



Designation: E9 – 19

Standard Test Methods of Compression Testing of Metallic Materials at Room Temperature¹

This standard is issued under the fixed designation E9; 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 cover the apparatus, specimens, and procedure for axial-force compression testing of metallic materials at room temperature (**Note 1**). For additional requirements pertaining to cemented carbides, see **Annex A1**.

NOTE 1—For compression tests at elevated temperatures, see Practice **E209**.

1.2 The values stated in inch-pound units are to be regarded as standard. The values given in parentheses are mathematical conversions to SI units that are provided for information only and are not considered 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, health, and environmental health practices and determine the applicability of regulatory limitations prior to use.*

1.4 *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

B557 Test Methods for Tension Testing Wrought and Cast Aluminum- and Magnesium-Alloy Products

¹ These test methods are under the jurisdiction of ASTM Committee **E28** on Mechanical Testing and are the direct responsibility of Subcommittee **E28.04** on Uniaxial 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.

E4 Practices for Force Verification of Testing Machines
E6 Terminology Relating to Methods of Mechanical Testing
E83 Practice for Verification and Classification of Extensometer Systems
E111 Test Method for Young's Modulus, Tangent Modulus, and Chord Modulus
E177 Practice for Use of the Terms Precision and Bias in ASTM Test Methods
E209 Practice for Compression Tests of Metallic Materials at Elevated Temperatures with Conventional or Rapid Heating Rates and Strain Rates
E251 Test Methods for Performance Characteristics of Metallic Bonded Resistance Strain Gages
E691 Practice for Conducting an Interlaboratory Study to Determine the Precision of a Test Method
E2658 Practices for Verification of Speed for Material Testing Machines

3. Terminology

3.1 *Definitions:* The definitions of terms in Terminology **E6** shall apply to these test methods. These terms include compressive strength, extensometer system, modulus of elasticity, necking, proportional limit, stress-strain curve, stress-strain diagram, tangent modulus, testing machine, upper yield strength, yield strength, and Young's modulus. The terms precision, bias, coefficient of variation, repeatability, reproducibility, and accuracy are used as defined in Practice **E177**.

3.2 *Definitions of Terms Specific to This Standard:*

3.2.1 *alignment device*—a fixture for compression testing in a testing machine that is an integral part of the load train and that aids in achieving and maintaining axial forces.

3.2.2 *anti-buckling fixture, n*—a device that applies lateral support to a thin-sheet specimen to prevent it from buckling, but does not interfere with axial deformation.

3.2.3 *solid cylindrical specimen, n*—a specimen with solid cylindrical cross section that does not require lateral support to

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