



IPC-TM-650 TEST METHODS MANUAL

1.0 Scope This procedure is a rapid means for evaluating glass epoxy laminate integrity on different lots of base laminate materials before placing materials on the production floor, and thereby reducing the cost of processing material which may later prove to be defective.

2.0 Applicable Documents

IPC-A-600 Acceptability of Printed Boards

IPC-MI-660 Guidelines for Incoming Inspection of Raw Materials

3.0 Specimens The samples of qualification or incoming production test coupons shall be 4.0 inch x 4.0 inch x 1/16 inch thick (see 7.1) and etched using the standard commercial practices procedure of the individual test facility. The test coupons can be taken from any part of the laminate. The test strip may be sheared, but the individual test coupons shall be sawed and their edges sanded.

4.0 Number of Test Coupons to be Tested Five coupons shall be tested and may arbitrarily contain a known “pass” and “fail” control coupon. However, if a failure mode is established, a second set of 5 samples shall be tested from another laminate and this set must contain a pass and fail control. The number of test coupons tested at any one time should be limited to the capacity of the pressure vessel being used.

5.0 Apparatus

5.1 Any standard laboratory autoclave pressure vessel having a 6-quart capacity. A commercial household 6-quart stainless steel pressure cooker capable of developing 15 psi pressure (the 15 psi pressure set at the location of the test) may be used if equipped with a properly calibrated pressure gauge to maintain 15 psi \pm 0.5 psi pressure.

5.2 A laboratory solder pot capable of maintaining a solder bath (SN 60) at 500°F -0° + 10°F.

5.3 Stop watch.

5.4 Solder pot containing SN 60/40 solder.

6.0 Test

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Originating Task Group N/A	

6.1 Preparation

6.1.1 Cut test coupons only by sawing, and sand the edges of the specimens so they are smooth.

6.1.2 Etch specimens to remove metal foil except in any areas which may have identification codes.

6.1.3 Apply permanent identification markings on specimens on the end that will not be immersed in the solder pot.

6.1.4 The specimens will be placed in a suitable rack for suspending in the pressure vessel. The specimens should not be drilled for suspension as this creates a path for moisture incursion, giving false results.

6.1.5 Pour water into pressure vessel to approximately 1.0 inch depth. Cover and bring to a boil without pressurizing.

6.2 Test

6.2.1 When steam is observed at the vent, uncover and suspend specimens vertically over boiling water, being careful not to allow specimens to touch each other or the walls of the pressure vessel. This step must be done rapidly to avoid undue cooling of the water and pressure vessel.

6.2.2 The heat-up time should be controlled at 7 minutes \pm 1 minute.

6.2.3 After reaching 15 psi. maintain this condition for 30 minutes + 2 -0 minutes.

Note: Other pressure vessel dwell times may be agreed upon between user and vendor.

6.2.4 At the end of the exposure time, cool and vent the pressure vessel as recommended by the manufacturer.

6.2.5 Carefully remove the hot specimens from the pressure vessel and blot dry with paper towel (see caution notes).

6.2.6 The specimens shall be maintained at ambient temperature, and within 10 minutes it shall be immersed vertically (with the edge parallel to the solder surface) into the solder bath which is maintained at either 500°F -0 + 10°F for 20

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seconds. Immersion and withdrawal rates should not exceed 2 seconds. Do not allow test coupons to touch bottom of solder bath.

Note: Other solder bath temperatures maybe agreed upon by user and vendor.

6.3 Evaluation

6.3.1 Do not evaluate areas within 1/8 inch from all edges, including solder line.

6.3.2 Grading Grade specimens on the evaluation scale of 5 through 1 (below) according to degree of severity of the attack. In order for the grading to be more meaningful, the tester should also provide comments on the overall specimen appearance. For additional description and illustrations of measles, blisters, weave texture, delamination, etc., refer to *IPC-A-600, Acceptability Guidelines for Printed Wiring*.

Value	Condition
5	The samples have no measles, blisters, or surface erosion.
4	Occasional minute (1/32 inch or less) measles.
3	Minute measles scattered across the specimen.
2	Occasional minor blisters (two to four adjacent weave intersections).
1	Large blisters, delamination, or convolution.

If five test coupons are evaluated, the test may use a total performance points-rating (e.g., 5 x 5 = 25).

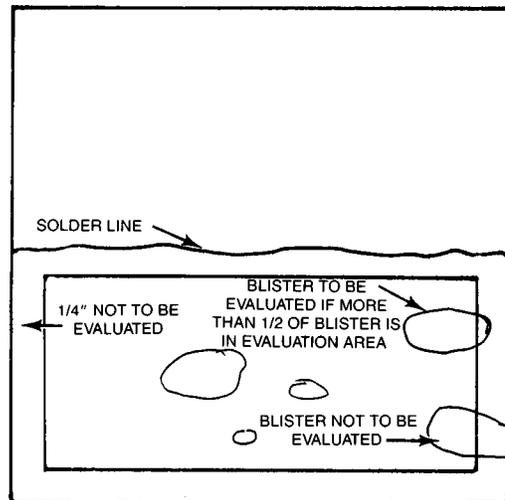
7.0 Notes

7.1 This test method is developed for 1/16 inch thick material. Different results are to be expected for other thicknesses. Therefore, the time of exposure and grading values may change for different thicknesses and must be agreed upon between user and vendor.

7.2 Warning Pressure vessel must always be opened with extreme caution to be certain pressure has been released.

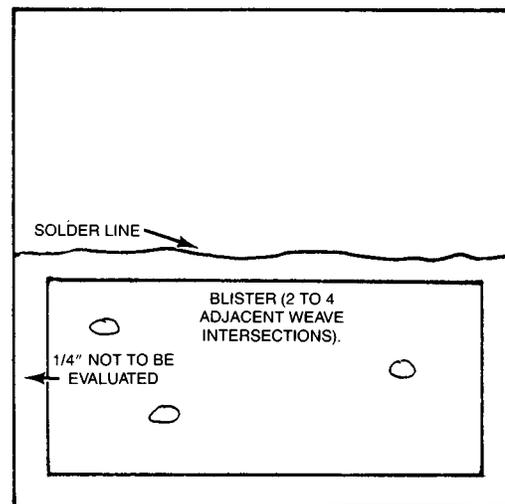
7.3 Warning Samples could retain some moisture. Therefore, care should be taken in immersing the sample in the solder bath. It is recommended that the operator work behind a suitable protective screen and use a glove to protect the hand holding the sample. The wet specimens will react violently

during the immersion into the solder pot, splaying and spluttering bits of molten solder about the fume hood. Proper precautionary measures must be taken.



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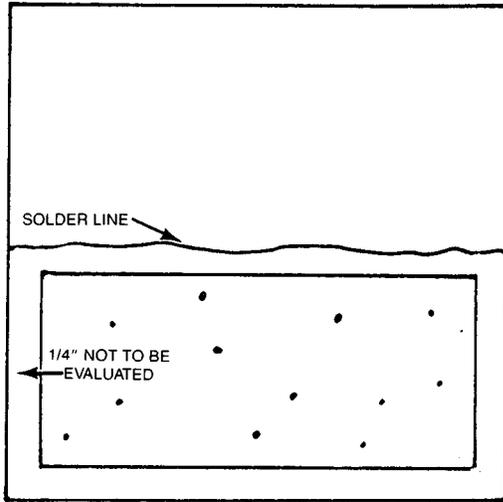
CONDITION 1



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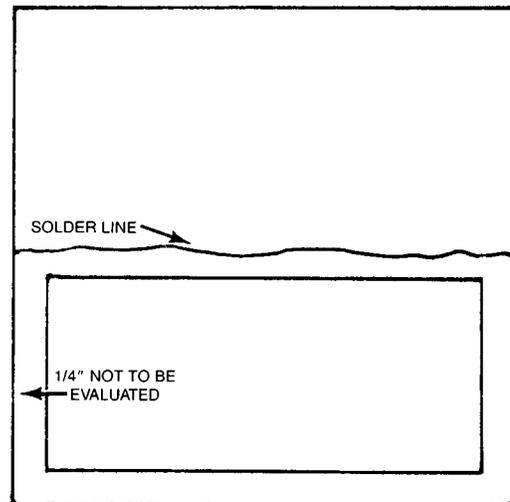
CONDITION 2

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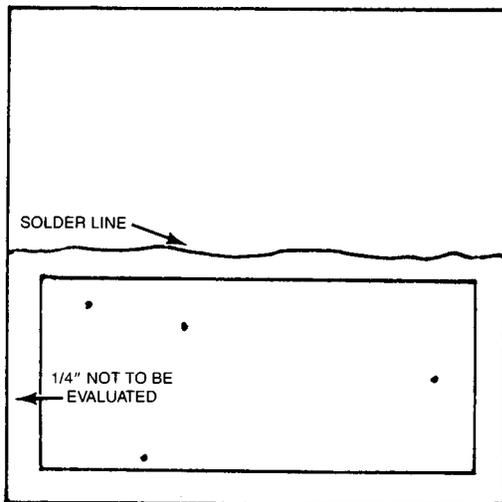
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CONDITION 3



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CONDITION 5



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CONDITION 4