at the edges due to the shearing process may not exceed the thickness of the base material. Delamination at the edges of drilled holes due to the drilling process is not permissible. Drilled holes shall be capable of being through-plated with no interference from any exudations into the hole."

5.6 Solderability

Delete the title and text of this subclause.

Page 15

5.7 Dimensional stability

Replace the present table V by the following new table V:

Table V

Property	Test method (subclause of IEC 60249-1)	Nominal thickness mm	Requirements
Dimensional stability	3.11 T = (150 ± 2) °C	0,05 to 0,3 over 0,3 to 0,8	0,8 mm/m max. 0,5 mm/m max.
NOTE The requirements apply to copper claddings 35 µm maximum only. For thicknesses of copper greater than 35 µm, the requirements shall be agreed upon between purchaser and supplier.			

Replace the existing subclause 5.8 "Size tolerances" and subclause 5.9 "Rectangularity of cut panels" by the following:

5.8 Sheet sizes

5.8.1 Typical sheet sizes

Typical sheet size are:

1 060 mm × 1 150 mm
915 mm × 1 220 mm
1 000 mm × 1 000 mm
1 000 mm × 1 200 mm.

Apart from these typical sheet sizes, fractions of the sizes and other sizes, for example larger, are available on the market.

5.8.2 Tolerances for sheet sizes

The size of the sheets delivered by the supplier shall not deviate more than $^{+20}_{0}$ mm from the ordered size.

5.9 Cut panels

5.9.1 Cut panel sizes

Cut panel sizes shall be, when delivered, in accordance with the purchaser's specification.

5.9.2 Size tolerances for cut panels

For panels cut to size according to the purchaser's specification, the following tolerances for length and width shall apply:

Panel size (mm)	Tolerance ± (mm)	
	Normal	Close
Up to 300	2	0,5
Over 300 to 600		0,8
Over 600		1,6
NOTE The specified tolerances include all deviations caused by cutting the panels.		

5.9.3 Rectangularity of cut panels

Property	Test method (subclause of IEC 60249-1)	Requirements	
		Coarse (mm/m)	Normal (mm/m)
Rectangularity of cut panels	3.15	3	2