

CONSOLIDATED 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)**



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(SMD)**

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CONTENTS

FOREWORD	5
1 Scope	7
2 Normative references	7
3 Terms and definitions	8
4 Grouping of soldering processes and related test severities	9
5 Test equipment.....	10
5.1 Solder bath	10
5.2 Reflow equipment	10
6 Test Td ₁ : Solderability of terminations.....	11
6.1 Object and general description of the test	11
6.2 Specimen preparation	11
6.3 Accelerated ageing	11
6.4 Initial measurements.....	11
6.5 Method 1: Solder bath.....	11
6.5.1 Solder bath	11
6.5.2 Solder and flux	11
6.5.3 Test procedure and conditions.....	12
6.6 Method 2: Reflow	14
6.6.1 Reflow equipment.....	14
6.6.2 Solder paste	14
6.6.3 Test substrates.....	14
6.6.4 Test procedure	14
6.6.5 Reflow temperature profile for Test Td ₁	15
6.6.6 Test conditions	16
7 Test Td ₂ : Resistance to soldering heat.....	16
7.1 Object and general description of the test	16
7.2 Specimen preparation	16
7.3 Preconditioning	16
7.4 Initial measurements.....	16
7.5 Method 1: Solder bath.....	17
7.5.1 Solder bath	17
7.5.2 Solder and flux	17
7.5.3 Test procedure and conditions.....	17
7.6 Method 2: Reflow	19
7.6.1 Reflow equipment.....	19
7.6.2 Solder paste	19
7.6.3 Test substrates.....	19
7.6.4 Test procedure and conditions.....	19
8 Test Td ₃ : Dewetting and resistance to dissolution of metallization	21
8.1 Object and general description of the test	21
8.2 Specimen preparation	21
8.3 Initial measurements.....	22
8.4 Method 1: Solder bath.....	22
8.4.1 Solder bath	22
8.4.2 Solder and flux	22

8.4.3	Test procedure and conditions	22
8.5	Method 2: Reflow	22
8.5.1	Reflow equipment	22
8.5.2	Specimen	22
8.5.3	Solder paste	22
8.5.4	Flux	22
8.5.5	Reflow profile	22
8.5.6	Placement of the specimen	23
8.5.7	Application of the reflow profile	23
8.5.8	Evaluation	23
9	Final measurements	23
9.1	Flux removal	23
9.2	Recovery conditions	23
9.3	Evaluation	23
9.3.1	Wetting	23
9.3.2	Dewetting	24
9.3.3	Resistance to soldering heat	25
9.3.4	Resistance to dissolution of metallization	25
10	Information to be given in the relevant specification	25
10.1	General	25
10.2	Solderability	25
10.3	Resistance to soldering heat, dewetting and resistance to dissolution of metallization	26
Annex A (normative)	Criteria for visual examination	27
A.1	Evaluation of wetting	27
A.1.1	General	27
A.1.2	Evaluation of Criteria for wetting	27
A.1.3	Evaluation of method 2 (Td₁) Additional criteria for wetting, method 2	28
A.2	Evaluation of dewetting, method 2	29
Annex B (informative)	Guidance	31
B.1	General	31
B.2	Limitations	31
B.3	Choice of severity	31
B.3.1	Test Td ₁ : Solderability by solder bath method	31
B.3.2	Test Td ₂ : Resistance to soldering heat – Solder bath method	32
B.3.3	Test Td ₂ : Resistance to soldering heat –Reflow method	32
B.3.4	Immersion attitude	33
B.3.5	Test Td ₃ : Dewetting and resistance to dissolution of metallization for 30 s at 260 °C	33
Annex C (normative)	Application of the test methods to through hole reflow soldering components (THR)	34
C.1	Solderability	34
C.2	Resistance to soldering heat	34
C.3	Dewetting	34
C.4	Criteria for evaluation	34
Annex X (informative)	Cross reference for references to the prior revision of this specification	35
Bibliography	37

Figure 1 – Examples of immersion attitudes	13
Figure 2 – Reflow temperature profile for solderability	15
Figure 3 – Examples of immersion attitude.....	18
Figure 4 – Reflow temperature profile for resistance to soldering heat	20
Figure 5 – Example for placement of a specimen to a test substrate	23
Figure 6 – Identification of areas on metallic termination.....	24
Figure A.1 – Evaluation of wetting.....	28
Figure A.2 – Evaluation of dewetting.....	30
Table 1 – Grouping of soldering processes and typical test severities – Overview.....	10
Table 2 – Solder alloy and flux for test Td ₁	12
Table 3 – Solderability – Test conditions and severity, solder bath method	14
Table 4 – Solder paste specification	14
Table 5 – Solderability – Test conditions – Method 2: Reflow	16
Table 6 – Resistance to soldering heat – Test conditions and severity, solder bath method	19
Table 7 – Resistance to soldering heat – Test conditions and severity, reflow method	21
Table 8 – Dewetting and resistance to dissolution of metallization – Test conditions and severity, solder bath method	22
Table B.1 – Test conditions.....	32
Table C.1 – Test conditions for solderability test.....	34

INTERNATIONAL ELECTROTECHNICAL COMMISSION

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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This Consolidated version of IEC 60068-2-58 bears the edition number 4.1. It consists of the fourth edition (2015-03) [documents 91/1222/FDIS and 91/1250/RVD] and its amendment 1 (2017-07) [documents 91/1445/FDIS and 91/1451/RVD]. The technical content is identical to the base edition and its amendment.

In this Redline version, a vertical line in the margin shows where the technical content is modified by amendment 1. Additions are in green text, deletions are in strikethrough red text. A separate Final version with all changes accepted is available in this publication.

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

This fourth edition constitutes a technical revision.

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

- the addition of Sn-Bi low temperature solder alloy;
- the addition of several reflow test conditions in Table 7 – Resistance to soldering heat – Test conditions and severity, reflow method;
- introduction of reflow test method for Test Td₃: Dewetting and resistance to dissolution of metallization;
- implementation of guidance for the choice of a test severity in Clause B.3.

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

A list of all parts in the IEC 60068, published under the general title *Environmental testing*, can be found on the IEC website.

The committee has decided that the contents of the base publication and its amendment 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

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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)

1 Scope

This part of IEC 60068 outlines test Td, applicable to surface mounting devices (SMD).

This ~~standard~~ document provides procedures for determining the solderability, resistance to dissolution of metallization and resistance to soldering heat of devices in applications using solder alloys, which are eutectic or near eutectic tin lead (Pb), or lead-free alloys.

The procedures use either a solder bath or reflow method and are applicable only to specimens or products designed to withstand short term immersion in molten solder or limited exposure to reflow systems.

The solder bath method is applicable to SMDs designed for flow soldering and SMDs 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 SMDs for reflow soldering and when the solder bath (dipping) method is not appropriate.

The objective of this standard is to ensure solderability of component lead or termination. 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.

This standard covers tests Td₁, Td₂ and Td₃ as listed below:

Number of Td	Test	Method
Td ₁	Solderability of terminations	Method 1: Solder bath Method 2: Reflow
Td ₂	Resistance to soldering heat	Method 1: Solder bath Method 2: Reflow
Td ₃	Dewetting and resistance to dissolution of metallization	Method 1: Solder bath Method 2: Reflow

NOTE 1 For specific components other test methods may exist.

NOTE 2 Test Td does not apply to printed wiring board (PWB), see IEC 61189-3.

NOTE 3 Specific through-hole devices (where the device supplier has specifically documented support for reflow soldering) are also included in this standard.

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

IEC 60068-2-20:2008, *Environmental testing – Part 2-20: Tests – Test T: Test methods for solderability and resistance to soldering heat of devices with leads*

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

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

IEC 61190-1-2:2014, *Attachment materials for electronic assembly – Part 1-2: Requirements for solder pastes for high-quality interconnections in electronics assembly*

IEC 61190-1-3:2007, *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 61190-1-3:2007/AMD1:2010

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

IEC 61249-2-22, *Materials for printed boards and other interconnecting structures – Part 2-22: Reinforced base materials clad and unclad – Modified non-halogenated epoxide woven E-glass laminated sheets of defined flammability (vertical burning test), copper-clad*

IEC 61249-2-35, *Materials for printed boards and other interconnecting structures – Part 2-35: Reinforced base materials, clad and unclad – Modified epoxide woven E-glass laminate sheets of defined flammability (vertical burning test), copper-clad for lead-free assembly*

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

ISO 9454-2:1998, *Soft soldering fluxes – Classification and requirements – Part 2: Performance requirements*

3 Terms and definitions

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

3.1

solderability

ability of the termination or electrode of the 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 the applicable temperature range of the solder alloy

3.2

resistance to soldering heat

ability of the component to withstand the highest temperature stress in terms of temperature gradient, peak temperature and duration of the soldering process, within the applicable temperature range of the solder alloy

3.3

flow soldering

wave, drag or dip soldering process where the product is brought into contact with molten solder in order to attach electronic components to the interconnecting surface

3.4

reflow soldering

joining of surfaces that have been tinned and/or have solder between them, placing them together, heating them until the solder flows, and allowing the surface and the solder to cool in the joined position

3.5

wetting

formation of an adherent coating of solder on a surface indicated by a small contact angle