



Standard Test Method for Rapid Indentation Hardness Testing of Metallic Materials¹

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1. Scope

1.1 This test method covers the procedure for rapid indentation hardness testing of metallic materials as an alternative to Test Method E 10 on standard Brinell hardness. It includes methods for the verification of rapid indentation hardness testing machines, Part B, and the calibration of reference hardness test blocks, Part C.

1.2 The values stated in SI units are to be regarded as standard.

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:*

E 4 Practices for Force Verification of Testing Machines²

E 10 Test Method for Brinell Hardness of Metallic Materials²

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 *rapid indentation hardness test*—an indentation hardness test using calibrated machines to force a hard steel or carbide ball, under specified conditions, into the surface of the material under test and to measure the depth of the indentation. The depth measured can be from the surface of the test specimen or from a reference position established by the application of a preliminary test force.

3.1.3 *verification*—checking or testing to assure conformance with the requirements of the method.

4. Significance and Use

4.1 This test method is used when it is desired to make hardness tests very rapidly, as in the inspection of the output of a heat-treating furnace.

4.2 This test method is not to be regarded as a standard Brinell hardness test method.

4.3 Since the test forces and method of display of the depth measurement differ between manufacturers of rapid indentation hardness testing equipment, the test results from equipment from different manufacturers are not comparable.

A. GENERAL DESCRIPTION AND TEST PROCEDURE

5. Apparatus

5.1 *Testing Machine*—Equipment for rapid indentation hardness testing is used essentially to measure hardness by determining the depth of indentation of a penetrator into the specimen. The test force can be applied either as a single total test force whereby the depth is measured usually from the surface of the test specimen or as a preliminary and total test force whereby the depth is measured as the increase from the preliminary to the total test force. The magnitude of the indenting test force or test forces is determined by agreement. The design and construction of the testing machine shall be such that no rotational or lateral movement of the indenter or test specimen occurs while the test force is being applied or removed.

5.2 *Penetrator:*

5.2.1 The standard ball penetrator shall be 10 mm in diameter. Other values of ball penetrator may be used as provided in 7.1.

5.2.2 The balls used shall be free of surface imperfections and conform to the requirements prescribed in 13.1.2.

5.3 *Mechanism for Measuring the Depth of the Indentation*—The depth of the indentation is determined by a measuring device that shall conform to the requirements prescribed in 13.1.3.

5.4 When diameters of indentations are measured to ascertain the accuracy of hardness values of test specimens or of reference hardness test blocks, the measuring microscope shall

¹ This test method is under the jurisdiction of ASTM Committee E28 on Mechanical Testing and is the direct responsibility of Subcommittee E28.06 on Indentation Hardness Testing.

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