Designation: D 898 – 05

Standard Test Method for Applied Weight Per Unit Area of Dried Adhesive Solids[1]

This standard is issued under the fixed designation D 898; 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.

This standard has been approved for use by agencies of the Department of Defense.

1. Scope

1.1 This test method covers the determination of the quantity of adhesive solids applied in a spreading or coating operation.

1.2 *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.*

1.3 The values stated in SI units are to be regarded as the standard. The values in parentheses are for information only.

2. Referenced Documents

2.1 *ASTM Standards:* [2]

D 907 Terminology of Adhesives

3. Terminology

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

3.2 *Definitions of Terms Specific to This Standard:*

3.2.1 *spreading or coating weight per unit area*, *n*—the total quantity of adhesive solids uniformly applied, expressed in pounds per thousand square feet, or kilograms per one hundred square metres, of joint or surface area.

3.2.2 *test specimen or adherend*, *n*—that material which is to be spread or coated with adhesive.

3.2.3 *total quantity of adhesive solids applied*, *n*—the solvent-free gross weight of adhesive on the surface or at the glue joint, whether resulting from a single spread, double spread (both contacting surfaces spread) or multiple applications of adhesive.

4. Significance and Use

4.1 This test method allows one to quantitatively measure the weight of adhesive applied during a coating application.

5. Apparatus

5.1 The apparatus consists of a balance capable of weighing the material accurately to the nearest 1 %, and a suitable instrument for measuring the linear dimensions of the specimens to the same degree of precision.

5.2 Equipment capable of satisfactorily drying the spread or coated specimens to the solvent-free condition is to be employed.

6. Test Specimens

6.1 Select adherend test specimens from portions of the actual material to be coated or spread, or, from the same, or a similar lot, having the same physical characteristics such as thickness, density, texture, etc.

6.2 The size of the test specimen may vary with the nature of the material to which the adhesive is to be applied. Materials of low porosity may normally require larger test specimens than materials of high porosity.

6.3 Select test specimens of simple geometric shape to facilitate precise measurement of dimensions.

6.4 For operations involving the coating or spreading of sheeted stock, individual plies or lamina of the adherend, a minimum of five coated and uncoated duplicate specimens is required for determining the average weight of adhesive solids applied.

6.5 For operations wherein the adherend test specimen is in continuous form, such as roll stock of paper, fabric, etc., use test specimens with sufficient total area to reflect accurately the average weight of adhesive solids applied per thousand square feet, or hundred square metres, of coated surface.

7. Conditioning

7.1 Unless otherwise agreed upon by the purchaser and the manufacturer, the atmospheric conditions surrounding the specimen prior to and during the test shall be 23 ± 1°C (73.4 ± 1.8°F) and 50 ± 5 % relative humidity. The conditioning

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

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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.

period prior to test is 48 h for specimens of ⅛ in. or less in thickness and 96 h for thicker specimens.

8. Procedure

8.1 Determine the linear dimensions of the test specimens and calculate their areas to an accuracy of 1 %. Determine the weight of the test specimens to the nearest 1 %.

8.2 Apply the adhesive in accordance with the procedure recommended by the manufacturer.

8.3 Use only test specimens reflecting a normal uniform application of adhesive (by visual inspection) in calculating the weight of adhesive solids applied.

8.4 Simultaneously dry both coated and uncoated test specimens to the solvent-free condition using the procedure recommended by the adhesive manufacturer.

8.5 Reweigh the solvent-free, coated and uncoated specimens. For continuous operations (where adherend test specimens are fed from roll stock) weigh the dried, solvent-free, coated specimens. Establish the weight of an equal area of identical, uncoated stock.

9. Calculation

9.1 Calculate the weight of adhesive solids applied, where it is possible to provide exact duplicate specimens for this determination, as follows:

When W_2 and W_1 are expressed in grams:

$$D = [(W_2 - W_1) \times 317.5]/(N \times A) \quad (1)$$

$$D_1 = [(W_2 - W_1) \times 155.0]/(N \times A) \quad (2)$$

where:

D = weight of adhesive solids applied, lb/1000 ft^2 of joint or surface areas,
D_1 = weight of adhesive solids applied, kg/100m^2 of joint or surface areas,
W_2 = weight of the specimen after application of the adhesive and elimination of solvents,
W_1 = weight of the duplicate uncoated specimen,
A = area of test specimen in square inches, and
N = number of surfaces spread.

9.2 Calculate the weight of adhesive solids applied, where it is not possible to provide exact duplicate specimens for this determination, as follows:

When W_2 and W_1 are expressed in grams:

$$D = \{[W_2 - W_1(1 - k)] \times 317.5\}/(N \times A) \quad (3)$$

$$D_1 = \{[W_2 - W_1(1 - k)] \times 155.0\}/(N \times A) \quad (4)$$

where:

D = weight of adhesive solids applied, expressed in lb/1000 ft^2 of joint or surface area,
D_1 = weight of adhesive solids applied, kg/100 m^2 of joint or surface area.
W_2 = weight of the specimen after application of the adhesive and elimination of solvents,
W_1 = original uncoated weight of the specimen,
A = area of test specimen, in^2,
N = number of surfaces spread, and
k = a factor applied to correct for changes in specimen weight that occur during the solvent elimination process. It is obtained by weighing a duplicate specimen and then exposing it simultaneously with the original coated specimen to the solvent evaporation procedure. k is calculated as follows:

$$k = (M_0 - M_1)/M_0 \quad (5)$$

where: M_0 = original weight of duplicate specimen, and M_1 = weight after exposure to solvent elimination.

NOTE 1—For spreading or coating operations where both contacting surfaces of the joint are spread, or where successive coatings of adhesive are applied, use the formulas above for each surface spread or successive coating applied, and the combined weight is equal to the total weight of adhesive solids applied.

10. Report

10.1 Report the following information:

10.1.1 Complete identification of the adhesive applied,

10.1.2 Method of applying the adhesive and drying the test specimens,

10.1.3 Complete description of the adherend test specimens (composition or type, moisture content, size, source, etc.),

10.1.4 Number of test specimens used (or total area of test specimens if from a continuous operation) and calculated weight of adhesive solids applied to each specimen,

10.1.5 The average calculated weight of adhesive solids applied per thousand square feet, or hundred square metres, of joint or surface area, and

10.1.6 Any qualifying remarks concerning the test procedure.

11. Precision and Bias

11.1 No precision and bias exists for this test method, as the necessary resources have not been forthcoming.

12. Keywords

12.1 applied weight; solids