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**Determination of Adhesion to
 Release Coated Substrates:
 Wet Spread Method**

1. DEFINITION

1.1 Adhesion to release liner as determined by the wet spread method is the force required to separate the release liner material from the adhesive at a 90° angle and 300 mm per minute (12" per minute) release speed. Data reported should specify both release angle and release speed (See Section 6).

1.2 Adhesion to release liner (alternate method) as defined in Section 1.1 may also be determined at a 135° angle and 300 mm per minute (12" per minute) release speed. Data reported should specify release angle and release speed (See Section 6).

2. SIGNIFICANCE

2.1 The wet spread method is a procedure to measure the exact release value between a specific release liner material and a specific adhesive applied to this same liner.

2.2 This method determines the release value of a specific release liner removed from a specific adhesive.

3. TEST SPECIMEN

3.1 For test specimen conditioning, selection and test conditions, see Appendixes A & D.

3.2 The specimen shall be 24 mm (1") wide and 150 mm (6") in length. A width tolerance of ± 0.4mm (1/64") shall be allowed.

4. EQUIPMENT

4.1 Apparatus capable of applying a smooth wet spread coating of adhesive to a 0.05 mm (0.002") ± 10%, or other preselected dry film thickness. Release value will change with a change in dry film thickness.

4.2 Vented air drying chamber.

4.3 Mechanical circulating air oven.

4.4 Gravity type oven.

4.5 Cover sheet material with an easy release silicone coating (e.g., Akrosil SBL 60# SC Silox 1 U/0 or 60# H.P. Smith grade 8716 S10).

4.6 Tensile Tester (300 mm [12"] per minute release), Adhesion/Release Tester as per Appendix B capable of 300 mm (12") or 7600 mm (300 inches) per minute.

4.7 90° Constant Angle Test Fixture for tensile tester.

4.8 Panels (50 mm by 125 mm [2" by 5"] stainless steel). See Appendix B.

4.9 Roller, 2 kg (4.5 lb.), rubber covered, hand operated. See Appendix B.

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5.1 Wet Coating: Apply a wet coating of the adhesive directly onto the release liner being tested using any type of standard laboratory coating equipment. Coating thickness should be adjusted to yield a dry film thickness of 0.05 mm (0.002"). Other dry film thicknesses are allowed as mentioned in section 4.1. In the case of a 2-sided release liner, each side is direct coated separately with adhesive. Carefully label each side being tested when evaluating 2-sided release liner material. See Figure 1.

5.2 Drying Procedure: Wet coatings should be air dried at ambient conditions in an appropriate drying chamber for 15 minutes. After air drying, coatings should then be placed in a mechanical circulating air oven set at 93°C ± 1°C (200°F ± 2°F) for 5 minutes (± 30 seconds). After oven drying, test samples should be inspected for the presence of any blistering in the release liner material. If none is found, proceed to step 5.3. If blistering of the liner is observed, discard sample and lower oven temperature to 82°C ± 1°C (180°F ± 2°F). Redo test sample again using 5 minutes (± 30 seconds) of drying time.

5.3 Condition Procedure: After oven drying, cover the exposed side of the adhesive with an easy release cover sheet. Allow samples to condition for 24 hours at room temperature before proceeding to the next step.

5.4 Sample Size: Cut three (3) 24 mm x 150 mm (1" by 6") samples from different sections of the release liner material being tested.

Test Procedure: Sections 5.5-5.11

5.5 Separate and roll back an approximate 12 mm (0.5-inch) section of the cover sheet from either end of the 24 mm x 150 mm (1" by 6") test sample. Remove the 12 mm x 24 mm (0.5" x 1") section of visible adhesive from the release liner being tested.

5.6 Staple an approximate 300 mm (12") length of masking tape to the exposed end of the release liner. Remove the entire cover sheet.

5.7 Before lamination of the test sample to the test panel, clean each panel per method given in Appendix C.

5.8 Laminate the 24 mm x 150 mm (1" x 6") sample strip, adhesive side down to a stainless steel test panel using the 2 kg (4.5 lb.) hand roller. Lamination should be made so as not to cause any wrinkling or air entrapment in the test sample. The lamination step is best accomplished by touching one end of the sample to the stainless steel plate and then rolling sample along its length using the hand roller.

5.9 Set the tensile tester to measure 300 mm per minute (12" per minute) release speed. Position sample on the 90° constant angle test fixture to measure release value at the specified 90° angle (See Section 1.1). Alternately, set the adhesion to release tester to 7500 mm per minute (300" per minute) release speed. Position sample on adhesion to release tester to measure release at a 135° angle (See Section 1.2).

5.10 Double back the free end of the release liner and attach tape leader to the attachment fixture on the test apparatus (see Figure 2).

5.11 Read the adhesion to release value from the test apparatus used. Disregard the release value from the first 24 mm (1") section of the liner removed and report value obtained in the following 48 mm (2") section.

6. REPORT

6.1 Report all data obtained in Newtons per 10 mm of width (N/10 mm width) or ounces per inch of width (oz/in. width) basis or in other acceptable units. Release speed(s) should also be stated for all data. The three release values obtained for each liner sample should be averaged. Report the range and average release value for each release liner sample. Separate the adhesive and adhesive thickness used for each liner material.

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6.2 The range and average release value, release speed(s), adhesive type and adhesive thickness should also be stated as in Section 6.1 when alternate units are quoted for liner evaluation.

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Figure 1. Sample wet coating apparatus.

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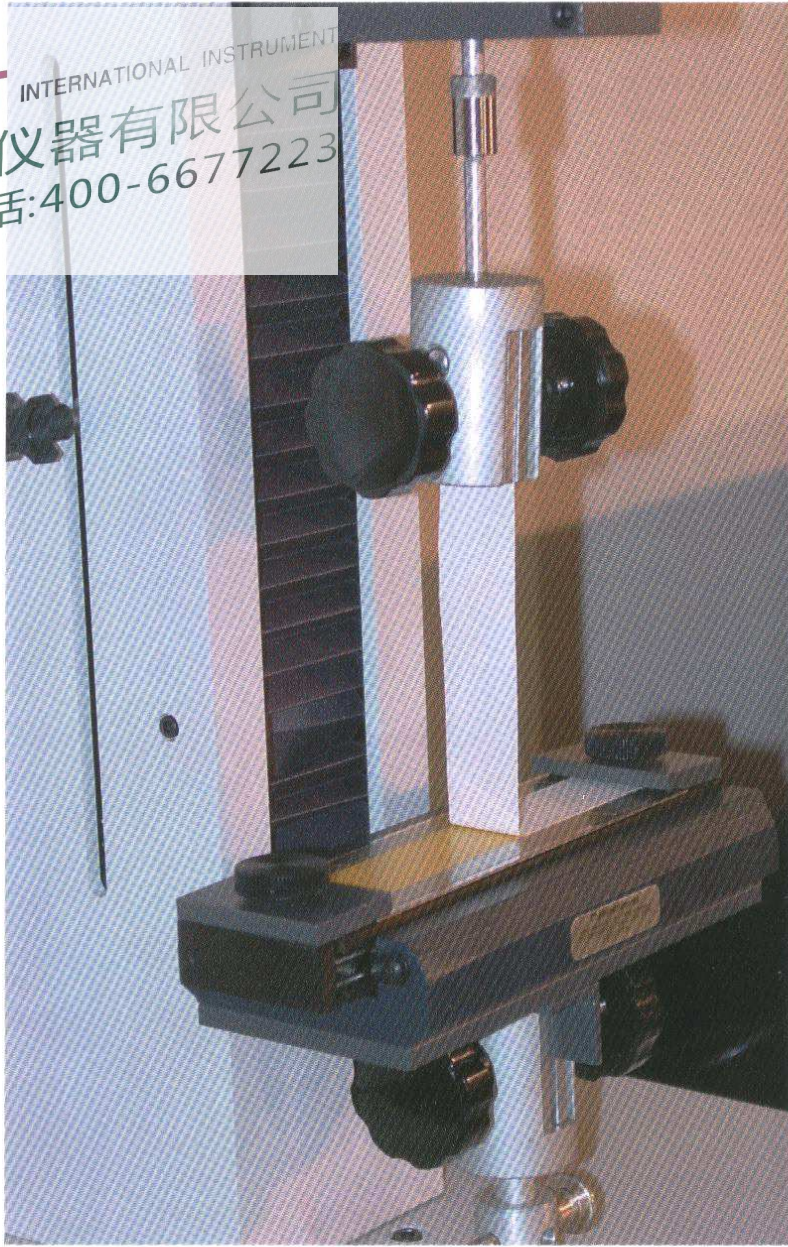


Figure 2. Sample attached to fixture on tensile tester.