ASSOCIATION CONNECTING
ELECTRONICS INDUSTRIES

IPC-9502

PWB Assembly Soldering Process Guideline for Electronic Components

IPC-9502
April 1999 A standard developed by IPC

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1 SCOPE

This document describes manufacturing solder process limits that components subjected to IPC-9501, IPC-9503, IPC-9504 and J-STD-020 would survive. It does not include optimum conditions for assembly, but rather guides to assure components are not damaged.

This document applies to both surface-mount (SM) and through-hole (TH) components that are wave soldered, reflowed or hand soldered. This document is intended to complement other industry documents, listed in applicable documents.

Note: This document does not address the increased temperature requirements of lead-free solders.

2 APPLICABLE DOCUMENTS

2.1 IPC[1]

IPC-T-50 IPC Terms and Definitions

IPC-AC-62 Aqueous Post Solder Cleaning Handbook

IPC-TM-650 Test Method Manual

2.6.9.1 Test to Determine Sensitivity of Electronic Components to Ultrasonic Energy

IPC-SM-786 Procedures for Characterizing and Handling of Moisture/Reflow Sensitive ICs

IPC-SM-817 General Requirements for Dielectric Surface Mounting Adhesives

IPC-7711 Rework of Electronic Assemblies

IPC-9501 PWB Assembly Process Simulation

IPC-9503 Moisture Sensitivity Classification for Non-IC Components

IPC-9504 Assembly Process Simulation for Evaluation of Non-IC Components

2.2 Joint Industry Standards

J-STD-002 Solderability Tests for Component Leads, Terminations, Lugs, Terminals and Wires

J-STD-020 Moisture-Induced Sensitivity Classification for Plastic Integrated Circuit Surface Mount Devices

2.3 Electronic Industries Association

JESD22-A113 Preconditioning of Plastic Surface Mount Devices Prior to Reliability Testing

3 TERMS AND DEFINITIONS

Spike = The peak temperature of a component lead on the solder side of the board while in contact with molten solder minus its temperature prior to entering reflow. This parameter is also referred to sometimes as the ‘‘delta T’’ or thermal shock.

Ramp Rate = Greatest temperature difference in four consecutive seconds in the entire reflow thermal profile divided by four.

4 APPLICATIONS AND OBJECTIVES

The objectives of the document in combination with IPC-9501, IPC-9503, IPC-9504 and J-STD-020 are to:

- Maintain a common definition of the thermal and chemical SMT and TH assembly process requirements that are used to assure compatibility between components and assembly processes.
- Facilitate the development and manufacture of robust components by establishing a set of levels for solder process compatibility.

The use of this document is illustrated in Figure 1 which shows typical steps and relationships of this document and decision points in flow chart form. The intent is to provide the process levels that the component could be exposed to during the assembly process.

The processes described include:

- Storage
- Soldering of both surface-mount and through-hole components.
- Exposure to corrosive fluxes (water soluble).
- Exposure to cleaning materials.

The conditions provide levels for the assembly process to assure that parts are not damaged.

The following procedures should be followed:

1. Review component process exposure levels.
2. Optimize the process parameters based on maximizing reliability and yields.

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