



IPC-TM-650 TEST METHODS MANUAL

1 Scope This test method will give an indication of activity of wave solder fluxes, core solder fluxes, and solder paste.

2 Applicable Documents

ASTM B-36 Brass Plate, Sheet, Strip, and Rolled Bar

IPC J-STD-004 Requirements for Soldering Fluxes

IPC/EIA J-STD-006 Requirements for Electronic Grade solder Alloys and Fluxed and Non-Fluxed Solid Solders for Electronic Soldering Applications

3 Test Specimen

3.1 A minimum of 10 ml of first article or production specimen of liquid flux.

3.2 For solid or paste flux, 10 ml of a 35% by weight solution of the flux in reagent grade 2-propanol (or other solvent recommended by the manufacturer) (see J-STD-004).

3.3 For solder paste, 10 ml of a 25% by weight solution of the reflowed solder paste flux in reagent grade 2-propanol (or other solvent recommended by the manufacturer) (see J-STD-004).

3.4 For cored wire, 10 ml of a 10% by weight solution of reflowed cored solder flux in reagent grade 2-propanol (or other solvent recommended by the manufacturer). For low solids, no clean fluxes a 5% solution shall be used (see J-STD-004).

3.5 For preform, 10 ml of a 10% by weight solution of reflowed preform flux in reagent grade 2-propanol (or other solvent recommended by the manufacturer). For low solids, no clean fluxes a 5% solution shall be used (see J-STD-004).

4 Apparatus and Reagents

4.1 Five (5) replicates, approximately 40 x 75 mm [1.575 x 2.953 in], of 0.25 mm [0.00984 in] thick 70/30 brass, per ASTM-B-36 C2600 HO2.

4.2 Degreased steel wool #00.

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4.3 Sn60 1.5 mm [0.0591 in] diameter Type S solid wire solder per J-STD-006.

4.4 Solder pot containing at least 2 kg of solder and no less than 25 mm [0.984 in] in depth.

4.5 Reagent grade isopropyl alcohol (IPA).

4.6 3.0 mm [0.118 in] diameter mandrel.

5 Test

5.1 Specimen Preparation

5.1.1 Clean the five (5) brass coupons with steel wool.

5.1.2 Using a flat strip of brass as a guide, put a 90° bend in opposite ends of each test coupon to stiffen and flatten the coupon.

5.1.3 Cut a 30 ± 0.5 mm [1.181 ± 0.020 in] length of solid wire solder.

5.1.4 Wrap the cut length of solder around a 3.0 mm [0.118 in] mandrel.

5.1.5 Slide the perform (coil) off of the mandrel. Make a total of five solder performs in this manner.

5.2 Procedures

5.2.1 Maintain solder pot at 260 ± 10 °C [500 ± 18 °F].

5.2.2 Place a preformed solder circle in the center of a test coupon (on the surface which faces up when the bent ends point up).

5.2.3 Place one drop (0.05 ml) of flux in the center of the perform and allow to dry to minimize spattering.

5.2.4 Carefully place the coupon on the surface of the solder bath for 15 seconds. If the solder has not melted in 15 seconds, leave the coupon on the solder bath until the perform melts.

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5.2.5 Remove the coupon in a horizontal position and place on a flat surface, allowing the melted solder to solidify undisturbed.

5.2.6 Repeat steps 5.2.2 through 5.2.5 to test four additional specimens.

5.2.7 Use a suitable solvent to remove all flux residue from the test coupons.

5.3 Evaluation

5.3.1 Measure each solder spread area by comparing to circles (predrawn) with areas similar to those listed in Table 1. Report the mean of the spread (area in mm²) of the five tested specimens.

Table 1 is intended as an aid in defining areas in mm².

Table 1 Typical Spread Areas Defined in mm²

Diameter in mm	Area in mm ²
10.00	78.54
10.70	90.00
11.28	100.00

6 Notes

6.1 Safety Observe all appropriate precautions on MSDS for chemicals involved in this test method.