



IPC-TM-650 TEST METHODS MANUAL

1.0 Scope This test is to determine the ability of a printed pattern of solder paste to retain a probe placed in the solder paste by measuring the force required to separate the probe from the paste. Time between printing and probe placement are progressively increased to simulate variables in a manufacturing process.

2.0 Applicable Documents None

3.0 Test Specimen A representative sample of this paste should then be printed out, using a stencil, onto clean plain-glass slides. At least six paste deposits should be printed per required time data-point. The final deposits must be circular, 6.3 mm in diameter and 0.25 mm thick. Mark the test specimen in a suitable manner to identify the sample and the time after printing when tackiness is to be measured. The prepared samples shall be stored at $25^{\circ}\text{C} \pm 2^{\circ}\text{C}$ and $50^{\circ}\text{C} \pm 10\%$ relative humidity (RH) until evaluated. The samples shall not be stored in an enclosed cabinet or container, which allows the solder paste solvent vapors to saturate the environment surrounding the printed paste, thus preventing natural drying of the material.

4.0 Equipment/Apparatus A Chatillon tackiness tester or other equipment may be used, providing it is capable of accurately measuring force when tested at a similar velocity. The equipment shall have a stainless steel test probe with a nominal $5.1 \text{ mm} \pm 0.13 \text{ mm}$ diameter bottom surface, which is smooth, flat, and aligned parallel to the plane of the subject test specimen. The probe shall contact the test specimen at a controlled speed and apply a controlled, fixed initial contact force. Finally, a means shall be provided to withdraw the test probe from the surface of the test specimen at a controlled speed and record the peak force required to break contact with the test specimen.

5.0 Procedure Place the specimen slide under the test probe and center the probe over one of the three printed patterns. Bring the test probe in contact with the printed paste specimen at a rate of $2.5 \text{ mm/min.} \pm 0.5 \text{ mm/min.}$ and apply a force of $300 \text{ g} \pm 30 \text{ g}$ to the specimen. Within five seconds

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following application of this force, withdraw the probe from the specimen at a rate of $2.5 \text{ mm/min.} \pm 0.5 \text{ mm/min.}$ and record the peak force required to break the contact. Take at least five additional measurements under the same test conditions and average all the readings. Record both the tack force and time following paste printing.

5.1 Evaluation Initial measurements are to be taken immediately after printing. Subsequent measurements of force shall be taken as needed to best define the rise and decline of the tack force. Tackiness data should be presented in graph form, provided that the graph with tack force is plotted as a function of time after printing. The data can also be reported as follows:

1. Time to reach 80% of the peak value.
2. The peak tack force in grams with the expected variation.
3. Time over which the peak value is maintained or for the tack force to decline to 80% of its peak value.

6.0 Notes

6.1 Test Equipment Sources The equipment sources described in 6.1.1 and 6.1.2 represent those currently known to the industry. Users of this test method are urged to submit additional source names as they become available so that this list can be kept as current as possible.

6.1.1

AMETEK/Chatillon
8600 Somerset Drive
Largo, FL 33773
Phone: 1 (800) 527-9999

6.1.2

Malcom Instruments Corp.
26226 Industrial Blvd.
Hayward, CA 94545
Phone: 1 (510) 293-0580