

Environmental testing —

Part 2: Tests —

Test Te: Solderability testing of electronic components for surface mount technology by the wetting balance method

The European Standard EN 60068-2-69:1996 has the status of a
British Standard

This Part should be read in conjunction with BS EN 60068-1:1995 *General
and guidance*

ICS 19.040

Committees responsible for this British Standard

The preparation of this British Standard was entrusted to Technical Committee GEL/50, Environmental testing of electrotechnical products, upon which the following bodies were represented:

- Federation of the Electronics Industry
- GAMBICA (BEMA Ltd.)
- Ministry of Defence
- Society of Motor Manufacturers and Traders Limited

This British Standard, having been prepared under the direction of the Electrotechnical Sector Board, was published under the authority of the Standards Board and comes into effect on 15 August 1996

© BSI 08-1999

The following BSI references relate to the work on this standard:
Committee reference GEL/50
Draft for comment 93/213653

ISBN 0 580 26161 1

Amendments issued since publication

Amd. No.	Date	Comments

Contents

	Page
Committees responsible	Inside front cover
National foreword	ii
Foreword	2
Text of EN 60068-2-69	3
List of references	Inside back cover

National foreword

This British Standard has been prepared by Technical Committee GEL/50 and is the English language version of EN 60068-2-69:1996, *Environmental testing — Part 2: Tests — Test Te: Solderability testing of electronic components for surface mount technology by the wetting balance method* published by the European Committee for Electrotechnical Standardization (CENELEC). It is identical with IEC 68-2-69:1995 published by the International Electrotechnical Commission (IEC).

Cross-references

Publication referred to ^a	Corresponding British Standard
EN 60068-1:1994 (IEC 68-1:1988)	BS EN 60068 <i>Environmental testing</i> BS EN 60068-1 ^b :1995 <i>General and guidance</i>
HD 323.2.20 S3:1988 (IEC 68-2-20:1979) IEC 68-2-54:1985	BS 2011 <i>Environmental testing</i> Part 2.1 <i>Tests</i> Part 2.1T:1981 <i>Test T. Soldering</i> Part 2.1Ta:1989 <i>Test Ta. Soldering.</i> <i>solderability testing by the wetting balance method</i>
EN 60068-2-44:1995 (IEC 68-2-44:1995)	BS EN 60068 <i>Environmental testing</i> BS EN 60068-2 <i>Test methods</i> BS EN 60068-2-44:1995 <i>Tests. Guidance on</i> <i>Test T. Soldering</i>
EN 29453:1993 (ISO 9453:1990)	BS EN 29453:1994 <i>Soft solder alloys.</i> <i>Chemical compositions and forms</i> BS EN 29454 <i>Soft soldering fluxes. Classification and</i> <i>requirements</i>
EN 29454-1:1993 (ISO 9454-1:1990)	BS EN 29454-1:1994 <i>Classification, labelling and</i> <i>packaging</i>

^a Undated in the text.

^b BS EN 60068-1:1995 includes the corrigendum October 1988 and A1:1993 to IEC 68-1.

A British Standard does not purport to include all the necessary provisions of a contract. Users of British Standards are responsible for their correct application.

Compliance with a British Standard does not of itself confer immunity from legal obligations.

Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii the EN title page, pages 2 to 16, an inside back cover and a back cover.

This standard has been updated (see copyright date) and may have had amendments incorporated. This will be indicated in the amendment table on the inside front cover.

ICS 19.040

Descriptors: Environmental testing, solderability, electronic components, surface mounting technology, wetting balance method, test apparatus, procedures

English version

Environmental testing
Part 2: Tests
Test Te: Solderability testing of electronic components for
surface mount technology by the wetting balance method

(IEC 68-2-69:1995)

Essai d'environnement

Partie 2: Essais

Essai Te: Essai de brasabilité des composants électroniques pour la technologie de montage en surface par la méthode de la balance de mouillage

(CEI 68-2-69:1995)

Umweltprüfungen

Teil 2: Prüfungen

Prüfung Te: Prüfung der Lötbarkeit von Bauelementen der Elektronik für Oberflächenmontagetechnologie mit der Benetzungswaage

(IEC 68-2-69:1995)

This European Standard was approved by CENELEC on 1995-11-28. 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, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, 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

© 1996 Copyright reserved to CENELEC members

Ref. No. EN 60068-2-69:1996 E
 **Documents**
Document Sharing Hub

Foreword

The text of document 50/358/FDIS, future edition 1 of IEC 68-2-69, prepared by TC 50, Environmental testing, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 60068-2-69 on 1995-11-28.

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) 1996-09-01
- latest date by which the national standards conflicting with the EN have to be withdrawn (dow) 1996-09-01

Annexes designated “normative” are part of the body of the standard. In this standard, Annex ZA is normative. Annex ZA has been added by CENELEC.

Contents

	Page
Foreword	2
1 Scope	3
2 Normative references	3
3 General description of the method	3
4 Description of the test apparatus	3
5 Preconditioning	3
5.1 Preparation of specimens	3
5.2 Materials	4
6 Procedures	4
6.1 Test temperature	4
6.2 Solder bath wetting balance procedure	4
6.3 Solder globule wetting balance procedure	7
7 Presentation of results	8
7.1 Form of force versus time trace	8
7.2 Test requirements	8
8 Information to be given in the relevant specification	9
Annex A (normative) Equipment specification	10
Annex B (normative) Use of the wetting balance for SMD solderability testing	11
Annex ZA (normative) Normative references to international publications with their corresponding European publications	16
Figure 1 — Test apparatus	4
Figure 2 — Typical wetting balance trace	8
Table 1 — Recommended solder bath wetting balance test conditions	5
Table 2 — Recommended solder globule wetting balance test conditions	6

1 Scope

This International Standard describes two wetting balance methods. These methods determine quantitatively the solderability of terminations on surface mounted devices.

The procedures describe the solder bath wetting balance method and the solder globule wetting balance method and are both applicable to components with metallic terminations and metallized solder pads.

The terms used in this standard are those defined in IEC 68-2-20 and IEC 68-2-54.

2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this part of IEC 68. At the time of publication, the editions indicated were valid. All normative documents are subject to revision, and parties to agreements based on this part of IEC 68 are encouraged to investigate the possibility of applying the most recent editions of the normative documents listed below. Members of IEC and ISO maintain registers of currently valid International Standards.

IEC 68-2-20:1979, *Basic environmental testing procedures — Part 2: Tests — Test T: Soldering*.

IEC 68-2-44:1995, *Environmental testing — Part 2: Tests — Guidance on Test T: Soldering*.

IEC 68-2-54:1985, *Basic environmental testing procedures — Part 2: Tests — Test Ta: Soldering — Solderability testing by the wetting balance method*.

ISO 683, *Heat-treatable steels, alloy steels and free-cutting steels*.

ISO 6362, *Wrought aluminium and aluminium alloy extruded rods/bars, tubes and profiles*.

ISO 9453:1990, *Soft solder alloys — Chemical compositions and forms*.

ISO 9454-1:1990, *Soft soldering fluxes — Classification and requirements — Part 1: Classification, labelling and packaging*.

3 General description of the method

After applying the liquid flux to the component termination and mounting the component in a suitable holder, the specimen is suspended from a sensitive balance. The component termination is brought into contact with the cleaned surface of a solder bath or the apex of a solder globule, and immersed to the prescribed depth.

The resultant forces of buoyancy and surface tension acting upon the immersed termination are detected by a transducer and converted to a signal which is continuously monitored as a function of time, and recorded on a high speed chart recorder or displayed on a computer screen.

The wetting speed and the extent of wetting are derived from the force against time curve.

4 Description of the test apparatus

A diagram showing a suitable arrangement for the test apparatus is shown in Figure 1. The specimen is suspended from a sensitive balance and a mechanism used to either raise the solder to meet the specimen or lower the specimen into the solder.

After conditioning, the transducer signal is passed to either a chart recorder or a computer, where the force against time curve may be displayed and analysed.

Any other system capable of measuring the vertical forces acting on a specimen is admissible, providing that the system has the characteristics given in Annex A, and the solder bath and globule support block meet the requirements of Annex A.

5 Preconditioning

5.1 Preparation of specimens

Unless otherwise specified the specimen shall be tested in the as-received condition and care should be taken to ensure that no part of the surface to be tested becomes contaminated, particularly by contact with the fingers, during the preparation and handling of the specimen.

If required by the component specification, the specimen may be cleaned by immersion in a neutral organic solvent at room temperature. The specimen should be allowed to dry in air before testing. No other cleaning is permitted.

If required by the component specification, the component may be subjected to accelerated ageing before testing. Ageing shall be performed in accordance with one of the following conditions:

- ageing 1a of IEC 68-2-20 (4.5.1);
- ageing 1b of IEC 68-2-20 (4.5.1);
- ageing 3 of IEC 68-2-20 (4.5.3);
- ageing according to method 1 of IEC 68-2-20, but for 8 h;
- ageing for 10 days at 85 °C in air with 85 % relative humidity.