



Standard Test Method for Measuring and Recording the Deviations from Flatness in Copper and Copper Alloy Strip¹

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€¹ NOTE—Editorial changes were made throughout this standard in March 2000.

1. Scope *

1.1 This test method describes a procedure for the measurement of distortions in thin metal strip and the application of these measurements to an equation that will indicate the deviation from flatness.

1.2 The distortions to be measured in this test method are dish, wavy edges, buckle, longitudinal corrugation, and herringbone.

1.3 This test method is not intended to include the measurement of coil set or longitudinal curl, camber or edgewise curvature, or twist.

1.4 This test method is limited to metal strip 0.003 to 0.020 in. (0.08 to 0.50 mm) thick and not more than 6.0 in. (150.0 mm) wide.

1.5 The values stated in inch-pound units are the standard. The values given in parentheses are for information only.

1.6 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

2. Terminology

2.1 Definitions of Terms Specific to This Standard:

2.1.1 *buckle (center bulge or oil can)*—alternate bulges and hollows recurring along the length of a strip with the edges remaining relatively flat.

2.1.2 *dish (cross or transverse bow)*—the departure from flatness across the full width of the strip in the form of a single arc, excluding burrs.

2.1.3 *herringbone*—a series of long continuous waves running at various angles to the rolling direction.

2.1.4 *longitudinal corrugation*—a condition similar to dish except that the sense of curvature changes sign at least once across the width of the strip.

2.1.5 *wavy edges (waves—edge wave)*—a continuous pattern of waves or wrinkles along the edges of the strip, with a relatively flat center portion.

3. Significance and Use

3.1 This test method is intended for measuring distortion in strip used for making close tolerance parts. Since distortion in this strip would influence the shape of the part being produced and cause difficulties in feeding through close-fitting dies and other manufacturing equipment, it is important that this material be flat.

3.2 This test method provides a universal procedure for measuring the irregularities that cause the deviation from flatness.

3.3 This test method allows the purchaser and manufacturer to inspect strip with a standard technique to a mutually agreed upon and acceptable percentage deviation from flatness.

4. Apparatus

4.1 *Surface Plate*, to be used as a reference flat. It must have a large enough surface area to accommodate the maximum size test specimen. It shall be flat within 0.0002 in. (0.005 mm) per 1 in. (25 mm).

4.2 *Micrometer*, for measuring metal thickness. It shall be graduated in 0.0001-in. (0.0025-mm) increments.

4.3 *Height Gage*, for measuring the height of irregularities. The arm of this gage must be long enough to extend beyond the center of the widest strip to be measured. It shall be graduated in 0.001-in. (0.025-mm) increments.²

4.4 *Steel Rule*, for measuring the lengths of the irregularities. It shall be graduated in 0.02-in. (0.50-mm) increments.

5. Test Specimens

5.1 The test specimen shall be the full-finished slit width of the strip and cut long enough so that measurement will not be influenced by the distortions referred to in 1.3.

5.2 When cutting specimens, caution must be taken to prevent additional distortion.

¹ This test method is under the jurisdiction of ASTM Committee B05 on Copper and Copper Alloys and is the direct responsibility of Subcommittee B05.06 on Methods of Test.

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² An electronic touch sensitive system, which will not distort the sample, has been found to be acceptable.