

# Australian Standard®

## Methods of test for single sided and double sided pressure-sensitive adhesive tape

### Method 1.12: Adhesion—Resistance to shear peel at ambient temperature

#### PREFACE

This Standard was prepared by the Standards Australia Committee PK-025, Packaging Code at the request of Australian Industry.

The objective of this Standard is to specify a test method for determining the shear peel strength of single sided and double sided pressure-sensitive adhesive tape at ambient temperature.

#### METHOD

##### 1 SCOPE

This Standard specifies the method to determine shear peel strength of single and double sided pressure-sensitive adhesive tape at ambient temperature.

##### 2 REFERENCED DOCUMENTS

The following documents are referred to in this Standard:

AS

1683 Methods of test for elastomers

1683.15.2 Method 15.2: Durometer hardness

2193 Calibration and classification of force-measuring systems

##### 3 REAGENTS

###### 3.1 Isopropynol

Reagent grade is required.

##### 4 APPARATUS AND MATERIALS

The following apparatus and materials are required:

#### 4.1 Tension testing machine

The tensile testing machine shall have a moving jaw or carriage with a rate of travel of  $300 \pm 10$  mm/min. The testing unit shall comply with the requirements of AS 2193 for Grade B machines over suitable load ranges.

#### 4.2 Stainless steel panel

Approximately 50 mm wide, at least 125 mm long, and approximately 1.5 mm thick and finished in the lengthwise direction to a bright annealed finish with a surface finish of  $0.04 \mu\text{m}$ .

#### 4.3 Steel roller (see Figure 1)

Of diameter  $80 \pm 5$  mm and width  $45 \pm 1$  mm, covered with rubber approximately 6 mm thick, and having a durometer hardness of  $80 \pm 5$  Type A degrees (in accordance with AS 1683.15.2).

NOTE: The mass of the roller proper (which applies pressure to the specimen) should be  $2.0 \pm 0.1$  kg. It should be so constructed that the mass of the handle is not added to the mass of the roller during use.

#### 4.4 Fresh absorbent cleaning material

These cleaning materials shall be lint free and contain no soluble additives (e.g. surgical glaze, untreated paper tissue).

#### 4.5 Specimen cutter

Consisting of a 25 mm thick  $\times$  200 mm long  $\times$  25 mm wide aluminium bar stock. The edges for about 125 mm from one end shall be rounded slightly to form a handle. The width of the bar for 75 mm from the opposite end shall be narrowed to exactly 25 mm minus the thickness of a single razor blade (one of two razor blades used as cutting edges).

### 5 TEST CONDITIONS

Testing shall be conducted at  $23 \pm 5^\circ\text{C}$  and  $50 \pm 5\%$  relative humidity.

### 6 PREPARATION OF TEST SPECIMENS

The roll shall be conditioned at  $23 \pm 5^\circ\text{C}$  and  $50 \pm 5\%$  relative humidity for  $24 \pm 1$  h prior to testing.

The test specimen shall be a minimum of 250 mm long.

### 7 PROCEDURE

The procedure shall be as follows:

- (a) Dispense the isopropynol (3.1) on the clean stainless steel panel (4.2) and wipe until dry with the fresh absorbent cleaning material (4.4). Repeat this procedure for a total of three washes. Discard cleaned panels showing stains, discoloration or scratches. Avoid contact of the panel surface with the fingers.

NOTE: Either surgical gauze or untreated paper tissue can be used as the cleaning material, as these are lint free and contain no soluble additives.

- (b) Take a test specimen from a freely rotating conditioned roll, the minimum width of which shall be 6 mm, by manually unrolling the roll radially and discarding the outer three laps of the roll.

NOTE: The speed of removal of the test specimen from the roll is operator-dependent. Usually, a speed of approximately 300 mm/s is attained.

- (c) Where the width of a roll is 25 mm wide or less, use the test specimen direct.

- (d) Where a roll is greater than 25 mm wider, cut the roll, using the specimen cutter, to a width of 25 mm.
- (e) Apply the specimen, adhesive side down, to the centre of the surface of the stainless steel panel and parallel to its long axis, leaving sufficient of the specimen extending beyond the panel to be accommodated in the tensile testing machine. Do not allow the adhesive surface to come in contact with the fingers and other foreign objects, or to become contaminated with dust.

NOTE: Where a test specimen is taken from a roll less than 25 mm wide, cut other strips from the same roll and apply these strips parallel and adjacent to the test specimen to provide a total width of approximately 25 mm, for rolling purpose only.

- (f) Using the steel roller (4.3), roll the test specimen on the steel panel once in each direction along its length at a rate of approximately 5 mm/s. Ensure that no pressure additional to the mass of the roller is applied and that no air bubbles are entrapped.
- (g) Measure and record the width of the specimen to the nearest 0.5 mm. Allow the specimen to stand for  $20 \pm 5$  min.
- (h) Double back the free end of the specimen at an angle of 180 degrees and peel off approximately 25 mm of the specimen from the panel at the doubled end.
- (i) Attach the exposed (doubled) end of the steel panel to one jaw or carriage of the tension testing machine, and attach the free end of the specimen to the other jaw or carriage of the tension testing machine.
- (j) The testing assembly (see Figure 2), shall be maintained at the temperature specified in Clause 5.
- (k) Operate the tension testing machine at a uniform speed of  $300 \pm 10$  mm/min so that the specimen continues to double back at an angle of 180 degrees and in alignment with itself.
- (l) Take at least five readings at equidistant intervals as the specimen is peeled from the panel, disregarding the removal, from the steel panel, of the first and the last 20 min.
- (m) Reject any specimen which breaks and substitute an additional specimen.
- (n) Repeat Steps (a) to (l) using another two test specimens taken from the same roll.

## 8 CALCULATION

The adhesion strength, in newtons per 25 millimetres, for each specimen, shall be calculated from the following equation:

$$\text{Adhesion} = \frac{\text{Sum of the readings}}{\text{Number of readings}} \times \frac{25}{\text{Measured width of specimen}}$$

## 9 REPORT

The following information shall be reported:

- (a) The average adhesion strength of the three specimens taken from the same roll, expressed in newtons per 25 millimetres width to the nearest 0.1 N/25 mm.
- (b) Reference to this Australian Standard, i.e. AS 2313.1.12.