



Designation: D2918 – 99 (Reapproved 2020)

Standard Test Method for Durability Assessment of Adhesive Joints Stressed in Peel¹

This standard is issued under the fixed designation D2918; 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 combination of stress and moisture decreases the durability of most adhesive joints. Stresses in the presence of water or water vapor may cause some adhesive joints to fail at some fraction of the stress required to break the dry joint. The time to failure for a given adhesive joint tested under moist conditions generally decreases with increasing stress, temperature, and relative humidity.

1. Scope

1.1 This test method provides data for assessing the durabilities of adhesive joints by means of T-peel type specimens stressed in contact with air, air in equilibrium with certain solutions, water, aqueous solutions, or other environments at various temperatures.

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

B209 [Specification for Aluminum and Aluminum-Alloy Sheet and Plate](#)

D907 [Terminology of Adhesives](#)

D1828 [Practice for Atmospheric Exposure of Adhesive-Bonded Joints and Structures](#)

D1876 [Test Method for Peel Resistance of Adhesives \(T-Peel Test\)](#)

D2651 [Guide for Preparation of Metal Surfaces for Adhesive Bonding](#)

E104 [Practice for Maintaining Constant Relative Humidity by Means of Aqueous Solutions](#)

3. Terminology

3.1 *Definitions*—Many terms in this practice are defined in Terminology [D907](#).

4. Significance and Use

4.1 The combination of stress and moisture decreases the durability of most adhesive joints. Stresses in the presence of water or water vapor may cause some adhesive joints to fail at some small fraction of the stress required to break the dry joint. The time to failure for a given adhesive joint generally decreases with increasing stress, temperature, and relative humidity.

4.2 This test method may be used as an accelerated screening test for assessing the durability of adhesive joints. It may be used to measure durability of adhesive joints exposed outdoors or to environmental conditions experienced by adhesive joints in service. It may also be used to determine the effects of various surface preparations or substrates on durabilities of adhesive joints.

4.3 The durability performance of various adhesives may be compared by using this test method under uniform sets of conditions. To assess the overall durability of a given adhesive, T-peel joints should be tested under a range of stress, relative humidity, and temperature. For a specific end use it may be possible to obtain the needed durability data using only one set of test conditions.

¹ This test method is under the jurisdiction of ASTM Committee [D14](#) on Adhesives and is the direct responsibility of Subcommittee [D14.80](#) on Metal Bonding 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.

5. Apparatus

5.1 For outdoor exposure the test location should be in an area free of or protected from high winds. Standard outdoor weathering racks are suggested (Practice D1828), but any stable frame may be used (for example galvanized pipe or painted steel channel). No other special apparatus is required for outdoor tests.

5.2 For exposure in environmental cabinets or chambers no additional special apparatus is necessary. Constant-temperature baths may also be used.

5.3 For exposure to distilled or deionized water in the laboratory it may be convenient to use the apparatus shown in Fig. 1.

5.4 For exposure to constant relative humidities, the specimen may be placed in an apparatus similar to that shown in Fig. 1. A saturated salt solution may be placed in the bottom of the glass tube to provide a constant relative humidity (see Practice E104); a stopper having a small glass tube packed with grease may be used to seal the upper end of the large glass tube.

6. Test Specimens

6.1 The successful use of the following test method depends on preparing good quality T-peel joint specimens. Prepare the test panels carefully according to the adhesive manufacturer's directions or according to some other specified set of conditions agreed upon between the manufacturer and the purchaser.

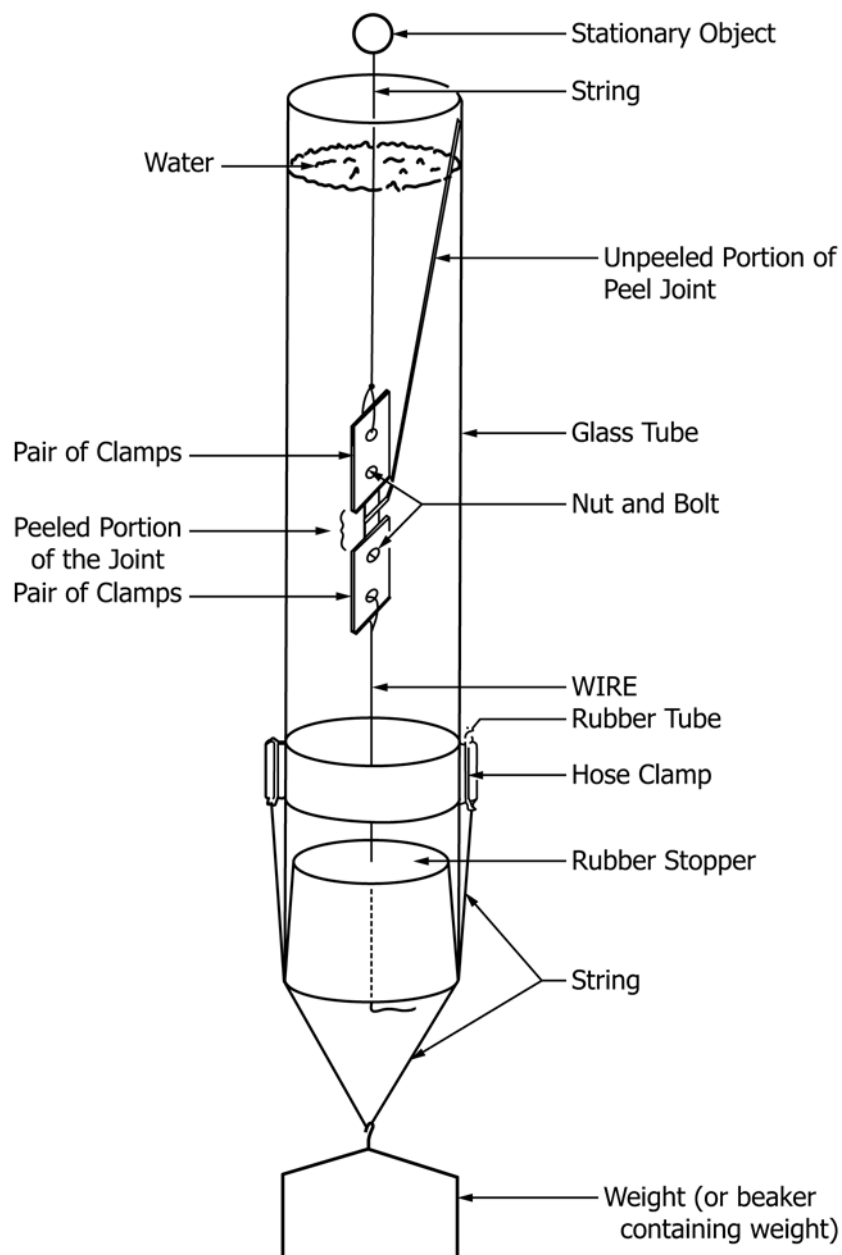


FIG. 1 Apparatus for Measuring Adhesive Peel Rates in Water