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Standard Test Methods for Structural Panels in Tension¹

This standard is issued under the fixed designation D 3500; 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.

^{ε1} NOTE—Section 15 was added editorially in July 1995.

1. Scope

1.1 These test methods cover the determination of the tensile properties of structural panels.

1.2 Structural panels in use include plywood, waferboard, oriented strand board and composites of veneer, and other wood-based layers

1.3 *Test Method A, Tensile Test for Small Specimens:*

1.3.1 This test method employs small specimens that should have a reduced cross section at the center of their length to avoid failure in the grip area. The transition from full width of specimen to reduced section at the center should be gradual to minimize stress concentration.

1.3.2 When the measurements of elastic properties are to be made, the length of the reduced cross section at the center should be of sufficient length to accommodate an extensometer.

1.4 *Test Method B, Tensile Test for Large Specimens:*

1.4.1 This test method employs large specimens and responds well to manufacturing variables, plywood growth characteristics, and other defects influencing the tensile properties of structural panels.

1.4.2 The test specimens are large enough to contain the maximum sized defects found in plywood panels. The test specimens have a constant cross section since the size and location of defects control the location of failures and the effect of stress concentration at the grips is overshadowed.

1.4.3 This test method is recommended for the following:

1.4.3.1 Comparative tests of structural panels,

1.4.3.2 Determining the influence of any specific strength reducing defects on the tensile properties of structural panels,

1.4.3.3 Determination of tensile properties of plywood and composites containing veneer with growth and manufacturing characteristics.

1.5 *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 Method for Direct Moisture Content Measurement of Wood and Wood-Base Materials²

3. Significance and Use

3.1 These test methods determine the tensile properties of structural panels in response to stresses acting in the plane of the panel.

3.2 *Test Method A*—This test method is suited to material that is uniform with respect to tensile properties. It is normally applied to structural panels and plywood of clear, straight-grained veneers. It may also be used to evaluate the strength of scarf and finger joints and other manufacturing process variables that can be expected to influence the tensile properties of structural panels in a uniform manner across the width of the sheet.

3.3 *Test Method B*—This test method employs large test specimens and responds well to all manufacturing variables and growth characteristics that affect the tensile properties of structural panels.

3.4 It is recommended that where comparisons are to be made that the same test method and specimen size be used throughout. This is because the volume of material included in a test specimen can influence the tensile 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 Structural panel specimens to be tested at specific moisture contents or after reaching equilibrium moisture content at specific temperature and relative humidity conditions shall be conditioned to approximate constant weight in controlled atmospheric conditions. For approximating moisture conditions of structural panels used under dry conditions, a relative humidity of $65 \pm 2\%$ at a temperature of $(68 \pm 6^\circ\text{F})$

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 Oct. 26, 1990. Published December 1990. Originally published as D 3500 – 76. Last previous edition D 3500 – 76 (1986).

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