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Solderability Tests for
Printed Boards



participants from
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Solderability Tests for Printed Boards

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

Contact:

IPC
3000 Lakeside Drive, Suite 105 N
Bannockburn, IL
60015-1249
Tel 847 615.7100
Fax 847 615.7105

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Assembly and Joining Committee

Chair
Daniel Foster
Missile Defense Agency (MDA)

Vice Chair
Udo Wetzel
Robert Bosch GmbH

Printed Circuit Board Solderability Specifications Task Group

Co-Chairs
Gerard O'Brien
Solderability Testing & Solutions Inc.

Ernst Eggelaar
Micronic M.V. GmbH

Technical Liaisons of the IPC Board of Directors

Bob Neves
Microtek (Changzhou) Laboratories

Printed Circuit Board Solderability Specifications Task Group

Elizabeth Allison
NTS Baltimore

Raiyomand F. Aspandiar
Intel Corporation

Jasbir Bath
Koki Solder America

Martin W. Bayes
TE Connectivity

Jennifer Bennett
IBM Corporation

Gerald Leslie Bogert
Bechtel Plant Machinery.

Trevor S. Bowers
Lockheed Martin Space Systems Co.

Scott A. Bowles
Lockheed Martin Corporation

Steven A. Bowles
Lockheed Martin Corporation

Lance Brack
Raytheon Missile Systems

Christopher Brett Carillo
Uyemura International Corp

Srinvas Chada
Raytheon Missile Systems

Zhiman Chen
ZhuZhou CRRC Times Electric Co.

Jinfen Chen
White Horse Laboratories Limited

Brian Chislea
Dow Corning

Beverly Christian
HDP User Group

Michael Collier
Teledybe Advanced Electronic Solutions

Cesar De Luna
NTS Anaheim

Miguel Dominguez
Continental Automotive

Don DuPriest
Lockheed Martin Missiles & Fire Control

Ernst Eggelaar
Microtronic

William Fox
Lockheed Martin Missiles & Fire Control

Dennis Fritz
Fritz Consulting

Mahendra S. Gandhi
Northrup Grumman Space Systems

Ryder Gao
CVTE

Kaan Garpli
Vestel Elektronik A.S.

Gonzalo J. Garcia Leypon
Aethercom

Karl Gerdom
Atotech Deutschland GmbH

Vicka Hammill
Hoenywell Inc. Air Support Transport Systems

Gaston Hildago
Toyota Motor North America

Ife Hsu
Intel Corporation

Leo Huang
APCB Electronics (Thailand) Co., Ltd.

Emma Hudson
Emma Hudson Technical Consultancy Ltd.

Christopher Hunt
Gen3 Systems Limited

Jennie S. Hwang
H-Technologies Group

Milea J. Kammer
Honeywell International

E. Kannan
Kaynes Technology India Pvt. Ltd.

Jason Keeping
Celestica International L.P.

Leo Lambert
EPTAK Corporation

Jan Lesky
Pioneer Circuits

Daniel Lipps
L3Harris Fuzing & Ordnance Systems

Dan Loew
L3Harris Fuzing & Ordnance Systems

Michael Lowry
Summit Interconnect - Orange

Chris Mahanna
Robisan Laboratory Inc.

Anthony Martinelli
Raytheon Company

James J. Monarchio TTM Technologies	Jose Rios Raytheon	Crystal Vanderpan UL LLC
Graham K. Naisbitt Gen3 Systems Limited	Timo Schlosser Atotech Deutschland GmbH	Scott Vorhies Space Exploration Technologies
Robert Neves Microtek Laboratories China	Douglas R. Schueller	Bill R. Vuono Qorvo US, Inc.
Gerard O'Brien Solderability Testing & Solutions Inc.	Jose Ma Servin Olivares Vitesco Technologies	Mingye Wang Junfeng Electronics Control Technology
Gerry Partida Summit Interconnect - Anaheim	Russell S. Shepherd NTS Anaheim	Udo Wetzel Robert Bosch GmbH
Laura Preiss Robbins Air Force Base	Poul Poul Skjold Danfoss Power Electronics A/S	Arbi Zaied Team Partner
Alan Preston TTM Technologies Inc.	David Summervold TCLAD Incorporated	Jack Zhu Veoneer China Co. Ltd.
Randy Reed Reed Consultancy LLC	Ingrid Swenson TTM Technologies Inc.	
	Toshiyasu Takei Japan Unix Co., Ltd.	

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Solderability Tests for Printed Boards

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 (PTHs). This standard is intended for use by both user and supplier.

This standard is not intended to verify the potential of successful processing at assembly or to evaluate design impact on wettability. This standard describes procedures or methods to determine the acceptable wettability of a surface finish. Wettability can be affected by handling, finish application, and environmental conditions.

1.1 Purpose This standard describes solderability determinations that are 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. Reference coupons or representative portions of a printed board may be used. Solderability is determined by evaluation of a test specimen which has been processed as part of a panel of boards and subsequently removed for testing per the method selected.

1.2 Classification

CLASS 1 General Electronic Products

Includes products suitable for applications where the major requirement is function of the completed assembly.

CLASS 2 Dedicated Service Electronic Products

Includes products where continued performance and extended life is required, and for which uninterrupted service is desired but not critical. Typically, the end-use environment would not cause failures.

CLASS 3 High Performance/Harsh Environment Electronic Products

Includes products where continued high performance or performance-on-demand is critical, equipment downtime cannot be tolerated, end-use environment may be uncommonly harsh, and the equipment must function when required, such as life support or other critical systems.

The coating durability rating of the surface finish to be tested for solderability as per this document is NOT related to the classification product as detailed above. The default coating durability rating is 2 for surface finishes containing Pb and A for Pb-free and all other surface finishes. It is noted that these default coating durability ratings do not require stressing prior to solderability testing.

This standard relies on input from participants in standards development and the IPC-4500 family of printed-board-surface finish documents to determine the durability rating potential for each specified finish. This document and the appropriate IPC-4500 family of documents should be considered complimentary to one another.

1.3 Measurement Units All dimensions and tolerances in this specification are expressed in hard SI (metric) units and bracketed soft imperial [inch] units. Users of this specification are expected to use metric dimensions. All dimensions ≥ 1 mm [0.0394 in] will be expressed in millimeters and inches. All dimensions < 1 mm [0.0394 in] will be expressed in micrometers and microinches.

1.4 Definition of Requirements The words **shall** or **shall not** are used in the text of this document wherever there is a requirement for materials, preparation, process control or acceptance.

The word “should” reflects recommendations and is used to reflect general industry practices and procedures for guidance only.

Line drawings and illustrations are depicted herein to assist in the interpretation of the written requirements of this Standard. The text takes precedence over the figures.

1.5 Process Control Requirements The primary goal of process control is to continually reduce variation in the processes, products, or services to provide products or processes meeting or exceeding User requirements. Process control tools such as IPC-9191, JESD557 or other User-approved system may be used as guidelines for implementing process control.

Manufacturers of Class 3 products **shall** develop and implement a documented process control system.

A documented process control system, if established, **shall** define process control and corrective action limits.

This may or may not be a statistical process control system. The use of “statistical process control” (SPC) is optional and should be based on factors such as design stability, lot size, production quantities, and the needs of the Manufacturer, see Section 7 Statistical Process Control.

Process control methodologies should be used in the planning, implementation and evaluation of the manufacturing processes used to produce soldered electrical and electronic assemblies. The philosophy, implementation strategies, tools and techniques may be applied in different sequences depending on the specific company, operation, or variable under consideration to relate process control and capability to end product requirements.