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IPC J-STD-003B

Solderability Tests for Printed Boards

Developed by the Printed Wiring Board Solderability Specification Task Group (5-23a) of the Assembly & Joining Processes Committee (5-20) of IPC

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Users of this publication are encouraged to participate in the development of future revisions.

Contact:
IPC
3000 Lakeside Drive, Suite 309S
Bannockburn, IL 60015-1249
Phone (847) 615-7100
Fax (847) 615-7105

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1 GENERAL

1.1 Scope This standard prescribes test methods, defect definitions and illustrations for assessing the solderability of printed board surface conductors, attachment lands, and plated-through holes. This standard is intended for use by both vendor and user.

1.2 Purpose The solderability determination is made to verify that the printed board fabrication processes and subsequent storage have had no adverse effect on the solderability of those portions of the printed board intended to be soldered. This is determined by evaluation of the solderability test specimen portion of a board or representative test specimen which has been processed as part of the panel of boards and subsequently removed for testing per the method selected.

1.3 Objective The objective of the solderability test methods described in this standard is to determine the ability of printed board surface conductors, attachment lands, and plated-through holes to wet easily with solder and to withstand the rigors of the printed board assembly processes.

1.3.1 Shall or Should The word ''**shall**'' is used in the text of this document wherever there is a requirement for materials, preparation, process control or acceptance of a soldered connection or a test method. The word ''should'' reflects recommendations and is used to reflect general industry practices and procedures for guidance only.

1.3.2 Document Hierarchy In the event of conflict, the following descending order of precedence applies:

1. Procurement as agreed between user and supplier.
2. Master drawing or master assembly drawing reflecting the user's detailed requirements.
3. When invoked by the customer or per contractual agreement, this document, J-STD-003.
4. Other documents to extent specified by the customer.

1.4 Performance Classes Three general classes have been established to reflect progressive increases in sophistication, functional performance requirements and testing/inspection frequency. It should be recognized that there may be an overlap of equipment categories in different classes. The user has the responsibility to specify in the contract or purchase order the performance class required for each product and **shall** indicate any exceptions to specific parameters, where appropriate.

Class 1 – General Electronic Products

Includes consumer products, some computer and computer peripherals suitable for applications where cosmetic imperfections are not important and the major requirement is function of the completed printed board.

Class 2 – Dedicated Service Electronic Products

Includes communications equipment, sophisticated business machines, instruments where high performance and extended life is required and for which uninterrupted service is desired but not critical. Certain cosmetic imperfections are allowed.

Class 3 – High Performance Electronic Products

Includes the equipment and products where continued performance or performance on demand is critical. Equipment downtime cannot be tolerated and must function when required such as in life support items or flight control systems. Printed boards in this class are suitable for applications where high levels of assurance are required and service is essential.

1.5 Method Classification This standard describes test methods by which both the surface conductors (and attachment lands) and plated-through holes may be evaluated for solderability. Test A, Test B, Test C, Test D and Test E for tin/lead solder processes and Test A1, Test B1, Test C1, Test D1 and Test E1 for lead-free solder processes, unless otherwise agreed upon between vendor and user. Test A and Test C for tin/lead solder processes, Test A1 and Test C1 for lead-free solder processes are to be used as a default solderability tests.

Provisions are made for this determination to be performed at the time of manufacture, at the receipt of the boards by the user, or just prior to assembly and soldering. User and vendor **shall** agree to the appropriate method to be used and their correlation.

Standard dwell times are defined in some of the methods called out in this standard. Variations in board heat capacity may necessitate the use of longer solder dwell times (see 6.2). Any change in solder dwell **shall** be agreed upon by user and vendor.

1.5.1 Visual Acceptance Criteria Tests

Tin Lead Solder Alloy

Test A – Edge Dip Test For surface conductors and attachment lands only (see 4.2.1)

Test B – Rotary Dip Test For plated-through holes, surface conductors and attachment lands, solder source side (see 4.2.2)