



# IPC-TM-650 TEST METHODS MANUAL

**1 Scope** This test method is used to determine the resistance of the applied solder mask to reverting to liquid when exposed to high humidity at a specific time and temperature condition. This test method evaluates the stability of a cured solder mask that has been applied to a printed board under storage (nonoperating) conditions.

## 2 Applicable Documents

**IPC-SM-840** Qualification and Performance of Permanent Solder Mask

**3 Test Specimens** Three copper clad laminates, approximately 10 cm x 10 cm [3.94 in x 3.94 in], coated with solder mask and cured according to the supplier's recommendations.

## 4 Equipment

**4.1 Desiccator** At least 25 cm [9.84 in] in diameter

**4.2 Potassium Sulfate** Reagent grade potassium sulfate

**4.3 Cotton Swabs**

**4.4 Oven** Capable of maintaining temperature up to 100 °C [212 °F]

**4.5 Test Chamber** Capable of maintaining a constant temperature of 97 ± 2 °C [206.6 ± 3.6 °F] with 94 ± 4% relative humidity.

**4.6 High Temperature Silicone Grease**

## 5 Procedures

### 5.1 Desiccator Method

**5.1.1** Prepare a saturated solution of distilled or deionized water and potassium sulfate [35 grams per 100 mL] at a temperature of 97 ± 2 °C [206.6 ± 3.6 °F]. Pour the solution into the desiccator just below the ceramic plate. Crystals of potas-

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sium sulfate should remain visible in the saturated solution during testing.

**Note:** Relative humidity is not to exceed 98%.

**5.1.2** Place the three test specimens on the ceramic plate in the desiccator so that they are not touching each other.

**5.1.3** Seal the desiccator with high temperature silicone grease and close the desiccator.

**5.1.4** Place the desiccator in the oven maintained at 97 ± 2 °C [206.6 ± 3.6 °F].

**5.1.5** Allow the desiccator, containing the test specimens, to remain in the oven for 28 days (672 hours).

### 5.2 Chamber Method

**5.2.1** Place the three test specimens in a rack so they do not touch each other and place the rack into the test chamber. Close the chamber door.

**5.2.2** Set the chamber's parameters at 97 ± 2 °C [206.6 ± 3.6 °F] and 94 ± 4% relative humidity. Activate the test chamber and begin testing.

**5.2.3** Allow the specimens to remain in the test chamber for 28 days (672 hours).

### 5.3 Evaluation

**5.3.1** After the required time exposure remove the test specimens and visually examine the specimens for evidence of reversion as indicated by softening, chalking, blisters, cracks, tackiness, loss of adhesion or liquefaction.

**5.3.2** Touch (do not wipe) the surface of the solder mask coating with a swab of absorbent cotton and observe for particles of the cotton adhering to the coating.

**Note:** Examination and testing may be done at intervals within the required exposure time, if there is suspicion of early failure and evaluation time is critical.