This document is not an ASTM standard and is intended only to provide the user of an ASTM standard an indication of what changes have been made to the previous version. Because it may not be technically possible to adequately depict all changes accurately, ASTM recommends that users consult prior editions as appropriate. In all cases only the current version of the standard as published by ASTM is to be considered the official document.

Designation: ~~B648 – 10~~ B648 – 10 (Reapproved 2015)ε1

Standard Test Method for Indentation Hardness of Aluminum Alloys by Means of a Barcol Impressor[1]

This standard is issued under the fixed designation B648; 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.

ε[1] NOTE—Appendix X1 was moved to appear one page in October 2015.

1. Scope

1.1 This test method covers the determination of indentation hardness of aluminum alloys using a Barcol Impressor, Model No. 934-1.

1.2 The values stated in SI units are to be regarded as standard. No other units of measurement are included in this standard.

1.2.1 *Exception*—The values given in parentheses are for information only.

NOTE 1—Another model, No. 935, is for use on plastics but is not included in this test method and should not be used 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
E177 Practice for Use of the Terms Precision and Bias in ASTM Test Methods
E691 Practice for Conducting an Interlaboratory Study to Determine the Precision of a Test Method

iTeh Standards
(https://standards.iteh.ai)
Document Preview
ASTM B648-10(2015)e1
https://standards.iteh.ai/catalog/standards/sist/1a5b25df-bdce-4f78-805a-28d820e18d54/astm-b648-102015e1

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 Barcol Impressor is portable and therefore useful for in situ determination of the hardness of fabricated parts and individual test specimens for production control purposes.

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

5. Apparatus

5.1 *Barcol Impressor, Model 934-1*— See Fig. 1 and Fig. 2.

5.2 *Indentor*—The indentor shall consist of a hardened steel truncated cone having an angle of 26° with a flat tip 0.157 mm (0.0062 in.) in diameter. It shall fit into a hollow spindle and be held down by a spring-loaded plunger. See Fig. 2.

5.3 *Indicating Device*—The indicating dial shall have 100 divisions, each representing a depth of 0.0076 mm (0.00030 in.) penetration. The higher the reading, the harder the material.

[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.
Current edition approved ~~Dec. 1, 2010~~Oct. 1, 2015. Published ~~January 2011~~October 2015. Originally approved in 1978. Last previous edition approved in ~~2006~~2010 as ~~B648 – 78 (2006).~~B648 – 10. DOI: ~~10.1520/B0648-10.~~10.1520/B0648-10R15E01.

[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.

Copyright © ASTM International, 100 Barr Harbor Drive, PO Box C700, West Conshohocken, PA 19428-2959. United States

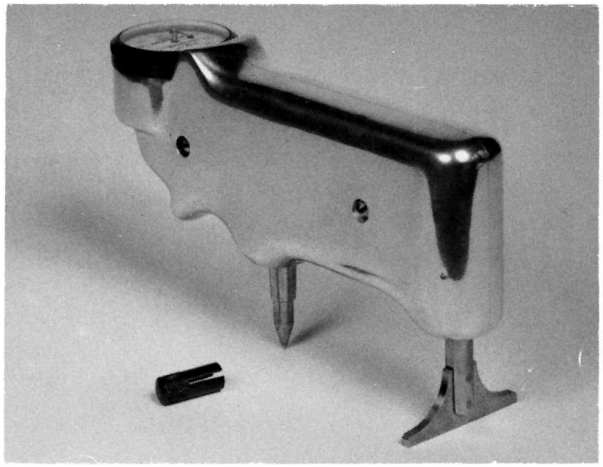

FIG. 1 Barcol Impressor, Model 934-1

6. Test Parts or Specimen

6.1 The testing area shall be smooth, clean, and free of mechanical damage. The surface may be lightly polished to eliminate scratches or die lines. It shall be such that it can be essentially perpendicular to the indentor during the test.

NOTE 2—The effect of curvature of the test specimen on the Barcol Impressor readings is presented in Appendix X1, Fig. X1.1.

6.2 *Dimensions*—Test parts or specimens shall be at least 1.5 mm (1⁄16 in.) thick and large enough to ensure a minimum distance of 3 mm (⅛ in.) in any direction from the indentor point to the edge.

7. Calibration

7.1 With the plunger upper guide backed out until it just engages the spring, place the impressor on a glass surface and press down until the penetrator point is forced all the way back into the lower plunger guide. The indicator should then read 100 ± 1. If it does not, loosen the locknut and turn the lower plunger guide in or out to obtain a reading of 100.

7.2 Read the hardness of a "hard" aluminum alloy reference disk supplied by the manufacturer of the impressor and, if necessary, adjust so that the reading is within the range marked on the disk.

iTeh Standards
(https://standards.iteh.ai)
Document Preview
ASTM B648-10(2015)e1
https://standards.iteh.ai/catalog/standards/sist/...-805a-28d820e18d54/astm-b648-102015e1

TABLE 1 Recommended Sample Sizes to Equalize the Variance of the Average

Hardness, M-934-1 Scale	Reading Variance	Coefficient of Variation, %	Variance of Average	Minimum No. of Readings
50	1.66	1.1	0.28	6
60	1.39	0.9	0.28	5
70	1.12	0.8	0.28	4
80	0.85	0.7	0.28	3

7.3 Repeat the process with a "soft" reference disk.

7.4 If the reference readings cannot be obtained, subsequent measurements are not valid.

8. Procedure

8.1 Support the test parts or specimens on a hard, firm surface if they are likely to bend or deform under the pressure of the indentor (Note 3). The indentor must be perpendicular to the surface being tested.

NOTE 3—Curved surfaces may be more difficult to support. When the load is applied, bending and spring action in the part or specimen should be avoided.

8.2 Grasp the impressor firmly between leg and point sleeve and set both on the surface to be tested. For irregular parts or small specimens this may require the impressor leg to be shimmed so that the indentor will be perpendicular to the test surface.

8.3 Quickly apply by hand sufficient pressure (4 to 7 kg, or 10 to 15 lb) on the housing to ensure firm contact with the test specimen and record the highest dial reading to the nearest 0.5 division (Note 4). Take care to avoid sliding or scraping while the indentor is in contact with the surface being tested.

NOTE 4—For relatively soft materials, the dial may indicate some drift toward lower numbers with time after the initial pressure. For this reason it is