



Standard Test Methods for Single-Bolt Connections in Wood and Wood-Based Products¹

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1. Scope

1.1 These test methods cover procedures for evaluating the strength and stiffness of single-bolt connections in wood or wood-based products when subjected to short-term static loading. These test methods serve as a basis for determining the effects of various factors on the strength and stiffness of the connection. Long-term loading and creep displacement characteristics are outside the scope of this protocol.

1.2 These test methods are intended for situations employing a smooth shank bolt with a constant diameter.

1.3 The values stated in inch-pound units are to be regarded as the standard. The SI units in parentheses are 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 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 Density and Specific Gravity \(Relative Density\) of Wood and Wood-Based Materials](#)

[D2915 Practice for Sampling and Data-Analysis for Structural Wood and Wood-Based Products](#)

[D4442 Test Methods for Direct Moisture Content Measurement of Wood and Wood-Based Materials](#)

[E4 Practices for Force Verification of Testing Machines](#)

[E2309/E2309M Practices for Verification of Displacement Measuring Systems and Devices Used in Material Testing Machines](#)

¹ These test methods are under the jurisdiction of ASTM Committee [D07](#) on Wood and are the direct responsibility of Subcommittee [D07.05](#) on Wood Assemblies.

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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.

[F606/F606M Test Methods for Determining the Mechanical Properties of Externally and Internally Threaded Fasteners, Washers, Direct Tension Indicators, and Rivets](#)

2.2 *Federal Specification:*

[Fed. Spec. FF-W-92 for Washers, Metal, Flat \(Plain\)](#)

2.3 *Other Standards:*

[NDS ANSI/AWC National Design Specification for Wood Construction](#)

3. Summary of Test Methods

3.1 Specimens consisting of at least one wood or wood-based member fastened with one bolt to at least one other member of any material are evaluated for capacity to resist compressive or tensile forces applied at a constant speed of displacement with a suitable testing machine. The slip, or displacement, of the connection at various intervals of loading is measured. Supplementary physical properties of the wood or wood-based members are also determined.

4. Significance and Use

4.1 Connections are one of the most important components in wood construction. While the strength of metal bolts and of wood or wood-based products are ascertainable, a full evaluation of the performance of the combination is only possible through the testing of a complete connection assembly. Such variables as member thickness, member width, end and edge distances, type of bolt, fabrication tolerances, moisture content of the wood or wood-based product, preservative or fire-retardant treatment of the wood or wood-based product, species of wood, and/or material type and orientation of wood-based material may affect connection behavior. In order to develop design criteria for established bolt types as well as those under development, the effect of these variables on connection strength and stiffness must be known. The tests described herein permit the observation of data on the strength and stiffness of wood or wood-based connections, or both, under the influence of any or all of these factors.

5. Apparatus

5.1 *Testing Machine*—Any suitable testing machine capable of operation at a constant movable crosshead speed and having an accuracy of $\pm 1\%$ when calibrated in accordance with Practices [E4](#).