Measurement of Copper Thickness by the Weight Method

Thickness determination of rolled and electrodeposited (ED) copper foil should always be performed using the weight method. This method provides far more accuracy than contact thickness gauges. Since the topography of treated foil varies greatly, non-contact methods are recommended.

Copper foil is manufactured and sold by weight. This method fits with its original use as a building material, and has remained even after its use in electronic circuits. Today, copper foil is measured in ounces per square foot. For example, "one-ounce copper" weighs one ounce per square foot, and is 0.0014 inches or 35 μm in thickness.

The following describes a test method which is used as a standard procedure in measurement of copper thickness:

> An aluminum or G-10 template 12 inches (0.305m) square is used to cut three foot-square samples from the right, center, and left sides of a roll of copper foil. A sharp blade should be used to cut as closely as possible to the edges of the template.

Each copper foil sample is folded in half twice to form a 6 inch (0.152m) square of four layers. This process is repeated to result in a 3 inch (76mm) square of sixteen layers (Figure 1). Using an analytical balance with the sample centered on it, the weight is measured to the nearest 0.001g.
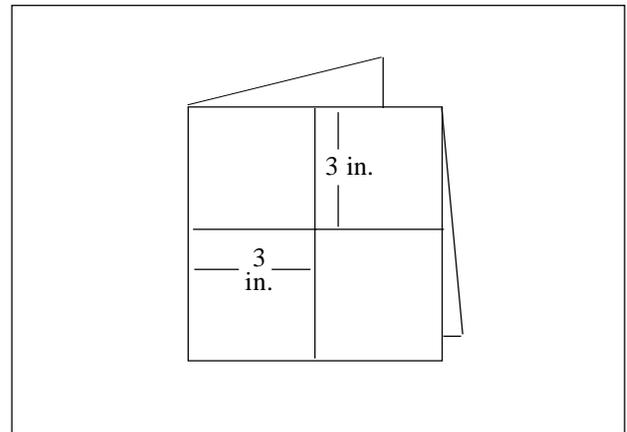

Figure 1. Typical Fold

The following formula is used to calculate the thickness of the sample foil:

$$\text{Thickness} = \frac{A}{B} \times C$$

Where:
A = sample weight (g)
B = 28.375 g for 1-ounce copper
= 56.750 g for 2-ounce copper
C = 0.0014 inch (35μm) for 1-ounce copper
= 0.0028 inch (70μm) for 2-ounce copper

The average of the three sample sheets is taken for the average thickness across the roll.

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