This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.

Designation: E23 – 23a

An American National Standard

Standard Test Methods for Notched Bar Impact Testing of Metallic Materials[1]

This standard is issued under the fixed designation E23; 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 U.S. Department of Defense.

1. Scope*

1.1 These test methods describe notched-bar impact testing of metallic materials by the Charpy (simple-beam) test and the Izod (cantilever-beam) test. They give the requirements for: test specimens, test procedures, test reports, test machines (see Annex A1) verifying Charpy impact machines (see Annex A2), optional test specimen configurations (see Annex A3), designation of test specimen orientation (see Terminology E1823), and determining the shear fracture appearance (see Annex A4). In addition, information is provided on the significance of notched-bar impact testing (see Appendix X1), and methods of measuring the center of strike (see Appendix X2).

1.2 These test methods do not address the problems associated with impact testing at temperatures below –196 °C (77 K).

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

1.3.1 *Exception*—Section 9 and Annex A4 provide inch-pound units for information only.

1.4 *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, health, and environmental practices and determine the applicability of regulatory limitations prior to use.* Specific precautionary statements are given in Section 6.

1.5 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

2. Referenced Documents

2.1 *ASTM Standards:*[2]

B925 Practices for Production and Preparation of Powder Metallurgy (PM) Test Specimens

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

E1823 Terminology Relating to Fatigue and Fracture Testing

E2298 Test Method for Instrumented Impact Testing of Metallic Materials

3. Terminology

3.1 *Definitions of Terms Common to Mechanical Testing:*

3.1.1 *drop height, h,* [L], *n*—the center of strike vertical distance between the free-hanging position and the latched position.

3.2 *Definitions of Terms Specific to This Standard:*

3.2.1 *absorbed energy,* [FL], *n*—work spent to fracture a specimen in a single pendulum swing, as measured by a compensated indicating device.

3.2.2 *direct verification, n*—process that ensures all parts that may affect measured absorbed energy are within specified dimensional tolerances.

3.2.3 *free-hanging position, n*—position of the pendulum after oscillation stops such that the potential and kinetic energy is zero.

3.2.4 *free swing, n*—uninterrupted (without a test specimen) pendulum swing from the latched position as recorded by the indicating device (see A2.3.8.1).

3.2.5 *indirect verification, n*—process that ensures the average absorbed energy from testing a set of verification specimens corresponds to the certified absorbed energy within a specified tolerance (see A2.4.1).

[1] These test methods are under the jurisdiction of ASTM Committee E28 on Mechanical Testing and are the direct responsibility of Subcommittee E28.07 on Impact Testing.

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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.

***A Summary of Changes section appears at the end of this standard**

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