ASSOCIATION CONNECTING ELECTRONICS INDUSTRIES®

IPC-HDBK-840

Solder Mask Handbook

Developed by the Solder Mask Handbook Task Group (5-33d) of the Cleaning and Coating Committee (5-30) of IPC

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

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Solder Mask Handbook

1 INTRODUCTION

1.1 Background Solder masks are permanent protective coatings that perform a number of functions during the fabrication, assembly and end use of printed circuits. One of the main purposes of solder mask is to protect the circuitry from interacting with solder during the assembly process. A solder mask's job isn't solely restricted to the solder operation however, as it also helps to protect the laminate, holes and traces from collecting contaminants and from degrading during the service life of the circuit. It also acts as an insulator of known dielectric property between components and traces.

The main requirements of the solder mask (as a material qualification) are tested within the IPC-SM-840. However, increasing technical diversification created further testing needs. Not every technical requirement is relevant for every application and thus these requirements will not be part of a general material qualification. These properties are usually required for specific original equipment manufacturer's (OEM) approvals. This solder mask handbook provides the reader with the background knowledge to make an educated decision if specific properties are required and how to test them. It also provides significant educational information about process influences.

1.2 Purpose The purpose of this handbook is to provide additional supporting information for IPC-SM-840 regarding solder mask types, processes, characteristics and properties in order to assist with the correct selection and use of the most appropriate material for the intended application. It should be read in conjunction with the solder mask manufacturer's technical information and other solder mask specification documents, which may be relevant, such as those listed in Section 2.

1.3 Target Audience The target audience for this document are solder mask manufacturers, solder mask processing equipment manufacturers, printed circuit board (PCB) designers, manufacturers, assemblers and repair technicians, assembly equipment and ancillary chemical suppliers, and OEMs.

2 APPLICABLE DOCUMENTS

2.1 IPC[1]

IPC-T-50 Terms and Definitions for Interconnecting and Packaging Electronic Circuits

IPC-SC-60 Post Solder Solvent Cleaning Handbook

IPC-SA-61 Post Solder Semi-Aqueous Cleaning Handbook

IPC-AC-62 Aqueous Post Solder Cleaning Handbook

IPC-CH-65 Guidelines for Cleaning of Printed Boards and Assemblies

IPC-HDBK-001 Handbook and Guide to Supplement J-STD-001

IPC-PE-740 Troubleshooting for Printed Board Manufacture and Assembly

IPC-CC-830 Qualification and Performance of Electrical Insulating Compound for Printed Wiring Assemblies

IPC-HDBK-830 Guidelines for Design, Selection and Application of Conformal Coatings

IPC-SM-840 Qualification and Performance of Permanent Solder Mask for Printed Boards

IPC-1751 Generic Requirements for Declaration Process Management

IPC-1752 Materials Declaration Management

IPC-2221 Generic Standard on Printed Board Design

IPC-4761 Design Guide for Protection of Printed Board Via Structures

IPC-6011 Generic Performance Specification for Printed Boards

IPC 6012 Qualification and Performance Specification for Rigid Printed Boards

IPC 6013 Qualification and Performance Specification for Flexible Printed Boards

IPC-9691 Users Guide for the IPC-TM-650, Method 2.6.25, Conductive Anodic Filament (CAF) Resistance Test (Electrochemical Migration Testing)

IPC-TM-650 Test Methods Manual[2]

2.3.23 Cure (Permanency) Thermally Cured Solder Mask

1. www.ipc.org
2. Current and revised IPC Test Methods are available on the IPC website (www.ipc.org/html/testmethods.htm).