



Standard Test Method for Indentation Hardness of Aluminum Alloys by Means of a Newage, Portable, Non-Caliper-Type Instrument¹

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1. Scope

1.1 This test method covers indentation hardness testing of aluminum alloys using a Newage, portable, non-caliper-type, hardness instrument which provides readout values numerically equivalent to Rockwell B-scale as determined by Test Methods E 18.

NOTE 1—This is a comparative Rockwell B test and does not provide an actual Rockwell B test value. HRBN, the values obtained from the Newage instrument, are numerically equivalent to Rockwell B values, but do not represent an actual Rockwell B test in accordance with Test Methods E 18.

1.2 This test method measures indentation hardness of heat-treatable aluminum alloys having a hardness from 30 to 100 HRBN, a thickness greater than 1.50 mm (0.060 in.), and pieces too large to be tested by a caliper type instrument.

NOTE 2—This test method covers two instruments (one analog and one digital) which operate differently. Refer to the manufacturer's instruction for proper operation.

1.3 The flat surface size of the area being tested must be compatible with the instrument support area and the material must not deflect during the test.

1.4 The values stated in SI units are the standard. The values given in parentheses are for information only.

2. Referenced Documents

2.1 ASTM Standards:

B 648 Test Method for Indentation Hardness of Aluminum Alloys by Means of Barcol Impressor²

E 18 Test Methods for Rockwell Hardness and Rockwell Superficial Hardness of Metallic Materials³

E 177 Practice for Use of the Terms Precision and Bias in ASTM Standards⁴

E 691 Practice for Conducting an Inter-laboratory Test Program to Determine the Precision of Test Methods⁴

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 Annual Book of ASTM Standards, Vol 02.02.

³ Annual Book of ASTM Standards, Vol 03.01.

⁴ Annual Book of ASTM Standards, Vol 14.02.

3. Terminology

3.1 Definitions:

3.1.1 Definitions of terms relating to hardness testing appearing in Test Methods E 18 shall apply to terms used in this test method.

3.1.2 *HRBN*—The suffix “N,” added to the HRB scale designation, indicates hardness numbers derived using this test method which can be related to, but are not necessarily identical to, Rockwell-B (HRB) values obtained in accordance with Test Methods E 18. When reporting results derived using this test method, this designation should follow the numeric value.

4. Summary of Test Method

4.1 A portable hand-held and hand-operated instrument rests firmly upon an aluminum alloy surface. The manual downward movement of the tester in a steady, even and synchronous manner toward the surface moves a penetrator into the surface. Depth of penetration between preload and full load as reflected on the display of the unit, (dial or digital) is an indication of the hardness value.

4.1.1 The indicator of dial read-out units is read while the tester is in the fully depressed position, while the digital display of digital read-out units is read when the tester is in the fully released position, since the reading is automatically locked in at the preload position as the unit is being released.

NOTE 3—Another portable non-caliper-type instrument is employed in Test Method B 648. One hand is used to operate the instrument. Hardness numbers are given as Barcol Impressor readings.

5. Significance and Use

5.1 The instrument may be used on a variety of geometries of aluminum alloy test pieces, providing the surface being tested has proper support for the instrument.

5.2 This test method is intended for quality assurance and production control purposes. This test method is not intended to be an independent material-acceptance test.

5.3 The thickness of the test piece shall be such that a mark or bulge is not produced on the reverse side of the test piece and the test piece does not deflect during the test.

5.4 Calibration of the instrument through the use of reference blocks is required for true comparative hardness values.