



IPC-TM-650 TEST METHODS MANUAL

1.0 Scope This method is intended to describe optically enhanced measurement techniques for dimensions of 3 mm or less, typically referenced on a Printed Board drawing. This method will not cover mechanical dimensional verification which is covered by IPC-TM-650, Method 2.2.1. This method is intended to supersede IPC-TM-650, Method 2.2.3.

2.0 Applicable Documents

IPC-OI-645 Standard for Visual Optical Inspection Aids

IPC-A-600E Acceptability of Printed Boards

3.0 Test Specimens

3.1 The test specimen(s) shall be defined in the applicable performance specification or standard.

4.0 Apparatus or Material

4.1 Optical inspection aid capable of a magnification where the feature(s) to be measured occupies at least 20% of the field of view. (See IPC-OI-645 for detailed description.)

4.2 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 mm (inches) between each division.

5.0 Procedure

5.1 Select an optical aid which allows for clear viewing of the area(s) containing the attributes to be measured.

Number 2.2.2	
Subject Optical Dimensional Verification	
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Originating Task Group Rigid Board T.M. Task Group, 7-11d	

5.2 Adjust the optical aid so that both the feature(s) to be measured and the reticle or filar micrometer attachment are in focus.

5.3 Align the reticle or filar micrometer so that the measurement scale is visible and aligned with the edges of the feature(s) to be measured.

5.4 Read the reticle or filar micrometer to obtain the number of divisions between feature edges.

5.5 To obtain the actual dimensions of the feature, multiply the number of divisions read by the calibration data previously obtained for the reticle or filar micrometer in ($\mu\text{m}/\text{division}$) (inches/division) at the given magnification.

5.6 Record the dimensions for the attribute(s) 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 For a thorough description of the requirements, definitions, and certification provisions for optical inspection aids, see IPC-OI-645.

6.2 IPC-A-600 contains figures and diagrams which depict measurement techniques for certain attributed.