Designation: D 1337 – 96

Standard Test Method for Storage Life of Adhesives by Consistency and Bond Strength[1]

This standard is issued under the fixed designation D 1337; 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 covers a means by which the storage life of an adhesive can be measured using rheological and adhesive performance testing.

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

2. Referenced Documents

2.1 *ASTM Standards:*

D 618 Practice for Conditioning Plastics for Testing[2]

D 897 Test Method for Tensile Properties of Adhesive Bonds[3]

D 906 Test Method for Strength Properties of Adhesives in Plywood Type Construction in Shear by Tension Loading[3]

D 907 Terminology of Adhesives[3]

D 1002 Test Method for Apparent Shear Strength of Single-Lap-Joint Adhesively Bonded Metal Specimens by Tension Loading (Metal-to-Metal)[3]

3. Terminology

3.1 *Definitions*—Many terms in this test method are defined in Terminology D 907.

4. Significance and Use

4.1 This test method is applicable to all adhesives having a relatively short storage life.

4.2 This test method is intended to determine whether the storage life conforms to the minimum specified storage life required of an adhesive by consistency tests (Procedure A) or by bond strength tests (Procedure B), or by both.

PROCEDURE A—CONSISTENCY TEST

5. Apparatus

5.1 *Viscometer*—Any means of measuring the viscosity or consistency of the adhesive is selected, provided that the results are expressed in fundamental units.

5.2 *Controlled-Temperature Chamber*, capable of maintaining temperature to ±1.1°C (±2°F), to provide temperature storage conditions.

6. Storage of Adhesive

6.1 Store the adhesive and all its components, if there are any, in their original and unopened containers when the container is approximately quart (or litre) size. When the adhesive is supplied in larger containers, the desired number of samples is withdrawn from the large container. In this latter case, the size, type of closure, and nature (such as glass, steel, or tin-coated steel) of the small storage container is agreed upon by the purchaser and the manufacturer.

6.2 For storage temperature, use any one of the standard temperatures specified in Practice D 618. The time of storage is any time agreed upon by the purchaser and the manufacturer. If the effect of storage time is desired, it is suggested that at least three quantities of the adhesive be stored under the prescribed conditions, and tested at various intervals of time. Use a separate, unopened container at each such test.

7. Conditioning

7.1 Condition all containers after storage at 23 ± 1°C (73.4 ± 2°F) before opening. If the adhesive consists of two or more components, blend the components in accordance with the instructions from the manufacturer, and again adjust the temperature to 23 ± 1°C, if required.

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[1] This test method is under the jurisdiction of ASTM Committee D-14 on Adhesives and is the direct responsibility of Subcommittee D14.10 on Working Properties.

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[2] *Annual Book of ASTM Standards*, Vol 08.01.

[3] *Annual Book of ASTM Standards*, Vol 15.06.

8. Procedure

8.1 Measure the consistency on both the original adhesive as received, and on the adhesive after being subjected to storage. Test the adhesive in either its original container or after transferring into a more suitable container.

9. Report

9.1 Report the following information:

9.1.1 Complete identification of the adhesive, including type, source, manufacturer's code number, form, date of test, date of manufacture, and the mixing proportions followed in preparing the adhesive for use,

9.1.2 Conditions of storage, including temperature, length of storage, and type and size of container used,

9.1.3 Complete identification of the viscometer, and details of the test procedure or the ASTM test method used,

9.1.4 Consistency results on both the freshly received and stored adhesives, and

9.1.5 Pertinent observations, such as settling, discoloring, separating, caking, or gelling which might influence the usability of the adhesive.

PROCEDURE B—BOND STRENGTH TEST

10. Apparatus

10.1 *Testing Machine*, of suitable capacity, capable of maintaining a specified rate of loading, and equipped with self-aligning grips for holding the test specimens.

10.2 *Controlled-Temperature Chamber*, capable of maintaining temperature to ±1.1°C (±2°F), to provide temperature storage conditions.

11. Storage of Adhesive

11.1 Store the adhesive as described in 6.1 and 6.2.

11.2 For storage temperature use any one of the standard temperatures specified in Practice D 618. The time of storage shall be any time agreed upon by the purchaser and the manufacturer. If the effect of storage time is desired, it is suggested that at least three quantities of the adhesive be stored under the prescribed conditions and tested at various intervals of time. Use a separate, unopened container at each such test.

12. Conditioning

12.1 Condition as described in 7.1

13. Preparation of Test Specimens

13.1 Prepare test panels or sheets for determining the bond strength of the adhesive in accordance with any of the ASTM test methods suitable for the purpose. For example, the lap-type shear specimens or the spool-type tension specimens such as those described in the following methods are acceptable for use: Test Method D 897, Test Method D 906, and Test Method D 1002.

13.2 In preparing the test specimens, use the adhesive in accordance with the instructions of the manufacturer. Prepare test specimens for bond strength for both the original adhesive as received and for the adhesive which has been subjected to the storage test, using the same procedure and conditions of bonding.

14. Procedure

14.1 Conduct the bond strength test by means of the testing machine on samples of both the original adhesive as received and on the adhesive after being subjected to storage.

15. Report

15.1 Report the following information:

15.1.1 Complete identification of the adhesive, including type, source, manufacturer's code number, form, date of test, date of manufacture, and the mixing proportions followed in preparing the adhesive for use,

15.1.2 Complete identification of the adherends used, including the method of cleaning, the manner of applying the adhesive, the curing treatment, all other pertinent bonding conditions, and the methods used,

15.1.3 Conditions of storage of the adhesive, including temperature, length of storage, and the type and size of container used,

15.1.4 Bond strength results on both the freshly received and stored adhesive, and dates when the tests were performed, and

15.1.5 Pertinent observations, such as settling, discoloring, separating, caking, or gelling which might influence the usability of the adhesive.

16. Precision and Bias

16.1 No information is presented about either the precision or bias of this test method because resources necessary for testing have not been forthcoming.

17. Keywords

17.1 bond strength; consistency; storage life; viscosity