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# IPC-2222

## Sectional Design Standard for Rigid Organic Printed Boards

**ANSI/IPC-2222**

February 1998

A standard developed by IPC

Supersedes IPC-D-275  
September 1991

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# **Sectional Design Standard for Rigid Organic Printed Boards**

Developed by the IPC-D-275 Task Group (D-31b) of the Rigid Printed Board Committee (D-30) of IPC

APPROVED JANUARY 7, 1999 BY



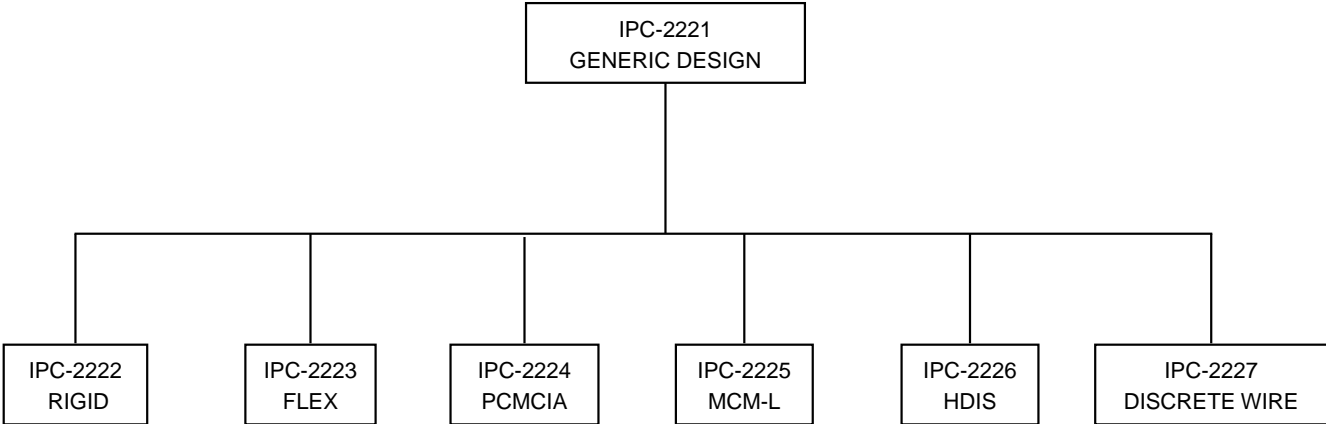
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Users of this standard are encouraged to participate in the development of future revisions.

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HIERARCHY OF IPC DESIGN SPECIFICATIONS  
(2220 SERIES)



**FOREWORD**

This standard is intended to provide information on the detailed requirements for organic rigid printed board design. All aspects and details of the design requirements are addressed to the extent that they can be applied to the unique requirements of those designs that use organic rigid (reinforced) materials or organic materials in combination with inorganic materials (metal, glass, ceramic, etc.) to provide the structure for mounting and interconnecting electronic, electromechanical, and mechanical components.

The information contained herein is intended to supplement generic engineering considerations and design requirements identified in IPC-2221. When coupled with the engineering design input, the complete disclosure should facilitate the appropriate selection process of the materials and the detailed organic rigid structure fabrication technology necessary to meet the engineering design objectives.

The selected component mounting and interconnecting technology for the printed board should be commensurate with the requirements provided and the specific focus of this sectional document.

IPC's documentation strategy is to provide distinct documents that focus on specific aspect 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).

Included in the set is the generic information which is contained in the first document of the set and identified by the four digit set number. The generic standard is supplemented by one or many sectional documents each of which provide specific focus on one aspect of the topic or the technology selected. The designer of the printed board, needs as a minimum, the generic, the sectional of the chosen technology, the generic engineering considerations, and the engineering description of the final product.

Failure to have all information available prior to starting a design may result in a product that is difficult to manufacture or exceeds the cost predictions or expectations of the printed board.

As technology changes, specific focus standards will be updated, or new focus standards added to the document set. The IPC invites input on the effectiveness of the documentation and encourages user response through completion of "Suggestions for Improvement" forms located at the end of each document

## Acknowledgment

Any Standard involving a complex technology draws material from a vast number of sources. While the principal members of the IPC-D-275 Task Group (D-31b) of the Rigid Printed Board Committee (D-30) are shown below, it is not possible to include all of those who assisted in the evolution of this Standard. To each of them, the members of the IPC extend their gratitude.

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# Table of Contents

<b>1.0 SCOPE</b> .....	1	<b>7.0 THERMAL MANAGEMENT</b> .....	16
1.1 Purpose .....	1	<b>8.0 COMPONENT AND ASSEMBLY ISSUES</b> .....	16
1.2 Document Hierarchy .....	1	8.1 General Attachment Requirements.....	16
1.3 Presentation .....	1	8.1.1 Attachment of Wires/Leads to Terminals .....	16
1.4 Interpretation .....	1	8.1.2 Board Extractors .....	16
1.5 Classification of Products .....	1	<b>9.0 HOLE/INTERCONNECTIONS</b> .....	16
1.5.1 Board Type.....	1	9.1 General Requirements for Lands with Holes ...	16
1.6 Assembly Types .....	1	9.1.1 Land Requirements .....	16
<b>2.0 APPLICABLE DOCUMENTS</b> .....	1	9.1.2 Thermal Relief in Conductor Planes.....	16
2.1 Institute for Interconnecting and Packaging Electronic Circuits (IPC) .....	1	9.1.3 Clearance Area in Planes.....	17
2.2 Underwriters Laboratories .....	3	9.1.4 Nonfunctional Lands.....	18
<b>3.0 GENERAL REQUIREMENTS</b> .....	3	9.1.5 Conductive Pattern Feature Location Tolerance .....	18
3.1 Performance Requirements.....	3	9.2 Holes .....	18
<b>4.0 MATERIALS</b> .....	3	9.2.1 Unsupported Holes .....	18
4.1 Material Selection .....	3	9.2.2 Plated-Through Holes .....	19
4.2 Dielectric Base Materials (Including Prepregs and Adhesives).....	3	9.2.3 Etchback.....	19
4.2.1 Epoxy Laminates .....	3	9.3 Drill Size Recommendations for Printed Boards.....	20
4.2.2 High-Temperature Laminates .....	3	<b>10.0 GENERAL CIRCUIT FEATURE REQUIREMENTS</b> .....	20
4.2.3 Special Clad Materials.....	3	<b>INDEX</b> .....	23
4.2.4 Other Laminates.....	3	10.1 Conductor Characteristics.....	20
4.3 Laminate Materials .....	3	10.1.1 Edge Spacing .....	20
4.3.1 Measurement of Dielectric Thickness.....	3	10.1.2 Balanced Conductors .....	21
4.3.2 Dielectric Thickness/Spacing.....	4	10.1.3 Flush Conductors for Rotating or Sliding Contacts.....	21
4.3.3 Laminate Properties .....	5	10.1.4 Metallic Finishes for Flush Conductors.....	21
4.3.4 Prepreg .....	5	10.2 Land Characteristics .....	21
4.3.5 Single-Clad Laminates.....	5	10.2.1 Lands for Interfacial Connection Vias .....	21
4.3.6 Double-Clad Laminates .....	5	10.2.2 Offset Lands .....	21
4.3.7 Laminate Material.....	5	10.2.3 Conductive Pattern Feature Location Tolerance .....	21
4.4 Conductive Materials.....	13	10.2.4 Nonfunctional Lands.....	21
4.5 Organic Protective Coatings.....	13	10.3 Large Conductive Areas .....	21
4.6 Markings and Legends .....	13	<b>11.0 DOCUMENTATION</b> .....	22
<b>5.0 MECHANICAL/PHYSICAL PROPERTIES</b> .....	13	11.1 Filled Holes.....	22
5.1 Fabrication Requirements .....	13	11.2 Nonfunctional Holes .....	22
5.2 Product/Board Configuration.....	13	<b>12.0 QUALITY ASSURANCE</b> .....	22
5.2.1 Board Geometries .....	13		
5.2.2 Support .....	13		
5.3 Assembly Requirements .....	13		
5.3.1 Assembly and Test.....	14		
5.4 Dimensioning Systems .....	15		
5.4.1 Grid Systems.....	15		
5.4.2 Profiles, Cutouts and Notches .....	15		
<b>6.0 ELECTRICAL PROPERTIES</b> .....	16		
		<b>Figures</b>	
		Figure 1-1 Electrical assembly types.....	2
		Figure 4-1 Dielectric layer thickness measurement.....	4

Figure 4-2	Designer / end user materials selection map .....	11	Table 4-5	BT Copper Clad Laminate Construction Selection Guide .....	9
Figure 5-1	Panel borders .....	14	Table 4-6	Polyimide Copper Clad Laminate Construction Selection Guide.....	10
Figure 5-2	Scoring parameters .....	14	Table 5-1	Panel Size to Manufacturing Operation Relationships .....	14
Figure 5-3	Breakaway tabs .....	15	Table 5-2	Standard Scoring Parameters.....	14
Figure 8-1	Permanent board extractor.....	16	Table 5-3	Tolerance of Profiles, Cutouts, Notches, and Keying Slots, as Machined, mm .....	15
Figure 8-2	External board extractor .....	16	Table 9-1	Feature Location Tolerances (Lands, Conductor Pattern, etc.) (Diameter True Position).....	18
Figure 9-1	Clearance area in planes, mm .....	17	Table 9-2	Minimum Unsupported Holes Tolerance Range (Difference between high and low hole size limits).....	18
Figure 9-2	Foil web size.....	18	Table 9-3	Plated-Through Hole Diameter to Lead Diameter Relationships .....	20
Figure 9-3	Lead-to-hole clearance.....	19	Table 9-4	Plated-Through Hole Aspect Ratio.....	20
Figure 10-1A	Typical flush circuit .....	21	Table 9-5	Minimum Plated-Through Hole Diameter Tolerance Range, mm (Difference between high and low hole size limits).....	20
Figure 10-1B	Surface flushness conditions.....	22	Table 9-6	Minimum Drilled Hole Size for Plated-Through Hole Vias .....	20
Figure 10-2	Cross-hatched large conductive layers with isothermal conductors.....	22	Table 9-7	Drill Size Recommendations Related to Maximum Board Thickness .....	20
			Table 10-1	Surface Flushness Requirements .....	21

### Tables

Table 4-1	Clad Laminate Maximum Operating Temperatures.....	4			
Table 4-2	FR-4 Copper Clad Laminate Construction Selection Guide .....	6			
Table 4-3	High T <sub>G</sub> FR-4 Copper Clad Laminate Construction Selection Guide.....	7			
Table 4-4	Cyanate Ester (170 to 250° T <sub>G</sub> ) Copper Clad Laminate Construction Selection Guide .....	8			

# Sectional Design Standard for Rigid Organic Printed Boards

## 1.0 SCOPE

This standard establishes the specific requirements for the design of rigid organic printed boards and other forms of component mounting and interconnecting structures. The organic materials may be homogeneous, reinforced, or used in combination with inorganic materials; the interconnections may be single, double, or multilayered.

**1.1 Purpose** The requirements contained herein are intended to establish specific design details that **shall** be used in conjunction with IPC-2221 (see 2.0) to produce detailed designs intended to mount and attach passive and active components.

The components may be through-hole, surface mount, fine pitch, ultra-fine pitch, array mounting or unpackaged bare die. The materials may be any combination able to perform the physical, thermal, environmental, and electronic function.

**1.2 Document Hierarchy** Document hierarchy **shall** be in accordance with the generic standard IPC-2221.

**1.3 Presentation** Presentation **shall** be in accordance with the generic standard IPC-2221.

**1.4 Interpretation** Interpretation **shall** be in accordance with the generic standard IPC-2221.

**1.5 Classification of Products** Classification of Products **shall** be in accordance with the generic standard IPC-2221 and as follows:

**1.5.1 Board Type** This standard provides design information for different board types. Board types are classified as:

Type 1 — Single-Sided Printed Board

Type 2 — Double-Sided Printed Board

Type 3 — Multilayer Board without Blind or Buried Vias

Type 4 — Multilayer Board with Blind and/or Buried Vias

Type 5 — Multilayer Metal-Core Board without Blind or Buried Vias

Type 6 — Multilayer Metal-Core Board with Blind and/or Buried Vias

**1.6 Assembly Types** A type designation signifies further sophistication describing whether components are mounted on one or both sides of the packaging and interconnecting

structure. Type 1 defines an assembly that has components mounted on only one side; Type 2 is an assembly with components on both sides. Type 2, Class A is not recommended.

Figure 1-1 shows the relationship of two types of assemblies.

The need to apply certain design concepts should depend on the complexity and precision required to produce a particular land pattern or P&I structure. Any design class may be applied to any of the end-product equipment categories; therefore, a moderate complexity (Type 1B) would define components mounted on one side (all surface mounted) and when used in a Class 2 product (dedicated service electronics) is referred to as Type 1B, Class 2. The product described as a Type 1B, Class 2 might be used in any of the end-use applications; the selection of class being dependent on the requirements of the customers using the application.

## 2.0 APPLICABLE DOCUMENTS

The following documents form a part of this document to the extent specified herein. If a conflict of requirements exist between IPC-2222 and those listed below, IPC-2222 takes precedence.

The revision of the document in effect at the time of solicitation **shall** take precedence.

### 2.1 Institute for Interconnecting and Packaging Electronic Circuits (IPC)<sup>1</sup>

**IPC-EG-140** Specification For Finished Fabric Woven From "E" Glass for Printed Board

**IPC-MF-150** Metal Foil for Printed Wiring Applications

**IPC-CF-152** Composite Metallic Materials Specification for Printed Wiring Boards

**IPC-D-279** Design Guidelines for Reliable Surface Mount Technology Printed Board Assemblies

**IPC-TM-650** Test Methods Manual

Method 2.1.1 Microsectioning

Method 2.1.6 Thickness of Glass Fabric

**IPC-SM-782** Surface Mount Design and Land Pattern Standard

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