

**SLOVENSKI STANDARD**  
**SIST EN 60249-2-11:1995/A2:1997**  
**01-avgust-1997**

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**Base materials for printed circuits - Part 2: Specifications - Specification No.11:  
Thin epoxide woven glass fabric copper-clad laminated sheet - General purpose  
grade, for use in the fabrication of multilayer printed boards (IEC 249-2-  
11:1987/A2:1993) - Amendment 2**

Base materials for printed circuits -- Part 2: Specifications -- Specification No. 11: Thin  
epoxide woven glass fabric copper-clad laminated sheet, general purpose grade, for use  
in the fabrication of multilayer printed boards

**iTeh STANDARD PREVIEW**

Basismaterialien für gedruckte Schaltungen -- Teil 2: Einzelbestimmungen --  
Einzelbestimmung Nr. 11: Dünne kupferkaschierte Epoxidharz-Glashartgewebetafeln für  
allgemeine Anwendungszwecke zur Herstellung von Mehrlagenleiterplatten

<https://standards.iteh.ai/catalog/standards/sist/973026a9-d120-475c-ace3-0ce2d502a4f8/sist-en-60249-2-11-1995-a2-1997>

Matériaux de base pour circuits imprimés -- Partie 2: Spécifications -- Spécification n° 11:  
Feuille de stratifié mince en tissu de verre époxyde, recouverte de cuivre, de qualité  
courante, destinée à la fabrication des cartes de câblages imprimées multicouches

**Ta slovenski standard je istoveten z: EN 60249-2-11:1994/A2:1994**

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**ICS:**

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

**SIST EN 60249-2-11:1995/A2:1997 en**

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UDC 621.3.049.75-033.5-41

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

Amendment A2 to the English version of EN 60249-2-11

Base materials for printed circuits  
 Part 2: Specifications  
 Specification No. 11: Thin epoxide woven glass fabric copper-clad laminated sheet, general purpose grade, for use in the fabrication of multilayer printed boards  
 (IEC 249-2-11:1987/A2:1993)

Matériaux de base pour circuits imprimés

Partie 2: Spécifications  
 Spécification n° 11: Feuille de stratifié mince en tissu de verre époxyde, recouverte de cuivre, de qualité courante, destinée à la fabrication des cartes de câblages imprimées multicouches  
 (CEI 249-2-11:1987/A2:1993)

Basismaterialien für gedruckte Schaltungen

Teil 2: Einzelbestimmungen  
 Einzelbestimmung Nr. 11: Dünne kupferkaschierte Epoxidharz-Glashartgewebetafeln für allgemeine Anwendungszwecke zur Herstellung von Mehrlagenleiterplatten  
 (IEC 249-2-11:1987/A2:1993)

This amendment A2 modifies the European Standard EN 60249-2-11:1994. 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

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EN 60249-2-11:1994/A2:1994

FOREWORD

At the request of the 76th Technical Board of CENELEC, amendment 2:1993 to the International Standard IEC 249-2-11:1987 was submitted to the CENELEC members for formal vote.

The text of the International Standard was approved by CENELEC as amendment A2 to EN 60249-2-11 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 249-2-11:1987 was approved by CENELEC as an amendment to the European Standard without any modification.

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SIST EN 60249-2-11:1995/A2:1997

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**NORME  
INTERNATIONALE  
INTERNATIONAL  
STANDARD**

**CEI  
IEC  
249-2-11**

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° 11: Feuille de stratifié mince  
en tissu de verre époxyde, recouverte de cuivre,  
de qualité courante, destinée à la fabrication  
des cartes imprimées multicouches**

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**Amendment 2**

**Base materials for printed circuits**

**Part 2: Specifications**

**Specification No. 11: Thin epoxide woven glass  
fabric copper-clad laminated sheet, general  
purpose grade, for use in the fabrication of  
multilayer printed boards**

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Commission Electrotechnique Internationale  
International Electrotechnical Commission  
Международная Электротехническая Комиссия

CODE PRIX  
PRICE CODE

**E**

Pour prix, voir catalogue en vigueur  
For price, see current catalogue

## 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)387
	52(CO)379	52(CO)388
	52(CO)380	52(CO)389
	52(CO)391	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.

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[SIST EN 60249-2-11:1995/A2:1997](https://standards.iteh.ai/catalog/standards/sist/973026a9-d120-475c-ace3-0ce2d502a4f8/sist-en-60249-2-11-1995-a2-1997)

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#### 4 Electrical properties

*Replace, in table 1, 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

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#### 5.3 Maximum bow and twist

*Replace the sentence:*

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

Page 13, table III

Replace the 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 0,075 N/mm (0,43 lbf/in)	Not less than 0,09 N/mm (0,51 lbf/in)
		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/m <sup>2</sup> , 0,5 oz/ft <sup>2</sup> ); 35 µm (305 g/m <sup>2</sup> , 1 oz/ft <sup>2</sup> ); 70 µm (610 g/m <sup>2</sup> , 2 oz/ft <sup>2</sup> ); 105 µm (915 g/m <sup>2</sup> , 3 oz/ft <sup>2</sup> )				
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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**5.5 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.*

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**5.7 Dimensional stability***Replace the present table V by the following new table V:*

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Table V  
(standards.iteh.ai)

Property	Test method (subclause of IEC 249-1)	Nominal thickness mm	Requirements
Dimensional stability	3.11 $T = (150 \pm 2) ^\circ\text{C}$	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 $\mu\text{m}$ maximum only. For thicknesses of copper greater than 35 $\mu\text{m}$ , 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.