SLOVENSKI STANDARD
oSIST prEN IEC 60068-2-88:2024

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Okoljsko preskušanje - 2-88. del: Preskusi - Preskus xd: Odpornost komponent in sestavov na tekoče čistilno sredstvo

Environmental testing - Part 2-88: Tests - Test xd: Resistance of components and assemblies to liquid cleaning media

Ta slovenski standard je istoveten z: **prEN IEC 60068-2-88:2024**

ICS:

19.040	Preskušanje v zvezi z okoljem	Environmental testing
31.190	Sestavljeni elektronski elementi	Electronic component assemblies

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91/1964/CDV

COMMITTEE DRAFT FOR VOTE (CDV)

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IEC TC 91 : ELECTRONICS ASSEMBLY TECHNOLOGY	
SECRETARIAT: Japan	SECRETARY: Mr Osamu IKEDA
OF INTEREST TO THE FOLLOWING COMMITTEES: TC 37,TC 40,TC 46,TC 47,TC 48,TC 49,TC 51,TC 86,TC 94,TC 104,TC 107	HORIZONTAL FUNCTION(S):
ASPECTS CONCERNED:	
☒ SUBMITTED FOR CENELEC PARALLEL VOTING	☐ NOT SUBMITTED FOR CENELEC PARALLEL VOTING

Attention IEC-CENELEC parallel voting

The attention of IEC National Committees, members of CENELEC, is drawn to the fact that this Committee Draft for Vote (CDV) is submitted for parallel voting.

The CENELEC members are invited to vote through the CENELEC online voting system.

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TITLE:

ENVIRONMENTAL TESTING - Part 2-88: Tests – Test XD: Resistance of components and assemblies to liquid cleaning media

PROPOSED STABILITY DATE: 2030

NOTE FROM TC/SC OFFICERS:

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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ENVIRONMENTAL TESTING

Part 2-88: Tests – Test XD: Resistance of components and assemblies to liquid cleaning media

FOREWORD

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IEC 60068-2-88 has been prepared by IEC technical committee 91: Assembly Technology. It is an International Standard.

The text of this International Standard is based on the following documents:

Draft	Report on voting
XX/XX/FDIS	XX/XX/RVD

Full information on the voting for its approval can be found in the report on voting indicated in the above table.

The language used for the development of this International Standard is English.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/standardsdev/publications.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under "http://webstore.iec.ch" in the data related to the specific document. At this date, the document will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

INTRODUCTION

Background

"Surface mount technology development and innovation continues in response to market pressures for higher functionality, cost reduction, cycle time reduction, and improved quality. To achieve increased functionality, today's circuit assemblies pack more performance into smaller board designs. Advanced package designs require an increasing number of interconnects to support power requirements and bandwidth. With active and passive component size reduction as well as many area array pitches and standoff heights also reducing, this increases the risk of dendrite formation and electrochemical migration."[1]

Current manufacturing processes preferably to not use cleaning steps for the sake of cost saving, environmental impacts, and potentially detrimental effects to quality and reliability of the equipment. But there are situations, where cleaning of components or assemblies becomes unavoidable, e.g. in case protective coatings are to be applied, or cleaning is required by specific regulations concerning the end use of the equipment. It is the challenge for process engineers to select effective cleaning media and processes at one side, and on the other side to evaluate whether the components and circuit boards exposed to those processes can withstand it without being damaged or its performance being deteriorated.

Current industry standard test methods

Current standards, like IEC 60068-2-45 and some other component standards describe resistance to solvents test, but the test liquids used for testing (e.g. alcohols) are not commonly used in real industrial cleaning processes. In addition, the current resistance to solvent test methods are immersion tests without any mechanical load to the components or ultrasonic agitation. The current focus of these tests is put mainly on the legibility of marking, etc.

Other standards, like MIL-STD-202, Method 215K, describe very specific qualification processes and solvents, which again are not common in today's manufacturing processes of electronic equipment.

To close the gap

It is the intention of this document to close the above-described gap between industrial practice and existing test methods. The approach used is a combination of basic qualification tests to be performed on component and upopulated circuit board level, and a validation test to be performed on assembly level, using the real manufacturing processes conditions and media. By this two-step approach, a pre-selection of components suitable for the intended assembly and cleaning processes, the evaluation of its resistance against the selected processes, and detection of material incompatibilities is enabled.

The test liquids specified in this document are representative for solvent families used in cleaning processes of electronics industry.

[1] Source: IPC 9505

ENVIRONMENTAL TESTING

Part 2-88: Tests – Test XD: Resistance of components and assemblies to liquid cleaning media

1 Scope

This part of IEC 60068-2 establishes test methods for the resistance of electronic and electromechanical components, unpopulated circuit boards and assemblies to liquid cleaning media and cleaning processes, which are agreed between user and supplier for applications, where cleaning is required. These tests are not applicable to components, unpopulated circuit boards and assemblies, which are not intended to be subjected to cleaning processes.

Tests XD_1 and XD_2 primarily are intended for qualification testing of components and unpopulated circuit boards suitable for cleaning processes, but can be adopted as well to testing of material compatibility and specific cleaning media used in manufacturing processes of components and unpopulated circuit boards.

Test XD_3 is intended to determine the resistance of electronic assemblies suitable for cleaning processes to the various cleaning processes to which they are exposed during manufacturing, including the effects of assembly and soldering processes.

2 Normative references

There are no normative references in this document.

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at https://www.electropedia.org/
- ISO Online browsing platform: available at https://www.iso.org/obp

3.1
compatibility
interaction between material sets which do not negatively impact the end use product

Example: removal of flux while not interacting with the markings required for product use.

[SOURCE: IPC 9505]

3.2
incompatibility
interaction between material sets which do negatively impact the end use product

Example: removal of protective coatings and critical type markings.

[SOURCE: IPC 9505]

3.3
qualification process
process to demonstrate the ability to fulfil specified requirements

[SOURCE: ISO 9000:2015, 3.8.6]

3.4
validation
confirmation, through the provision of objective evidence, that the requirements for a specific intended use or application have been fulfilled

[SOURCE: ISO 9000:2015, 3.8.5]

4 Objective and general aspects

4.1 Objective

To establish methods to assess the effects of short-term exposure of components and unpopulated circuit boards to prescribed liquid cleaning media as they as used typically in cleaning processes of electronic assemblies. It provides a qualification process and the validation of cleaning processes as they are used during manufacturing of electronic assemblies.

Plastic materials show a different behaviour against liquid cleaning media, even when the liquid cleaning media are from the same family with similar contents. A component or circuit board can therefore not generally be regarded as resistant against liquid cleaning media. It can only be stated as resistant to such liquid cleaning media that it has been tested against.

4.2 General

Testing is performed to ensure resistance of a test specimen to liquids to which it could be exposed during manufacturing or assembly and is carried out by immersing the test specimen in a specified test liquid, or group of liquids, for a specified period at a specified temperature. Separate test specimen shall be used for each test liquid and test condition. Properties are measured prior to and after exposure to the liquid.

Components and unpopulated circuit boards should be tested under the same conditions and severities as described in test XD_1 and XD_2, assuming that at a later stage both will be stressed in the same way during the assembly processes.

Components and unpopulated circuit boards shall be tested in as received conditions without cleaning. The tests described do not differ between components or unpopulated circuit boards, which may contain flux residues coming from their manufacturing process (e.g. certain inductors or boards using hot air leveling finishes) and those without flux residues,

WARNING *− Intended users of this procedure are cautioned that tests of this nature may involve the use of certain hazardous material, operations and equipment. In particular, some of the fluids that may be used are flammable or may constitute health hazards, or both. Test temperatures should be at least 10°C below the flashpoint of any fluid being used. Open flame heat sources should not be used with any organic solvents. Test personnel should consult the relevant material's safety data sheets when necessary.*

4.3 Qualification and validation process

Details of the qualification and validation process are described in Annex A. For qualification of components and unpopulated circuit boards (tests XD_1 and XD_2) it is important,

– to test components and unpopulated circuit boards individually to enable inspection from all sides for any detrimental effects. In assembled stage this would be not possible anymore, e.g., underneath components,
– to select appropriate test liquids and conditions under consideration of worst-case conditions, to which the components and circuit boards later can be exposed in manufacturing processes of electronic assemblies.

For validation (test XD_3) it is important,

– to use the cleaning media and cleaning equipment as used in the manufacturing process,
– to set cleaning process parameters under consideration of worst-case conditions,
– to include all cleaning steps into the test sequence.