



Standard Practice for Estimating the Percentage of Wood Failure in Adhesive Bonded Joints¹

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1. Scope

1.1 This practice provides procedures for estimating the percentage of wood failure that occurs in plywood-shear, block-shear, finger joint test specimens, or any other bondline involving wood.

1.2 The values stated in SI units are to be regarded as the standard. The values in parentheses are provided for information purposes only.

1.3 *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 905 Test Method for Strength Properties of Adhesive Bonds in Shear by Compression Loading²

D 906 Test Method for Strength Properties of Adhesives in Plywood Type Construction in Shear by Tension Loading²

D 2559 Specification for Adhesives for Structural Laminated Wood Products for Use Under Exterior (Wet Use) Exposure Conditions²

D 4688 Test Methods for Evaluating Structural Adhesives for Finger Jointing Lumber²

D 5572 Specification for Adhesives Used for Finger Joints in Nonstructural Lumber Products²

D 5751 Specification for Adhesives Used for Laminate Joints in Nonstructural Lumber Products²

2.2 American National Standards:

ANSI/HPMA HP American National Standard for Hardwood and Decorative Plywood³

ANSI/AITC A190.1 American National Standard for Wood Products—Structural Glued, Laminated Timber⁴

2.3 Other Standards:

American Plywood Association Proposed Standard Method for Estimating Percentage Wood Failure on Plywood Shear Specimens⁵

PS 1 U.S. Product Standard for Construction and Industrial Plywood⁵

Wood Handbook: Wood as an Engineering Material, Agricultural Handbook No. 72, Forest Service, Forest Products Laboratory (1987)⁶

Inspection Bureau Memorandum No. 1 Interpretation of Wood Failure⁴

2.4 ASTM Adjunct:

Photographs for Visually Estimating the Percentage of Wood Failure in Standard Adhesively Bonded Specimens⁷

3. Terminology

3.1 Definitions:

3.1.1 *deep wood failure, n*—failure that is invariably several to many cells away from the adhesive layer, in which the fracture path is strongly influenced by the grain angle and growth-ring structure.

3.1.2 *shallow wood failure, n*—failure that is invariably within the first one or two layers of cells beyond the adhesive layer in which the fracture path is not influenced by the wood-grain angle or growth-ring structure (see 7.7 and 8.1).

3.1.3 *wood failure, n*—the rupturing of wood fibers in strength tests on bonded specimens, usually expressed as the percentage of the total area involved which shows such failure.

4. Significance and Use

4.1 Wood failure is one of the principal means for determining the quality of an adhesively bonded wood joint.

4.2 When evaluated after a water soaking, water soaking and drying, or boiling and drying, the percentage of wood failure is an important criterion for qualifying adhesives for use in plywood and glued laminated structural timber for exterior use, and for daily quality control of the processes for manufacturing plywood and glued, laminated timbers. Standards that use the percentage of wood failure are included in Section 2.

¹ This practice is under the jurisdiction of ASTM Committee D-14 on Adhesives, and is the direct responsibility of Subcommittee D14.30 on Wood Adhesives.

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² *Annual Book of ASTM Standards*, Vol 15.06.

³ Available from Hardwood Plywood Manufacturers' Association, 1825 Michael Faraday Drive, P.O. Box 2789, Reston, VA 22090-2789.

⁴ Available from American Institute for Timber Construction, 11818 S. E. Mill Plain Blvd., Suite 415, Vancouver, WA 98684-5092.

⁵ Available from American Plywood Association, P.O. Box 11700, Tacoma, WA 98411-0700.

⁶ Available from Superintendent of Documents, U. S. Government Printing Office, Washington, DC 20402.

⁷ Available from ASTM Headquarters. Order ADJD5266.