



IPC-TM-650 TEST METHODS MANUAL

1.0 Scope This test method is to describe the procedures to be used for performing dimensional inspections on microsections of printed boards. This method does not apply to measurements less than 1.25 μm (0.00005 in). This method is intended to supersede IPC-TM-650, Methods 2.2.9 and 2.2.11.

2.0 Applicable Documents

IPC-TM-650 Method 2.1.1

IPC-TM-650 Method 2.1.1.2

IPC-A-600 Acceptability of Printed Boards

3.0 Test Specimens The test specimens are to be microsections of printed boards or the associated quality conformance test circuitry prepared in accordance with IPC-TM-650, Methods 2.1.1 or 2.1.1.2.

4.0 Apparatus or Material

4.1 Metallographic equipment and consumables as described in IPC-TM-650, Methods 2.1.1 or 2.1.1.2.

4.2 In addition, the microscope or metallograph described in Methods 2.1.1 or 2.1.1.2 shall be equipped with a measuring reticle or filar eyepiece.

4.2.1 Reticle or Filar Micrometer attachment to Optical Inspection Aid that contains gradations or a scale, which will provide a minimum measurement resolution of 50% of the last significant digit of the referenced dimensional requirement. The Reticle or Filar Micrometer should be calibrated at the given magnification to ascertain the distance in μm (inches) between each division.

5.0 Procedure

5.1 The dimensional inspections are to be performed on freshly prepared and etched microsections. When oxidation and/or staining are present that would inhibit the clear viewing

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of the areas to be measured the microsections(s) shall be prepared again beginning with the finest grinding step in the metallographic preparation sequence.

5.2 The microscope's or metallograph's measuring reticle or filar eyepiece shall be calibrated in accordance with the manufacturer's instructions using a stage micrometer. The calibration frequency shall be at a minimum of one (1) year intervals or more frequently, if required, to maintain accuracy of the dimensional inspections.

5.3 Attributes that can be measured using microsections of printed boards include but are not limited to: plating, coating, or solder resist thickness, the size of laminate voids or cracks, the amount of positive or negative etchback, conductor thickness, dielectric spacing, either laterally or vertically, annular ring width, layer-to-layer registration, or the extent of wicking.

5.4 Select a magnification that allows clear viewing of the areas containing the attributes to be measured. For instance, when viewing multilayer printed boards with plated-through holes or vias for layer-to-layer registration, magnifications of 50X to 100X would be used. When measuring plating thicknesses of electrodeposited copper or nickel, a magnification of 200X would be used.

5.5 Read and record the dimensions for the attributes(s) to be measured using the same number of significant digits specified by the drawing, standard, or specification as a minimum or maximum limiting value.

6.0 Notes

6.1 Measurements less than 1.25 μm (0.00005 in) cannot accurately be made using optical techniques. Electronic measurement techniques should be considered for these measurements.

6.2 IPC-A-600 contains figures and diagrams which depict microsectional attributes and measurements.