



Standard Test Method for Axial Compression Test of Reinforced Plastic and Polymer Matrix Composite Vertical Members¹

This standard is issued under the fixed designation E2954; 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 test method covers the evaluation of vertical members in axial compression for “full-sized” specimens with various end conditions with constant cross-sections throughout the length.

1.2 This test method is limited to reinforced plastic and polymer matrix composite materials and covers the determination of the compressive properties of structural members. The method is intended primarily for members of rectangular cross section, but is also applicable to irregularly shaped studs, round posts, or special sections.

1.3 This test method covers short-term axial load testing under standard indoor atmospheric conditions. It does not address: sampling, the ability of the material to carry a sustained long-term load, design load derivations, temperature effects, performance under freeze/thaw or salt spray exposure conditions, chemical/UV exposure effects, or engineering analysis/modeling needed to extrapolate the results to conditions other than those tested. Each of these factors, and potentially others, need to be considered by the design professional or product standard development committee before using the information generated by this test method to assess structural adequacy.

1.4 Short sections are not covered in this test method and should be tested using a material test standard such as Test Method D6108 or Test Methods D198.

1.5 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.

1.6 *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.*

¹ This test method is under the jurisdiction of ASTM Committee E06 on Performance of Buildings and is the direct responsibility of Subcommittee E06.11 on Horizontal and Vertical Structures/Structural Performance of Completed Structures.

Current edition approved May 1, 2015. Published July 2015. DOI: 10.1520/E2954-15

2. Referenced Documents

2.1 ASTM Standards:²

D198 Test Methods of Static Tests of Lumber in Structural Sizes

D883 Terminology Relating to Plastics

D2915 Practice for Sampling and Data-Analysis for Structural Wood and Wood-Based Products

D3878 Terminology for Composite Materials

D6108 Test Method for Compressive Properties of Plastic Lumber and Shapes

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

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

E631 Terminology of Building Constructions

3. Terminology

3.1 *Definitions*—Terminology D3878 defines terms relating to high-modulus fibers and their composites. Terminology D883 defines terms relating to plastics. Terminology E6 defines terms relating to mechanical testing. In the event of a conflict between terms, Terminology D3878 shall have precedence over the other standards.

3.1.1 For definitions of terms in this standard, see Terminology E631.

3.2 Definitions of Terms Specific to This Standard:

3.2.1 *full-sized specimen*—full-sized specimens (meaning full cross-sectional area) tested with standard lengths with various end conditions and bracing conditions about the weak and strong member axes. The end conditions addressed include: eccentricity, fixed, pinned.

3.2.2 *short sections* (not considered in this test method)—compressive test sections having a maximum length, L , less than 17 times the least radius of gyration, r , where $r = \sqrt{I/A}$.

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.