



Designation: **D2339 – 98 (Reapproved 2017) D2339 – 20**

Standard Test Method for Strength Properties of Adhesives in Two-Ply Wood Construction in Shear by Tension Loading¹

This standard is issued under the fixed designation D2339; 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.

INTRODUCTION

The accuracy of the results of strength tests of adhesive bonds depends on the conditions under which the bonding process is carried out. Unless otherwise agreed upon between the manufacturer and the purchaser, the bonding conditions shall be prescribed by the manufacturer of the adhesive. In order to ensure that complete information is available to the individual conducting the tests, the manufacturer of the adhesive shall furnish numerical values and other specific information for each of the following variables:

- (1) The moisture content of the wood at the time of bonding.
- (2) Complete mixing directions for the adhesive.
- (3) Conditions for application of the adhesive including the rate of spread or thickness of film, number of coats to be applied, whether to be applied to one or both surfaces and the conditions of drying where more than one coat is required.
- (4) Assembly conditions before application of pressure, including the room temperature, length of time, and whether open or closed assembly is to be used.
- (5) Curing conditions, including the amount of pressure to be applied, the length of time under pressure, and the temperature of the assembly when under pressure. It should be stated whether this temperature is that of the bondline, or of the atmosphere at which the assembly is to be maintained.
- (6) Conditioning procedure before testing, unless a standard procedure is specified, including the length of time, temperature, and relative humidity.

A range for any variable or combination of variables is permitted provided any arbitrarily chosen value within the range or combinations specified is acceptable to both the manufacturer and the purchaser of the adhesives.

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~~A range may be prescribed for any variable by the manufacturer of the adhesive if it can be assumed by the test operator that any arbitrarily chosen value within such a range or any combination of such values for several variables will be acceptable to both the manufacturer and the purchaser of the adhesive.~~

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. Current edition approved Aug. 1, 2017/April 1, 2020. Published August 2017/April 2020. Originally approved in 1965. Last previous edition approved in 2014/2017 as D2339 – 98 (2014); (2017). DOI: 10.1520/D2339-98R17; 10.1520/D2339-20.

1. Scope

1.1 This test method covers the determination of the comparative shear strengths of adhesives when tested on a standard specimen and under specified conditions of preparation, conditioning, and testing. This test method is intended to be applied only to adhesives used in bonding wood to wood.

1.2 The values stated in SI units are to be regarded as the standard. The values given in parentheses are for information 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, health, and environmental practices and determine the applicability of regulatory limitations prior to use.*

1.4 *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](#)

[D1038 Terminology Relating to Veneer, Plywood, and Wood Structural Panels](#)

[D143D4442 Test Methods for Small Clear Specimens of Timber](#) [Direct Moisture Content Measurement of Wood and Wood-Based Materials](#)

[D907D5266 Terminology of Adhesives](#) [Practice for Estimating the Percentage of Wood Failure in Adhesive Bonded Joints](#)

3. Terminology

3.1 *Definitions:*

3.1.1 Many terms in this test method are defined in Terminology [D907](#) and [D1038](#).

3.1.2 *shear, n*—in an adhesively bonded joint, stress, strain, or failure resulting from applied forces that tends to cause adjacent planes of a body to slide parallel in opposite directions.

4. Significance and Use

4.1 By the nature of the way adhesives are used in two-ply wood construction, shear strength is an important performance criteria.

4.2 Shear strength measured by this test method is suitable for use in adhesive development, manufacturing quality control, and in materials-performance specifications.

5. Apparatus

5.1 Adjust the loading rate of the testing machine between ~~4535.535 and 7560 g/s~~ ~~7.560 kg/s~~ (600 and 1000 lb/min). ~~Where the testing machine is adjusted by rate of crosshead movement rather than load application rate, select an appropriate head movement rate so as to yield an average load application rate in the 4535 and 7560 g/s (600 and 1000 lb/min) range. Provide suitable grips and jaws so that the specimen can be gripped tightly and held in alignment as the load is applied. The grips and jaws shown in Fig. 1 have been found satisfactory. Locate the testing machine in an atmosphere such that the moisture content of the specimens developed under the conditions prescribed in Section 7 is not noticeably altered during testing.~~

NOTE 1—Where the testing machine is adjusted by rate of crosshead movement rather than load application rate, select an appropriate head movement rate so as to yield an average load application rate in the 4.535 and 7.560 kg/s (600 and 1000 lbs./min) range.

5.2 The testing machine shall be provided with suitable grips and jaws so that the specimen can be gripped tightly and held in alignment as the load is applied.

NOTE 2—The grips and jaws shown in Fig. 1 have been found satisfactory.

5.3 The testing machine shall be located in an atmosphere such that the moisture content of the specimens developed under the conditions prescribed in Section 7 is not noticeably altered during testing.

6. Preparation of Test Panels

6.1 The standard substrate for this test is 1.6 mm (1/16 in.) thick rotary-cut or sliced veneer of sweet birch (*Betula lenta*) or yellow birch (*Betula alleghaniensis*). ~~Any other thickness or species of veneer may be substituted upon~~ Upon written agreement between the party requesting this test and the manufacturer of the adhesive, any other thickness or species of veneer is permitted.

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.