

**DETERMINATION OF 90° ADHESION STRENGTH OF INTERIOR MATERIALS TO RIGID OR FLEXIBLE SUBSTRATES****Application**

This procedure is used to determine the peel adhesion strength of emblems and badges bonded to rigid substrates.

Apparatus and Materials Required**Tensile Testing Machine**

Universal Testing Machine, Instron or equivalent capable of using the integral method of calculation.

Indexing Peel Fixture

Instron Catalog No. 2820-036 or equivalent

<http://www.instron.us/en-us/products/testing-accessories/grips/application-specific-accessories/adhesive-peel/2820-036>

The fixture shall be capable of maintaining a 90° angle of peel throughout the test by indexing forward as sample is peeled. See Figure 1 for example.

Tape – 3M Scotch filament tape 898 or tape with equivalent tensile strength (6650 N/100 mm width)

Preparation of Test Specimens

Number of specimens required will be identified in the material or performance specification. If the number of specimens is not identified, then test 3 specimens.

1. Clamp the substrate horizontally onto the peel fixture. Clamping should ensure that no buckling or distortion of the substrate occurs during the test.
2. If testing a flexible material (such as an emblem), manually separate the flexible material from the rigid substrate. Adhere the 3M tape or equivalent to the free end of the flexible material with at least 25 mm overlap. Clamp the other end of the tape in the tensile testing machine (See Figure 2).
3. If testing a rigid material (such as a badge), use a suitable fixture to grip the bonded component at one edge to pull it at 90° to the substrate surface (See Figure 3). Suitable methods may include:
 - Gripping a badge under one edge
 - Attaching or adhering a structure to one edge of the badge that may be gripped more easily by standard jaws
4. Clamp separation distances should be set so that the test specimen is clamped in position without undue distortion. The apparatus shall maintain a 90° angle of peel throughout the test by indexing forward as the sample is peeled. The method of clamping should ensure no slippage of the specimen or tape (if used). The grip faces need to be as wide, or wider than the specimen.
5. Separate the test specimens at a rate of 25 mm/minute. Obtain separation data for the length of the specimen.

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6. For flexible materials (emblems), ignore data for the first and last 10% of traverse and determine the average value (integral method preferred) as calculated per the specification requirement.
7. For rigid badges, determine the maximum load in Newtons.
8. Calculate the adhesion strength in Newtons per specimen width or as required in the material/performance specification.

Example calculation:

$$\frac{\text{Load}}{\text{Specimen width}} = \text{N/mm}$$

Load for emblems = average load calculated in step 6

Load for badges = maximum load determined in step 7

If required as only N then report load only.

Data Reporting

The report should include the following:

- 1) Specimen dimensions
- 2) Cross head speed
- 3) Pre-conditioning requirements as specified in the performance specification (ex. Autoclave, wet, short term heat, etc)
- 4) Adhesion strength of each specimen in the units specified in the performance specification
- 5) Deviations from method
- 6) Photo of Setup