



Standard Test Methods for Rockwell Hardness and Rockwell Superficial Hardness of Metallic Materials^{1,2}

This standard is issued under the fixed designation E 18; 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.

This standard has been approved for use by agencies of the Department of Defense.

1. Scope

1.1 These test methods cover the determination of the Rockwell hardness and the Rockwell superficial hardness of metallic materials, including test methods for the verification of machines for Rockwell hardness testing (Part B) and the calibration of standardized hardness test blocks (Part C).

1.2 Values stated in inch-pound units are to be regarded as the standard. SI units are provided for information only.

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. (See Note 5.)*

NOTE 1—The National Institute of Standards and Technology (NIST) maintains the national Rockwell hardness standards for the United States. In June 1998, NIST released new Rockwell C scale (HRC) test blocks as Standard Reference Materials (SRMs). The blocks were calibrated using NIST's primary reference standardizing machine. The major benefit of the NIST standards is that their HRC levels are in line with the other industrialized countries around the world. The NIST HRC levels establish the hardness of materials slightly harder than the historical standards used in the United States for the past 75 years. The revision of E 18 requires that all performance verifications of Rockwell hardness indenters and hardness machines must be made using test blocks calibrated traceable to the Rockwell standards maintained by NIST. This can be accomplished through the use of commercial test blocks calibrated traceable to the NIST standards or by directly using the NIST SRMs. This requirement will apply only to the Rockwell scale(s) for which NIST supplies primary reference test blocks

2. Referenced Documents

2.1 ASTM Standards:

A 370 Test Methods and Definitions for Mechanical Testing of Steel Products³

¹ These test methods are under the jurisdiction of ASTM Committee E-28 on Mechanical Testing and are the direct responsibility of Subcommittee E28.06 on Indentation Hardness Testing.

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² In this test method, the term Rockwell refers to an internationally recognized type of indentation hardness test as defined in Section 3, and not to the hardness testing equipment of a particular manufacturer.

³ *Annual Book of ASTM Standards*, Vol 01.03.

B 19 Specification for Cartridge Brass Sheet, Strip, Plate, Bar, and Disks (Blanks)⁴

B 36/B36 M Specification for Brass Plate, Sheet, Strip, and Rolled Bar⁴

B 96 Specification for Copper-Silicon Alloy Plate, Sheet, Strip, and Rolled Bar for General Purposes and Pressure Vessels⁴

B 97 Specification for Copper-Silicon Alloy Plate, Sheet, Strip, and Rolled Bar for General Purposes⁵

B 103/B 103 M Specification for Phosphor Bronze Plate, Sheet, Strip, and Rolled Bar⁴

B 121/B 121 M Specification for Leaded Brass Plate, Sheet, Strip, and Rolled Bar⁴

B 122/B 122 M Specification for Copper-Nickel-Tin Alloy, Copper-Nickel-Zinc Alloy (Nickel Silver), and Copper-Nickel Alloy Plate, Sheet, Strip, and Rolled Bar⁴

B 130 Specification for Commercial Bronze Strip for Bullet Jackets⁴

B 134 Specification for Brass Wire⁴

B 152 Specification for Copper Sheet, Strip, Plate, and Rolled Bar⁴

B 291 Specification for Copper-Zinc-Manganese Alloy (Manganese Brass) Sheet and Strip⁴

B 370 Specification for Copper Sheet and Strip for Building Construction⁴

E 4 Practices for Force Verification of Testing Machines⁶

E 29 Practice for Using Significant Digits in Test Data to Determine Conformance with Specifications⁷

E 140 Hardness Conversion Tables for Metals⁶

3. Terminology

3.1 Definitions:

3.1.1 *calibration*—determination of the values of the significant parameters by comparison with values indicated by a reference instrument or by a set of reference standards.

3.1.2 *Rockwell hardness number, HR*—a number derived from the net increase in the depth of indentation as the force on

⁴ *Annual Book of ASTM Standards*, Vol 02.01.

⁵ Discontinued, see 1981 *Annual Book of ASTM Standards*, Part 6.

⁶ *Annual Book of ASTM Standards*, Vol 03.01.

⁷ *Annual Book of ASTM Standards*, Vol 14.02.