



ASSOCIATION CONNECTING
ELECTRONICS INDUSTRIES®



IPC/JEDEC J-STD-033B.1
Includes Amendment 1

Handling, Packing, Shipping and Use of Moisture/Reflow Sensitive Surface Mount Devices

A joint standard developed by the JEDEC JC-14.1 Committee on Reliability Test Methods for Packaged Devices and the B-10a Plastic Chip Carrier Cracking Task Group of IPC

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

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Table of Contents

1 FOREWORD	1	3.3.3 Labels	6
1.1 Purpose	1	3.3.4 Moisture Barrier Bag Sealing	6
1.2 Scope	1	3.3.5 Shelf Life	6
1.2.1 Packages	1	4 DRYING	7
1.3 Assembly Processes	1	4.1 Post Exposure to Factory Ambient	7
1.3.1 Mass Reflow	1	4.1.1 Any Duration Exposure	7
1.3.2 Localized Heating	1	4.1.2 Short Duration Exposure	7
1.3.3 Socketed Components	1	4.2 General Considerations for Baking	8
1.3.4 Point-to-Point Soldering	1	4.2.1 High Temperature Carriers	8
1.4 Reliability	2	4.2.2 Low Temperature Carriers	8
1.5 Terms and Definitions	2	4.2.3 Paper and Plastic Container Items	8
1.5.1 Active Desiccant	2	4.2.4 Bakeout Times	9
1.5.2 Bar Code Label	2	4.2.5 ESD Protection	9
1.5.3 Bulk Reflow	2	4.2.6 Reuse of Carriers	9
1.5.4 Carrier	2	4.2.7 Solderability Limitations	9
1.5.5 Desiccant	2	5 USE	10
1.5.6 Floor Life	2	5.1 Incoming Bag Inspection	10
1.5.7 Humidity Indicator Card (HIC)	2	5.1.1 Upon Receipt	10
1.5.8 Manufacturer's Exposure Time (MET)	2	5.1.2 Component Inspection	10
1.5.9 Moisture Barrier Bag (MBB)	2	5.2 Floor Life	10
1.5.10 Rework	2	5.3 Safe Storage	10
1.5.11 Shelf Life	2	5.3.1 Dry Pack	10
1.5.12 SMD	2	5.3.2 Shelf Life	10
1.5.13 Solder Reflow	2	5.3.3 Dry Atmosphere Cabinet	10
1.5.14 Water Vapor Transmission Rate (WVTR)	2	5.4 Reflow	11
2 APPLICABLE DOCUMENTS	3	5.4.1 Opened MBB	11
2.1 American Society for Testing and Materials (ASTM)	3	5.4.2 Reflow Temperature Extremes	11
2.2 Electronic Industries Alliance (EIA, JEDEC)	3	5.4.3 Additional Thermal Profile Parameters	11
2.3 IPC Standards	3	5.4.4 Multiple Reflow Passes	11
2.4 Joint Industry Standards	3	5.4.5 Maximum Reflow Passes	11
2.5 Department of Defense	3	5.5 Drying Indicators	11
3 DRY PACKING	3	5.5.1 Excess Humidity in the Dry Pack	11
3.1 Requirements	3	5.5.2 Floor Life or Ambient Temperature/ Humidity Exceeded	12
3.2 Drying of SMD Packages and Carrier Materials Before Being Sealed in MBBs	4	5.5.3 Level 6 SMD Packages	12
3.2.1 Drying Requirements - Levels 2a - 5a	4	6 BOARD REWORK	12
3.2.2 Drying Requirements - Carrier Materials	4	6.1 Component Removal, Rework and Remount ...	12
3.2.3 Drying Requirements - Other	4	6.1.1 Removal for Failure Analysis	12
3.2.4 Excess Time Between Bake and Bag	4	6.1.2 Removal and Remount	12
3.3 Dry Pack	4	6.2 Baking of Populated Boards	12
3.3.1 Description	4	7 DERATING DUE TO FACTORY ENVIRONMENTAL CONDITIONS	12
3.3.2 Materials	4		

Appendix A	Test Method for Humidity Indicator Card used with Electronic Component Packaging	14
Appendix B	Derivation of Bake Tables	15
Appendix C	Amendment 1 - Differences between J-STD-033B.1 and J-STD-033B	15

Figures

Figure 3-1	Typical Dry Pack Configuration for Moisture-Sensitive SMD Packages in Shipping Tubes	4
Figure 3-2	Example Humidity Indicator Card	5
Figure 3-3	Moisture-Sensitive Identification Label (Example)	6
Figure 3-4	Moisture-Sensitive Caution Label (Example)	7
Figure A-1	Photo of Testing Apparatus	14

Tables

Table 3-1	Dry Packing Requirements	3
Table 3-2	Typical HIC Spot Compliance	6
Table 4-1	Reference Conditions for Drying Mounted or Unmounted SMD Packages	8
Table 4-2	Default Baking Times Used Prior to Dry-Pack that were Exposed to Conditions $\leq 60\%$ RH (Supplier Bake: "MET" = 24 h)	9
Table 4-3	Resetting or Pausing the "Floor Life" Clock at User Site	9
Table 5-1	Moisture Classification Level and Floor Life	10
Table 7-1	Recommended Equivalent Total Floor Life (days) @ 20°C, 25°C & 30°C, 35°C For ICs with Novolac, Biphenyl and Multifunctional Epoxies	13

Handling, Packing, Shipping and Use of Moisture/ Reflow Sensitive Surface Mount Devices

1 FOREWORD

The advent of surface mount devices (SMDs) introduced a new class of quality and reliability concerns regarding package damage “cracks and delamination” from the solder reflow process. This document describes the standardized levels of floor life exposure for moisture/reflow-sensitive SMD packages along with the handling, packing and shipping requirements necessary to avoid moisture/reflow-related failures. Companion documents J-STD-020 and JEP113 define the classification procedure and the labeling requirements, respectively.

Moisture from atmospheric humidity enters permeable packaging materials by diffusion. Assembly processes used to solder SMD packages to printed circuit boards (PCBs) expose the entire package body to temperatures higher than 200°C. During solder reflow, the combination of rapid moisture expansion, materials mismatch, and material interface degradation can result in package cracking and/or delamination of critical interfaces within the package.

The solder reflow processes of concern are convection, convection/IR, infrared (IR), vapor phase (VPR) and hot air rework tools. The use of assembly processes that immerse the component body in molten solder are not recommended for most SMD packages.

1.1 Purpose The purpose of this document is to provide SMD manufacturers and users with standardized methods for handling, packing, shipping, and use of moisture/reflow sensitive SMD packages that have been classified to the levels defined in J-STD-020. These methods are provided to avoid damage from moisture absorption and exposure to solder reflow temperatures that can result in yield and reliability degradation. By using these procedures, safe and damage-free reflow can be achieved, with the dry packing process, providing a minimum shelf life capability in sealed dry-bags of 12 months from the seal date.

1.2 Scope

1.2.1 Packages

1.2.1.1 Nonhermetic This standard applies to all nonhermetic SMD packages subjected to bulk solder reflow processes during PCB assembly, including plastic encapsulated packages and all other packages made with moisture-permeable polymeric materials (epoxies, silicones, etc.) that are exposed to the ambient air.

1.2.1.2 Hermetic Hermetic SMD packages are not moisture sensitive and do not require moisture precautionary handling.

1.3 Assembly Processes

1.3.1 Mass Reflow This standard applies to bulk solder reflow assembly by convection, convection/IR, infrared (IR), and vapor phase (VPR) processes. It does not apply to bulk solder reflow processes that immerse the component bodies in molten solder (e.g., wave soldering bottom mounted components). Such processes are not allowed for many SMDs and are not covered by the component qualifications standards used as a basis for this document.

1.3.2 Localized Heating This standard also applies to moisture sensitive SMD packages that are removed or attached singly by local ambient heating, i.e., “hot air rework.” See Clause 6.

1.3.3 Socketed Components This standard does not apply to SMD packages that are socketed and not exposed to solder reflow temperatures. Such SMD packages are not at risk and do not require moisture precautionary handling.

1.3.4 Point-to-Point Soldering This standard does not apply to SMD packages in which only the leads are heated to reflow the solder, e.g., hand-soldering, hot bar attach of gull wing leads, and through hole by wave soldering. The heat absorbed by the package body from such operations is typically much lower than for bulk surface mount reflow or hot air rework, and moisture precautionary measures are typically not needed.