SLOVENSKI STANDARD

SIST EN 60249-2-5:1997/A5:2002

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Base materials for printed circuits - Part 2: Specifications - Specification No. 5: Epoxide woven glass fabric copper-clad laminated sheet of defined flammability (vertical burning test)

ICS 13.220.40; 31.180

Referenčna številka
SIST EN 60249-2-5:1997/A5:2002(en)

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 60249-2-5/A5

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English version

Base materials for printed circuits
Part 2: Specifications
Specification No. 5: Epoxide woven glass fabric copper-clad laminated sheet of defined flammability (vertical burning test)
(IEC 60249-2-5:1987/A5:2000)

Matériaux de base pour circuits imprimés
Partie 2: Spécifications
Spécification n° 5: Feuille de tissu de verre époxyde recouverte de cuivre, d'inflammabilité définie (essai de combustion verticale)
(CEI 60249-2-5:1987/A5:2000)

Basismaterialien für gedruckte Schaltungen
Teil 2: Einzelbestimmungen
Einzelbestimmung Nr. 5: Kupferkaschierte Epoxidharz-Glashartgewebetafeln definierter Brennbarkeit (Prüfung mit vertikaler Probenlage)
(IEC 60249-2-5:1987/A5:2000)

This amendment A5 modifies the European Standard EN 60249-2-5:1994; 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

Foreword

The text of document 52/844/FDIS, future amendment 5 to IEC 60249-2-5:1987, prepared by IEC TC 52, Printed circuits, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as amendment A5 to EN 60249-2-5:1994 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 5:2000 to the International Standard IEC 60249-2-5:1987 was approved by CENELEC as an amendment to the European Standard without any modification.

NORME INTERNATIONALE

INTERNATIONAL STANDARD

CEI
IEC
60249-2-5

1987

AMENDEMENT 5
AMENDMENT 5
2000-06

Amendement 5

Matériaux de base pour circuits imprimés –

Partie 2: Spécifications – Specification n° 5: Feuille de tissu de verre époxyde recouverte de cuivre, d'inflammabilité définie (essai de combustion verticale)

Amendment 5

Base materials for printed circuits –

Part 2: Specifications – Specification No. 5: Epoxide woven glass fabric copper-clad laminated sheet of defined flammability (vertical burning test)

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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 3 (1993) and amendment 4 (1994).

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

FDIS	Report on voting
52/844/FDIS	52/866/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 5.

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.

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5.3 Maximum bow and twist

Replace this title by the following title:

5.3 Bow and twist

Replace existing table IV by the following new table IV:

Table IV – Maximum bow and twist

Property	Test method (IEC 61189-2)	Nominal thickness mm	Panel dimension Maximum length mm	Requirement(s) % maximum	
				Copper foil on one side	Copper foil on both sides
Bow and twist	2M01	≥0,8 ≤1,2	≤350	2,0	1,5
			>350 ≤500	1,8	1,3
			>500	1,5	1,0
		>1,2 ≤1,6	≤350	1,5	1,0
			>350 ≤500	1,3	0,8
			>500	1,0	0,5
		>1,6	≤350	1,0	0,5
			>350 ≤500	0,8	0,4
			>500	0,5	0,3
Bow and twist after etching and heating	2M02	Under consideration			

NOTE The requirements for bow and twist apply only to one sided copper-clad laminates with maximum foil thickness of 105 µm (915 g/m²) and double sided copper-clad laminates with maximum foil thickness difference of 70 µm (610 g/m²).

Requirements for laminates beyond these limits shall be subject to agreement between purchaser and supplier.

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Table V

To be deleted.

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Replace table VI as follows:

Table VI

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 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	3.6.7			
Temperature 260 °C (optional)		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.				

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5.6 Solderability

Delete the title and text of this subclause.

5.7 Dimensional stability

Replace the existing table VIII by the following new table VIII.

Table VIII

Property	Test method (subclause of IEC 60249-1)	Nominal thickness mm	Requirement
Dimensional stability	3.11 T = (150 ± 2) °C	0,5 to 0,8 over 0,8 to 6,4	0,5 mm/m max. 0,3 mm/m max.

Add, after subclause 5.7, the following new subclauses:

5.8 Sheet sizes

5.8.1 Typical sheet sizes

Typical sheet sizes 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.		