



Standard Practice for Determining the Adhesion of Lamination Films to Prints Utilizing Mechanical Stress: Four Different Test Methods— Score/Tape, Cross Hatch, X-Cut, and Crease-Folding¹

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1. Scope

1.1 This practice describes procedures for assessing the adhesion between lamination films and black and white or color images produced by printers, copies and other reprographic devices.

1.2 This practice can be used to test different laminates with a given set of inks and media or it can be used to evaluate inks and media with a given laminate.

1.3 This practice is applicable to laminated images, where the substrate surface is subject to failure under mechanical stress from mostly peel conditions (that is, paper, film, cloth, etc.).

2. Significance and Use

2.1 The image life of printed media displayed in both typical office and outdoor environments can be extended by lamination or encapsulation. While natural aging is the most reliable method of assessing lamination adhesion, the length of the time required makes this method impractical for most materials. This practice utilizing mechanical stress allows comparative studies of prints and laminating films.

2.2 Factors in the office and outdoor environments, such as heat, cold, thermal shock, ultraviolet/visible radiation and water vapor can have effect on laminate stability. The resistance of the laminate to these factors can be assessed by applying mechanical stress.

2.3 Good adhesion is a prime consideration for laminating films and prints. A laminating film, which does not adhere to a print or vice versa generally, has no commercial value. This practice is used to obtain comparative data of adhesion strength of encapsulated or laminated media.

3. Interferences

3.1 Since the ability of laminating film to adhere to printed media is dependent on temperature and humidity, it is impor-

tant that the effects of mechanical stress be assessed under the conditions appropriate to the end use applications. While printed media may be handled and displayed under a variety of conditions, this practice is intended to determine adhesion in indoor environments.

3.2 The laminate adhesion is dependent on lamination temperature and should be applied at the manufacturers' recommended temperature for the best performance.

3.3 The adhesion between lamination films and color images is dependent on the printing mode, the type of color and the amount of applied ink, lamination conditions such as lamination temperature, the lamination speed and the pressure on the nip.

3.4 This practice is intended to measure adhesion of printed media without specifying above-mentioned parameters.

4. Conditioning

4.1 It is recommended that samples be conditioned at 23°C and 50 % RH for at least 24 h prior to printing and for at least 24 h subsequent to lamination. Specimens should be visually inspected for surface irregularities, which could adversely affect lamination.

4.2 It is recommended that samples be conditioned at 23°C and 50 % RH for 24 h prior to delamination to provide additional time for equilibrium of adhesive containing interfaces.

4.3 The above conditioning steps are pertinent only where media evaluation or comparison is needed. Obviously, as a production tool, the conditioning period is not practical. Therefore, when media are coated in production, the specimens should be obtained from each roll and checked as soon as possible in a repeatable procedure appropriate to the operation. It is imperative that operators use caution in selecting and preparing specimens to maintain good uniformity.

5. Materials

5.1 Razor blade, single edge or cutting board.

5.2 A 3M Scotch Brand Transparent Tape #610 25 mm (1 in.) wide or equivalent.

¹ This practice is under the jurisdiction of ASTM Committee F05 on Business Imaging Products and is the direct responsibility of Subcommittee F05.03 on Research.

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