



Designation: D3930 – 08 (Reapproved 2023)

Standard Specification for Adhesives for Wood-Based Materials for Construction of Manufactured Homes¹

This standard is issued under the fixed designation D3930; 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

This specification provides a standard for measuring and evaluating the performance of adhesives that will be used in joints of wood-based materials in constructing manufactured homes. This specification has two parts: Part I contains the requirements necessary for an adhesive to conform to this specification; and Part II provides test methods by which the performance of the adhesives will be measured. A classification system is provided that groups adhesives according to resistance to deformation under load, resistance to moisture, and gap-filling ability. Minimum test values have been specified for certain properties of durability, while other property requirements are left open-ended. The test methods used to obtain these values reflect adverse exposure and stress conditions that exist during the construction, transit, and use of manufactured homes. By using values published from these prescribed test methods, the design engineer can select an adhesive that best meets the requirements of a specific adhesive application.

The test methods used in this specification were developed predominantly from existing ASTM standards, while others came from standards that have been generally accepted for years. Some test methods were more recently developed. In most instances, only parts of these standards have been used in this specification. Since no precision and bias statements are available from the original test methods, none can be made for this specification at this time.

PART I— REQUIREMENTS

1. Scope

1.1 This specification provides the means to measure and evaluate the performance of adhesives for structural or semi-structural bonding of wood-to-wood in manufactured homes. Wood as used in this specification includes lumber, plywood, particleboard, gypsum board, and all materials having wood-based surfaces at the bondline. This specification does not cover other adhesives used in manufactured homes such as adhesives for carpet, floor tile, ceramic fixtures, plastic laminates, trim and millwork, and similar nonstructural applications.

1.1.1 The performance of the adhesives is measured in the following tests:

¹ This specification is under the jurisdiction of ASTM Committee D14 on Adhesives and is the direct responsibility of Subcommittee D14.70 on Construction Adhesives.

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10	Mold	25
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1.2 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.

1.3 *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

- A269 Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service
- A376/A376M Specification for Seamless Austenitic Steel Pipe for High-Temperature Service
- D9 Terminology Relating to Wood and Wood-Based Products
- D905 Test Method for Strength Properties of Adhesive Bonds in Shear by Compression Loading
- D907 Terminology of Adhesives
- D1002 Test Method for Apparent Shear Strength of Single-Lap-Joint Adhesively Bonded Metal Specimens by Tension Loading (Metal-to-Metal)
- D1165 Nomenclature of Commercial Hardwoods and Softwoods
- D2294 Test Method for Creep Properties of Adhesives in Shear by Tension Loading (Metal-to-Metal)
- D2339 Test Method for Strength Properties of Adhesives in Two-Ply Wood Construction in Shear by Tension Loading
- D3110 Specification for Adhesives Used in Laminate Joints for Nonstructural Glued Lumber Products (Withdrawn 1996)³
- D3632 Test Method for Accelerated Aging of Adhesive Joints by the Oxygen-Pressure Method
- D3931 Test Method for Determining Strength of Gap-Filling Adhesive Bonds in Shear by Compression Loading
- D4300 Test Methods for Ability of Adhesive Films to Support or Resist the Growth of Fungi
- E6 Terminology Relating to Methods of Mechanical Testing
- E41 Terminology Relating to Conditioning (Withdrawn 2019)³

3. Terminology

3.1 Definitions:

3.1.1 Many terms in this specification are defined in Terminology D907.

3.1.2 *creep, n*—in an adhesive, the time-dependent increase in strain resulting from a sustained stress.

3.1.3 *gap-filling adhesive, n*—an adhesive capable of forming and maintaining a bond between surfaces that are not close-fitting.

3.1.3.1 *Discussion*—Close fitting is relative to a given material and industry; for example, standards in construction

differ from standards in electronics. Some adhesives will bond by bridging without completely filling the gap; others by filling the gap completely.

3.2 Definitions of Terms Specific to This Standard:

3.2.1 *manufactured home*⁴—a structure, transportable in one or more sections which in the traveling mode is 8 body feet or more in width or 40 body feet or more in length or when erected on site, is 320 or more square feet and which is built on a permanent chassis and designed to be used as a dwelling with or without a permanent foundation when connected to the required utilities, and includes the plumbing, heating, air-conditioning, and electrical systems contained therein. Calculations used to determine the number of square feet in a structure will be based on the structure's exterior dimensions measured at the largest horizontal projections when erected on site. These dimensions will include all expandable rooms, bay windows, cabinets, and other projections containing interior space.

3.2.2 *semi-structural adhesive*—an adhesive capable of transferring required loads between adherends and which deforms a maximum of 0.050 in. (1.27 mm) under static load when tested in accordance with Test 9, Section 24.

3.2.3 *structural adhesive*—an adhesive capable of transferring required loads between adherends and which deforms a maximum of 0.006 in. (0.15 mm) under static load when tested in accordance with Test 9, Section 24.

3.2.4 *total deformation*—the total dimensional change with time of a material under constant load, and consisting of the initial instantaneous elastic or rapid deformation and the slower time dependent deformation or creep.

3.2.5 *Type 1 adhesive*—an adhesive that will retain its bond integrity when the joint is repeatedly wetted and dried.

3.2.6 *Type 2 adhesive*—an adhesive intended for use in protected locations but that will maintain its bond integrity when the bond is subjected to occasional wetting.

3.2.7 *Type 3 adhesive*—an adhesive intended for use in interior locations, but that will maintain its bond integrity during conditions of high humidity.

NOTE 1—The following ASTM standards may be referred to for other terms used in this specification: D9, Terms Relating to Timber; D907, Terms Relating to Adhesives; D1165, Nomenclature of Domestic Hardwoods and Softwoods; E6, Terms Relating to Methods of Mechanical Testing; and E41, Terms Relating to Conditioning.

4. Classification

4.1 Adhesives shall be classified as follows (see Table 1):

4.1.1 By resistance to deformation as:

4.1.1.1 Group A, Structural; or Group B, Semistructural,

4.1.2 By resistance to water and water vapor as:

4.1.2.1 Type 1, Type 2, or Type 3, and

4.1.3 By gap-filling ability.

4.1.3.1 Those adhesives tested in accordance with Test 3, Section 18, shall carry the designation G/F.

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.

³ The last approved version of this historical standard is referenced on www.astm.org.

⁴ This definition conforms to that of the U.S. Department of Housing and Urban Development (Manufactured Housing Construction and Safety Standards Act of 1974 as amended in proposed rules in the Federal Register, Vol 48, No. 152, Aug. 7, 1981, pp. 40498 to 40500).