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# IPC-TM-650 TEST METHODS MANUAL

Number <b>2.4.3</b>	
Subject <b>Flexural Endurance, Flexible Printed Board Materials</b>	
Date <b>05/22</b>	Revision <b>F</b>
Originating Task Group <b>Flexible Circuits Test Methods Subcommittee (D-15)</b>	

**1 Scope** To determine the number of flexes to conductor failure of etched flexible printed board conductor patterns.

**2 Applicable Documents** None

**3 Test Specimen** The test specimen **shall** consist of an etched conductor pattern in accordance with Figure 1. A minimum of six specimens with the long dimension of the conductors oriented in the transverse direction of the base material **shall** be prepared using standard commercial practices. For double-sided clad constructions, a separate sample specimen **shall** be prepared for each side. The opposite (untested) side **shall** be completely etched of copper.

**4 Apparatus** Flexural Endurance Tester (see Figure 2) or equivalent.

## 5 Procedures

**5.1** Examine the etched conductor specimen for any preexisting fractures and look for evidence of process anomalies (such as pin holes and nicks), which could cause premature fracture. If such fractures or anomalies are found, the specimen **shall** be discarded and a new specimen selected.

**5.2** Attach (solder, clamp, etc.) a short length of insulated wire to the extreme ends of the conductor pattern of each of the six specimens.

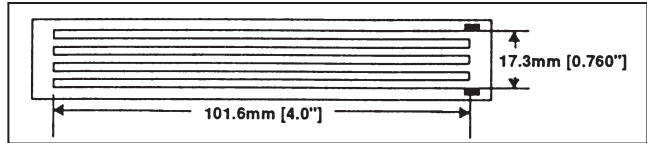
**5.3** Using the flexure test equipment as seen in Figure 2, mount the specimen so that the inside diameter of the loop is 6 mm ± 1 mm [approximately, 0.25 in ± 0.04 in] and connect the two wires to the relay. The horizontal oscillation of the reciprocating bar causes the flexible test specimen to move in what can be described as a rolling, flexible action.

**5.4** Test three specimens per clad side with the conductor on the inside of the loop. The reciprocating travel should not exceed 10 cycles per minute. The loop **shall** travel 25 mm ± 5 mm [effectively, 1 in ± 0.2 in].

**5.5** The number of cycles to failure is when electrical discontinuity of the conductor occurs.

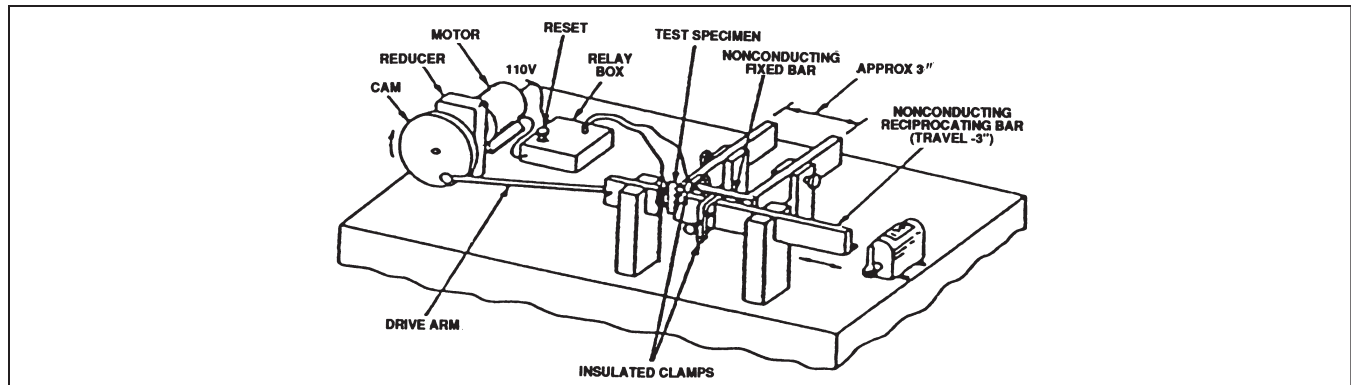
**5.6** Report the average number of cycles to failure for the three specimens tested per clad side.

**6 Note** Master set of drawings of a similar test fixture as seen in Figure 2 is available from the IPC office. This fixture is not commercially available.



**Figure 1 Flexural Endurance Test Pattern.**

(NOTE: Conductors are 1.5 mm ± 0.1 mm [approximately, 0.059 in ± 0.004 in] wide on 2.5 mm ± 0.1 mm [approximately, 0.01 in ± 0.004 in] centers.)



**Figure 2 Typical Flexural Endurance Test Fixture Equipment**