



IPC-TM-650 TEST METHODS MANUAL

1.0 Scope This test method covers the cure, or permanence testing of ultraviolet-initiated dry film solder mask (solder resist) organic coatings. Dry film solder masking is the application of a film coating on laminates and circuits. Following processing and curing, the dry film mask covers only those areas where no solder is to appear and, conversely, does not cover those areas where soldering is intended.

2.0 Applicable Documents None

3.0 Test Specimens IPC Test Board IPC-B-25 preproduction board, or a sample production board with the dry film solder mask coating applied and cured as recommended by the manufacturer. See Procedure 5.1.

4.0 Apparatus

4.1 MESERAN Surface Analyzer Model 1200 or equivalent. (Cf. 6.1, 6.2).

4.2 MESERAN Test Solution TSAL2X, TSBH2X, or TSAJ or equivalent. (Cf. 6.1, 6.2).

4.3 Ultraviolet intensity monitor.

5.0 Procedure

5.1 Preparation and testing of REFERENCE specimens.

5.1.1 Prepare specimens as described by the solder mask manufacturer and with attention to the following instructions.

5.1.1.1 Use U.V. intensity monitor to assure the output of the U.V. lamps giving careful attention to the variability of each lamp in the curing system if multiple lamps are used.

5.1.1.2 Test according to paragraph 6.1 - 6.3 a minimum of two REFERENCE specimens prepared as follows:

- One specimen at manufacturer's recommended U.V. level but omitting final baking process.
- Another specimen at manufacturer's recommended U.V. level and bake cycle.

These REFERENCE specimens become the standards from which the test method will measure cure differences. If end-

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use performance standards for the solder masks are desired in addition to those of the solder mask manufacturer, prepare the REFERENCE standards accordingly.

6.0 Test

6.1 Load pre-selected test solution into Surface Analyzer. The manufacturer recommends specific test solutions, which are commercially available, for particular dry film solder masks.

6.2 Following proper exposure to U.V. curing, but prior to baking cycle, cool the board to room temperature (can be accelerated with a fan).

6.3 Place board to be tested into Surface Analyzer and initiate 4-minute automatic analysis as recommended by manufacturer.

6.4 If the cure value, as determined by the Surface Analyzer, is equal to the cure value of the REFERENCE standard 5.1.1.2.a, continue the baking cycle of the tested board. If, however, additional U.V. exposure is required, adjust the line speed of the U.V. curing system using lamp intensity monitor and test a new specimen. Repeat U.V. adjustments until REFERENCE cure values are achieved.

6.5 Following the completed baking process and cooling to room temperature, test board as described in 6.3 above. The cure value should equal that of the REFERENCE standard prepared in 5.1.1.2.b above. If not, the baking cycle must be adjusted and testing on a new specimen is required.

7.0 Notes

7.1 MESERAN is a registered U.S. Trademark

7.2 MESERAN Surface Analyzers and MESERAN Test Solutions are manufactured and marketed by:

The MESERAN Company
P.O. Box 15035
Chattanooga, TN 37415
(615) 875-3931

The Surface Analyzers are automatic instruments with microcomputer-based controls.

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7.3 The test method described herein is a solvent swell/diffusion test based on the principle of Evaporative Rate Analysis (ERA).

The ERA technique involves deposition onto a test surface of ca. 20 ul of a low boiling solvent containing ca. 0.4 microgram of a high boiling, but volatile, C-14 labeled material. Then, with metered dry nitrogen gas flowing between the test surface and a detector positioned just above the surface, the rate at which the radiochemical evaporates is a function of the degree of cure when the solvent has been properly preselected. The less the count from molecules retained at the surface, the more the cure.