



IPC-1602

Standard for Printed Board Handling and Storage

Developed by the Printed Board Storage and Handling Subcommittee
(D-35) of the Rigid Printed Board Committee (D-30) of IPC

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

Contact:

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Standard for Printed Board Handling and Storage

1 INTRODUCTION

1.1 Background Historically, the printed board industry has relied on military specifications and guidelines to define packaging methods to preserve the quality and reliability of printed boards during shipment and storage. However, many of these documents are obsolete, incomplete, do not address Pb-free assembly processes, or do not cover newer laminates or final finishes.

1.2 Scope This standard provides requirements and recommendations for proper handling, packaging materials and methods, environmental conditions, and storage for printed boards. The requirements and recommendations are intended to protect printed boards from contamination, physical damage, solderability degradation, electrostatic discharge (ESD) (when necessary), and moisture uptake. Moisture absorbed in printed board laminates expands at soldering temperatures, and in some cases, the resulting vapor pressure can cause internal delamination or excessive strain on plated-hole walls and other structures. This is especially challenging with the higher temperatures used for Pb-free soldering.

Note: This standard includes requirements for the handling, packaging and storage of printed boards and directly supersedes IPC-1601 Revision A from 2016.

This document covers all phases from the manufacture of the bare printed board, through delivery, receiving, stocking, assembly, and soldering.

1.3 Application The target audience includes those involved in all phases of printed board design, manufacture, assembly, shipping, storage, and possible warranty activities. Information herein has been supplied for all of these functions.

1.4 Terms and Definitions Other than those terms listed below, the definitions of terms used in this Standard are in accordance with IPC-T-50.

1.4.1 Assembler The entity that receives a completed printed board and performs subsequent assembly, wiring, or soldering operations.

1.4.2 Dry Packaging Packaging that consists of desiccant material and a Humidity Indicator Card (HIC) sealed with the printed boards inside a Moisture Barrier Bag (MBB) (see 4.2).

1.4.3 Humidity Indicator Card (HIC) An indicator of relative humidity in the form of a card with printed deposits of moisture-sensitive chemicals, usually as round dots arranged in sequence, each changing color at a higher relative humidity. Color will change (depending on the chemicals, either from blue to pink or from brown to azure) when humidity exceeds the value printed on the dot. When humidity decreases, color will change back (to blue or brown).

1.4.4 Manufacturer (Printed Board Fabricator or Assembler) The individual, organization, or company responsible for the applicable printed board fabrication or assembly process, and verification operations necessary to ensure full compliance of printed boards or assemblies to this Standard.

1.4.5 Moisture Barrier Bag (MBB) A bag designed to restrict the transmission of water vapor and used to pack moisture sensitive devices. An MBB is made of material with a low Water Vapor Transmission Rate (WVTR) (see 4.2.1). An MBB includes a metallized layer (aluminum), making the bag appear shiny and opaque.

1.4.6 Shall The words “shall” and “shall not” are used in this document to establish a requirement, which is a provision that is mandatory. To assist the reader, the words “shall” and “shall not” are presented in bold characters.

1.4.7 Should The words “should” and “should not” indicate suggestions, recommendations, best practices, or generally accepted industry methods or procedures, and are intended for guidance only.

1.4.8 Sub-Lam (Subcomposite) In sequential lamination, a printed board subassembly composed of more than two layers that have been laminated together, and which will subsequently be laminated with other layers into a complete printed board.