SLOVENSKI STANDARD

SIST EN 60068-2-58:2005

september 2005

Okoljsko preskušanje – 2-58. del: Preskusi - Preskus Td: Preskusna metoda za spajkanje, odpornost površinsko montiranih komponent (SMD) proti razkrajanju pokovinjenja in vročini spajke

Environmental testing – Part 2-58: Tests – Test Td: Test methods for solderability, resistance to dissolution of metallization and to soldering heat of surface mounting devices (SMD)

ICS 19.040; 31.190

Referenčna številka
SIST EN 60068-2-58:2005(en)

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 60068-2-58

October 2004

ICS 19.040; 31.190

Supersedes EN 60068-2-58:1999

English version

Environmental testing
Part 2-58: Tests –
Test Td: Test methods for solderability, resistance to dissolution of metallization and to soldering heat of surface mounting devices (SMD)

(IEC 60068-2-58:2004)

Essais d'environnement
Partie 2-58: Essais –
Essai Td: Méthodes d'essai
de la soudabilité, de la résistance
de la métallisation à la dissolution
et de la résistance à la chaleur
de soudage des composants
pour montage en surface (CMS)
(CEI 60068-2-58:2004)

Umweltprüfungen
Teil 2-58: Prüfungen –
Prüfung Td: Prüfverfahren für
Lötbarkeit, Widerstandsfähigkeit
gegenüber Auflösen der Metallisierung
und Lötwärmebeständigkeit
bei oberflächenmontierbaren
Bauelementen (SMD)
(IEC 60068-2-58:2004)

This European Standard was approved by CENELEC on 2004-09-01. 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, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Slovakia, Slovenia, 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

Ref. No. EN 60068-2-58:2004 E

Foreword

The text of document 91/447/FDIS, future edition 3 of IEC 60068-2-58, prepared by IEC TC 91, Electronics assembly technology, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 60068-2-58 on 2004-09-01.

This European Standard supersedes EN 60068-2-58:1999.

This European Standard includes the following significant technical changes with respect to EN 60068-2-58:1999:

– expansion of the scope so that it includes lead-free solder alloy in addition to the existing tin-lead eutectic or near eutectic solder alloy (the structure of the document has been changed accordingly);

– addition of the definitions "solderability" and "resistance to soldering heat" for SMDs;

– specification of the re flow temperature profiles for the resistance to soldering heat using lead-free solder;

– addition of an Annex C enabling a quick overview of the test conditions.

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) 2004-12-01

– latest date by which the national standards conflicting with the EN have to be withdrawn (dow) 2005-06-01

Annex ZA has been added by CENELEC.

Endorsement notice

The text of the International Standard IEC 60068-2-58:2004 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 60068-2-4	NOTE	Harmonized as EN 60068-2-4:1995 (not modified).
IEC 60068-2-54	NOTE	Harmonized as EN 60068-2-54:1987 (not modified).
IEC 60068-2-69	NOTE	Harmonized as EN 60068-2-69:1996 (not modified).

Annex ZA
(normative)

Normative references to international publications with their corresponding European publications

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.

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

Publication	Year	Title	EN/HD	Year
IEC 60068-1	1988	Environmental testing Part 1: General and guidance	EN 60068-1 [1)]	1994
IEC 60068-2-20	1979	Part 2: Tests - Test T: Soldering	HD 323.2.20 S3 [2)]	1988
IEC 60194	1999	Printed board design, manufacture and assembly - Terms and definitions	-	-
IEC 60749-20	2002	Semiconductor devices - Mechanical and climatic test methods Part 20: Resistance of plastic-encapsulated SMDs to the combined effect of moisture and soldering heat	EN 60749-20	2003
IEC 61190-1-1	2002	Attachment materials for electronic assembly Part 1-1: Requirements for soldering fluxes for high-quality interconnections in electronics assembly	EN 61190-1-1	2002
IEC 61190-1-2	2002	Attachment materials for electronic assembly Part 1-2: Requirements for solder pastes for high-quality interconnections in electronics assembly	EN 61190-1-2	2002
IEC 61190-1-3	2002	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	2002
IEC 61191-2	1998	Printed board assemblies Part 2: Sectional specification - Requirements for surface mount soldered assemblies	EN 61191-2	1998

1) EN 60068-1 includes corrigendum October 1988 + A1:1992 to IEC 60068-1:1988.

2) HD 323.2.20 S3 includes A2:1987 to IEC 60068-2-20.

Publication	Year	Title	EN/HD	Year
IEC 61249-2-7	2002	Materials for printed boards and other interconnecting structures Part 2-7: Reinforced base materials clad and unclad - Epoxide woven E-glass laminated sheet of defined flammability (vertical burning test), copper-clad	EN 61249-2-7	2002
IEC 61760-1	1998	Surface mounting technology Part 1: Standard method for the specification of surface mounting components (SMDs)	EN 61760-1	1998

NORME INTERNATIONALE

INTERNATIONAL STANDARD

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Troisième édition
Third edition
2004-07

Essais d'environnement –

Partie 2-58:
Essais – Essai Td: Méthodes d'essai de la soudabilité, résistance de la métallisation à la dissolution et résistance à la chaleur de brasage des composants pour montage en surface (CMS)

Environmental testing –

Part 2-58:
Tests – Test Td: Test methods for solderability, resistance to dissolution of metallization and to soldering heat of surface mounting devices (SMD)

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International Electrotechnical Commission
Международная Электротехническая Комиссия

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For price, see current catalogue

CONTENTS

FOREWORD....5
1 Scope and object....9
2 Normative references....9
3 Terms and definitions....11
4 Grouping of soldering processes using lead-free solder alloys....11
5 Preconditioning....13
6 Solder bath method....13
6.1 Test apparatus and materials for the solder bath method....13
6.2 Test procedure for solder bath method....15
7 Solder reflow methods....17
7.1 Test apparatus and materials for solder reflow methods....17
7.2 Test procedure for the solder reflow method....21
8 Test conditions....23
8.1 Test conditions for lead-free solder alloys....23
8.2 Test conditions for lead containing solder alloy....27
9 Final measurements....31
9.1 Flux removal....31
9.2 Recovery conditions....31
9.3 Evaluation....33
10 Information to be given in the relevant specification....35

Annex A (normative) Criteria for visual examination....39
Annex B (informative) Guidance....43
Annex C (informative) Overview of test conditions....49

Bibliography....53

Figure 1 – Examples of immersion....17
Figure 2 – Reflow temperature profile....23
Figure 3 – Identification of areas on metallic termination....33
Figure A.1 – Evaluation of wetting....41

Table 1 – Grouping of soldering processes related to lead-free solder alloys....13
Table 2 – Severities (duration and temperatures) – Solder bath method – Lead-free solder alloys....25
Table 3 – Reflow temperature profile for wetting – Lead-free solder alloys....25
Table 4 – Reflow temperature profile for resistance to soldering heat – Lead-free solder alloys....27
Table 5 – Severities (duration and temperature)....27
Table 6 – Reflow temperature profile for wetting – Lead containing solder alloys....29
Table 7 – Reflow temperature profile for resistance to soldering heat – Lead containing solder alloys....31
Table C.1 – Overview of the temperature and duration conditions....51

INTERNATIONAL ELECTROTECHNICAL COMMISSION

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ENVIRONMENTAL TESTING –

Part 2-58: Tests – Test Td: Test methods for solderability, resistance to dissolution of metallization and to soldering heat of surface mounting devices (SMD)

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.
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International Standard IEC 60068-2-58 has been prepared by IEC technical committee 91: Electronics assembly technology.

This edition includes the following significant technical changes with respect to the previous edition:

– expansion of the scope so that it includes lead-free solder alloy in addition to the existing tin-lead eutectic or near eutectic solder alloy (the structure of the document has been changed accordingly);
– addition of the definitions of "solderability" and "resistance to soldering heat" for SMDs;
– specification of the reflow temperature profiles for the resistance to soldering heat using lead-free solder;
– addition of an Annex C enabling a quick overview of the test conditions.

This bilingual version (2005-02) replaces the English version.

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

FDIS	Report on voting
91/447/FDIS	91/459/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.

The French version of this standard has not been voted upon.

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

The committee has decided that the contents of this publication 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.

ENVIRONMENTAL TESTING –

Part 2-58: Tests – Test Td: Test methods for solderability, resistance to dissolution of metallization and to soldering heat of surface mounting devices (SMD)

1 Scope and object

This part of IEC 60068 outlines test Td, applicable to surface mounting devices (SMD), which are intended to mount on substrates. This standard provides the standard procedures for solder alloys containing lead (Pb) and for lead-free solder alloys.

This standard provides standard procedures for determining the solderability and resistance of soldering heat to lead-free solder alloys.

This standard provides standard procedures for determining the solderability, dissolution of metallization (see B.3.3) and resistance of soldering heat to solder alloys which are eutectic or near eutectic tin lead solders.

The procedures in this standard include the solder bath method and reflow method. The solder bath method is applicable to the SMD designed for flow soldering and the SMD designed for reflow soldering when the solder bath (dipping) method is appropriate. The reflow method is applicable to the SMD designed for reflow soldering, to determine the suitability of SMD for reflow soldering and when the solder bath (dipping) method is not appropriate.

The objective of this standard is to ensure that component lead or termination solderability meets the applicable solder joint requirements of IEC 61191-2 using each of the soldering methods specified in IEC 61760-1. In addition, test methods are provided to ensure that the component body can resist against the heat load to which it is exposed during soldering.

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

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

IEC 60194:1999, *Printed board design, manufacture and assembly – Terms and definitions*

IEC 60749-20:2002, *Semiconductor devices – Mechanical and climatic test methods – Part 20: Resistance of plastic-encapsulated SMDs to the combined effect of moisture and soldering heat*

IEC 61190-1-1:2002, *Attachment materials for electronic assembly – Part 1-1: Requirements for soldering fluxes for high-quality interconnections in electronic assembly*

IEC 61190-1-2:2002, *Attachment materials for electronic assembly – Part 1-2: Requirements for solder pastes for high-quality interconnections in electronic assembly*

IEC 61190-1-3:2002, *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*

IEC 61191-2:1998, *Printed board assemblies – Part 2: Sectional specification – Requirements for surface mount soldered assemblies*

IEC 61249-2-7:2002, *Materials for printed boards and other interconnecting structures – Part 2-7: Reinforced base materials clad and unclad – Epoxide woven E-glass laminated sheet of defined flammability (vertical burning test), copper-clad*

IEC 61760-1:1998, *Surface mounting technology – Part 1: Standard method for the specification of surface mounting components (SMDs)*

3 Terms and definitions

For the purposes of this document, the terms and definitions as defined in IEC 60068-1, IEC 60068-2-20, IEC 60194, as well as the following apply.

3.1
solderability
ability of the termination or electrode of SMD to be wetted by solder at the temperature of the termination or electrode which is assumed to be the lowest temperature in the soldering process within solderable temperature of solder alloy

3.2
resistance to soldering heat
ability of SMD to withstand the highest temperature of the termination or electrode in soldering process, within applicable temperature range of solder alloy

4 Grouping of soldering processes using lead-free solder alloys

The melting temperatures of lead-free solder alloys selected currently for industrial processes are significantly different from those for Sn-Pb solder alloy. Moreover, the melting temperatures of lead-free solder alloys are different from each other but can be clustered in groups.

According to the ability of the SMD to withstand the typical temperature and dwell time conditions that match the exposure to the processes using the selected lead-free alloys, the following groups of soldering processes outlined in Table 1 are given as a a guideline for selecting the severities for the wetting and resistance tests against the specified soldering heat: