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Printed Board Handling and Storage Guidelines

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.

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Table of Contents

Figures

Tables

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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 laminate or final finishes.

1.2 Scope This document provides suggestions for proper handling, packaging materials and methods, environmental conditions, and storage for printed boards. These guidelines 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.

This document covers all phases from the manufacture of the bare printed board, through delivery, receiving, stocking, assembly, and soldering. As a guideline, this information is to be used with, and is secondary to, established requirements in such documents as the IPC-4550 series for final finishes.

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 The definition of all terms used herein are as specified in IPC-T-50 and as defined in 1.4.1 through 1.4.6.

1.4.1 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).

1.4.2 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.

1.4.3 Subcomposite In sequential lamination, a structure 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.

1.4.4 Water Vapor Transmission Rate (WVTR) A measure of the permeability of plastic film or metallized plastic film material to moisture, an important rating for moisture barrier bags (MBBs).

1.4.5 Sulfur Free Materials that are unlikely to express corrosive sulfur compounds like H_2S or SO_2.

1.4.6 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 4.3.1).

1.5 Revision Level Changes Changes incorporated into the current revision of this standard are indicated throughout by gray shading of the relevant subsection(s). Changes to a figure or table are indicated by gray shading of the figure or table header and applicable content.