BS IEC 61189-5-4:2015

BSI Standards Publication

Test methods for electrical materials, printed boards and other interconnection structures and assemblies

Part 5-4: General test methods for materials and assemblies — Solder alloys and fluxed and non-fluxed solid wire for printed board assemblies

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National foreword

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The UK participation in its preparation was entrusted to Technical Committee EPL/501, Electronic Assembly Technology.

A list of organizations represented on this committee can be obtained on request to its secretary.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

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

Part 5-4: General test methods for materials and assemblies – Solder alloys and fluxed and non-fluxed solid wire for printed board assemblies

FOREWORD

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International Standard IEC 61189-5-4 has been prepared by IEC technical committee 91: Electronics assembly technology.

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

FDIS	Report on voting
91/1212/FDIS	91/1225/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.

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

This International Standard is used in conjunction with IEC 61189-1:1997, IEC 61189-2:2006, IEC 61189-3:2007.

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

The committee has decided that the contents of this publication will remain unchanged until the stability date indicated on the IEC website 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- withdrawn,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.

INTRODUCTION

IEC 61189 relates to test methods for materials or component robustness for printed board assemblies, 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 (for example, TC 104) 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 robustness of materials or component for printed board assemblies. 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 a possible 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 "5-4C01" represents the first chemical test method described in IEC 61189-5-4.

In short, in this example, 5-4 is the number of the part of IEC 61189, C is the group of methods, and 01 is the test number.

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

Part 5-4: General test methods for materials and assemblies – Solder alloys and fluxed and non-fluxed solid wire for printed board assemblies

1 Scope

This part of IEC 61189 is a catalogue of test methods representing methodologies and procedures that can be applied to test printed board assemblies.

This part of IEC 61189 focuses on test methods for solder alloys, fluxed and non-fluxed solid wire, based on existing IEC 61189-5 and IEC 61189-6. In addition, it includes test methods for solder alloys, fluxed and non-fluxed solid wire, and for lead free soldering.

2 Normative references

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

IEC 61189-5, *Test methods for electrical materials, interconnection structures and assemblies – Part 5: Test methods for printed board assemblies*

IEC 61189-6, *Test methods for electrical materials, interconnection structures and assemblies – Part 6: Test methods for materials used in manufacturing electronic assemblies*

IEC 61190-1-3, *Attachment materials for electronic assembly – Part 1-3: Requirements for electronic grade solder alloys and fluxed and non-fluxed solid solders for electronic soldering applications*

3 Accuracy, precision and resolution

3.1 General

Errors and uncertainties are inherent in all measurement processes. The information given below enables valid estimates of the amount of error and uncertainty to be taken into account.

Test data serve a number of purposes which include

– monitoring of a process;
– enhancing of confidence in quality conformance;
– arbitration between customer and supplier.

In any of these circumstances, it is essential that confidence can be placed upon the test data in terms of

– accuracy: calibration of the test instruments and/or system;
– precision: the repeatability and uncertainty of the measurement;