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# Standard Practice for Indentation Hardness of Metallic Materials by Comparison Hardness Testers[1]

This standard is issued under the fixed designation A833; 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 practice covers the determination of indentation hardness of metallic materials using comparison hardness testers.

1.2 This practice applies only to those comparison hardness testers, normally portable, that use comparative test bars that have been standardized according to Test Method E10 as a basis for comparison.

1.3 Calibration of comparative test bars (rods), used for comparison to determine hardness numbers, is also covered by this practice.

1.4 The impression force used during comparison hardness testing is normally an impact load applied by striking a hammer on the appropriate areas as outlined in the manufacturer's instructions.

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

1.6 *This standard does not purport to address all of the safety problems, 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]

A370 Test Methods and Definitions for Mechanical Testing of Steel Products

E10 Test Method for Brinell Hardness of Metallic Materials

## 3. Significance and Use

3.1 The comparative hardness test is an empirical dynamic indentation hardness test. Comparative hardness tests provide useful information about metallic materials. This information may correlate to tensile strength, wear resistance, ductility, heat treatment condition, or other physical characteristics of metallic materials, and may be useful in quality control and selection of materials.

3.2 Comparative hardness testing at a specific location on a part may not represent the physical characteristics of the whole part or end product.

## 4. Apparatus

4.1 Comparison hardness testers are used principally for testing articles that are too large or unwieldy to be tested in the usual types of testing machines, for testing parts of fixed structures, or for testing under any conditions that require that the indenting force be applied in a direction other than vertical.

4.1.1 Required equipment includes an apparatus that contains the impression ball and a slot or spacing to insert the comparative test bar (rod), the comparative test bar, a structure to apply the impact (anvil), and an impacting tool, normally a hammer. This apparatus is designed to allow a ball impression to be produced on the standard rod simultaneously with one produced on the piece to be tested. Comparison of the impression diameters together with the hardness of the comparative bar (rod) is used to determine hardness of the part.

4.1.2 The structure to convey the impact to the test bar, impression ball, and part being tested is designed with the striking surface for the impacting tool centered directly above the location of the impression ball.

4.1.3 The apparatus may also be designed to include an extension for stabilization.

4.1.4 The Brinell hardness of the comparison test bar (rod) used should be within ±15% of the anticipated Brinell hardness of the part being tested, and of the same general type of material.

4.1.5 *Impression Ball:*

4.1.5.1 The diameter of the impression ball shall be 10 ± 0.01 mm.

4.1.5.2 The ball shall be made from steel hardened within the range of 60 to 67 HRC and shall be capable of being used

[1] This practice is under the jurisdiction of ASTM Committee A01 on Steel, Stainless Steel and Related Alloysand is the direct responsibility of Subcommittee A01.06 on Steel Forgings and Billets.

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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.