



IEC 60749-21

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# INTERNATIONAL STANDARD

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**Semiconductor devices - Mechanical and climatic test methods -  
Part 21: Solderability**

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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**Semiconductor devices -  
Mechanical and climatic test methods -  
Part 21: Solderability**

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IEC 60749-21 has been prepared by IEC technical committee 47: Semiconductor devices. It is an International Standard.

This third edition cancels and replaces the second edition published in 2011. This edition constitutes a technical revision.

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

- a) revision to certain operating conditions in line with current working practices.

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

Draft	Report on voting
47/2961/FDIS	47/2982/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](http://www.iec.ch/members_experts/refdocs). The main document types developed by IEC are described in greater detail at [www.iec.ch/publications](http://www.iec.ch/publications).

A list of all parts in the IEC 60749 series, published under the general title *Semiconductor devices - Mechanical and climatic test methods* can be found on the IEC website.

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

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## 1 Scope

This part of IEC 60749 establishes a standard procedure for determining the solderability of device package terminations that are intended to be joined to another surface using tin-lead (SnPb) or lead-free (Pb-free) solder for the attachment.

This test method provides a procedure for “dip and look” solderability testing of through hole, axial and surface mount devices (SMDs) as well as an optional procedure for a board mounting solderability test for SMDs for the purpose of allowing simulation of the soldering process to be used in the device application. The test method also provides optional conditions for ageing.

This test is considered destructive unless otherwise detailed in the relevant specification.

NOTE 1 This test method does not assess the effect of thermal stresses which can occur during the soldering process. More details can be found in IEC 60749-15 or IEC 60749-20.

NOTE 2 If a qualitative test method is preferred, the Wetting balance test method can be found in IEC 60068-2-69.

## 2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 61190-1-2:2014, *Attachment materials for electronic assembly - Part 1-2: Requirements for soldering pastes for high-quality interconnects in electronics assembly*

IEC 61190-1-3:2017, *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*

## 3 Terms and definitions

No terms and definitions are listed in this document.

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

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

## 4 Test apparatus and materials

### 4.1 Solder bath

The solder bath shall be not less than 40 mm in depth and not less than 300 ml in volume such that it can contain at least 1 kg of solder. The apparatus shall be capable of maintaining the solder at the specified temperature within  $\pm 5$  °C. The solder in solder baths used for solderability testing shall be analysed or replaced to ensure that the composition complies with 4.6.2.

### 4.2 Dipping device

A mechanical dipping device capable of controlling the rates of immersion and emersion of the terminations and providing a dwell time (time of total immersion to the required depth) in the solder bath as specified shall be used.