



# IPC-TM-650 TEST METHODS MANUAL

Number <b>2.3.1</b>	
Subject <b>Chemical Processing, Suitable Processing Material</b>	
Date <b>4/73</b>	Revision
Originating Task Group <b>N/A</b>	

**1 Scope** This test method covers acceptance of incoming copper clad epoxy-glass laminates ranging in thickness from 0.8 mm to 6.5 mm, clad on one or both sides. It provides for a standard method of inspection and establishes operations that simulate the manufacture of PWBs. Specific values for the acceptability are based on copper foil adhesion and visual surface condition of the base laminate.

## 2 Applicable Documents

**MIL-STD-105** Sampling Procedures and Tables for Inspection by Attributes

**MIL-P-13949** Plastic Sheet, Laminated, Copper-Clad (For Printed Wiring)

## 3 Test Specimen

**3.1 Specimen** One specimen shall be tested for each sample, except in the case where material is clad on both sides, in which case two specimens shall be processed for each sample (one for each surface). Each specimen will have four readings.

**3.2 Sampling** The sampling procedure will be to MIL-STD-105. The inspection level shall be S-2 at 6.5 A.Q.L.

## 4 Apparatus

**4.1** Complete photo processing facilities

**4.2** Etching facilities

## 5 Procedures

**5.1 Print and Etch** For print and etch testing use 5.3.1, 5.3.2, 5.3.4, 5.3.5, 5.3.7, 5.3.8, 5.3.9, 5.3.10, and 5.3.11 only.

**5.2 Print, Etch, and Plate** For print, etch, and plate testing, use 5.3.1 through 5.3.11 inclusively.

## 5.3 Steps

### 5.3.1 Preparation

**5.3.1.1** Sand the edges of the test specimens to remove burrs, allowing close contact between the specimen, negative, and frame glass, resulting in a better defined etched pattern.

**5.3.1.2** Scrub the copper surface(s) with FFF pumice and brush to remove any contamination on the surface of the specimen until it passes a water break test.

**5.3.1.3** Dry using compressed filtered air.

### 5.3.2 Apply Resist

**5.3.2.1** Dip the specimens in the following photo-resist solution:

- One part KPR III
- One part Toluene
- One part Acetone

All parts are by volume and should be used at room temperature. Specific gravity of the solution is 0.920.

**5.3.2.2** Hold the specimen by one corner when dipping. Allow excess solution to drain until dripping stops.

**5.3.2.3** Put the specimens on the rack (after draining) into 80°C oven for three to five minutes to dry and harden KPR.

**5.3.2.4** Remove the rack from the oven and allow the specimens to cool to room temperature.

**5.3.2.5** Place the specimens upon the negative in the printing frame with the copper side against the negative.

**5.3.2.6** Expose the mounted specimen for seven minutes, 75 mm from the fluorescent black light.

**5.3.2.7** Develop in trichlorethylene vapor for 15 seconds. It may require two to six cycles until the pattern is clear. Air dry the specimen after developing.

**5.3.2.8** Use artwork from MIL-P-13949.

**5.3.3** Etch per MIL-P-13949, Method A or B

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**5.3.4** Drill 1.5 mm holes in the pads of the 3 mm lines with good fabricating practice.

**5.3.5** Remove the developed KPR by rubbing the pattern lightly with cold trichlorethylene liquid. Rinse in water. Scrub the specimens with FFF pumice and water with a strong bristle brush.

**5.3.6** Plate (this is simulated plating) per MIL-P-13949.

**5.3.7** Deoxidize by dipping in 10% hydrochloric acid for two minutes and wash in running water for five minutes. Dry 30 minutes, minimum, at 105°C to 110°C.

**5.3.8** Coat the etched copper surface with white petrolatum. Specimens shall be immersed horizontally in solder 6.5 mm below the surface for  $20 \pm 1$  seconds at 260°C  $+5/-0$ °C measured 25 mm below the surface.

**5.3.9** Remove the petrolatum from the surface of the specimen with a two minute scrub in cold trichlorethylene, followed by a one minute rinse in hot trichlorethylene.

**5.3.10** Inspect the surface for weave exposure, measling, crazing, resin loss, delamination, and blistering.

**5.3.11** Test four 1 mm lines on the specimen for peel strength per MIL-P-13949, reporting the average value for the four lines.