



IPC-TM-650 TEST METHODS MANUAL

Number 2.4.9.2	
Subject Bonding Process	
Date 11/98	Revision
Originating Task Group SMT Mounting Adhesives Task Group (5-24d)	

1 Scope In order to assess the actual performance of any given lot of material, it is necessary to apply and thermally bond the material between the substrates of interest. This method describes the recommended procedure for both pre-tacking and bonding anisotropically conductive films (ACF). This method describes a fully manual procedure.

2 Applicable Documents

3 Test Specimens

3.1 Appropriate flex circuit and test substrate(s)

4 Apparatus

4.1 "Hot-Bar" type soldering station: Unitek PM-4 or equivalent

4.2 Thermode: 1.5 mm width minimum; sufficient length to span bond-line

4.3 Hot-Plate: Pace, Inc., 'Hot Spot' or equivalent (optional if hot bar bonder is used for tacking or if adhesive can be tacked without applied heat)

4.4 Razor blade

4.5 Cotton swab (optional; see 4.3)

4.6 One roll or sheet of conductive adhesive

4.7 Appropriate compliant material (as required)

5 Procedure

5.1 Sample Preparation

5.1.1 Allow the roll of adhesive to equilibrate at room temperature before handling.

5.1.2 Cut the flex circuit sample to the appropriate length and width for the given performance test.

5.1.3 Cut an adhesive sample to match the width and length of the bond area.

5.2 Procedure

5.2.1 Position the adhesive over the pads on the flex circuit, liner-side up.

5.2.2 If the adhesive requires heat to tack it, tack the adhesive in place on the flex circuit using the hot plate and cotton swab (alternatively, the adhesive can be tacked using an appropriately low setting of the hot bar equipment). The adhesive should be easily tackable with a three to five second exposure at 100°C. A cotton swab should be used to apply mild pressure in order to facilitate wetting. Allow the flex circuit to cool before handling further.

5.2.3 Peel the release liner away from the flex circuit in order to expose the adhesive. The adhesive may need pre-cutting (using a razor blade) to separate it from the liner along the starting edge.

5.2.4 Align the flex circuit to the test substrate. In instances requiring extreme accuracy of alignment, it is helpful to affix the flex circuit relative to the substrate to prevent misregistration prior to and during bonding. This can be accomplished with custom fixturing. Alternatively, a soldering iron can be brushed lightly along the bond-line in order to tackify the adhesive, thereby temporarily adhering the flex circuit to the test substrate.

Note: When a soldering iron is used, it should be powered through a Variac in order to provide temperature control. The temperature/time of the soldering iron should be just high enough to tackify the adhesive but not so high as to substantially cross-link the adhesive (i.e., 100°-130°C) and only a few seconds exposure to these temperatures.

5.2.5 Bond the flex circuit to the test substrate using the hot-bar soldering station. Apply a minimum of 20 kg and a maximum of 40kg/sq. cm of total bond-line area (or as recommended by the adhesive vendor), then ramp the temperature to the set point. The thermode set point needs to be set to permit the adhesive layer to reach 180°C within 10 seconds (or as recommended by the adhesive vendor) of the time at which the thermode reaches its setpoint. The thermode should remain at the setpoint for a time sufficient to cure the adhesive according to vendor's specification (typically 20 seconds). Some vendors may advise that the bond pressure

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should be maintained until the adhesive layer cools to 100°C. Allow the test sample to cool slightly before handling. The compliant material (if one is used) should be placed between the thermode and flex circuit prior to bonding.