



Designation: D7998 – 19 (Reapproved 2024)

Standard Test Method for Measuring the Effect of Temperature on the Cohesive Strength Development of Adhesives using Lap Shear Bonds under Tensile Loading¹

This standard is issued under the fixed designation D7998; 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 This test method concerns bonding and testing of wood adhesives and related adhesives using small scale tensile lap-shear samples in a manner that emphasizes transient cohesive strength as a function of bonding time and temperature.

1.2 Use of thin adherends enables bondlines to be rapidly heated to elevated temperatures and maintained at those temperatures for a range of times at a controlled pressure before testing.

1.3 Optional rapid forced air cooling of bonds after pressing and immediately before testing enables the effect of testing temperature on transient strength to be evaluated.

1.4 Bond overlap distance is specified to ensure that failure occurs in the bondline rather than in unbonded portions of adherend strips, and also to minimize the effect of shear stress non-uniformity along the overlap during tensile testing.

1.5 Standard wood or alternative non-standard materials must be of specified high quality and uniformity of structure and dimension to minimize variability of bonding and maximize stress transfer into the bonds during testing.

1.6 The effect of wood variability and type, or of the properties of alternative non-wood materials, on bond strength development may be explored using the method.

1.7 Optional hermetic sealing of bond overlaps during their heated pressing enables the effect of moisture on bonding to be evaluated.

1.8 Thermal damage, either of pre-formed bonds or by prolonging bond forming times, may be evaluated as a function of time and elevated temperature using this test method.

1.9 The values stated in SI units are to be regarded as standard. No other units of measurement are included in this standard.

¹ This test method is under the jurisdiction of ASTM Committee D14 on Adhesives and is the direct responsibility of Subcommittee D14.30 on Wood Adhesives.

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1.10 *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. Some specific hazards statements are given in Section 10 on Hazards.*

1.11 *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

D907 Terminology of Adhesives

E691 Practice for Conducting an Interlaboratory Study to Determine the Precision of a Test Method

3. Terminology

3.1 See Terminology D907 for other terms related to adhesives.

3.2 *Definitions of Terms Specific to This Standard:*

3.2.1 *adherend strip, n*—one of two adherend pieces that constitute a test specimen.

3.3 *adhesive spread rate, n*—the mass of adhesive applied per unit surface area of the overlap region of the adherend.

3.4 *contact heating, n*—the transfer of heat energy to the test specimen by the application of precisely temperature-controlled heads pressing on the test specimen's surfaces with controlled force.

3.5 *forced air cooling, n*—the rapid cooling of the overlap region of a test specimen after bonding at elevated temperature

² For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at www.astm.org/contact. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.