



IPC-TM-650 TEST METHODS MANUAL

1.0 Scope To determine the change in resistance of plated through-holes after being subjected to repeated thermal cycling conditions.

2.0 Applicable Documents None

3.0 Test Specimen Test specimen shall be made using identical laminate as that of finished product, and shall conform to all details of Figure 1.

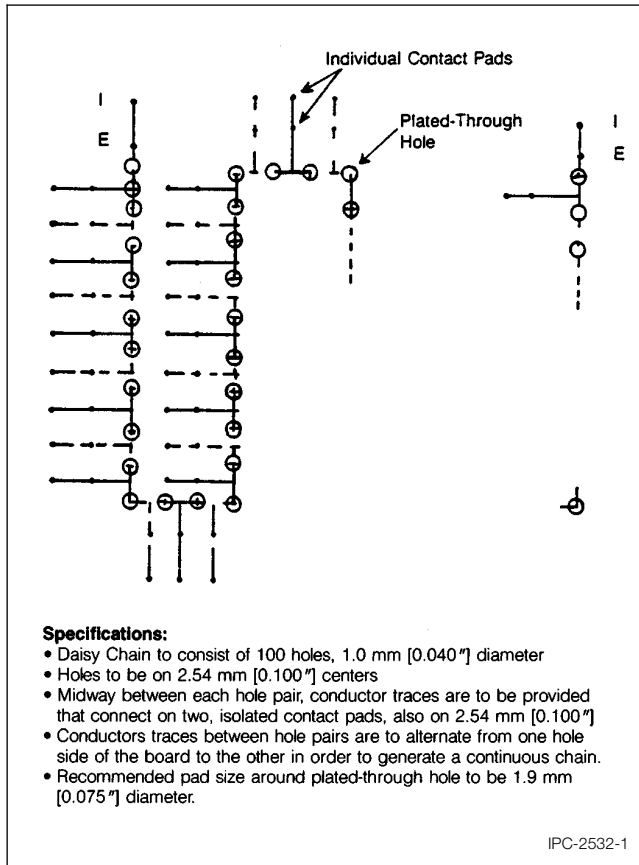


Figure 1 Test specimen artwork

4.0 Apparatus

4.1 Circulating Air Chamber Capable of maintaining a uniform temperature of 135° (275°F) to 149°C (300°).

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4.2 Milliohm Meter Incorporating use of four-point probe measurement technique, with a range of at least 2 milliohm to 300 milliohms.

4.3 Thermal Cycling Chamber Either an air-to-air system or a liquid to liquid system, capable of cycling between -75°C and +200°C [-103°F and 392°F] and a transfer time of one minute or less.

4.4 Desiccator

5.0 Procedure

5.1 Specimens shall be conditioned by drying in an oven for four hours at 135°C (275°F) to 149°C (300°F) and cooled to room temperature in a desiccator.

5.2 Resistance Measurement Using the four point milliohm meter, connect the current probes to the "I" contact pads at each end of the daisy chain pattern. Connect the voltage measurement probes to the "e" contact pads at the end of the chain. Record the total chain resistance in the appropriate "Initial Resistance" record to a chart similar to Figure 2.

Entry #	Cycle	Total Chain Resistance (milliohms)
1	Initial	_____
2	Cycle #10	_____
3	Cycle #20	_____
4	Cycle #30	_____
5	Cycle #40	_____

5.3 Program the temperature cycling equipment for the selected test cycle.

5.3.1 Recommended Cycle: Ambient Temperature

-65°C [-85°F]	10 minutes
Transfer.....	1 minute (max.)
+125°C [257°F].....	10 minutes
Transfer.....	1 minute (max.)
(Repeat)	

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5.4 Load parts into chamber and allow to cycle for 10 cycles.

5.5 Remove parts from chamber at ambient temperature conditions, and repeat Resistance Measurement of Section 5.2, recording Total Chain Resistance on chart shown in Figure 2.

5.6 Double Plated Through-Hole Resistance Measurement In the event it is desired that the resistance of an individual hole pair measured, use the same milliohm meter as follows:

5.6.1 Using four contact pads provided in artwork as in Figure 1, select two pads on each side of a pair of holes.

5.6.2 Apply current probes to pads furthest from the holes.

5.6.3 Apply voltage probes to pads immediately adjacent to the holes.

5.6.4 Perform resistance measurement with milliohm meter and record value.