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IPC-TM-650 TEST METHODS MANUAL

1 Scope This test method assesses the relative activity of liquid fluxes using a wetting balance.

2 Applicable Documents

ISO 1634

IPC J-STD-004 Requirements for Soldering Fluxes

3 Test Specimen

3.1 The test specimen shall be a copper coupon complying with ISO 1634-CU-ETP Condition HA. The width shall be 6.0 ± 0.25 mm [0.236 ± 0.00984 in]; the length should be 25.0 ± 1.0 mm [0.984 ± 0.0394 in] or as appropriate to the test equipment. The thickness shall be 0.5 ± 0.05 mm [0.0197 ± 0.00197 in].

3.2 A minimum of 50 ml of the liquid flux to be tested.

4 Apparatus and Reagents

4.1 Apparatus (see Figure 1).

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Originating Task Group Flux Specifications Task Group, (5-24a)	

4.2 A meniscus force measuring device (wetting balance) which includes a temperature-controlled solder pot containing solder maintained at 245 ± 3 °C [473 ± 5.4 °F].

Note: Reaction rate is very sensitive at this temperature.

Solder composition shall be Sn60/Pb40 or Sn63/Pb37.

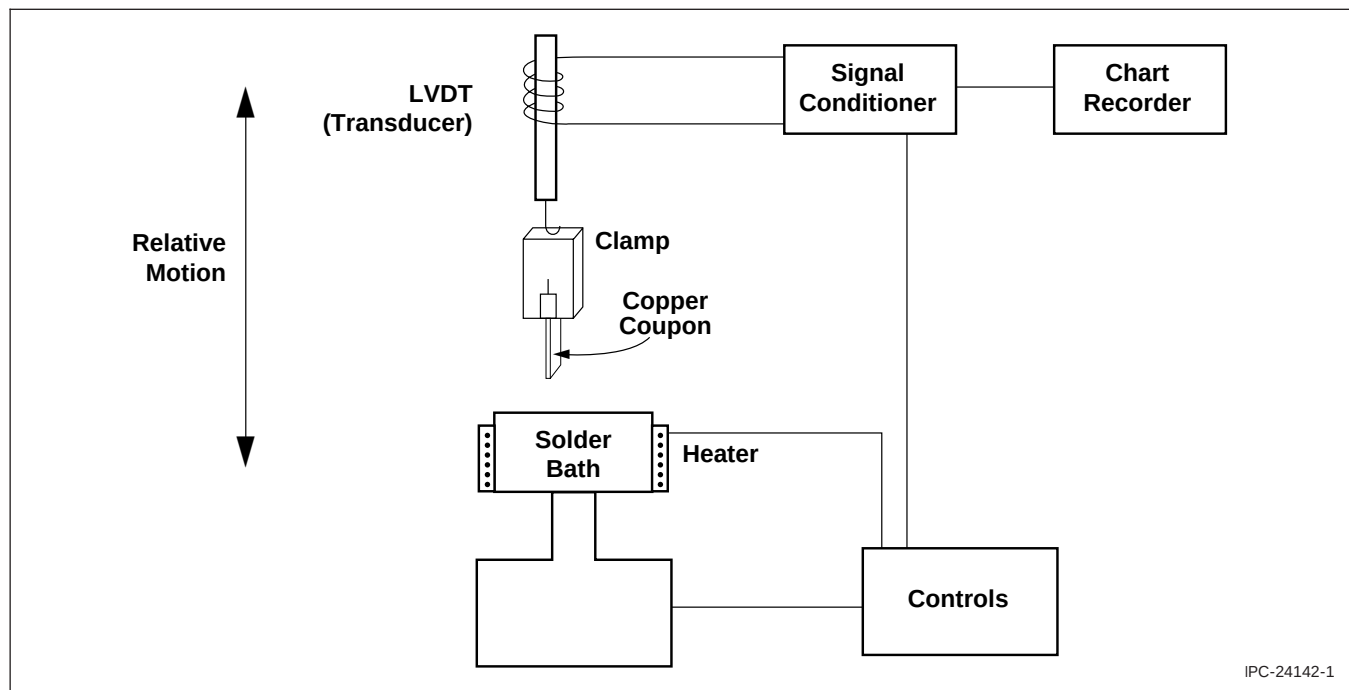
4.3 A chart recorder, data logger, or computer capable of recording force as a function of time with a minimum recorder speed of 10 mm/s [0.394 in].

4.4 A mechanical dipping device able to produce an immersion and emersion rate of 20-25 mm [0.787 - 0.984 in] per second to a depth of 6.0 ± 0.1 mm [0.236 ± 0.00394 in], with a dwell time of 5.0 ± 0.5 seconds.

5 Procedure

5.1 Preparation

5.1.1 Degrease the test coupon by immersing it in a suitable solvent. Use a $10 \pm 1\%$ fluoroboric acid dip to clean the coupon.



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Figure 1 Wetting Balance Apparatus

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5.1.2 Rinse the coupon with deionized water, then dry the coupon.

5.2 Test

5.2.1 Immerse the coupon in the liquid flux at room temperature to a minimum depth of 10.0 mm [0.394 in].

5.2.2 Immediately drain off excess flux by standing the specimen vertically on a clean filter paper for 1-5 seconds.

5.2.3 After partial drying, mount the coupon in the test equipment.

5.2.4 Skim (remove dross from) the surface of the molten solder just prior to immersing the specimen in the solder.

5.2.5 Hold the specimen 3.0 mm [0.118 in] above the solder pot for approximately 10 ± 1 seconds. Start the test.

Immerse the specimen to a depth of 5.0 ± 0.1 mm [0.197 ± 0.00394 in], using an immersion and emersion rate of 20-25 mm [0.787-0.984 in] per second and a dwell time of 5.0 ± 0.5 seconds.

5.2.6 Record the wetting curve during the test.

5.3 Evaluation Use the wetting balance curve recorded during the test to determine the following flux activity parameters:

5.3.1 T_w , the wetting time. This is the time at which the wetting curve crosses the corrected zero axis, measured from the start of the test (see Figure 2).

5.3.2 The maximum wetting force, F_{max} , with the zero axis corrected for buoyancy (see 6.2 and Figure 2).

6 Notes This test method can be useful in requalifying materials that have exceeded the recommended shelf life. In

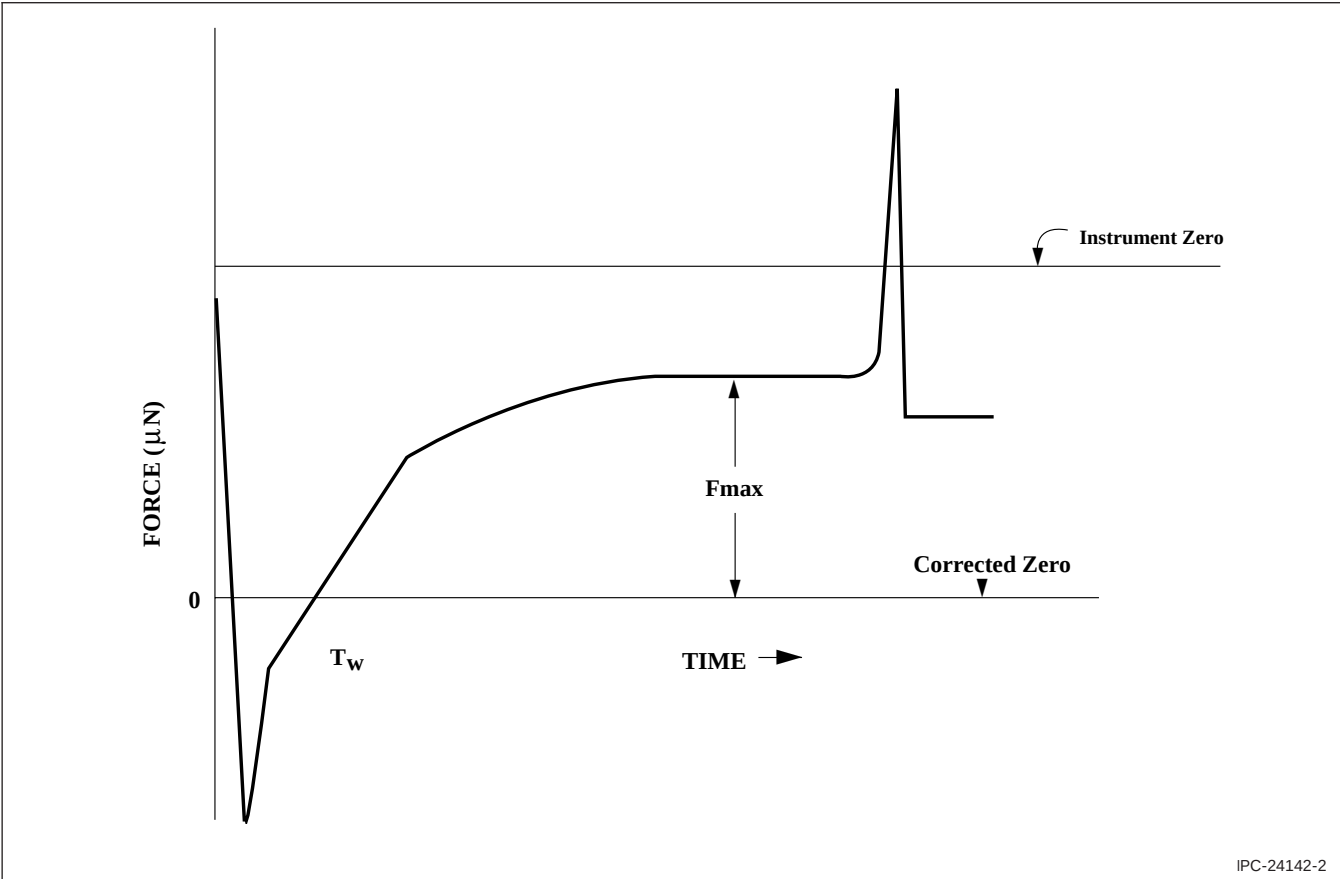


Figure 2 Wetting Balance Curve