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INTERNATIONAL STANDARD

**Test methods for electrical materials, printed boards and other interconnection structures and assemblies –
Part 3: Test methods for interconnection structures (printed boards)**

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

TEST METHODS FOR ELECTRICAL MATERIALS, PRINTED BOARDS AND OTHER INTERCONNECTION STRUCTURES AND ASSEMBLIES –

Part 3: Test methods for interconnection structures (printed boards)

FOREWORD

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International Standard IEC 61189-3 has been prepared by IEC technical committee 91: Electronics assembly technology.

This second edition cancels and replaces the first edition, published in 1997, its amendment 1 (1999) and constitutes a technical revision.

The document 91/698/FDIS, circulated to the National Committees as Amendment 2, led to the publication of the new edition.

The major technical changes with regard to the previous edition concern the addition of 25 new tests, as follows:

- 6 V: Visual test methods: 3V01, 3V02 and 3V03;
- 7 D: Dimensional test methods: 3D03;

- 8 C: Chemical test methods: 3C02, 3C13 and 3C14;
- 9 M: Mechanical test methods: 3M01, 3M03, 3M04, 3M07 and 3M09;
- 10 E: Electrical test methods: 3E03, 3E04, 3E05, 3E11, 3E12, 3E13, 3E16, 3E17 and 3E18;
- 11 N: Environmental test methods: 3N03, 3N07 and 3N12;
- 12 X: Miscellaneous test methods: 3X01

This edition also includes the deletion of Annex B: Conversion table, as the referred documents were disbanded in 2005 and do not officially exist. Should any one wish to consult such information, they should refer to the first edition of IEC 61189-3 (1997).

The text of this standard is based on the first edition, its Amendment 1 and the following documents:

FDIS	Report on voting
91/698/FDIS	91/727/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.

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

A list of all the parts in the IEC 61189 series, under the general title *Test methods for electrical materials, printed boards and other interconnection structures and assemblies*, can be found on the IEC website.

NOTE Future standards in this series will carry the new general title as cited above. Titles of existing standards in this series will be updated at the time of the next edition.

This standard should be used in conjunction with the following parts:

- Part 1: General test methods and methodology
 - Part 2: Test methods for materials for interconnection structures
 - Part 3: Test methods for electronic components assembling characteristics
 - Part 5: Test methods printed board assemblies and also the following standard
 - Part 6: Test methods for materials used in manufacturing electronic assemblies
- IEC 60068 (all parts), Environmental testing

The committee has decided that the contents of the base publication and its amendments will remain unchanged until the maintenance result date indicated on the IEC web site under "<http://webstore.iec.ch>" in the data related to the specific publication. At this date, the publication will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

A bilingual version of this publication may be issued at a later date.

INTRODUCTION

IEC 61189 relates to test methods for printed boards and printed board assemblies, as well as related materials or component robustness, irrespective of their method of manufacture.

The standard is divided into separate parts, covering information for the designer and the test methodology engineer or technician. Each part has a specific focus; methods are grouped according to their application and numbered sequentially as they are developed and released.

In some instances test methods developed by other TCs (e.g. TC 50) have been reproduced from existing IEC standards in order to provide the reader with a comprehensive set of test methods. When this situation occurs, it will be noted on the specific test method; if the test method is reproduced with minor revision, those paragraphs that are different are identified.

This part of IEC 61189 contains test methods for evaluating printed boards and other forms of interconnection structures. The methods are self-contained, with sufficient detail and description so as to achieve uniformity and reproducibility in the procedures and test methodologies.

The tests shown in this standard are grouped according to the following principles:

- P: preparation/conditioning methods
- V: visual test methods
- D: dimensional test methods
- C: chemical test methods
- M: mechanical test methods
- E: electrical test methods
- N: environmental test methods
- X: miscellaneous test methods

To facilitate reference to the tests, to retain consistency of presentation, and to provide for future expansion, each test is identified by a number (assigned sequentially) added to the prefix (group code) letter showing the group to which the test method belongs.

The test method numbers have no significance with respect to an eventual test sequence; that responsibility rests with the relevant specification that calls for the method being performed. The relevant specification, in most instances, also describes pass/fail criteria.

The letter and number combinations are for reference purposes, to be used by the relevant specification. Thus "3D02" represents the second dimensional test method described in this publication.

In short, for this example, 3 is the part of IEC standard (61189-3), D is the group of methods, and 02 is the test number.

A list of all test methods included in this standard, as well as those under consideration is given in Annex B. This annex will be reissued whenever new tests are introduced.

TEST METHODS FOR ELECTRICAL MATERIALS, PRINTED BOARDS AND OTHER INTERCONNECTION STRUCTURES AND ASSEMBLIES –

Part 3: Test methods for interconnection structures (printed boards)

1 Scope

This part of IEC 61189 is a catalogue of test methods representing methodologies and procedures that can be applied to test materials used for manufacturing interconnection structures (printed boards) and assemblies.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 60051 (all parts), *Direct acting indicating analogue electrical measuring instruments and their accessories*

IEC 60068-1: 1988, *Environmental testing – Part 1: General and guidance*

IEC 60068-2-20: 1979, *Environmental testing – Part 2: Tests – Test T: Soldering*
Amendment 2 (1987)

IEC 60068-2-78, *Environmental testing – Part 2-78: Tests – Test Cab: Damp heat, steady state*

IEC 60169–15, *Radio-frequency connectors – Part 15: RF coaxial connectors with inner diameter of outer conductor 4,13 mm (0,163 in) with screw coupling – Characteristic impedance 50 ohms (Type SMA)*

IEC 60454-1:1992, *Specifications for pressure-sensitive adhesive tapes for electrical purposes – Part 1: General requirements*

IEC 60454-3-1:1998, *Pressure-sensitive adhesive tapes for electrical purposes – Part 3: Specifications for individual materials – Sheet 1: PVC film tapes with pressure-sensitive adhesive*

IEC 60584-1, *Thermocouples – Part 1: reference tables*

IEC 60695-11-5, *Fire hazard testing – Part 11-5: Test flames – Needle flame test method – Apparatus, confirmatory test arrangement and guidance*

IEC 61188-1-2:1988, *Printed boards and printed board assemblies – Design and use – Part 1-2: Generic requirements – Controlled impedance*

IEC 61189-1:1997, *Test methods for electrical materials, interconnection structures and assemblies – Part 1: General test methods and methodology*

IEC 61190-1-1, *Attachment materials for electronic assembly – Part 1-1: Requirements for soldering fluxes for high quality interconnections in electronics assembly*

IEC 61190-1-2, *Attachment materials for electronic assembly – Part 1-2: Requirements for*

solder pastes for high quality interconnections in electronic assembly

IEC 62326-4:1996, *Printed boards – Part 4: Rigid multilayer printed boards with interlayer connections – Sectional specification*

IEC 62326-4-1:1996, *Printed boards – Part 4: Rigid multilayer printed boards with interlayer connections – Sectional specification – Section 1: Capability Detail Specification – Performance levels A, B and C*

ISO 4046:1978, *Paper, board, pulp and related terms – Vocabulary (withdrawn)*¹

ISO 9002:1994, *Quality systems – Model for quality assurance in production, installation and servicing (withdrawn)*

ISO 9453:2006, *Soft solder alloys – Chemical compositions and forms*

¹ ISO 4046 has been withdrawn and replaced by ISO 4046: Parts 1 to 5.