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ELECTRONICS INDUSTRIES®

IPC-6013A

Amendment 2

Qualification and Performance Specification for Flexible Printed Boards

IPC-6013A
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March 2006

A standard developed by IPC

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Standards Should:

- Show relationship to Design for Manufacturability (DFM) and Design for the Environment (DFE)
- Minimize time to market
- Contain simple (simplified) language
- Just include spec information
- Focus on end product performance
- Include a feedback system on use and problems for future improvement

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- Inhibit innovation
- Increase time-to-market
- Keep people out
- Increase cycle time
- Tell you how to make something
- Contain anything that cannot be defended with data

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Adopted October 6, 1998

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Qualification and Performance Specification for Flexible Printed Boards

FOREWORD

This amendment provides a clerical correction of the sampling plan within IPC-6013A with Amendment 1 for the evaluation of structural integrity requirements for thermally stressed test coupons in Class 3 printed boards classified as Type 3 or 4.

Printed board suppliers who have utilized the reduced A.Q.L level of 1.0 for Class 3 end product in IPC-6013A with Amendment 1 are required to notify their customers and inform them if they had performed sampling to the 1.0 level for Class 3 end product and report the affected period of printed board fabrication by part number and date code. Users subsequently have the discretion to require additional testing as required for supplied end product inspected to the lower AQL during the period of performance that IPC-6013 with Amendment 1 was in affect.

2 APPLICABLE DOCUMENTS

Append the following to 2.1 IPC:

IPC-TM-650 Test Methods Manual²

2.5.5.7 Characteristic Impedance and Time Delay of Lines on Printed Boards by TDR

IPC-4103 Specification for Base Materials for High Speed/High Frequency Applications

IPC-4553 Specification for Immersion Silver Plating for Printed Circuit Boards

Table 1-1 Final Finish, Surface Plating and Coating Thickness Requirements

Append footnote to the following row in Table 1-1:

Code	Finish	Class 1	Class 2	Class 3
IS	Immersion Silver	Solderable ⁶	Solderable ⁶	Solderable ⁶

..and add the following footnote at the bottom of the table:

6. Surface measurements, when required for immersion silver thickness requires a unique pad size for both thin and/or thick silver deposits. See IPC-4553 for detailed measurement requirements.

Replace the following row in Table 1-1:

Surface and Hole Plating				
Copper ² (min. average)		Holes		
	Type 3, 4 \geq 6 layers	0.025 mm [0.00098 in]	0.025 mm [0.00098 in]	0.025 mm [0.00098 in]

with the following row:

Surface and Hole Plating				
Copper ² (min. average)		Holes		
	Type 3, 4 \leq 6 layers	0.025 mm [0.00098 in]	0.025 mm [0.00098 in]	0.025 mm [0.00098 in]

3.2.2 Laminates and Bonding Material for Multilayer Flexible Printed Wiring

Replace 3.2.2 title as follows:

3.2.2 Laminates and Bonding Materials

Replace first sentence as follows:

Metal-clad laminates, unclad laminates, and bonding material (prepreg) should be selected using IPC-4101, IPC-4103, IPC-4202, IPC-4203, IPC-4204 or NEMA LI 1-1989.

3.2.6.9 Other Metals and Coatings

Delete “immersion silver” and renumber to 3.2.6.10.

Append new 3.2.6.9 paragraph as follows:

3.2.6.9 Immersion Silver Plating Immersion silver plating shall be in accordance with IPC-4553.

Figure 3-11 Typical Microsection Evaluation Specimen (Three Plated-Through Holes)

Remove parenthetical “Three Plated-Through Holes” from the figure title.

Replace Note 2 as follows:

Laminate and adhesive anomalies or imperfections (such as laminate voids, adhesive voids, laminate cracks, delamination/blistering, etc.) shall be evaluated per 3.7.3 and 3.7.4 in Zone B following thermal stress or rework simulation. Laminate or adhesive anomalies in the Zone A are not evaluated on specimens that have been exposed to thermal stress or rework simulation.

3.11.1 Outgassing

Replace second sentence as follows:

The degree of outgassing shall not result in a weight loss of more than 1.0%.

3.11.2 Impedance Testing

Replace second paragraph as follows:

See IPC-2251 for the equations for calculating impedance from the test coupon and IPC-TM-650, Method 2.5.5.7, for the test method using the TDR technique.

Table 4-3 Acceptance Testing and Frequency

Replace the following row:

SOLDERABILITY							
Solderability: Surface/Hole	3.3.5		C and A or C and A/B	Sample (4.0)	Sample (2.5)	Sample (2.5)	Per panel

with the following two rows:

SOLDERABILITY							
Surface	3.3.5		M	Sample (4.0)	Sample (2.5)	Sample (2.5)	Per panel
Hole	3.3.5		A or A/B or S	Sample (4.0)	Sample (2.5)	Sample (2.5)	Per panel

Replace Structural Integrity After Stress Types 3-4 (Microsection) as follows:

Structural Integrity After Stress Types 3-4 (Microsection)⁶							
Flexible and Rigid Laminate Integrity	3.7.3 3.7.4		A and B or A/B	Sample (2.5)	Sample (1.5)	Sample (0.1)	Per panel
Etchback, Smear Removal and Negative Etchback (Type 3 and Type 4 Only)	3.7.5 3.7.6 3.7.7		A and B or A/B	Sample (2.5)	Sample (1.5)	Sample (0.1)	Per panel
Plating Integrity and Wicking	3.7.8 3.7.8.1		A and B or A/B	Sample (2.5)	Sample (1.5)	Sample (0.1)	Per panel
Plating Voids	3.7.9		A and B or A/B	Sample (2.5)	Sample (1.5)	Sample (0.1)	Per panel
Annular Ring and Breakout (Internal)	3.7.10 3.7.10.1		A and B or 2 A/B	Sample (2.5)	Sample (1.5)	Sample (0.1)	Twice per panel, opposite corners on diagonal ^{3,5}
Plating/Coating Thickness	3.7.11		A and B or A/B	Sample (2.5)	Sample (1.5)	Sample (0.1)	Per panel
Minimum Layer/Copper Foil Thickness	3.7.12		A and B or A/B	Sample (2.5)	Sample (1.5)	Sample (0.1)	Per panel
Minimum Surface Conductor Thickness	3.7.13		A and B or A/B	Sample (2.5)	Sample (1.5)	Sample (0.1)	Per panel
Metal Cores	3.7.14		A and B or A/B	Sample (2.5)	Sample (1.5)	Sample (0.1)	Per panel
Dielectric Thickness	3.7.15		A and B or A/B	Sample (2.5)	Sample (1.5)	Sample (0.1)	Per panel