



Standard Test Methods for Notched Bar Impact Testing of Metallic Materials¹

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

[E6](#) Terminology Relating to Methods of Mechanical Testing

[E29](#) Practice for Using Significant Digits in Test Data to Determine Conformance with Specifications

[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 from Terminology [E6](#):*

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

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

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

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.