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Standard Test Method for Indentation Hardness of Aluminum Alloys by Means of a Webster Hardness Gage[1]

This standard is issued under the fixed designation B647; 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 determination of indentation hardness of aluminum alloys with a Webster hardness gage, Model B.

1.2 The values stated in SI units are to be regarded as the standard. The values given in parentheses are for information only.

NOTE 1—Two other models, A and B-75, are in use, but are not covered in this test method. Model A does not provide numerical values of hardness and Model B-75 covers only a part of the range of interest for aluminum alloys.

1.3 *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 *ASTM Standards:*[2]

E6 Terminology Relating to Methods of Mechanical Testing

E10 Test Method for Brinell Hardness of Metallic Materials

E18 Test Methods for Rockwell Hardness of Metallic Materials

3. Terminology

3.1 *Definitions*—The definitions of terms relating to hardness testing appearing in Terminology E6 shall be considered as applying to the terms used in this test method.

4. Significance and Use

4.1 The Webster hardness gage is portable and therefore useful for in situ determination of the hardness of fabricated parts and individual test specimens for production control purposes. It is not as sensitive as Rockwell or Brinell hardness machines; see 10.2.

4.2 This test method should be used only as cited in applicable material specifications.

5. Apparatus (Fig. 1)

5.1 The Webster hardness gage, Model B, consists of three main parts: the frame, operating handle, and penetrator housing assembly. The penetrator housing assembly includes the principal working parts, including the penetrator, loading spring, adjusting nut, penetrator housing, housing key, return spring, and dial indicator.

5.2 The indentor is a hardened steel truncated cone.

5.3 The dial indicator is graduated from 1 to 20, and is actuated by the penetrator so that the higher the reading, the higher is the hardness of the test material.

5.4 The configuration of the Webster hardness gage is such that it is operated like a pair of pliers.

5.5 The clearance between the penetrator and the anvil is about 6 mm (¼ in.), limiting the thickness of sample that can be tested.

6. Test Parts or Specimens

6.1 Any part or piece of material greater than 1 mm (0.04 in.) in thickness and equal to or less than 6 mm (¼ in.) in thickness and with a clear flat area at an edge approximately 25 by 25 mm (1 by 1 in.) in size is suitable for test.

6.2 The surfaces shall be essentially parallel, smooth, clean, and free of mechanical damage. The test surface may be lightly polished to eliminate scratches or die lines.

6.3 The clear, flat area shall be such that there will be a clear distance of at least 3 mm (⅛ in.) from the edge of the part or specimen.

6.4 Parts or specimens with a slight taper or curvature may also be tested if a round anvil is used, as described in 8.1.1 and Fig. 2.

7. Calibration

7.1 *Zero Adjustment*:

7.1.1 Operate the instrument against the bare anvil and note whether or not the indicator gives the zero (full-scale) reading.

[1] This test method is under the jurisdiction of ASTM Committee B07 on Light Metals and Alloys and is the direct responsibility of Subcommittee B07.05 on Testing.

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[2] For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.