MICROTEK LABORATORIES
1435 Allec Street
Anaheim, CA 92805
Tel.714.999.1616
Fax.714.999.1636
www.thetestlab.com

CUSTOMER NAME

IPC-6012B

RIGID PRINTED BOARD

STRUCTURAL INTEGRITY

Sample Identification: 7602-60XX-12

Report Number: ?????

TEST RESULTS SUMMARY:

The test results indicate that the samples tested met or exceeded the requirements as specified in the indicated test method within this report and the applicable master drawing requirements, Class 2. Actual detailed test results are enclosed.

The master drawing was supplied with the samples submitted for evaluation.

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SUBMISSION IDENTIFICATION

The following sample(s) were submitted and received in a suitable condition for testing as requested:

TEST SAMPLES SUBMITTED: mm/dd/yyyy

REPORT DATE: mm/dd/yyyy

PURCHASE ORDER NUMBER: ?

SAMPLE IDENTIFICATION: ????-????-??

DATECODE: 2008

MFR: N/A

* * * * *

IN ACCOUNT WITH:

CUSTOMER NAME

Street

City, ST Postal Code

(AAA) ###-####

Attention: Contact Name

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RIGID PRINTED BOARD
STRUCTURAL INTEGRITY

TEST SPECIMEN

Rigid printed wiring board sample(s) were submitted for structural integrity analysis.

REFERENCE

Master Drawing; IPC-6012B; IPC-A-600; IPC-TM-650, Method 2.1.1.2.

IPC-6012B:

3.6 Structural Integrity Printed boards shall meet structural integrity requirements for thermally stressed (after solder float) evaluation test coupons specified in 3.6.2. Although the A and B or A/B coupons are assigned for this test, production boards may be used in lieu of the A and B or A/B coupons and are preferred for product that contains surface mount and vias or surface mount mixed with through-hole technology. Holes selected shall be equivalent to those specified for test coupons. The production boards and all other test coupons in the quality conformance test circuitry which contain plated-through holes shall be capable of meeting the requirements of this section.

Structural integrity shall be used to evaluate test coupons or production boards from Type 2 through Type 6 boards by microsectioning techniques. Characteristics not applicable to Type 2 boards (i.e., requirements for innerlayer separations, innerlayer inclusions, and inner foil cracks) are not evaluated. Dimensional measurements that are only possible through the use of microsectioning techniques are also defined in this section. Blind and buried vias shall meet the requirements of plated-through holes. Refer to IPC-2221 for appropriate coupon design of blind and buried vias for plated hole evaluation.

The evaluation of all properties and requirements shall be performed on the thermally stressed test coupon and all requirements must be met; however, per supplier election, certain properties and conditions as defined in the following paragraph(s), which are not affected by thermal stressing, may be evaluated in a test coupon(s) that has not been thermally stressed.

a) When a supplier elects to evaluate the unstressed test coupon for the properties listed in (b), he may do so at any operation following the copper plating operation. If the board undergoes additional thermal excursions above the Tg (glass transition temperature) after copper plating, the unstressed test coupon being evaluated shall also be subjected to these thermal excursions.

b) The properties which are not affected by thermal stress include but are not limited to: copper voids, plating folds/inclusions, burrs and nodules, glass fiber protrusion, wicking, final coating plating voids, etchback, negative etchback, plating/coating thickness, internal and surface copper layer or foil thickness.

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3.6.1 Thermal Stress Testing Test coupons or production boards shall be thermally stressed in accordance with IPC-TM-650, Method 2.6.8.

Following stress, test coupons or production boards shall be microsectioned. Microsectioning shall be accomplished per IPC-TM-650, Method 2.1.1, or 2.1.1.2 on test coupons or production boards. Evaluation of all applicable holes and vias, including blind and buried, for all such structures found on the finished printed board shall be inspected in the vertical cross section in accordance with Table 4-3. The grinding and polishing accuracy of the microsection shall be such that the viewing area of each of the holes is within 10% of the drilled diameter of the hole.

Plated-through holes shall be examined for foil and plating integrity at a magnification of 100X ± 5%. Referee examinations shall be accomplished at a magnification of 200X ± 5%. Each side of the hole shall be examined independently. Examination for laminate thickness, foil thickness, plating thickness, lay-up orientation, lamination and plating voids, and so forth, shall be accomplished at magnifications specified above. For foils less than 3/8 oz., higher magnifications may be required to confirm minimum thickness requirement. Plating thicknesses below 1.0 µm [39.4 µin] shall not be measured using metallographic techniques. Note: When agreed by user and supplier, alternate techniques may be used to supplement microsection evaluation.

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RIGID BOARD MICROSECTIONAL ANALYSIS

CUSTOMER NAME: CUSTOMER NAME
SAMPLE IDENTIFICATION: ????-????-??
TEST TECHNICIAN: Name
REPORT DATE: mm/dd/yyyy

PLATING THICKNESS

PLATED-THRU HOLE THICKNESS:	
Hole #1 Average PTH Cu	0.00138''
Hole #2 Average PTH Cu	0.00133''
Hole #3 Average PTH Cu	0.00129''
Average of Hole #'s 1, 2, 3	0.00133''
SURFACE CONDUCTOR THICKNESS:	
Conductor #1 Cu	0.00258''
Conductor #2 Cu	0.00271''

FOILS AND DIELECTRICS

CONSTRUCTION	LYR	THICKNESS
COPPER FOIL	1	0.00121''
DIELECTRIC	1/2	0.05900''
COPPER FOIL	2	0.00121''

STRUCTURAL INTEGRITY

	PROPERTY	REQUIREMENT (Class 2 and 3)	ACC	REJ	COMMENTS
3.6.2.1	Plating Integrity	No separation of plating layers, plating cracks or interconnection contamination or separation	X		Meets Requirement
3.6.2.2	Plating Voids	One non-circumferential allowed <5% PWB Thickness	X		None Found
Table 3-6	Plating Folds/Inclusions	Must be enclosed and min Cu thickness is met	X		None Found
Table 3-6	Burrs and Nodules	Allowed if minimum hole diameter is met	X		Meets Requirement
Table 3-6	Glass Fiber Protrusion	Allowed if minimum isolated plating thickness is met	X		Meets Requirement
Table 3-6	Wicking	0.003937" max [Class 2]; 0.003150" max [Class 3]	X		Meets Requirement
Table 3-6	Interlayer Inclusions	None allowed			Not Applicable
Table 3-6	Internal Foil Cracks	None allowed			Not Applicable
Table 3-6	External Foil Cracks	"D" & "B" cracks not allowed. "A" cracks allowed	X		None Found
Table 3-6	Barrel/Corner Cracks(E/F)	None allowed	X		None Found
Table 3-6	Interlayer Separation	None allowed			Not Applicable
Table 3-6	External Edge Separation	Allowed if it does not extend past vertical edge	X		None Found
Table 3-6	Plating Separation	None allowed	X		None Found
Table 3-6	Plated Barrel Separation	Dimensional and plating requirements must be met	X		Meets Requirement
Table 3-6	Lifted Lands (After Stress)	Allowed if visual (section 3.3.4) are met	X		Meets Requirement
3.6.2.3	Laminate Voids	Voids in Zone B not greater than 0.003150"	X		<0.00315"
3.6.2.4	Laminate Cracks	Cracks in Zone B not greater than 0.003150"	X		None Found
3.6.2.5	Delamination or Blistering	No evidence of delamination or blistering; Class 2 & 3	X		None Found
3.6.2.6	Etchback (When Specified)	0.000197" to 0.003150"; Preferred depth 0.000512"			Not Applicable
3.6.2.7	Smear Removal	Shall not be etched back more than 0.000984"			Not Applicable
3.6.2.8	Negative Etchback	Shall not exceed requirements in Figure 3-6			Not Applicable
3.6.2.9	Annular Ring, Internal	90° breakout [Class 2]; 0.000984" min [Class 3]			Not Applicable
3.6.2.10	Lifted Lands	Lifted lands are allowed after thermal stress	X		Meets Requirement
3.6.2.11	Copper Plating, Average	0.000787" Avg [Class 2]; 0.000984" Avg [Class 3]	X		0.00133"
3.6.2.11	Copper Plating, Minimum	0.000709" Min [Class 2]; 0.000787" Min [Class 3]	X		Meets Requirement
3.6.2.12	Internal Cu Foil Thickness	See IPC-6012, Table 3-7 and Master Drawing			Not Applicable
3.6.2.13	External Conductor Thkns	See IPC-6012, Table 3-8 and Master Drawing	X		Meets Requirement
3.6.2.14	Metal Core Spacing	0.003937" Minumum			Not Applicable
3.6.2.15	Dielectric Thickness	Shall be specified in the procurement documentation	X		Meets Requirement
3.6.2.16	Material Fill	60% min for buried; Blind vias per Master Drawing			Not Applicable
3.6.2.17	Nail Heading	Allowed; Process Indicator			Not Applicable

ADDITIONAL REQUIREMENTS

Table 3-2	Blind Vias	0.000787" Avg [Class 2]; 0.000984" Avg [Class 3]			Not Applicable
Table 3-2	Blind Micro Vias	0.000472" Avg [Class 2]; 0.000472" Avg [Class 3]			Not Applicable
Table 3-2	Buried Via Cores	0.000592" Avg [Class 2]; 0.000592" Avg [Class 3]			Not Applicable
Table 3-2	Buried Vias >2 Layers	0.000787" Avg [Class 2]; 0.000984" Avg [Class 3]			Not Applicable

[X] SAMPLE MEETS THE APPLICABLE REQUIREMENTS OF IPC-6012B, CLASS 2.

Comments:

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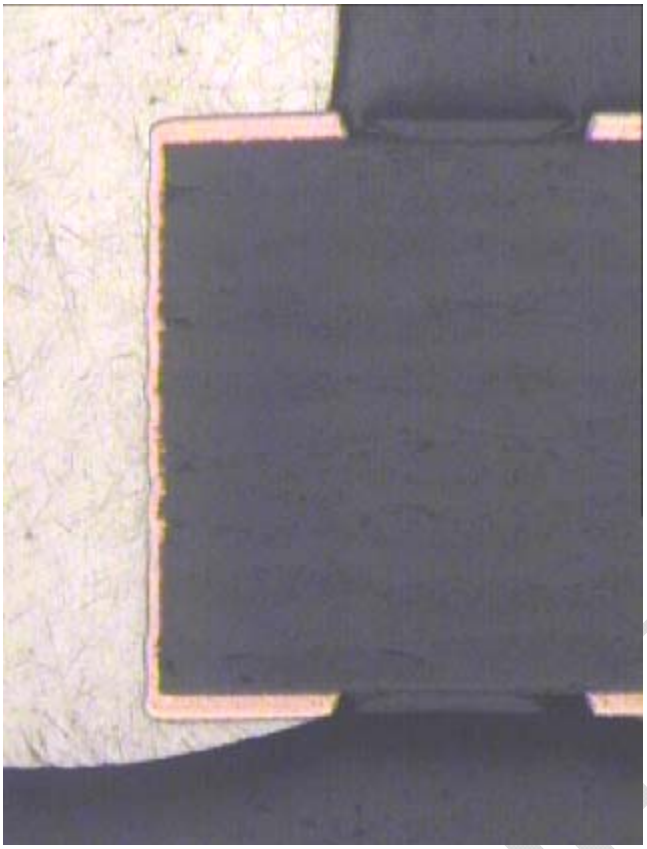

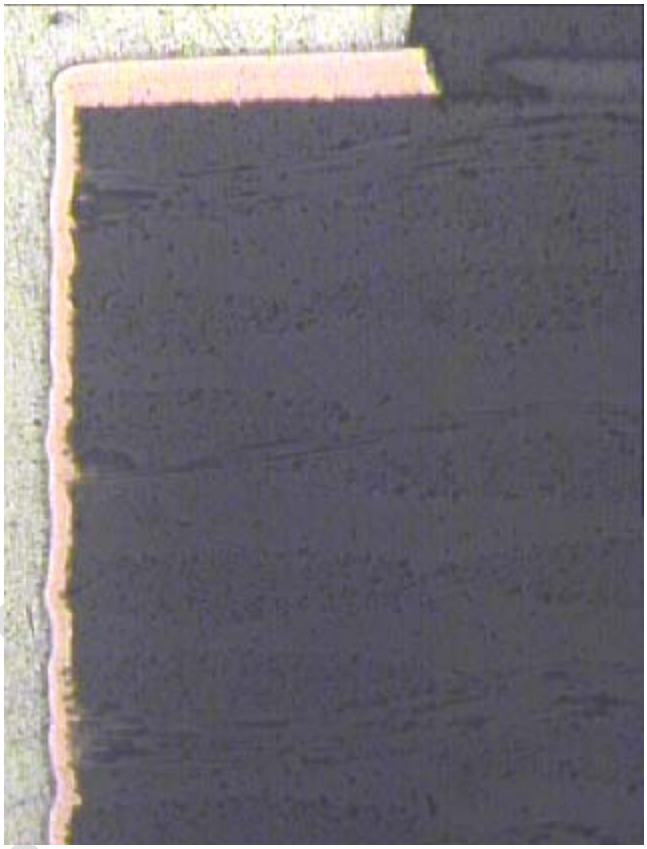

Date Code: 2008
Defects: None Found
Structural Integrity
Vertical Microsection @ 50X

Date Code: 2008
Defects: None Found
Structural Integrity
Vertical Microsection @ 100X

Sample Identification: 7602-60XX-12
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CERTIFICATE OF CONFORMANCE

Microtek Laboratories certifies that the test equipment used complies with the calibration requirements of ANSI/NCSL Z540-1, IPC-QL-653, and ISO/IEC-17025 and that the data contained in this report is accurate within the tolerance limitation of this equipment.

The materials and/or devices furnished on this order have been tested/analyzed/and inspected in accordance with all designated instructions and specifications. Physical reports and other data pertinent to applicable specifications are on file and available for inspection at this plant.

All test procedures detailed are complete. If any additional information or clarification of this report is required, please contact us.

Thank you for selecting Microtek Laboratories for your testing requirements.

Report Prepared By:

Sonny D.
Test Technician
MICROTEK LABORATORIES

Report Reviewed By:

Russell S. Shepherd
Laboratory Manager
MICROTEK LABORATORIES