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.

Designation: D5574 – 94 (Reapproved 2021)

Standard Test Methods for Establishing Allowable Mechanical Properties of Wood-Bonding Adhesives for Design of Structural Joints[1]

This standard is issued under the fixed designation D5574; 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 These test methods cover the principles for establishing allowable mechanical properties for adhesives that can be used to design adhesive-bonded joints for structural components and assemblies of wood or wood with other materials. These test methods are modeled after Practice D245.

1.2 The properties determined are allowable shear stress, allowable tensile stress, and allowable shear modulus.

1.3 In determination of allowable shear- and tensile-stress levels, these test methods are limited by the horizontal shear and tension perpendicular-to-the-grain capacity of the wood adherends (hard maple, *Acer saccharum*, Marsh.). The adhesives so tested may actually have shear or tensile allowable stresses exceeding the wood, but the determined allowable design stress levels are limited (upper bounded) by the wood in these test methods. If a wood other than hard maple is used for testing the adhesive, then the allowable strengths are upper bounded by the properties of that particular wood.

1.4 The strength properties are determined by standard ASTM test methods. As a result, only procedural variations from the standards and special directions for applying the results are given in these test methods.

1.5 Time-to-failure data derived from creep-rupture testing (see Test Method D4680) provide a measure of the ultimate strength of an adhesive bond as a function of time at various levels of temperature and moisture.

1.5.1 With proper caution, useful service life at a given shear stress level may be extrapolated from relatively short loading periods.

1.6 The resistance of the adhesive to permanent loss of properties due to aging (permanence) is assessed by means of strength tests after constant elevated-temperature and moisture aging of test specimens.

1.6.1 If the subject adhesives will be used to bond wood that has been treated with a preservative, fire retardant, or any other chemical to modify its properties, then the permanence of the adhesive shall be tested using wood adherends treated in the same manner.

1.7 Factors for durability, permanence, and creep derived by shear tests and analysis, are assumed to apply to tension (normal-to-the-bond) strength as well.

1.8 Requirements for production, inspection, and certification of adhesives evaluated under these test methods are not included.

1.9 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.

1.10 *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]

D245 Practice for Establishing Structural Grades and Related Allowable Properties for Visually Graded Lumber
D897 Test Method for Tensile Properties of Adhesive Bonds
D905 Test Method for Strength Properties of Adhesive Bonds in Shear by Compression Loading
D907 Terminology of Adhesives
D1101 Test Methods for Integrity of Adhesive Joints in Structural Laminated Wood Products for Exterior Use
D1151 Practice for Effect of Moisture and Temperature on Adhesive Bonds
D2555 Practice for Establishing Clear Wood Strength Values
D2559 Specification for Adhesives for Bonded Structural

[1] These test methods are under the jurisdiction of ASTM Committee D14 on Adhesives and are the direct responsibility of Subcommittee D14.70 on Construction Adhesives.

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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.

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