Designation: D 6677 – 01

Standard Test Method for Evaluating Adhesion by Knife[1]

This standard is issued under the fixed designation D 6677; 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 the procedure for assessing the adhesion of coating films to substrate by using a knife.

1.2 This test method is used to establish whether the adhesion of a coating to a substrate or to another coating (in multi-coat systems) is at a generally adequate level.

NOTE 1—The term "substrate" relates to the basic surface on which a coating adheres (may be steel, concrete, etc. or other coating).

1.3 This method can be used in the laboratory and field.

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

1.5 *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 2197 Test Methods for Adhesion of Organic Coatings by Scrape Adhesion.[2]

D 3359 Test Methods for Measuring Adhesion by Tape Test.[2]

D 4541 Test Method for Pull-Off Strength of Coatings Using Portable Adhesion Testers.[3]

3. Summary of Test Method

3.1 Adhesion is determined by making an *"X"* cut into the coating film to the substrate and by lifting the coating with a knife. Adhesion is evaluated qualitatively on a 0 to 10 scale.

4. Significance and Use

4.1 Coatings, to perform satisfactorily, must adhere to the substrates on which they are applied. This test method has been found useful as a simple means of assessing the adhesion of coatings. Although this method is a qualitative and a subjective test it has been used in industry for many years and can provide valuable information.

4.2 Other adhesion test methods may be useful in obtaining quantitative results. See D 2197, D 3359 and D 4541.

4.3 The Performance Evaluation Scale (see 7.4, Table 1) is based on both the degree of difficulty to remove the coating from the substrate and the size of removed coating.

4.4 This test method does not have a known correlation to other adhesion test methods (pull-off, tape, etc.).

4.5 A coating that has a high degree of cohesive strength may appear to have worse adhesion than one that is brittle and hence fractures easily when probed.

5. Apparatus and Materials

5.1 *Cutting Tool*—Sharp utility knife.

5.2 *Cutting Guide*—Steel or other hard metal straight edge to ensure straight cuts.

6. Test Specimen

6.1 When this test method is used in the field, the specimen is the coated substrate on which the adhesion is to be evaluated.

6.2 For laboratory use, apply the materials to be tested to panels of the composition and surface conditions on which it is desired to determine adhesion.

NOTE 2—If desired or specified, the coated test panels may be subjected to a preliminary exposure such as water immersion, salt spray, or high humidity before conducting the knife adhesion test.

7. Procedure

7.1 Select an area free of blemishes and surface imperfections.

7.2 Using a sharp knife and cutting guide, make two cuts into the coating with a 30 to 45 ° angle between legs and down to the substrate which intersects to form an *"X"*. Make each leg of the angle a minimum of 38.1 mm (1 ½ in.) in length. Disregard coating removed during cutting process.

7.3 Employing the point of the knife and beginning at the vertex of the angle, attempt to lift up the coating from the substrate or from the coating below. Rate according to Table 1.

[1] This test method is under the jurisdiction of ASTM Committee D01 on Paint and Related Coatings, and Applications and is the direct responsibility of Subcommittee D01.46 on Industrial Protective Coatings.

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[2] *Annual Book of ASTM Standards*, Vol 06.01.

[3] *Annual Book of ASTM Standards*, Vol 06.02.