



Standard Test Methods for Cyclic (Reversed) Load Test for Shear Resistance of Vertical Elements of the Lateral Force Resisting Systems for Buildings¹

This standard is issued under the fixed designation E2126; 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 These test methods cover the evaluation of the shear stiffness, shear strength, and ductility of the vertical elements of lateral force resisting systems, including applicable shear connections and hold-down connections, under quasi-static cyclic (reversed) load conditions.

1.2 These test methods are intended for specimens constructed from wood or metal framing braced with solid sheathing or other methods or structural insulated panels.

1.3 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.

1.4 *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 and health practices and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 ASTM Standards:²

D2395 Test Methods for Specific Gravity of Wood and Wood-Based Materials

D4442 Test Methods for Direct Moisture Content Measurement of Wood and Wood-Base Materials

D4444 Test Method for Laboratory Standardization and Calibration of Hand-Held Moisture Meters

E564 Practice for Static Load Test for Shear Resistance of Framed Walls for Buildings

E575 Practice for Reporting Data from Structural Tests of Building Constructions, Elements, Connections, and Assemblies

E631 Terminology of Building Constructions

2.2 *ISO Standard:*³

ISO 16670 Timber Structures—Joints Made with Mechanical Fasteners—Quasi-static Reversed-cyclic Test Method

2.3 *Other Standards:*⁴

ANSI/AF&PA NDS National Design Specification for Wood Construction

3. Terminology

3.1 For definitions of terms used in this standard, see Terminology **E631**.

3.2 *Definitions of Terms Specific to This Standard:*

3.2.1 *ductility ratio, cyclic (D), n*—the ratio of the ultimate displacement (Δ_u) and the yield displacement (Δ_{yield}) of a specimen observed in cyclic test.

3.2.2 *elastic shear stiffness (K_e)* (see **9.1.4**, **Fig. 1**), *n*—the resistance to deformation of a specimen in the elastic range before the first major event (FME) is achieved, which can be expressed as a slope measured by the ratio of the resisted shear load to the corresponding displacement.

3.2.3 *envelope curve* (see **Fig. 2**), *n*—the locus of extremities of the load-displacement hysteresis loops, which contains the peak loads from the first cycle of each phase of the cyclic loading and neglects points on the hysteresis loops where the absolute value of the displacement at the peak load is less than that in the previous phase.

3.2.3.1 *Discussion*—Specimen displacement in the positive direction produces a positive envelope curve; the negative specimen displacement produces a negative envelope curve. The positive direction is based on outward movement of the hydraulic actuator.

¹ These test methods are under the jurisdiction of ASTM Committee **E06** on Performance of Buildings and are the direct responsibility of Subcommittee **E06.11** on Horizontal and Vertical Structures/Structural Performance of Completed Structures.

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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.

³ Available from International Organization for Standardization (ISO), 1, ch. de la Voie-Creuse, Case postale 56, CH-1211, Geneva 20, Switzerland, <http://www.iso.ch>.

⁴ Available from American Forest and Paper Association (AF&PA), 1111 19th St., NW, Suite 800, Washington, DC 20036, <http://www.afandpa.org>.