



# IPC-TM-650 TEST METHODS MANUAL

**1 Scope** This test method shall establish and define the methods for predicting the bond strength, on a go-no-go basis, of additive rigid epoxy glass boards of the swell-etchable type.

## 2 Applicable Documents

**ASTM-D1000 Standard Test Method for Pressure-Sensitive Adhesive-Coated Tapes Used for Electrical and Electronic Applications**

**3 Test Specimen** A minimum of two boards per test, each board having the dimensions of 76 mm x 152 mm

## 4 Apparatus

**4.1** Liter beakers with slotted lids

**4.2** A wooden wallpaper seam roller (see Figure 1 and Figure 2). The type in Figure 1 can be purchased in most hardware shops, while the second roller is described in ASTM-D100.

**4.3** An Instron or some other suitable peel tester, capable of peeling at a 90° angle with a uniform, constant peel rate

**4.4** 3M Brand Filament tape, No. 898, or equal. A 6.4 mm width size is convenient.

**4.5 Chemicals** An additive chemical pre-treatment sequence from any of the major electronic chemical suppliers may be used. While the IPC does not endorse any specific chemical supplier, the chemical sequence should consist of several items.

- Conditioner
- Etchant
- Neutralizer

## 5 Procedure

### 5.1 Test

**5.1.1** Prepare the processing chemistry in one liter beakers in accordance with the chemical suppliers' recommendations.

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Subject <b>Tape Test for Additive Printed Boards</b>	
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Originating Task Group <b>N/A</b>	

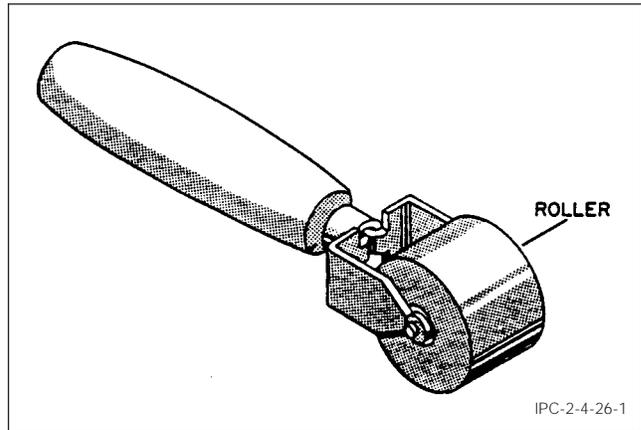


Figure 1 Paper Roller

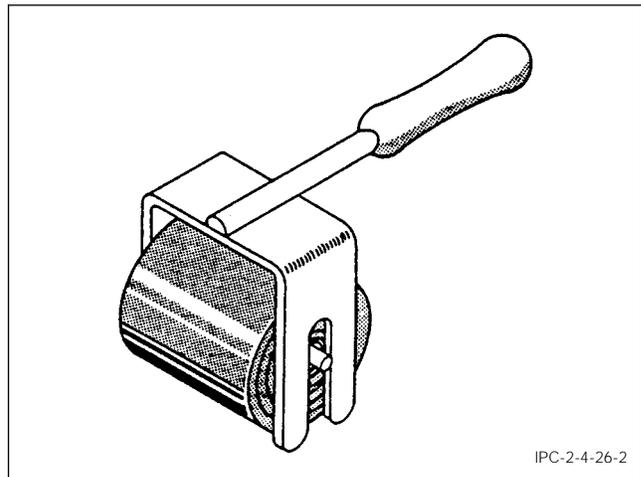


Figure 2 Uniform Pressure Roller

**5.1.2** In order to ensure that vapors from the processing solution do not attack the resin, some precaution should be taken to maintain minimum exposure of the untreated board area to vapors (e.g., use of a slotted lid over beaker). Also, no more than 10 sample boards/liter of any of the process chemicals shall be processed.

**5.1.3** Partially submerge a board (76 mm x 152 mm) in liter beakers following the process below. That portion of the board, not in the liquid, provides an "as is" surface as a control and base comparison.

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**5.1.4 Process Sequence** For a breakdown of time and temperature requirements of this test, see Table 1.

**Table 1 Process Sequence**

	Temp (°C)	Time (Min)
Conditioner	32	4
Rinse	16-27	2-3
Etch	66	6.5
Air Dry	–	0.75
Triple Rinse	16-27	3-5
Neutralizer	52	2.5
Rinse	25	5
Air Dry	25	Overnight

**5.1.5** Apply tape to both the treated and non-treated surfaces of the board using a wooden roller and fixed uniform pressure (approximately 4.5 kg.). Peel tape on Instron or other peel tester at 90° angle and a 5 cm/min. peel rate. Report the peel force as kg/cm on both treated and non-treated portions board.

**5.1.6** Use two boards per test. Put tape on each side of the board and obtain tape results for one tape strip per side per board.

**5.2 Evaluation**

**5.2.1** Report the tape peel strength in kg/cm width.

**5.2.2** Report the locus of failure of peeled tape (see Note 1.).

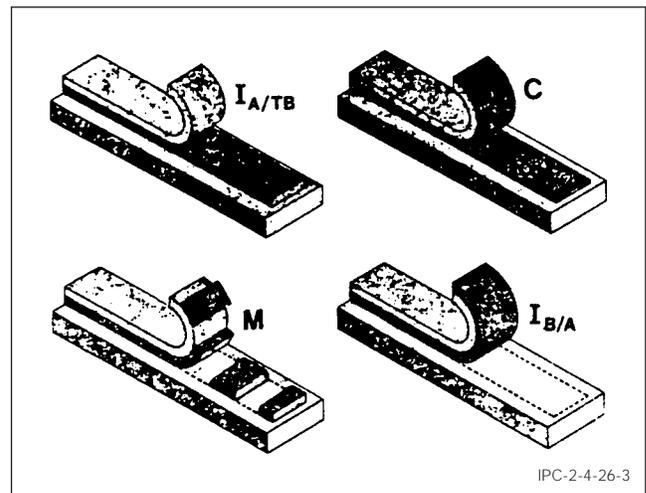
**Note 1:** The requirement of specifying the locus of mode of failure of the tape is very important and a critical aspect of the test. In order to be consistent with descriptions of failure modes, a common set of criteria is used, as defined in Table

2. Figure 3 shows, in schematic, the various failure modes one could obtain during performing this test. The three layers, from bottom to top, are (1) the epoxy/glass substrate, (2) the adhesive component of the tape, and (3) the tape backing (see top left drawing in Figure 3).

**5.2.3** Report the average of the two tape peel strengths (in kg/cm width) for the same side of both boards.

**Table 2 Modes of Failure Shown in Figure 3**

Notation	Meaning of Failure Mode
$I_{A/TB}$	Interfacial failure, between adhesive and tape backing
C	Cohesive failure within tape adhesive
M	Mixed failure mode, a combination of the other types
$I_{B/A}$	Interfacial failure, between the board and the adhesive of the tape.



**Figure 3 Modes of Failure**