

TECHNICAL BULLETIN

Field Adhesion Test Method

Adhesion is one of the most critical properties of any coating and provides a key indicator of the long-term performance of a coating system. Decorative and/or protective paint coatings must exhibit good adhesion in order to be effective. The durability and performance of paint coating is dependent upon its ability to adhere to the surface or substrate throughout the service life of the coating. Paint adhesion testing is used to determine if the coating will adhere properly to the substrates or surfaces to which they are applied.

Cure time before testing adhesion

There are several factors that affect the time needed for a coating to cure, including, but not limited to environmental conditions, the type of coating, colorant loading, thickness of coating film, and the surface being coated. Due to the variability that can exist in the drying of different coatings, it is recommended that the film be allowed to cure for at least seven (7) days prior to conducting an adhesion test.

Testing adhesion of a coating in the field

When testing the adhesion of a coating at a job site, the preferred method is ASTM D3359, Test Method A - X-Cut Tape Test. This test method is used to establish whether the adhesion of a coating to a substrate is at an adequate level. In order to conduct a field test for paint adhesion, the following materials will be needed:

- **Cutting Tool** – Sharp razor blade, scalpel, knife or other cutting devices. It is of particular importance that the cutting edges be in good condition.
- **Cutting Guide** – Steel or other hard metal straightedge to ensure straight cuts.

- **Tape** – One-inch (25-mm) wide pressure-sensitive tape with an adhesion strength agreed upon by the supplier and the user is needed.
- **Rubber Eraser** – On the end of a pencil.
- **Illumination** – A light source is helpful in determining whether the cuts have been made through the film to the substrate.

Test Procedure

1. An area of the coating that is free of blemishes and minor surface imperfections should be selected for testing. The surface to be tested should be clean and dry. Extreme temperatures or relative humidity may affect the adhesion of the tape or the coating.

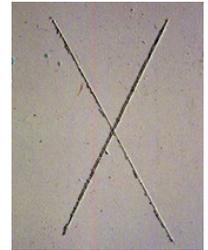


Figure 1

2. Using the sharp cutting tool, make two cuts in the film, each about 1.5 inches (40 mm) long, that intersect near their middle with a smaller angle of 30-45°, forming an X. When making the incisions in the film, use the straightedge and cut through the coating to the substrate in one steady motion. (**Figure 1**)

3. Inspect the incisions to ensure that the coating film has been penetrated. If the substrate has not been reached, make another X in a different location. Do not attempt to deepen a previous cut, as this may affect adhesion along the incision.

4. Cut a piece of the pressure-sensitive tape about 3 inches (75mm) long. (**Figure 2**)



Figure 2

5. Place the center of the tape at the intersection of the cuts. Smooth the tape into place by finger in the area of the incisions and then rub firmly with the eraser on the end of a pencil.

6. Within 90 ± 30 seconds of application, remove the tape

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by holding the free end and pulling it off rapidly, but evenly, back upon itself at about a 180° angle.

(Figure 3)

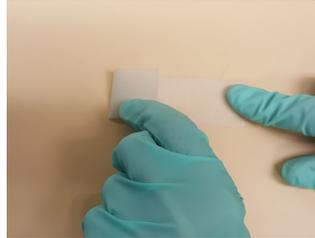


Figure 3

7. Inspect the X-cut area for removal of the coating from the substrate or previous coating and rate the adhesion.

Rating the Adhesion

The following scale should be used to rate the adhesion of the coating (Figure 4):

Ideally, for a new coating, a rating of 4 or higher should be

- | | |
|---|----------------------------------------------------------------------------------|
| 5 | No peeling or removal of the coating |
| 4 | Trace peeling or removal along incisions or at their intersection |
| 3 | Jagged removal along incisions up to 1/16 inch (1.6mm) on either side |
| 2 | Jagged removal along most of the incisions up to 1/8 inch (3.2mm) on either side |
| 1 | Removal from most of the area of the X under the tape |
| 0 | Removal beyond the area of the X |

achieved. A rating of 3 would be the lowest acceptable rating, while 2 or below would be considered a fail.

It is important that more than one trial is made in each area tested, so that the results may be representative of the entire surface. Report the coating/s that was tested, the number

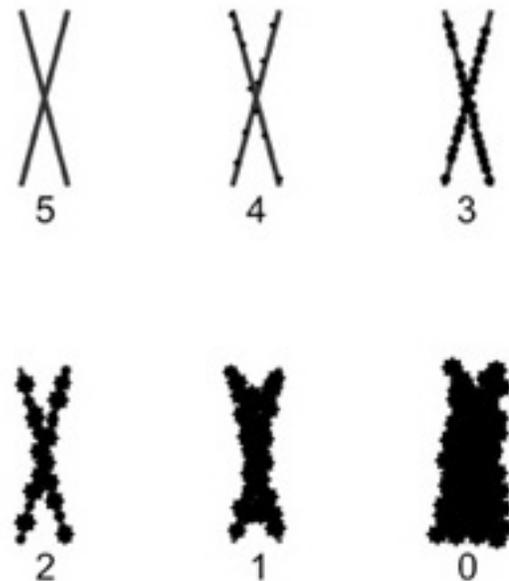


Figure 4

of tests that were conducted, the results for each trial, the location where each trial was conducted, and the environmental conditions at the time of testing.

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