

# INTERNATIONAL STANDARD



## AMENDMENT 1

**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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## FOREWORD

This amendment has been prepared by IEC technical committee 91: Electronics assembly technology.

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

FDIS	Report on voting
91/1445/FDIS	91/1451/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.

The committee has decided that the contents of this amendment and the base 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- withdrawn,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.

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### 1 Scope

*Replace the existing second paragraph of the Scope with the following new paragraph:*

This 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.

### 3.2 resistance to soldering heat

*Replace the existing definition with the following new definition:*

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

#### 6.5.3.4 Solder immersion

*Replace the existing first paragraph of Subclause 6.5.3.4 with the following new paragraph:*

If the preheating is prescribed by the relevant specification, the specified duration and temperature shall be applied immediately prior to the immersion of the specimen in the solder bath.

#### 8.5.8 Evaluation

*Replace “Clause A.4.” by “Clause A.2”.*

*Add the following new text at the end of Subclause 8.5.8:*

Note that this test does not directly assess the dewetting but assesses the possibility of the dewetting.

#### 9.3.1.3 Metallic terminations shorter than 6 mm (dimension “d” in Figure 6)

*Replace existing item b) with the following new text:*

b) The upper side of the termination (area “b” in Figure 6):

After the dipping test, the dipped surface shall show visible evidence of being wettable, as indicated by the presence of fresh solder. A homogeneous coating is not necessary here.

*Replace existing item c) with the following new text:*

c) Non-coated cut edges at the end of the termination and the termination above the lower bend (area “c” in Figure 6):

For these areas (“b”, “c” and “d”), no quality criterion of solder coating is given.

*Delete item d).*

## 10.2 Solderability

*Replace the existing text of Subclause 10.2 with the following new text:*

The following details shall be applied for solderability.

- a) Property to be tested \*
- b) Applicable test method \*

- c) Condition of preconditioning (if required) \*
- d) For solder bath method
  - 1) Selected solder alloy \*
  - 2) Flux type\*
  - 3) Clamping, fluxing and solder immersion \*
  - 4) Preheating \*
  - 5) Attitude to be used
  - 6) Solder temperature and duration \*
- e) For reflow method
  - 1) Solder paste \*
  - 2) Dimensional details of test substrate \*
  - 3) Thickness of solder paste \*
  - 4) Amount of solder paste
  - 5) Placement procedure
  - 6) Temperature profile \*
  - 7) Temperature measurement point \*
- f) Removal procedure
- g) Cleaning method
- h) Recovery conditions
- i) Areas of the terminations to be examined \*
- j) Final inspection requirements and acceptance criteria \*

### **10.3 Resistance to soldering heat, dewetting and resistance to dissolution of metallization**

*Replace the existing text of Subclause 10.3 with the following new text:*

The following details shall be applied for resistance to soldering heat, dewetting and resistance to dissolution of metallization.

- a) Property to be tested \*
- b) Applicable test method \*
- c) Condition of preconditioning (if required) \*
- d) For solder bath method
  - 1) Selected solder alloy \*
  - 2) Flux type \*
  - 3) Clamping, fluxing and solder immersion \*
  - 4) Preheating \*
  - 5) Attitude to be used
  - 6) Solder temperature and duration \*
  - 7) Number of test cycles if other than 1 cycle (for resistance to soldering heat) \*
- e) For reflow method
  - 1) Solder paste (if required)\*
  - 2) Dimensional details of test substrate (for resistance to soldering heat and if required) \*
  - 3) Thickness of solder paste (if required) \*

- 4) Amount of solder paste (if required) \*
  - 5) Placement procedure (if required) \*
  - 6) Temperature profile \*
  - 7) Temperature measurement point \*
  - 8) Number of test cycles for resistance to soldering heat \*
- f) Removal procedure
  - g) Cleaning method
  - h) Recovery conditions
  - i) Areas of the terminations to be examined \*
  - j) Final inspection requirements and acceptance criteria \*

## **Annex A Criteria for visual inspection**

*Replace the existing text of Annex A with the following new text:*

### **A.1 Evaluation of wetting**

#### **A.1.1 General**

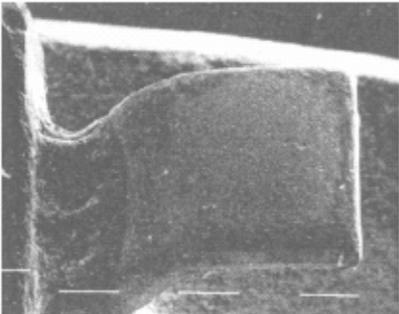
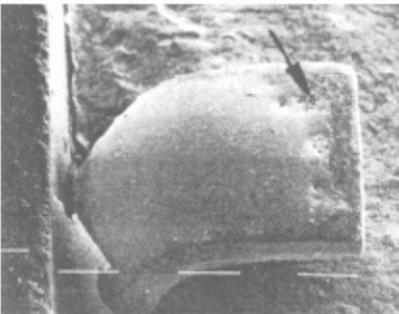
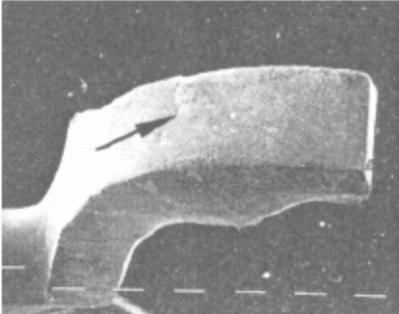
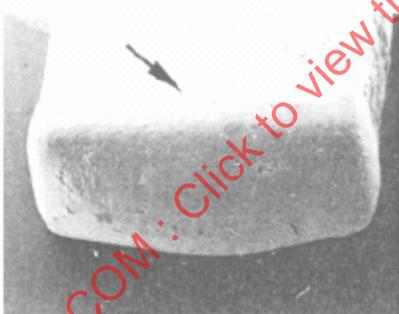
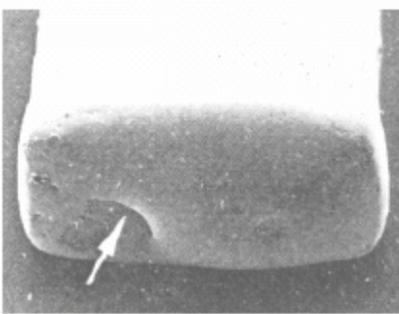
In various specifications, a complete or nearly complete coating with solder is often defined by the so-called 95 % requirement. The application of this requirement is often difficult when assessing specimens with metallized terminations or with short metallic terminations, especially when different parts of the termination are distinguished. Nevertheless, the same approach is followed here.

#### **A.1.2 Criteria for wetting**

Acceptable when 95 % or more area to be evaluated covered by an ideal solder coating with a dewetting area is scattered and not concentrated in one area.

Figure A.1 comprises six examples illustrating the criteria for visual examination.

NOTE To help in the evaluation of wetting, the photographs in Figure A.1 have been reproduced on such a scale that the dimensions are reasonably comparable with the view obtained under a microscope, while ensuring that smaller details are still sufficiently clear.

Acceptable	Unacceptable
 <p data-bbox="660 607 692 629">IEC</p> <p data-bbox="197 667 772 763">Acceptable: ideal coating both on the foot and on the sides; the visible rim is not dewetted because there is no contact angle; the flux residues between body and termination have not been removed.</p>	 <p data-bbox="1267 607 1299 629">IEC</p> <p data-bbox="804 667 1378 712">Unacceptable: more than 5 % dewetting on the toe; the bend is well coated</p>
 <p data-bbox="660 1106 692 1128">IEC</p> <p data-bbox="197 1167 772 1211">Acceptable: some spots of non-ideal coating on the surface are visible.</p>	 <p data-bbox="1267 1106 1299 1128">IEC</p> <p data-bbox="804 1167 1378 1189">Unacceptable: more than 5 % dewetting of the foot.</p>
 <p data-bbox="660 1554 692 1576">IEC</p> <p data-bbox="197 1615 772 1637">Acceptable: a few very small irregularities are visible.</p>	 <p data-bbox="1267 1554 1299 1576">IEC</p> <p data-bbox="804 1615 1378 1637">Unacceptable: more than 5 % of the area not wetted.</p>
<p data-bbox="197 1659 884 1682">The arrows indicate imperfections (acceptable or unacceptable).</p>	

**Figure A.1 – Evaluation of wetting**

**A.1.3 Additional criteria for wetting, method 2**

For method 2 (reflow), in addition to A.1.2, the following criteria shall be applied:

- solder balls at the pins or irregular solder accumulations are not allowed;
- the surface shall be homogenous without irregularities or damage.

## A.2 Evaluation of dewetting, method 2

Figure A.2 comprises four examples illustrating the criteria for visual examination.

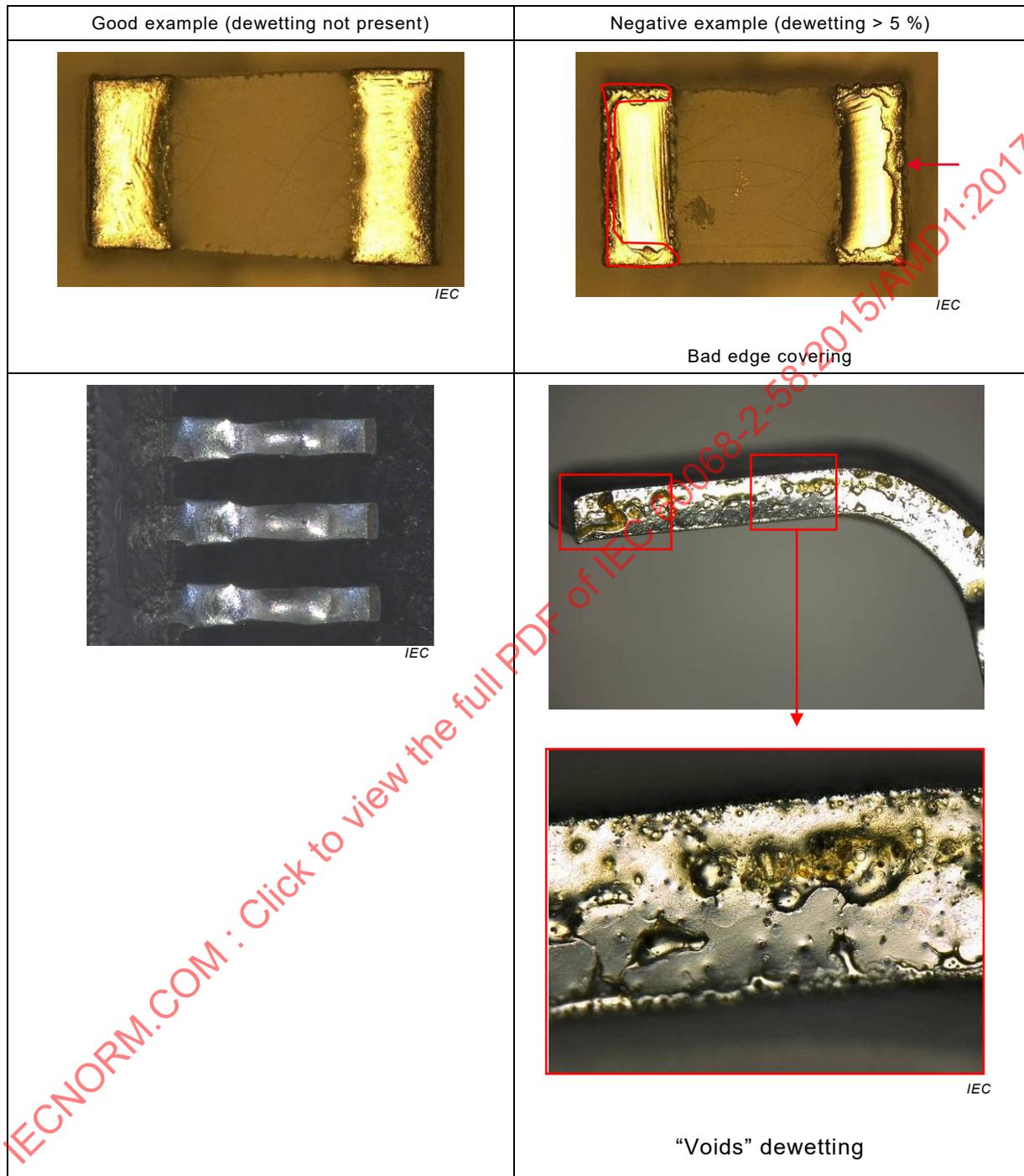


Figure A.2 – Evaluation of dewetting