



SLOVENSKI STANDARD

SIST EN 61189-5-2:2015

01-september-2015

**Preskusne metode za električne materiale, povezovalne strukture in sestave - 5-2.
del: Preskusne metode za sestave plošč tiskanih vezij: spajkalno talilo**

Test methods for electrical materials, interconnection structures and assemblies - Part 5-2: Test methods for printed board assemblies: Soldering flux

iTeh STANDARD PREVIEW
(standards.iteh.ai)

Ta slovenski standard je istoveten z: EN 61189-5-2:2015
<https://standards.iteh.ai/catalog/standards/sist/01a7bb7f-25e5-4ed7-8ae4-9644a46a0179/sist-en-61189-5-2-2015>

ICS:

31.180	Tiskana vezja (TIV) in tiskane plošče	Printed circuits and boards
31.190	Sestavljeni elektronski elementi	Electronic component assemblies

SIST EN 61189-5-2:2015

en

iTeh STANDARD PREVIEW
(standards.iteh.ai)

SIST EN 61189-5-2:2015

<https://standards.iteh.ai/catalog/standards/sist/0fa7bb7f-23e5-4ed7-8ae4-9644a46a0179/sist-en-61189-5-2-2015>

EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN 61189-5-2

March 2015

ICS 31.180

English Version

**Test methods for electrical materials, printed boards and other
interconnection structures and assemblies - Part 5-2: General
test methods for materials and assemblies - Soldering flux for
printed board assemblies
(IEC 61189-5-2:2015)**

Méthodes d'essai pour les matériaux électriques, les cartes
imprimées et autres structures d'interconnexion et
ensembles - Partie 5-2: Méthodes d'essai générales pour
les matériaux et les assemblages - Flux de brasage pour
les assemblages de cartes imprimées
(IEC 61189-5-2:2015)

Prüfverfahren für Elektromaterialien, Verbindungsstrukturen
und Baugruppen - Teil 5-2: Prüfverfahren für bestückte
Leiterplatten - Teil Lötflusmittel
(IEC 61189-5-2:2015)

STANDARD PREVIEW
(standards.iteh.ai)

This European Standard was approved by CENELEC on 2015-02-12. 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 CEN-CENELEC Management Centre or to any CENELEC member.

<https://standards.iteh.ai/catalog/standards/sist/0fa7bb7f-23e5-4ed7-8ae4-4a7e9a71793a/en-61189-5-2-2015>

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 CEN-CENELEC Management Centre has the same status as the official versions.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Bulgaria, Croatia, Cyprus, the Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.



European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels

Foreword

The text of document 91/1210/FDIS, future edition 1 of IEC 61189-5-2, prepared by IEC/TC 91 "Electronics assembly technology" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN 61189-5-2:2015.

The following dates are fixed:

- latest date by which the document has to be (dop) 2015-11-12
implemented at national level by
publication of an identical national
standard or by endorsement
- latest date by which the national (dow) 2018-02-12
standards conflicting with the
document have to be withdrawn

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CENELEC [and/or CEN] shall not be held responsible for identifying any or all such patent rights.

Endorsement notice

The text of the International Standard IEC 61189-5-2:2015 was approved by CENELEC as a European Standard without any modification.

In the official version, for Bibliography, the following notes have to be added for the standards indicated:

IEC 60068 Series	NOTE	Harmonized as EN 60068 Series.
IEC 60068-1:2013	NOTE	Harmonized as EN 60068-1:2014 (not modified).
IEC 60068-2-20	NOTE	Harmonized as EN 60068-2-20.
IEC 61189-1	NOTE	Harmonized as EN 61189-1.
IEC 61189-2	NOTE	Harmonized as EN 61189-2.
IEC 61189-3	NOTE	Harmonized as EN 61189-3.
IEC 61190-1-2	NOTE	Harmonized as EN 61190-1-2.
IEC 61249-2-7	NOTE	Harmonized as EN 61249-2-7.
IEC 62137:2004	NOTE	Harmonized as EN 62137:2004 (not modified).
ISO 9001	NOTE	Harmonized as EN ISO 9001.

Annex ZA (normative)

Normative references to international publications with their corresponding European publications

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.

NOTE 1 When an International Publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

NOTE 2 Up-to-date information on the latest versions of the European Standards listed in this annex is available here: www.cenelec.eu

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 61189-5	-	Test methods for electrical materials, interconnection structures and assemblies - Part 5: Test methods for printed board assemblies	EN 61189-5	-
IEC 61189-6	-	Test methods for electrical materials, interconnection structures and assemblies - Part 6: Test methods for materials used in manufacturing electronic assemblies	EN 61189-6	-
IEC 61190-1-1	-	Attachment materials for electronic assembly Part 1-1: Requirements for soldering fluxes for high-quality interconnections in electronics assembly	EN 61190-1-1	-
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	EN 61190-1-3	-
ISO 9455	Series	Soft soldering fluxes - Test methods	EN ISO 9455	Series
ISO 9455-1	-	Soft soldering fluxes - Test methods - Part 1: Determination of non-volatile matter, gravimetric method	EN 29455-1	-
ISO 9455-2	-	Soft soldering fluxes - Test methods - Part 2: Determination of non-volatile matter, ebulliometric method	EN ISO 9455-2	-

iTeh STANDARD PREVIEW
(standards.iteh.ai)

SIST EN 61189-5-2:2015

<https://standards.iteh.ai/catalog/standards/sist/0fa7bb7f-23e5-4ed7-8ae4-9644a46a0179/sist-en-61189-5-2-2015>



IEC 61189-5-2

Edition 1.0 2015-01

INTERNATIONAL STANDARD

NORME INTERNATIONALE

**Test methods for electrical materials, printed boards and other interconnection structures and assemblies –
Part 5-2: General test methods for materials and assemblies – Soldering flux for printed board assemblies**

SIST EN 61189-5-2:2015

<https://standards.iteh.ai/catalog/standards/sist/0fa7bb7f-23e5-4ed7-8ae4-964b261a701e/iec-61189-5-2:2015>

**Méthodes d'essai pour les matériaux électriques, les cartes imprimées et autres structures d'interconnexion et ensembles –
Partie 5-2: Méthodes d'essai générales pour les matériaux et les assemblages –
Flux de brasage pour les assemblages de cartes imprimées**

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

COMMISSION
ELECTROTECHNIQUE
INTERNATIONALE

ICS 31.180

ISBN 978-2-8322-1997-3

**Warning! Make sure that you obtained this publication from an authorized distributor.
Attention! Veuillez vous assurer que vous avez obtenu cette publication via un distributeur agréé.**

CONTENTS

FOREWORD	5
INTRODUCTION	7
1 Scope	8
2 Normative references	8
3 Accuracy, precision and resolution	8
3.1 General	8
3.2 Accuracy	9
3.3 Precision	9
3.4 Resolution	10
3.5 Report	10
3.6 Student's t distribution	10
3.7 Suggested uncertainty limits	11
4 C: Chemical test methods	12
4.1 Test 5-2C01: Corrosion, flux	12
4.1.1 Object	12
4.1.2 Test specimen	12
4.1.3 Apparatus and reagents	12
4.1.4 Procedures	12
4.1.5 Additional information	14
4.2 Test 5-2C02: Determination of acid value of liquid soldering flux potentiometric and visual titration methods	14
4.2.1 Object	14
4.2.2 Test specimen	14
4.2.3 Apparatus and reagents	14
4.2.4 Procedures	15
4.2.5 Additional information	16
4.3 Test 5-2C03: Acid number of rosin	16
4.4 Test 5-2C04: Determination of halides in fluxes, silver chromate method	16
4.4.1 Object	16
4.4.2 Test specimen	17
4.4.3 Apparatus and reagents	17
4.4.4 Procedure	17
4.4.5 Evaluation	17
4.4.6 Additional information	17
4.5 Test 5-2C05: Solids content, flux	18
4.5.1 Object	18
4.5.2 Test specimen	18
4.5.3 Apparatus and reagents	18
4.5.4 Procedures	19
4.5.5 Evaluation	19
4.5.6 Additional information	19
4.6 Test 5-2C06: Quantitative determination of halide content in fluxes (chloride and bromide)	19
4.6.1 Object	19
4.6.2 Test specimen	20
4.6.3 Apparatus and reagents	20

4.6.4	Procedure.....	21
4.6.5	Calculations.....	22
4.6.6	Report	23
4.6.7	Additional information	23
4.7	Test 5-2C07: Qualitative analysis of fluorides and fluxes by spot test.....	24
4.7.1	Object.....	24
4.7.2	Test specimen	24
4.7.3	Apparatus and reagents.....	24
4.7.4	Procedure.....	24
4.8	Test 5-2C08: Quantitative determination of fluoride concentration in fluxes.....	24
4.8.1	Object.....	24
4.8.2	Test specimen	25
4.8.3	Apparatus and reagents.....	25
4.8.4	Procedure.....	25
4.8.5	Additional information	27
4.8.6	Informative references	27
4.9	Test 5-2C09: Specific gravity	27
4.9.1	Object.....	27
4.9.2	Test specimen	27
4.9.3	Apparatus	28
4.9.4	Test procedure	28
4.9.5	Evaluation	28
4.10	Test 5-2C10: Flux induced corrosion (copper mirror method)	28
4.10.1	Object.....	28
4.10.2	Test specimen	28
4.10.3	Apparatus and reagents.....	28
4.10.4	Procedure.....	29
4.10.5	Evaluation	29
4.10.6	Additional information	30
4.10.7	Reference documents	30
5	X: Miscellaneous test methods	30
5.1	Test 5-2X01: Liquid flux activity, wetting balance method.....	30
5.1.1	Object.....	30
5.1.2	Test specimen	30
5.1.3	Apparatus and reagents.....	31
5.1.4	Procedure.....	31
5.1.5	Evaluation	31
5.1.6	Additional information	31
5.2	Test 5-2X02: Spread test, liquid or extracted solder flux, solder paste and extracted cored wires or preforms	34
5.2.1	Object.....	34
5.2.2	Method A	34
5.2.3	Method B	35
5.2.4	Additional information	37
5.3	Test 5-2X03: Flux residues – Tackiness after drying	37
5.3.1	Object.....	37
5.3.2	Test specimen	37
5.3.3	Apparatus and reagents.....	37
5.3.4	Procedure.....	38

5.3.5	Evaluation	39
5.3.6	Additional information	39
Bibliography	40
Figure 1 – Chlorides and/or bromides test results		18
Figure 2 – Test equipment of specific gravity (hydrometer reading).....		28
Figure 3 – Flux type classification by copper mirror test		30
Figure 4 – Wetting balance apparatus		32
Figure 5 – Wetting balance curve		33
Table 1 – Student's t distribution		11
Table 2 – Relation between halide content and mass of specimen		22
Table 3 – Mixing ratio from specimen size to water quantity		25
Table 4 – Specimen size to chloroform mixture		26
Table 5 – Typical spread areas defined in mm ²		35

iTeh STANDARD PREVIEW (standards.iteh.ai)

[SIST EN 61189-5-2:2015](https://standards.iteh.ai/catalog/standards/sist/0fa7bb7f-23e5-4ed7-8ae4-9644a46a0179/sist-en-61189-5-2-2015)

<https://standards.iteh.ai/catalog/standards/sist/0fa7bb7f-23e5-4ed7-8ae4-9644a46a0179/sist-en-61189-5-2-2015>

INTERNATIONAL ELECTROTECHNICAL COMMISSION

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

Part 5-2: General test methods for materials and assemblies – Soldering flux for printed board assemblies

FOREWORD

- 1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of 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, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). 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. 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 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 IEC National Committees.
- 3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
- 4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
- 5) IEC itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.
- 6) All users should ensure that they have the latest edition of this publication.
- 7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
- 8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
- 9) Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights.

International Standard IEC 61189-5-2 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
91/1210/FDIS	91/1223/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 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.

iTeh STANDARD PREVIEW (standards.iteh.ai)

[SIST EN 61189-5-2:2015](https://standards.iteh.ai/catalog/standards/sist/0fa7bb7f-23e5-4ed7-8ae4-9644a46a0179/sist-en-61189-5-2-2015)

<https://standards.iteh.ai/catalog/standards/sist/0fa7bb7f-23e5-4ed7-8ae4-9644a46a0179/sist-en-61189-5-2-2015>

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 revisions, 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 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 "5-2C01" represents the first chemical test method described in IEC 61189-5-2.

In short, in this example, 5-2 is the number of the part of IEC 61189, C is the group of methods, and 01 is the test number.

ITEH STANDARD PREVIEW
(standards.iteh.ai)

SIST EN 61189-5-2:2015

<https://standards.iteh.ai/catalog/standards/sist/0fa7bb7f-23e5-4ed7-8ae4-9644a46a0179/sist-en-61189-5-2-2015>