ASSOCIATION CONNECTING
ELECTRONICS INDUSTRIES

IPC-9503

Moisture Sensitivity Classification for Non-IC Components

IPC-9503

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A standard developed by IPC

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Moisture Sensitivity Classification for Non-IC Components

1 GENERAL

1.1 Scope

The purpose of this standard is to identify the moisture sensitivity classification level of passive surface mount devices and through-hole components, subjected to reflow soldering, so that they can be properly packaged, stored, and handled to avoid subsequent thermal/mechanical damage during the assembly solder reflow attachment and/or repair operation.

This standard may be used to determine what classification level should be used for initial reliability qualification.

If an initial qualification exists and no major changes have been made, this method may be used for reclassification to an improved level (longer floor life up to level 2). The reclassification level cannot be improved by more than one level without additional reliability testing.

No components classified as moisture sensitive by any previous version of JESD22 A112, IPC-SM-786 or J-STD-020 may be reclassified as non-moisture sensitive (Level 1) without additional reliability stress testing (i.e., JESD22 A113 and JESD47).

Passing the reject criteria in this test method is not sufficient by itself to provide assurance of long term reliability.

The classification procedure applies to all passive surface-mount devices and through-hole components, subjected to reflow, in packages which, because of absorbed moisture, could be sensitive to damage during solder reflow. The categories are intended to be used by component manufacturers to inform users (board assembly operations) of the level of moisture sensitivity of components, and by board assembly operations to ensure that proper handling precautions are applied to moisture/reflow sensitive components.

1.2 Background

Moisture inside a package turns to steam and expands rapidly when the package is exposed to the high temperature of solder reflow. Under certain conditions, the pressure from this expanding moisture can cause internal damage. In the most severe case, the stress can result in external package cracks. This is commonly referred to as the ''popcorn'' phenomenon because the internal stress causes the package to bulge and then crack with an audible ''pop.''

2 APPLICABLE DOCUMENTS

2.1 IPC[1]

IPC-TM-650 Test Methods Manual

2.1.1 Microsectioning

2.1.1.2 Microsectioning-Semi or Automatic Technique Microsection Equipment (Alternate)

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

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

2.2 Joint Industry Standards

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

J-STD-035 Acoustic Microscopy for Non-Hermetic Encapsulated Electronic Components

2.3 Electronic Industries Association[2]

EIA 625 Requirements for Handling Electrostatic Discharge Sensitive (ESD) Devices

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

JESD 47 Stress Test Driven Qualification Specification

JEP113 Symbol and Labels for Moisture Sensitive Devices

3 APPARATUS

3.1 Moisture chamber(s), capable of operating at 85°C/85% RH, 85°C/60% RH, 60°C/60% RH, and 30°C/60% RH. Within the chamber working area, temperature tolerance must be ± 2°C and the RH tolerance must be ± 3% RH.

3.2 Solder Reflow Equipment (One or more of the following shall be used.)

3.2.1 (Preferred) - 100% Convection reflow system capable of maintaining the reflow profile outlined section 5.

1. IPC, 2215 Sanders Road, Northbrook, IL 60062 www.ipc.org
2. EIA, 2500 Wilson Blvd., Arlington, VA 22201