



ASSOCIATION CONNECTING
ELECTRONICS INDUSTRIES

IPC-S-816

SMT Process Guideline and Checklist

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A standard developed by IPC

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SMT Process Guideline and Checklist

1.0 SCOPE

This document is intended to provide guidelines and assistance in performing and troubleshooting the steps involved in the process of producing printed wiring assemblies incorporating surface mounting attachment of components.

Each section contains a list of problems often observed during a specific part of the surface mount assembly process. The list of observed symptoms is matched by a description of causes often associated with the symptoms. Suggestions for correction are also included. These solutions may be related to the equipment, materials, or design. Accordingly, some of these corrective measures cannot be implemented on the shop floor.

1.1 Environmental, Safety, and Industrial Hygiene Considerations The use of some of the materials referenced in this document may be hazardous. Precautions should be taken to safeguard personnel and the environment, as outlined in the appropriate data supplied with the materials used. In addition, equipment and procedures should adhere to applicable local and federal regulations.

1.2 Applicable Documents The following documents, of the issue currently in effect, are applicable to the extent specified herein.

1.2.1 IPC¹

IPC-CH-65 Guidelines for Cleaning of Printed Boards and Assemblies

IPC-OI-645 Standard for Visual Optical Inspection Aids

IPC-R-700 Suggested Guidelines for Modification, Rework, and Repair of Printed Boards and Assemblies

IPC-SM-782 Surface Mount Land Patterns (configurations and Design Rules)

IPC-SM-786 Recommended Procedures for handling of Moisture Sensitive Plastic IC Packages

IPC-SM-840 Qualification and Performance of Permanent Polymer Coating (Solder Mask) For Printed Boards

1.2.2 Joint Industry Standards¹

J-STD-002 Solderability Test for Component Leads, Termination, Lugs, Terminals and Wires

J-STD-003 Solderability Tests for Printed Boards

J-STD-004 Requirements for Soldering Fluxes

J-STD-005 General Requirements and Test Methods for Electronic Grade Solder Paste

2.0 HANDLING

Handling is one topic that is not confined to a specific area of the manufacturing operation. Handling problems are a "cradle to grave" issue for which no one will claim responsibility; yet the impact on the surface mount process yield is substantial. Every major step covered in this guideline, from adhesive application to cleaning of surface mount assemblies, relies on a comprehensive component and assembly handling strategy. Handling can't be the concern of a single group in the manufacturing environment and must be an integral part of each process step in the surface mount assembly line. Although the general format of this document is problem-cause-corrective action, the following handling items need to be considered throughout the entire surface mount assembly process.

2.1 Electrostatic Discharge (ESD) Concerns The following are ESD concerns:

- 1) Has process machinery been properly grounded?
- 2) Have work stations and storage areas been properly grounded?
- 3) Are other environmental controls (i.e., ionizers, humidifiers, etc.) in place to reduce the occurrence of ESD?
- 4) Have operators and all other employees who may handle components or surface mount assemblies been properly trained to use ESD precautions such as wrist straps or other similar preventative measures?
- 5) Have the component packaging and assembly containers been reviewed for potential ESD problems?
- 6) Have ESD sensitive parts been identified and sufficiently protected?

2.2 Component Leads The following are concerns regarding component leads:

- 1) Has component lead coplanarity been addressed following manual or automatic lead forming operations?
- 2) Has component lead solderability concerns in relation to handling been reviewed and precautions taken where deemed necessary?

2.3 Storage The following are concerns regarding storage:

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