



# IPC-TM-650 TEST METHODS MANUAL

**1.0 Purpose** To determine dispersion of glass microbeads in Self Shimming Thermally Conductive Adhesives, thus ensuring the proper self-induced gap.

It is important for the beads to be well dispersed throughout the batch, since this adhesive is designed for bonding of electrical components to printed circuit boards where electrical isolation, provided by a consistent gap, is required. The testing is performed by measuring the gap induced by the adhesive placed between two flat metal surfaces.

## 2.0 Applicable Documents

None

## 3.0 Test Specimen

Two steel blocks; one with dimensions 1"x1"x $\frac{5}{16}$ ", the second must be machined to equal the area of a TO-220 transistor (.605"x.405"x0.060") on the center top of the block

## 4.0 Apparatus and Reagents

### 4.1 Apparatus

**4.1.1** Two steel blocks; one with dimensions 1"x1"x $\frac{5}{16}$ ", the second must be machined to equal the area of a TO-220 transistor (.605"x.405"x0.060") on the center top of the block. Both surfaces contacting the adhesive during the test must be highly polished. (See Figure 1).

**4.1.2** Micrometer, accurate to the nearest 0.001"

**4.1.3** Spatula

**4.1.4** Clamp, Hargrave #1

## 5.0 Test Procedure

### 5.1 Preparation

**5.1.1** Accurately measure to the nearest 0.001" the thickness of the two sandwiched steel blocks. Record.

**5.1.2** Apply sufficient adhesive to ensure coverage of the TO-220 machines area.

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| Number<br><b>2.4.51</b>  |          |
| Subject<br><b>Self Shimming Thermally Conductive Adhesives</b>             |          |
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| Originating Task Group<br><b>SMT Mounting Adhesives Task Group (5-11c)</b> |          |

**5.1.3** Assemble blocks without twisting.

### 5.2 Test

**5.2.1** Clamp blocks to induce vertical force.

**5.2.2** Wipe off excess adhesive, if any.

**5.2.3** Remove clamp.

**5.2.4** Measure thickness of the sandwiched blocks with the adhesive in between. Record.

### 5.3 Evaluation

**5.3.1** Gap Induced = Thickness measured in 5.2.4 – thickness measured in 5.1.1.

**5.3.2** Report the average of three determinations.

**Note:** A hargrave #1 clamp produces approximately 20 lbs of clamping force.

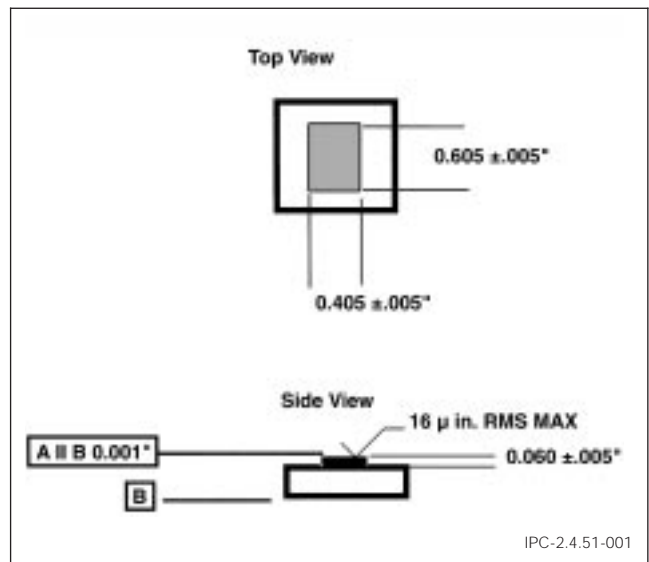


Figure 1