

# MEMO

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## **Subject: proposal for appendix to IPC4101**

The working group on cleanliness of base laminate materials drafted the proposal outlined below on 6 Feb 2013 and revised the proposal on 12 Sep 2014. WG participants are in copy of this memo.

## **IPC4101D – Appendix A**

### **A.1. SCOPE**

This appendix defines supplemental requirements to this standard with the purpose to define a high quality for base materials to be used for high reliability PWBs for critical applications. PWBs designed with small spacing or high voltage can be subject to failure of insulation resistance due to electromigration along foreign material in a harsh environment.

On final PWBs of class 3/A, manufactured in accordance with chapter A.1.2 of IPC6012, it is not allowed to have foreign inclusions that reduce dielectric spacing to below the minimum requirement. The requirements on base materials in this appendix aim to prevent and to detect such non-conformance earlier in the supply chain.

## **A.2 Prepreg**

### **A.2.1 Acceptance criteria for prepreg**

The requirements of chapters 3.8.3.2.1 and 3.8.3.2.2 shall apply for inclusions and imperfections in prepreg.

### **A.2.2 Test method for prepreg**

The prepreg shall be tested in accordance with table 3-2 for visual properties, with the following amendment:

The conformance testing of visual properties shall be performed on 100% of the units in a lot using IPC-TM-650 2.1.5 or an equivalent method AABUS.

### **A.2.3 Rejection criteria for prepreg**

Chapter 4.4.3 shall be discarded for rejected lots. The following amendment shall apply: Material with non-conformances shall be discarded from the batch. The remainder of the batch is compliant with this appendix A.

## **A.3 Laminate**

### **A.3.1 Acceptance criteria for laminate**

The requirements of chapter 3.8.3.1.6 shall apply for imperfections on laminate, with the following amendment:

Requirement f shall be discarded. Opaque foreign fibers shall be evaluated in accordance with requirement g for opaque foreign matter.

### **A.3.2 Test method for laminate**

The laminate shall be tested in accordance with table 3-1 for surface and sub-surface imperfections, with the following amendment:

The conformance testing of surface and sub-surface imperfections shall be performed on  $\geq 2\%$  of the total area of the lot.

### **A.3.3 Rejection criteria for laminate**

Chapter 4.4.3 shall be discarded for rejected lots. The following amendment shall apply: All base material in the lot is non-compliant to this appendix A if non-conformances are observed in the lot.

### **A.3.4 In-process requirement for laminate**

For the manufacture of copper clad laminate, the base material manufacturer shall use prepreg that is inspected and evaluated in accordance with chapter A.2 or AABUS.

### A.3.5 Hi-Pot test for laminate

Hi-Pot testing as per IPC-TM-650 method 2.5.7.2 can be performed AABUS on 100% of the copper clad laminate with a nominal thickness of  $\leq 0.119$  mm.

The preparation of edges of the laminate, the bake out, the electrical test parameters and the acceptance criteria are AABUS.

### A.4 Applicability

Chapter 4.2 shall apply for the responsibility of conformance testing performed by the base material manufacturer, with the following amendment:

The procurement authority has the right to perform any of the inspections set forth in this appendix A to verify acceptability of the lot, in which case the requirements of this appendix A shall apply.

### A.8 Certificate of Conformance

Chapter 4.4.5 shall apply for the certificate of conformance, with the following amendment: The certificate of conformance shall include a statement of compliance to this appendix A.

### A.9 Quality conformance inspection and frequency

Chapter 4.4 and 4.4.1 shall apply for quality conformance inspection and frequency with the following amendment:

The manufacturer's quality system shall not take precedence over the requirements in appendix A.

**Table A.1 Summary table of amendments to table 3-1 and 3-2**

Tests	Requirement paragraph	Test Method IPC-TM-650	Qualification Testing	Conformance Testing	Conformance Testing Frequency	Inspected specimens
Visual properties for prepreg	3.8.3.2	2.1.5 or AABUS	✓	✓	Lot	100% of the lot as per A.2.2
Surface and Sub-Surface Imperfections for laminate	3.8.3.1.6 and A.3		✓	✓	Lot	$\geq 2\%$ of the lot as per A.3.2
Hi-Pot electrical test on laminate	A.7	2.5.7.2 or AABUS	AABUS	AABUS		100% or AABUS