



IPC-TM-650 TEST METHODS MANUAL

1 Scope Ductility values are determined by measuring the bulge height on a Mullen bulge tester or equivalent. Measurements are made in mm.

2 Applicable Documents None

3 Test Specimen Three clean, smooth pieces of copper foil 10 cm x 10 cm area or any non-overlapping equivalent areas.

4 Apparatus Mullens Bulge Tester by B. F. Perkins & Son, Inc., Model A to be 10 RPM at large shaft between gear box and diaphragm, or equivalent.

5 Procedure

5.1 Preparation Raise upper clamping ring by rotating the hand wheel. Place a 10 cm x 10 cm by 0.15 mm thick steel plate that is perfectly flat over the diaphragm and lower the upper clamping ring applying sufficient pressure to prevent slippage. Zero the dial indicator. Raise the upper clamping ring and remove the 10 cm x 10 cm by 0.15 mm steel plate.

NOTE: The above operation should be done once every eight-hour shift.

Start the motor and move the ball-handled control lever to the right to be certain that the diaphragm is returned to its starting position.

Number 2.4.2	
Subject Ductility of Copper Foil	
Date 3/76	Revision A
Originating Task Group N/A	

5.2 Test

5.2.1 Place a sample of the copper foil to be tested over the diaphragm with the matte side up.

5.2.2 Lower the clamping ring, applying sufficient pressure to prevent slippage of the sample between the plates.

5.2.3 Move the ball-handled control lever to the left. The operator should keep his hand on the lever in readiness to stop or reverse the machine at any time during the test and when the test is complete. During the test, the operator should be watching the dial indicator and, at the instant bursting occurs, should note the reading on the dial indicator and the ball-handled control lever should be moved as far to the right as it will go and be released. This will return the diaphragm to its starting position and automatically shut off the pump.

5.3 Evaluation

5.3.1 Record the reading from the dial indicator.

5.3.2 Rotate the hand wheel to raise the clamping ring and remove the sample. Avoid overlapping of the clamping areas and disregard any single reading that is not reasonably consistent with those taken in neighboring areas, and repeat the test.