



SLOVENSKI STANDARD

SIST EN 61249-5-4:1997

01-avgust-1997

Materials for interconnection structures - Part 5: Sectional specification set for conductive films with or without coatings - Section 4: Conductive inks (IEC 1249-5-4:1996)

Materials for interconnection structures -- Part 5: Sectional specification set for conductive foils and films with or without coatings -- Section 4: Conductive inks

Materialien für Verbindungsstrukturen -- Teil 5: Rahmenspezifikationen für leitfähige Folien und Filme mit oder ohne Beschichtungen -- Hauptabschnitt 4: Leitfähige Druckfarben

Matériaux pour les structures d'interconnexion -- Partie 5: Collection de spécifications intermédiaires pour feuilles et films conducteurs avec ou sans revêtement -- Section 4: Encres conductrices

Ta slovenski standard je istoveten z: EN 61249-5-4:1996

ICS:

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

SIST EN 61249-5-4:1997

en

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EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN 61249-5-4

August 1996

ICS 31.180

Descriptors: Materials for interconnection structures, sectional specification, conductive foils and films, conductive inks, requirements

English version

Materials for interconnection structures
Part 5: Sectional specification set for conductive foils and films
with or without coatings
Section 4: Conductive inks
(IEC 1249-5-4:1996)

Matériaux pour les structures
d'interconnexion
Partie 5: Collection de spécifications
intermédiaires pour feuilles et films
conducteurs avec ou sans revêtement
Section 4: Encres conductrices
(CEI 1249-5-4:1996)

Materialien für Verbindungsstrukturen
Teil 5: Rahmenspezifikationen für
leitfähige Folien und Filme mit oder
ohne Beschichtungen
Hauptabschnitt 4: Leitfähige
Druckfarben
(IEC 1249-5-4:1996)

This European Standard was approved by CENELEC on 1996-07-02. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard 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 European Standard 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

Foreword

The text of document 52/602/FDIS, future edition 1 of IEC 1249-5-4, prepared by IEC TC 52, Printed circuits, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 61249-5-4 on 1996-07-02.

The following dates were fixed:

- latest date by which the EN has to be implemented
at national level by publication of an identical
national standard or by endorsement (dop) 1997-04-01
- latest date by which the national standards conflicting
with the EN have to be withdrawn (dow) 1997-04-01

Annexes designated "normative" are part of the body of the standard.

Annexes designated "informative" are given for information only.

In this standard, annexes A and ZA are normative and annexes B and C are informative.
Annex ZA has been added by CENELEC.

Endorsement notice

The text of the International Standard IEC 1249-5-4:1996 was approved by CENELEC as a European Standard without any modification.

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Annex ZA (normative)**Normative references to international publications
with their corresponding European publications**

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies (including amendments).

NOTE: When an international publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 68-2-2	1974	Basic environmental testing procedures Part 2: Tests - Test B: Dry heat	EN 60068-2-2 ¹⁾	1993
IEC 68-2-3	1969	Part 2: Tests - Test Ca: Damp heat, steady state	HD 323.2.3 S2 ²⁾	1987
IEC 68-2-20	1979	Part 2: Tests - Test T: Soldering	HD 323.2.20 S3 ³⁾	1988

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1) EN 60068-2-2 includes supplement A:1976 to IEC 68-2-2.
2) HD 323.2.3 S2 includes A1:1984 to IEC 68-2-3.
3) HD 323.2.20 S3 includes A2:1987 to IEC 68-2-20.

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**NORME
INTERNATIONALE
INTERNATIONAL
STANDARD**

**CEI
IEC**

1249-5-4

Première édition
First edition
1996-06

Matériaux pour les structures d'interconnexion –

Partie 5:

**Collection de spécifications intermédiaires
pour feuilles et films conducteurs avec
ou sans revêtement –**

Section 4: Encres conductrices

(standards.iteh.ai)

Materials for interconnection structures –

Part 5:

**Sectional specification set for conductive foils
and films with or without coatings –**

Section 4: Conductive inks

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International Electrotechnical Commission
Международная Электротехническая Комиссия

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For price, see current catalogue

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

MATERIALS FOR INTERCONNECTION STRUCTURES –

Part 5: Sectional specification set for conductive foils
and films with or without coatings –
Section 4: Conductive inks

FOREWORD

- 1) The IEC (International Electrotechnical Commission) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of the IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, the IEC publishes International Standards. Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. The IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
- 2) The formal decisions or agreements of the IEC on technical matters, express as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested National Committees.
- 3) The documents produced have the form of recommendations for international use and are published in the form of standards, technical reports or guides and they are accepted by the National Committees in that sense.
- 4) In order to promote international unification, IEC National Committees undertake to apply IEC International Standards transparently to the maximum extent possible in their national and regional standards. Any divergence between the IEC Standard and the corresponding national or regional standard shall be clearly indicated in the latter. <https://standards.iteh.ai/catalog/standards/sist/fb647a52-b9fb-4ca0-a2bc-9387d0cc5106/sist-en-61249-5-4-1997>
- 5) The IEC provides no marking procedure to indicate its approval and cannot be rendered responsible for any equipment declared to be in conformity with one of its standards.
- 6) Attention is drawn to the possibility that some of the elements of this International Standard may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights.

International standard IEC 1249-5-4 has been prepared by IEC technical committee 52: Printed circuits.

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

FDIS	Report on voting
52/602/FDIS	52/651/RVD

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

Annex A forms an integral part of this standard.

Annexes B and C are for information only.

MATERIALS FOR INTERCONNECTION STRUCTURES –

Part 5: Sectional specification set for conductive foils and films with or without coatings – Section 4: Conductive inks

1 Scope

This specification details requirements for the qualification of conductive inks, and for conductive inks intended for use as a substitute for metallic finishes on contacts.

Information in this specification will also provide guidance regarding the suitability of printed boards which feature conductive inks. Requirements for the release of products using conductive inks should be included in the customer detail specification (CDS).

2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this section of IEC 1249-5. At the time of publication, the editions indicated were valid. All normative documents are subject to revision, and parties to agreements based on this section of IEC 1249-5 are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

IEC 68-2-2: 1974, *Environmental testing – Part 2: Tests – Test B: Dry heat*

IEC 68-2-3: 1969, *Basic environmental testing procedures – Part 2: Tests – Test Ca: Damp heat, steady state*

IEC 68-2-20: 1979, *Environmental testing – Part 2: Tests – Test T: Soldering*

3 Requirements

3.1 Storage properties

Conductive inks, or their component compounds, when stored in their original sealed containers under the supplier's specified environmental conditions, shall retain the specified properties until the final date for use (see 3.2 b).

3.2 Containers and their markings

The conductive ink shall be supplied in sound, clean, dry containers. In addition to any statutory markings, each container in the consignment shall be clearly marked with the following:

- a) the type;
- b) the specified storage temperature and humidity or range thereof, and a final date for use;
- c) details of mixing and curing conditions;
- d) a distinct lot or batch number, and date of manufacture;
- e) the quantity in the container;
- f) the identity of the manufacturer and place of manufacture.

3.3 Electrical properties

3.3.1 Bulk resistance

The bulk resistance of the cured conductive ink shall not exceed the supplier's stated maximum. This should be stated in ohms per square.

3.3.2 Contact resistance

When tested in accordance with future IEC 1189-2*, test 2E16, the contact resistance shall not exceed 100 Ω , unless otherwise permitted by the customer's detail specification (CDS).

3.3.3 Insulation resistance between conductive patterns

When tested in accordance with the conditions given in table 1, the insulation resistance between discrete conductive patterns shall not be less than 100 M Ω , unless otherwise stated in the customer's detail specification (CDS).

The test specimens shall be in accordance with annex A of this specification. A minimum of three samples shall be taken.

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Specimens so tested shall exhibit no electromigration when examined with an approximately 10x magnification.

Table 1 – Test conditions

Material	Test conditions		
	Test environment	Storage duration days	Polarisation voltage (=) V
Paper / phenolic	(93^{+2}_{-3}) % RH (40 $\pm$ 2) °C	4	–
Other substrates	(93^{+2}_{-3}) % RH (40 $\pm$ 2) °C	21	100

* See annex C (Bibliography).