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Standard Test Methods for Structural Panels in Planar Shear (Rolling Shear)¹

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1. Scope

1.1 These test methods determine the shear properties of structural panels associated with shear distortion of the planes parallel to the edge planes of the panels. Both shear strength and modulus of rigidity may be determined. Primarily, the tests measure the planar shear (rolling shear) strength developed in the plane of the panel.

1.2 Structural panels in use include, but are not limited to, structural plywood, oriented strand board (OSB), and composites of veneer and of wood-based layers.

1.3 Two test methods are included:

1.3.1 *Test Method A*—Planar shear loaded by plates.

1.3.2 *Test Method B*—Planar shear induced by five-point bending.

1.3.3 The choice of method will be dictated by the purpose of the test and equipment available.

1.3.4 *Test Method A, Planar Shear Loaded by Plates*—This test method uses a rectangular panel section adhered between steel plates with protruding knife edges to create load at the panel faces. This test method has been used to develop shear properties of plywood and oriented strand board for the purpose of confirming design values. This test method does not produce pure shear, but the specimen length is prescribed so that the secondary stresses have a minimum effect. The method determines shear strength and modulus of rigidity.

1.3.5 *Test Method B, Planar Shear Induced by Five-Point Bending*—Planar shear stress is induced on the panel while loaded in bending using two continuous spans. This test method determines planar shear strength consistent with panel applications under transverse loading. This test method is able to determine shear strength at any moisture condition.

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

1.5 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

2. Referenced Documents

2.1 *ASTM Standards:*²

D2395 Test Methods for Density and Specific Gravity (Relative Density) of Wood and Wood-Based Materials

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

3. Significance and Use

3.1 Planar shear (rolling shear) characteristics of structural panels determined by these test methods are essential for the rigorous design of various glued wood-panel structural components, such as box beams, folded plate roofs, and stressed skin panels. Planar shear also may govern the design at low span-depth ratios encountered in floors subjected to high concentrated loads, concrete forms at high pouring pressures, and bulk storage structures.

3.2 The modulus of rigidity determined from Test Method A is a composite of the entire specimen acting as a unit. For plywood panels for which the ratio between the shear moduli of the plies with grain oriented parallel and perpendicular to the shear forces is known, the rolling shear modulus of the perpendicular plies can be calculated.

3.3 Veneer produced by slicing or rotary peeling may contain fine checks or separations parallel to the grain on the knife side of the veneer that are produced as the knife is forced through the wood. These checks are termed “knife checks” to distinguish them from occasional checks that may be formed on the opposite side of the veneer by forces at the compression bar, and from checks caused by drying. Knife checks can have a significant effect on rolling shear properties in plywood panels and may be of significance in other veneer containing

¹ This test method is under the jurisdiction of ASTM Committee D07 on Wood and is the direct responsibility of Subcommittee D07.03 on Panel Products.

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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.