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Qualification and Performance Specification for Printed Boards Containing Embedded Active and Passive Circuitry

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March 2009*

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Developed by the Embedded Devices Process Implementation
Subcommittee (D-55) of the Embedded Components Committee
(D-50) of IPC

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

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Table of Contents

1 SCOPE	1	3.2.6 Polymer Coating (Solder Mask)	7
1.1 Purpose	1	3.2.7 Resistor Materials	7
1.2 Classification	1	3.2.8 Capacitor Materials	7
1.3 Measurement Units	1	3.2.9 Coatings for Embedded Devices	7
1.4 Definition of Requirements	1	3.2.10 Underfill Materials	7
1.5 Process Control Requirements	2	3.2.11 Backfill Materials	7
1.6 Order of Precedence	2	3.2.12 Discrete Active Materials	7
1.6.1 Conflict	2	3.2.13 Discrete Passive Materials	7
1.6.2 Clause References	2	3.2.14 Attach Materials	8
1.6.3 Procurement Documentation	2	3.2.15 Printed Materials	8
1.7 Quality Conformance	2	3.2.16 Other Materials for Embedded Devices	8
1.8 Abbreviations and Acronyms	2	3.3 Visual Examination	8
1.9 Terms and Definitions	3	3.3.1 Edges	8
1.9.1 Embedded Passive Materials	3	3.3.2 Laminated Imperfections	9
1.9.2 Embedded Circuitry	3	3.3.3 Lifted Lands	9
1.9.3 Embedded Active Devices	3	3.3.4 Solderability	10
1.10 Embedded Circuitry Device Categories	3	3.3.5 Plating Adhesion	10
1.10.1 Embedded Passive Device Categories	3	3.3.6 Printed Board Contact, Junction of Au Plate to Solder Finish	10
1.10.2 Placed Embedded Active Devices	3	3.3.7 Separation Between Printed Materials and Printed Materials and Substrate	10
1.11 Documentation Hierarchy	3	3.3.8 Surface Cracks on Printed Materials	10
1.12 Selection for Procurement	3	3.3.9 Foreign Object Debris (FOD)	10
1.12.1 Production Master and Database	4	3.3.10 Registration	10
1.12.2 Deviations and Waivers	4	3.3.11 Dielectric Wetting	11
2 APPLICABLE DOCUMENTS	4	3.3.12 Printed and Formed Materials Adhesion	11
2.1 IPC	4	3.3.13 Marking	11
2.2 Joint Industry Standards	5	3.3.14 Defects in Printed and Formed Materials	11
2.3 National Electronic Manufacturers Association (NEMA)	5	3.3.15 Backfill Material	11
2.4 UL	5	3.3.16 Workmanship	12
3 REQUIREMENTS	6	3.4 Dimensional Requirements	12
3.1 General	6	3.4.1 Pattern Feature Accuracy	12
3.2 Materials	7	3.4.2 Bow and Twist (Rigid Areas and Applications) ..	12
3.2.1 Laminates and Bonding Materials	7	3.4.3 Flex	12
3.2.2 Other Dielectric Materials	7	3.4.4 Test Probe Dents	12
3.2.3 Metal Foils	7	3.4.5 Laser Trim	13
3.2.4 Metal Cores and Coins	7	3.4.6 Nicks and Pinholes	13
3.2.5 Surface Finishes, Coatings and Platings (Metallic and Nonmetallic)	7	3.5 Embedded Circuitry Dimensional Verification ..	13
		3.5.1 Spacing	13

3.6 Structural Integrity 13

3.6.1 Thermal Stress 13

3.6.2 Thermal Shock 13

3.6.3 Microsection Integrity 13

3.7 Electrical Requirements 13

3.7.1 Tolerance Requirements (Sheet-Based) 13

3.7.2 Dielectric Withstanding Voltage (Sheet-Based) . . . 13

3.7.3 Electrical Testing (Placed) 14

3.7.4 Circuitry 14

3.7.5 Moisture and Insulation Resistance (MIR)
(Sheet-Based and Formed) 14

3.8 Cleanliness 14

3.8.1 Placed, Soldered 14

3.9 Special Requirements 14

3.10 Rework and Repair 14

4 QUALITY ASSURANCE PROVISIONS 14

4.1 General 14

4.1.1 Qualification 14

4.1.2 Sample Test Coupons 17

4.2 Acceptance Tests 17

4.2.1 C=0 Zero Acceptance Number Sampling Plan . . 17

4.2.2 Referee Tests 17

APPENDIX A Index of Acronyms and Abbreviations . 18

Figures

Figure 1-1 Embedded Circuitry Device Categories 3

Figure 3-1 Foreign Object Debris (FOD) 10

Figure 3-2 Conductor Overlap 11

Tables

Table 3-1 Embedded Circuitry Test Requirements 3

Table 3-2 Maximum Limits of SnPb Solder
Bath Contaminant 10

Table 3-3 Edge Printed Board Contact Gap 10

Table 3-4 Tolerance Requirements (Sheet-Based) . . . 13

Table 3-5 Dielectric Withstanding Voltages
(Sheet-Based) 14

Table 4-1 Acceptance Testing and Frequency 15

Table 4-2 C=0 Sampling Plan (Sample Size for
Specific Index Value) 17

Qualification and Performance Specification for Printed Boards Containing Embedded Active and Passive Circuitry

1 SCOPE

This specification covers qualification and performance of embedded active and passive circuitry within the finished printed board.

1.1 Purpose The purpose of this standard is to define the electrical, mechanical and environmental requirements specific to embedded passive and active circuitry. These requirements are in addition to the applicable requirements of other performance specification(s) (e.g., IPC-6010 series, J-STD-001). Where specified, the requirements in this specification may supersede those requirements.

Substrates, as pertain to this standard, are materials (e.g., prepreg, laminate, films, cores, etc.) that serve as a platform for the embedded circuitry.

See IPC-7092 for additional guidance and information on embedded circuitry.

1.2 Classification IPC standards recognize that electrical and electronic assemblies are subject to classifications by intended end-item use. Three general end-product classes have been established to reflect differences in manufacturability, complexity, functional performance requirements, and verification (inspection/test) frequency. It should be recognized that there may be overlaps of equipment between classes.

CLASS 1 General Electronic Products

Includes products suitable for applications where the major requirement is function of the completed assembly.

CLASS 2 Dedicated Service Electronic Products

Includes products where continued performance and extended life is required, and for which uninterrupted service is desired but not critical. Typically, the end-use environment would not cause failure.

CLASS 3 High Performance/Harsh Environment Electronic Products

Includes products where continued high performance or performance-on-demand is critical, equipment downtime cannot be tolerated, end-use environment may be uncommonly harsh and the equipment must function when required, such as life support or other critical systems.

1.3 Measurement Units All dimensions and tolerances in this specification are expressed in hard SI (metric) units. Users of this specification are expected to use metric dimensions. All dimensions ≥ 1.0 mm will be expressed in mm. All dimensions < 1.0 mm will be expressed in μm .

1.4 Definition of Requirements The words **shall** or **shall not** are used in the text of this document wherever there is a requirement for materials, preparation, process control or acceptance.

The word "should" reflects recommendations and is used to reflect general industry practices and procedures for guidance only.

Line drawings and illustrations are depicted herein to assist in the interpretation of the written requirements of this Standard. The text takes precedence over the figures.

Where the word **shall** is used in this Standard, the requirements for each class are in brackets next to the requirement.

N = No requirement has been established for this Class

A = Acceptable

P = Process Indicator

D = Defect

Examples:

[A1P2D3] is Acceptable Class 1, Process Indicator Class 2 and Defect Class 3

[N1D2D3] is No requirement has been established Class 1, Defect Classes 2 and 3

[A1A2D3] is Acceptable Classes 1 and 2, Defect Class 3

[D1D2D3] is Defect for all Classes