IPC-7525C

2021 - November

Stencil Design Guidelines

Supersedes IPC-7525B
October 2011

A standard developed by IPC

BUILD ELECTRONICS BETTER

The Principles of Standardization

In May 1995 the IPC's Technical Activities Executive Committee (TAEC) adopted Principles of Standardization as a guiding principle of IPC's standardization efforts.

Standards Should:

- Show relationship to Design for Manufacturability (DFM) and Design for the Environment (DFE)
- Minimize time to market
- Contain simple (simplified) language
- Just include spec information
- Focus on end product performance
- Include a feedback system on use and problems for future improvement

Standards Should Not:

- Inhibit innovation
- Increase time-to-market
- Keep people out
- Increase cycle time
- Tell you how to make something
- Contain anything that cannot be defended with data

Notice

IPC Standards and Publications are designed to serve the public interest through eliminating misunderstandings between manufacturers and purchasers, facilitating interchangeability and improvement of products, and assisting the purchaser in selecting and obtaining with minimum delay the proper product for his particular need. Existence of such Standards and Publications shall not in any respect preclude any member or nonmember of IPC from manufacturing or selling products not conforming to such Standards and Publication, nor shall the existence of such Standards and Publications preclude their voluntary use by those other than IPC members, whether the standard is to be used either domestically or internationally.

Recommended Standards and Publications are adopted by IPC without regard to whether their adoption may involve patents on articles, materials, or processes. By such action, IPC does not assume any liability to any patent owner, nor do they assume any obligation whatever to parties adopting the Recommended Standard or Publication. Users are also wholly responsible for protecting themselves against all claims of liabilities for patent infringement.

IPC Position Statement on Specification Revision Change

It is the position of IPC's Technical Activities Executive Committee that the use and implementation of IPC publications is voluntary and is part of a relationship entered into by customer and supplier. When an IPC publication is updated and a new revision is published, it is the opinion of the TAEC that the use of the new revision as part of an existing relationship is not automatic unless required by the contract. The TAEC recommends the use of the latest revision. Adopted October 6, 1998

Why is there a charge for this document?

Your purchase of this document contributes to the ongoing development of new and updated industry standards and publications. Standards allow manufacturers, customers, and suppliers to understand one another better. Standards allow manufacturers greater efficiencies when they can set up their processes to meet industry standards, allowing them to offer their customers lower costs.

IPC spends hundreds of thousands of dollars annually to support IPC's volunteers in the standards and publications development process. There are many rounds of drafts sent out for review and the committees spend hundreds of hours in review and development. IPC's staff attends and participates in committee activities, typesets and circulates document drafts, and follows all necessary procedures to qualify for ANSI approval.

IPC's membership dues have been kept low to allow as many companies as possible to participate. Therefore, the standards and publications revenue is necessary to complement dues revenue. The price schedule offers a 50% discount to IPC members. If your company buys IPC standards and publications, why not take advantage of this and the many other benefits of IPC membership as well? For more information on membership in IPC, please visit www.ipc.org or call 847/597-2872.

Thank you for your continued support.

IPC-7525C

Stencil Design Guidelines

Developed by the members of the Solder Stencil Task Group (5-21e) of the Assembly & Joining Committee (5-20) of IPC.

Supersedes:
IPC-7525B - October 2011

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

Contact:

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

This Page Intentionally Left Blank

Acknowledgment

Any document involving a complex technology draws material from a vast number of sources. While the principal members of the Stencil Design Task Group (5-21e) of the Assembly and Joining Processes Committee (5-20) are shown below, it is not possible to include all of those who assisted in the evolution of this standard. To each of them, the members of the IPC extend their gratitude.

Assembly and Joining Processes Committee

Chair:

Daniel Foster
Missile Defense Agency (MDA)

Solder Stencil Task Group (5-21e)

Chair:

Jeff Schake
ASM Assembly Systems

Vice Chair:

Greg Smith
BlueRing Stencils

Technical Liaisons of the IPC Board of Directors

Bob Neves
Microtek (Changzhou) Laboratories

Component Mounting Subcommittee

Daniel Fillipe Barros Alves
Bosch Car Multimedia Portugal, S.A

Dudi Amir
Intel Corporation

Gerald Leslie Bogert
Bechtel Plant Machinery, Inc.

Lance Brack
Raytheon Missile Systems

Robin Bridge
Curtiss-Wright Defense Solutions

Edgar Butron
Lockheed Martin

Zhiman Chen
Zhuzhou CRRC Times Electric Co., Ltd.

Robert E. Cochran
Mind Chasers Inc.

Danielle L. Daniel
Naval Surface Warfare Center

Francesco Di Maio
GESTLABS S.r.l.

Michael Durkan
Mentor Graphics Corporation

Brian Flemming
National Instruments

Joseph E. Kane
BAE Systems

Anthony W. Lentz
FCT Assembly, Inc.

Kyle Loomis
Kester

Timothy O'Neill
AIM Solder

Frank Paradis
Calian Advanced Technologies

Kenneth Rahn
FCI USA, Inc.

Robert Rowland
Axiom Electronics, LLC

Jeff Schake
ASM Assembly Systems

Jeff Shubrooks
Raytheon Company

Greg Smith
BlueRing Stencils

Raymond Whittier
BAE Systems

Michael W. Yuen
Foxconn EMS, Inc.

Jack Zhu
Veoneer China Co., Ltd.

This Page Intentionally Left Blank

Table of Contents

Tables

Figures

Stencil Design Guidelines

1.0 SCOPE

1.1 Purpose This document provides guidance for the design and fabrication of stencils for solder paste and surface-mount adhesive. It is intended as a guideline only. Much of the content is based on the experience of stencil designers, fabricators, and users. Printing performance depends on many different variables and therefore no single set of design rules can be established. Although this Handbook uses mandatory terminology, e.g., **shall**, must, etc., nothing within this Handbook is considered mandatory unless this document is specified as a mandatory requirement in the contract documentation.

1.2 Classification There are three general Performance Classes

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.

1.3 Measurement Units All dimensions and tolerances in this specification are expressed in precise 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 Order of Precedence The contract **shall** take precedence over this Standard, referenced standards and drawings.

In the event of conflict, the following order of precedence applies:

1) Procurement as agreed and documented between customer and supplier.

2) Master drawing reflecting the customer’s detailed requirements.

3) When invoked by the customer or per contractual agreement, this standard.

When documents other than this standard are cited, the order of precedence **shall** be defined in the procurement documents.

The User has the opportunity to specify alternate acceptance criteria.

1.5.1 Conflict In the event of conflict between the requirements of this standard and the applicable drawing(s) and documentation, the applicable user-approved drawing(s) and documentation govern.

Some examples of documentation include the contract, purchase order, technical data package, engineering specification or performance specification. In the event of a conflict between the text of this standard and the applicable documents cited herein, the text of this standard takes precedence. In the event of conflict between the requirements of this standard and drawing(s) and documentation that has not been user approved, this standard governs.

1.5.2 Clause References When a clause in this document is referenced its subordinate clauses apply, unless the requirement references specific subordinate clauses.

1.5.3 Appendices Appendices to this standard are not binding requirements unless separately and specifically required by this standard, the applicable contracts, assembly drawing(s), documentation or purchase orders.