



IPC-TM-650 TEST METHODS MANUAL

Number 2.4.37	
Subject Evaluation of Hand Soldering Tools for Terminal Connections	
Date 7/91	Revision A
Originating Task Group N/A	

1 Scope The scope of this test method is to provide a means by which hand soldering tools may be evaluated under a standard, controlled set of conditions. This method may be used to either evaluate a single tool's performance or for comparison of several tools.

This test method is to be used for the evaluation of hand soldering tools in the area of discrete terminals. A separate test method will be provided for evaluation of tools for printed wiring applications.

2 Applicable Documents

IPC-S-805 Solderability Test for Component Leads and Terminations

3 Test Specimens

3.1 Solder The solder type, diameter, and flux type used for this test should be selected to represent the in-house production task. The solder diameter, alloy type, flux volume, and type should be consistent throughout the test.

4 Equipment/Apparatus

4.1 Workpiece The workpiece shall be tin or solder plated turret terminals mounted on a 3.18 mm thick laminate base.

4.1.1 Terminals The terminals shall be one of three sizes shown in Table 1. The terminals shall be solderable per IPC-S-805.

4.1.2 Thermocouple Wire The thermocouple wire shall be insulated Type J. The wire size shall be 30 gauge. The working junction shall be formed by welding.

4.1.3 Data Recorder The data recorder or comparable means shall be capable of resolving a graph, which can be read to $\pm 3^\circ\text{C}$ and ± 1 second of time. The normal response time shall be 10 cps or better.

4.1.4 Hookup Wire Solid, tinned hookup wire, which is non-insulated, is to be used. The wire shall be solderable per IPC-S-805. The size shall be 22 gauge for Type I terminals, 20 gauge for Type II terminals, and 18 gauge for Type III terminals (see Figure 1).

Table 1 Terminal Types

Type	Terminal Size	Weight Grams	Length L	Top Dia. D1	Stem Dia. D2	Base Dia. D3
I	Small	0.180	7.62 mm	2.41 mm	1.14 mm	3.30 mm
II	Medium	0.259	9.53 mm	2.79 mm	1.40 mm	4.06 mm
III	Large	0.675	12.07 mm	3.68 mm	1.65 mm	4.83 mm

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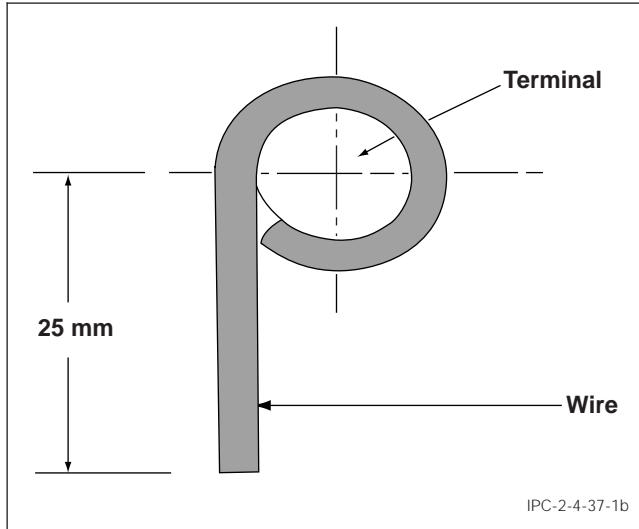


Figure 1 Hook and Turret Terminal Load Placement

5 Procedure

5.1 Preparation of Workpiece

5.1.1 Method A A small hole shall be drilled vertically into the top of the terminal. This hole shall be of such depth and diameter to fully enclose the welded junction of the thermocouple. The thermocouple shall then be inserted in the hole and mechanically staked into place.

5.1.2 Method B The tip of the thermocouple shall be welded to the center of the top of the terminal. The weld shall be secure enough to prevent dislodging during handling or the soldering test.

5.2 Preparation of the Soldering Tip A thermocouple shall be attached to the tip to be used in the test. This attachment shall be to the tip face opposite the working face. The attachment to the tip can either be done by drilling a small hole in the tip, nominally 3 mm back from the tip end, inserting the thermocouple wire and securing it with a small copper wedge, or by welding the thermocouple directly to the tip, also nominally 3 mm from the end, but not on the tinned surface of the tip (see Figure 2). Once the thermocouple wire is attached to the tip, the wires leading from the junction shall be taped to the handle to prevent damage.

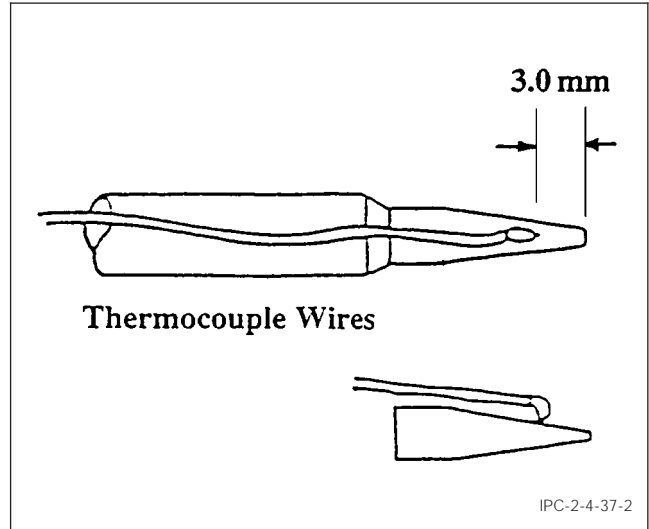


Figure 2 Thermocouple Placement

5.3 Test Preparation

5.3.1 Preparation The workpiece shall be secured in such a way that it will not move during soldering. The workpiece or soldering tool thermocouple leads shall be attached to the recorder. Both should be attached if using a two-channel recorder. The recorder should be properly zeroed or adjusted for correct reading.

5.3.2 Test A—Single Terminal Evaluation The tool tip should be wiped and prepared in the best commercial practice. Good soldering includes, but is not limited to, a solder bridge between a properly wetted tip and the terminal; then the tip of the iron and the end of the solder wire should be brought into opposite sides of the instrumented terminal at the wire location. The amount of solder used shall be consistent with the development of a full solder joint. The time of contact of the iron with the workpiece shall not exceed three seconds. After the contact period, the iron shall be removed and the recorder may be shut off after solder solidification.

5.3.3 Test B—Multiple Terminal Evaluation Five terminals shall be soldered in sequence using the procedure in 5.3.2. The delay time between joints shall be minimized, consistent, and shall not exceed two seconds. The fifth terminal on the workpiece shall be the instrumented terminal.