



Designation: B 820 – 98

Standard Test Method for Bend Test for Formability of Copper Alloy Spring Material¹

This standard is issued under the fixed designation B 820; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ϵ) indicates an editorial change since the last revision or reapproval.

1. Scope *

1.1 This test method covers the testing of thin copper alloy strip to determine its formability or its ability to resist cracking when forming around a specific radius. The criterion for failure is the occurrence of cracks found on the outer radius of curvature (convex).

1.2 This bend test is limited to strip 0.003 to 0.031 in. thick. (0.076 to 0.79 mm).

1.3 The size of the forming radii used in this test shall be 0.005 to 0.250 in. (0.127 to 6.35 mm).

1.4 The values stated in inch-pounds are to be regarded as the standard. The values given in parentheses are for information only.

1.5 *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. Referenced Documents

2.1 The following documents in the current issue of the *Annual Book of ASTM Standards* form a part of this specification to the extent referenced herein:

- 2.2 *ASTM Standards*: <https://standards.iteh.ai/catalog/standards/sist/4f280d5>
- E 6 Terminology Relating to Methods of Mechanical Testing²
 - E 290 Test Method for Semi-Guided Bend Test for Ductility of Metallic Materials²

3. Terminology

3.1 The following terms are defined in Terminology E 6, and are illustrated in Fig. 1.

3.1.1 angle of bend, and

3.1.2 radius of bend.

3.2 *Description of Terms Specific to This Standard:*

3.2.1 *longitudinal bend (or good way bend)*—The axis of the bend is at an angle of 90° to the direction of rolling, drawing or extrusion as shown in Fig. 2.

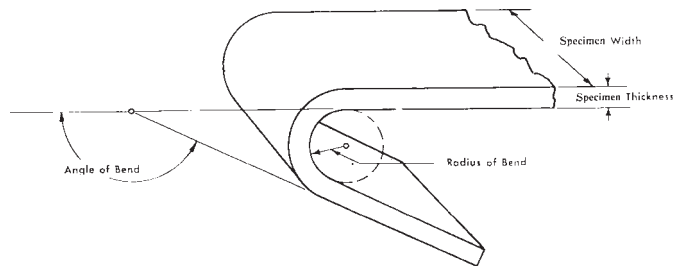


FIG. 1 Illustration of Terminology

3.2.2 *transverse bend (or bad way bend)*—The axis of the bend is a plane parallel to the direction of rolling, drawing or extrusion as shown in Fig. 2.

NOTE 1—The usage of these two terms is consistent with Test Method E 290.

4. Summary of Test Method

4.1 The bend test is made by applying a force transversely to the length of the specimen in the portion being bent, usually at midlength. These 90° bending forces are applied through an arrangement illustrated in Fig. 3, while 180° bending forces are applied through an arrangement illustrated in Fig. 4. When complete fracture does not occur, the convex surface of the specimen is examined for cracks. In general, the test using a 180° bend angle is a more severe test than the test using a 90° bend angle.

5. Significance and Use

5.1 This bend test provides information as to the formability or the ability of copper alloy spring material to resist cracking when being formed.

5.2 This test method can be used as a quality control tool to determine if a spring material is capable of forming to a given radius.

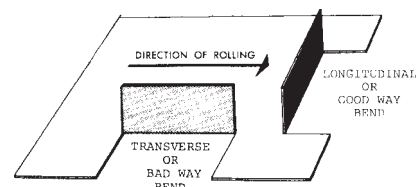


FIG. 2 Direction of Bending

¹ This test method is under the jurisdiction of ASTM Committee B-5 on Copper and Copper Alloys and is the direct responsibility of Subcommittee B05.06 on Methods of Test.

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² *Annual Book of ASTM Standards*, Vol 03.01.

*A Summary of Changes section appears at the end of this standard.