The Institute for Interconnecting and Packaging Electronic Circuits
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IPC-TM-650
TEST METHODS MANUAL

Number **2.2.16**	
Subject **Artwork Master Evaluation by Use of a Drilled Panel**	
Date **12/87**	Revision
Originating Task Group **N/A**	

1 Scope This test method is used to evaluate 1:1 artwork masters for adequacy in meeting end product annular ring requirements for the existence of extra, missing, or mislocated pads, and for the correctness of conductor placement relative to the holes.

2 Applicable Documents None

3 Test Specimens

3.1 1:1 artwork masters for each printed circuit layer

3.2 Drilled dummy panel

4 Apparatus

4.1 Light table

4.2 Magnifier

5 Procedure

5.1. Preparation/Drill Dummy

5.1.1 Prepare a drill tape to be used for the production PCB corresponding to the artwork masters being evaluated.

5.1.2 Drill a piece of copper clad circuit board material with the drill tape, but modify the hole sizes called out on the master drawing as explained in 5.1.2.1 through 5.1.2.3.

5.1.2.1 For all of the PTHs, drill 18 to 24 mils larger than the maximum after plating hole size called out on the master drawing for that hole.

Note: The exact number to be selected from this range (18 to 24 mils) will vary from shop to shop, depending on such variables as equipment, tooling, and panel size. As a general rule, lower numbers mean that smaller panels, better registration tooling, and more sophisticated production equipment must be used.

5.1.2.2 For all non-plated-through holes, drill the holes to the maximum size indicated on the master drawing.

5.1.2.3 Clean and deburr the drilled dummy panel.

5.1.3 Artwork Masters A 1:1 artwork master must be prepared for evaluation for each printed circuit layer. The following options apply:

a. Negatives for each layer

b. Bleached positives for each layer

c. Diazo film for each layer

d. Combinations of the above

5.2 Test

5.2.1 Tape the drilled dummy panel to the light table.

5.2.2 Align the first piece of film to the dummy panel, averaging the relative positions of the drilled holes to the pads on the artwork master to maximize annular rings without breakout.

5.2.3 Evaluate the result under magnification, then remove the film.

5.2.4 Align the next piece of film and evaluate in the same manner. Continue this process until all layers have been evaluated.

5.3 Evaluation

5.3.1 Examine each layer when aligned to the drilled panel under magnification for the following deficiencies:

a. Breakout of hole to pad

b. Missing pads

c. Mislocated pads

d. Extra pads

e. Insufficient clearance between conductors and holes

f. Holes running through conductors