SLOVENSKI STANDARD
SIST EN 60249-2-12:1995/A2:1997

01-avgust-1997

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 - Amendment 2 (IEC 249-2-12:1987/A2:1993)

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

Basismaterialien für gedruckte Schaltungen -- Teil 2-12: Einzelbestimmungen: Dünne kupferkaschierte Epoxidharz-Glashartgewebetafeln definierter Brennbarkeit zur Herstellung von Mehrlagenleiterplatten

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

Ta slovenski standard je istoveten z: **EN 60249-2-12:1994/A2:1994**

ICS:

13.220.40	Sposobnost vžiga in obnašanje materialov in proizvodov pri gorenju	Ignitability and burning behaviour of materials and products
31.180	Tiskana vezja (TIV) in tiskane plošče	Printed circuits and boards

SIST EN 60249-2-12:1995/A2:1997 **en**

EUROPEAN STANDARD EN 60249-2-12/A2

NORME EUROPEENNE

EUROPÄISCHE NORM March 1994

UDC 621.3.049.75-033.5-41

Descriptors: Printed circuit, composite materials, glass, copper, printed board-multilayer, flammability

Amendment A2 to the English version of EN 60249-2-12

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
(IEC 249-2-12:1987/A2:1993)

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
(CEI 249-2-12:1987/A2:1993)

Basismaterialien für gedruckte Schaltungen
Teil 2: Einzelbestimmungen
Einzelbestimmung Nr. 12: Dünne kupferkaschierte Epoxidharz-Glashartgewebetafeln definierter Brennbarkeit zur Herstellung von Mehrlagenleiterplatten
(IEC 249-2-12:1987/A2:1993)

This amendment A2 modifies the European Standard EN 60249-2-12:1994. It was approved by CENELEC on 1994-01-08. 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 60249-2-12:1994/A2:1994 E

FOREWORD

At the request of the 76th Technical Board of CENELEC, amendment 2:1993 to the International Standard IEC 249-2-12:1987 was submitted to the CENELEC members for formal vote.

The text of the International Standard was approved by CENELEC as amendment A2 to EN 60249-2-12 on 8 January 1994.

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 2:1993 to the International Standard IEC 249-2-12:1987 was approved by CENELEC as an amendment to the European Standard without any modification.

NORME INTERNATIONALE
INTERNATIONAL STANDARD

CEI IEC 249-2-12

1987

AMENDEMENT 2
AMENDMENT 2

1993-05

Comprenant la modification 1 (1989)
Incorporating Amendment 1 (1989)

Amendement 2

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 imprimées multicouches

Amendment 2

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

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
2	52(CO)378 52(CO)379 52(CO)380 52(CO)391	52(CO)387 52(CO)388 52(CO)389 52(CO)395
1	52(CO)319	52(CO)330

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

The text of Amendment 2 is indicated by a vertical line in the margin.

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

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 249-1)	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 supplier	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) Temperature 125 °C (optional)	3.6.7	Not less than 0,06 N/mm (0,34 lbf/in) Not less than 0,7 N/mm (4,0 lbf/in)	Not less than 0,075 N/mm (0,43 lbf/in) Not less than 0,9 N/mm (5,1 lbf/in)	Not less than 0,09 N/mm (0,51 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/m^2, 0,5 oz/ft^2); 35 µm (305 g/m^2, 1 oz/ft^2); 70 µm (610 g/m^2, 2 oz/ft^2); 105 µm (915 g/m^2, 3 oz/ft^2)

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 249-1)	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.			

5.8 *Size tolerances*

5.8.1 *Size tolerances for sheets*

The size of the sheets as delivered by the supplier shall not deviate from the nominal size by more than $^{+10}_{0}$ mm.

5.8.2 *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 *Rectangularity of cut panels*

Property	Test method (subclause of IEC 249-1)	Requirement	
		Coarse (mm/m)	Normal (mm/m)
Rectangularity of cut panels	3.15	3	2