



Standard Test Methods for Wood-Based Structural Panels in Compression¹

This standard is issued under the fixed designation D 3501; 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 Department of Defense.

1. Scope

1.1 These test methods cover the determination of the compression properties of wood-based structural panels. Wood-based structural panels in use include plywood, wafer-board, oriented strand board, and composites of veneer and of wood-based layers.

1.2 *Method A, Compression Test for Small Specimens*—This method is applicable to small specimens that are uniform with respect to elastic and strength properties. Two types of compression tests are employed: one to evaluate both elastic and compressive strength properties, and the second to evaluate maximum compressive strength only.

1.3 *Method B, Compression Test for Large Specimens*—This method employs large specimens and responds well to manufacturing variables and growth characteristics that influence compression properties of structural panels.

1.3.1 This method is intended for the following:

1.3.1.1 Comparative tests of structural panels,

1.3.1.2 Evaluating the effects of moisture content on strength properties of structural panels,

1.3.1.3 Determining the strength properties of structural panels, and

1.3.1.4 Evaluating the effects of raw material and manufacturing variables on compression properties of structural panels.

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:*

D 2395 Test Methods for Specific Gravity of Wood and Wood-Base Materials²

D 4442 Test Methods for Direct Moisture Content Measurement of Wood and Wood-Base Materials²

3. Significance and Use

3.1 These methods determine the compressive strength of

structural panels in response to stresses acting in the plane of the panel.

3.2 *Method A*—This method is applicable to structural panels of uniform properties within a panel. It is useful for evaluating plywood of clear, straight-grained veneers and determining the effect of chemical or preservative treatments, construction, principal direction with respect to direction of stress, and other variables that are expected to uniformly influence the panel.

3.3 *Method B:*

3.3.1 The compressive properties obtained by this method are a reliable approximation of the strength of a full-size panel, and are intended for use in design.

3.3.2 The compressive properties are influenced by buckling; however, this effect is eliminated in this test by restraining the edges of the specimens.

3.4 It is recommended that where comparisons are to be made, that the same method and specimen size be used throughout. This is because the volume of material included in a test specimen can influence the compressive strength regardless of whether the material properties are uniform throughout the sheet or vary widely due to the presence of growth or manufacturing features.

4. Control of Moisture Content

4.1 Condition structural panel samples to be tested at a specific moisture content or relative humidity to approximate constant weight in controlled atmospheric conditions before testing. For panels used under dry conditions, a relative humidity of $65 \pm 2\%$ at a temperature of $68 \pm 6^\circ\text{F}$ ($20 \pm 3^\circ\text{C}$) is preferred.

5. Variables Influencing the Compressive Properties of Structural Panels

5.1 *Moisture Content*—Cut a moisture content sample having minimum area of 2 in.² (13 cm²) from the clear areas of the specimen and weigh immediately after each test. Moisture content samples from large specimens of Method B shall have minimum area of 8 in.² (52 cm²). If inspection of the edges of a plywood panel reveals the presence of a knot in any ply, select a second sample. Moisture content samples also serving as specific gravity samples shall be free of voids. Moisture content determinations shall be made in accordance with Test Methods D 4442.

¹ These test methods are under the jurisdiction of ASTM Committee D-7 on Wood and are the direct responsibility of Subcommittee D07.03 on Panel Products. Current edition approved July 15, 1994. Published September 1994. Originally published as D 3501 – 76. Last previous edition D 3501 – 76(1986).

² *Annual Book of ASTM Standards*, Vol 04.10.