



ASSOCIATION CONNECTING
ELECTRONICS INDUSTRIES

IPC-6016

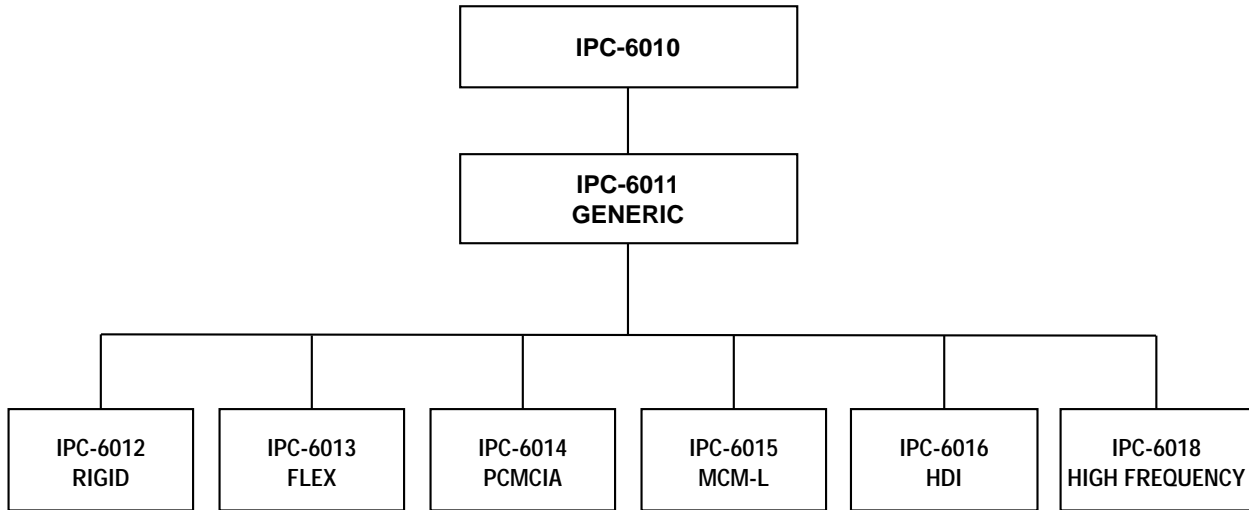
Qualification and Performance
Specification for High Density
Interconnect (HDI) Layers
or Boards

ANSI/IPC-6016

May 1999

A standard developed by IPC

**HIERARCHY OF IPC QUALIFICATION AND
PERFORMANCE SPECIFICATIONS
(6010 SERIES)**



FOREWORD

This specification is intended to provide information on the detailed performance criteria of High Density Interconnect layers only. The information contained herein supplements the generic requirements, identified in IPC-6011, as well as requirements relating to the core construction, identified in the sectionals: IPC-6012 (rigid), IPC-6013 (flex), IPC-6015 (MCM-L) or IPC-6018 (microwave). This document would be specified for and apply only to the added HDI features. The HDI layer should not modify most (if any) of the criteria set forth in the specification for the core construction. When used together, these documents should lead both manufacturer and customer to consistent terms of acceptability. If the HDI board does not employ a core construction, the customer should decide and specify which sectional performance specification should be used for evaluating criteria that is not covered in this document.

Within this document there are a number of performance criteria that are application dependent. These criteria are listed “slash sheets” in the back of the document that detail performance requirements based upon application. A blank slash sheet is also included to define needed requirements (agreed to by manufacturer and customer) for applications not currently covered.

NOTE: IPC-6016 was developed with consideration to HDI layers that use modified “conventional” plated-through hole processes and chemistries. The industry does not yet have enough experience to develop performance standards for HDI layers formed by novel processes that are drastically different from “conventional” plated-through hole constructions (i.e., non-plated copper processes). As experiences are gathered, criteria for these processes will be added. In the meantime, the customer and manufacturer should work together to set the criteria for acceptance of product using the new technologies.

IPC’s documentation strategy is to provide distinct documents that focus on specific aspects of electronic packaging issues. In this regard, document sets are used to provide the total information related to a particular electronic packaging topic. A document set is identified by a four digit number that ends in zero (0) (i.e., IPC-6010). The generic specification, the first document of the set, is supplemented by one or multiple sectional documents, each of which provide specific focus on one aspect of a topic or technology. IPC invites input on the effectiveness of the documentation and encourages user response through the “Standard Improvement Form” located at the back of each document.

Qualification and Performance Specification for High Density Interconnect (HDI) Layers or Boards

1 SCOPE

This specification establishes the specific requirements for organic high-density interconnect (HDI) layers with microvia technology and the quality and reliability assurance requirements that must be met for their acquisition.

1.1 Purpose The requirements contained herein are intended to reflect the electrical, mechanical, and environmental properties unique to the HDI layer. It is NOT intended to specify overall requirements for the core, which are already documented in the sectional performance specifications: IPC-6012 (rigid), IPC-6013 (flex), IPC-6015 (MCM-L), or IPC-6018 (microwave).

1.2 Performance Classification This specification recognizes HDI layers or boards will be subject to variations in performance requirements based on end use. The acceptance criteria of HDI layers are organized into slash sheet categories (A, B, C, etc., see Appendix A), which reflect those typical end-use applications. Users of this document **shall** select a slash sheet category that most closely resembles their product and are encouraged to modify it as necessary.

1.3 Slash Sheet Categories

- A. Chip Carrier
- B. Hand Held (cell phones, pagers)
- C. High Performance (avionics, military, medical)
- D. Harsh Environment (automotive, space)
- E. Portable (laptops, PDAs)

1.4 Documentation Hierarchy This document, combined with IPC-6011 and the applicable sectional performance specification(s) (IPC-6012, IPC-6013, IPC-6015 or IPC-6018), constitute a qualification and performance specification for HDI layers or boards.

2 APPLICABLE DOCUMENTS

The following specifications of the revision in effect at the time of order form a part of this document to the extent specified herein. If a conflict of requirements exists between IPC-6016 and the listed applicable documents, IPC-6016 **shall** take precedence.

2.1 IPC¹

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

IPC-PC-90 General Requirements for Implementation of Statistical Process Control

IPC-FC-231 Flexible Base Dielectrics for Use in Flexible Printed Wiring

IPC-FC-232 Adhesive Coated Dielectric Films for Use as Cover Sheets for Flexible Printed Wiring and Flexible Binding Films

IPC-FC-241 Flexible Metal-Clad Dielectrics for Use in Fabrication of Flexible Printed Wiring

IPC-AI-642 User's Guidelines for Automated Inspection of Artwork, Innerlayers, and Unpopulated PWBs

IPC-TM-650 Test Methods Manual²

2.1.1 Microsectioning

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

2.4.1 Adhesion, Tape Testing

2.4.8 Peel Strength of Metallic Clad Laminates

2.4.21.1 Bond Strength, Surface Mount Lands Perpendicular Pull Method

2.4.22 Bow and Twist

2.5.7 Dielectric Withstanding Voltage, PWB

2.6.3 Moisture and Insulation Resistance, Printed Boards

2.6.7.2 Thermal Shock, Continuity and Microsection, Printed Boards

2.6.8 Thermal Stress, Plated-Through Holes

2.6.8.1 Thermal Stress, Laminate

2.6.20 Assessment of Plastic Surface Mount Components for Susceptibility to Moisture/Reflow Induced Damage

IPC-ET-652 Guidelines and Requirements for Electrical Testing of Unpopulated Printed Boards

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

1. IPC, 2215 Sanders Road, Northbrook, IL 60062-6135

2. For convenience, applicable test methods are reprinted in the back of this standard. They represent the latest method in effect at the time of publication. Test methods may be updated independent of standard revision. Users should check the IPC website (www.ipc.org) for the most current test method available.