

TEST PRINCIPLE

Evaluation of the peel properties of two adhesive tapes using the loop method.

BACKGROUND

Adhesive tapes are coated with adhesives so as to adhere to the sample surface. It is the attractions between atoms and molecules in the polymer components used in the binders that makes the adhesives on a tape bond with other surfaces. The tapes can be single or double sided. Most adhesive tapes are formed into rolls of different widths; the wider the tape, the larger the surface area for optimal adhesion.



The type of adhesive will affect the degree of stickiness or tackiness and peel to a surface. Using the CT3 adhesive accessory, the adhesive strength of a tape can be measured to determine how well it will adhere and peel from a surface - a property that is very useful in automatic labelling of equipment. In the test, the force required to separate a looped tape from a surface at a given speed is measured.

METHOD

EQUIPMENT Instrument: CT3 with 4.5 kg load cell
Fixture Base Table (TA-BT-KIT)
Loop Tack Test System

SETTINGS Test Type: Compression
Test Speed: 5.0 mm/s
Post-Test Speed: Select return at test speed option.
Distance: 70 mm
Trigger Force: 0g

SAMPLE PREPARATION

1. Condition samples for no less than four hours to the temperature testing conditions (ideally room temperature).
2. Remove the first three layers of the tape.
3. Insert the two interlocking tape holders to their corresponding ends of the sample preparation platform.
4. Roll the tape onto the sample platform (adhesive face down) such that the tape sticks onto the interlocking tape holders on the sample platform.
5. Cut the tape to a length of 200 mm (platform length).
6. Attach the tensile grip to the load cell.
7. Using the tape holders, lift the tape from the sample preparation platform and bring the two ends of the tape together (adhesive side exposed) by interlocking the tape holders to form a looped tape.
8. Attach the interlocked tape holders to the tensile grip by tightening the screws of the tensile grip so that the looped sample is hanging vertically.



TEXTURE APPLICATION NOTE: ADHESIVE TAPE

PROCEDURE

1. Place a fixture base table to the base of the instrument and loosely tighten the thumb screws to enable some degree of mobility.
2. Insert a sample holding device onto the fixture base table and tighten the table side screws to hold the device into position.
3. Clamp a clean microscopic glass slide into the holding device.
4. Centrally align the sample holding device with the looped sample.
5. Once alignment is complete, tighten the thumb screws of the fixture base table.
6. Adjust the height between the tensile grip and glass slide to 85 mm.
7. Commence the test
8. After each test remove and clean the slide or insert a new glass slide.

RESULTS

A graph to show the adhesiveness of two adhesive tapes

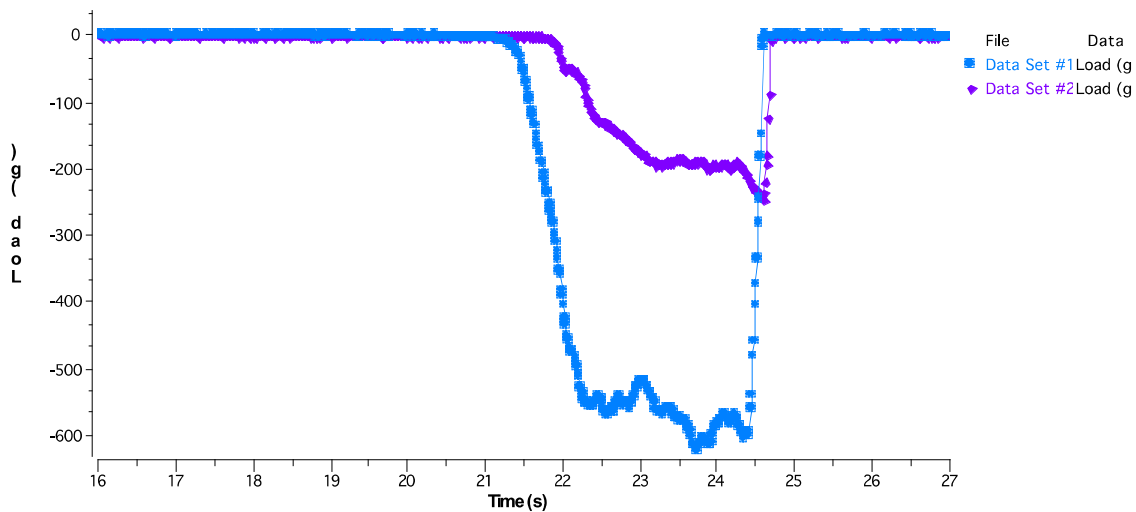


Figure 1

Figure 1. A graph to show the adhesiveness of two different types of adhesive tape tested at room temperature

Data Set #1: Sample A

Data Set #2: Sample B

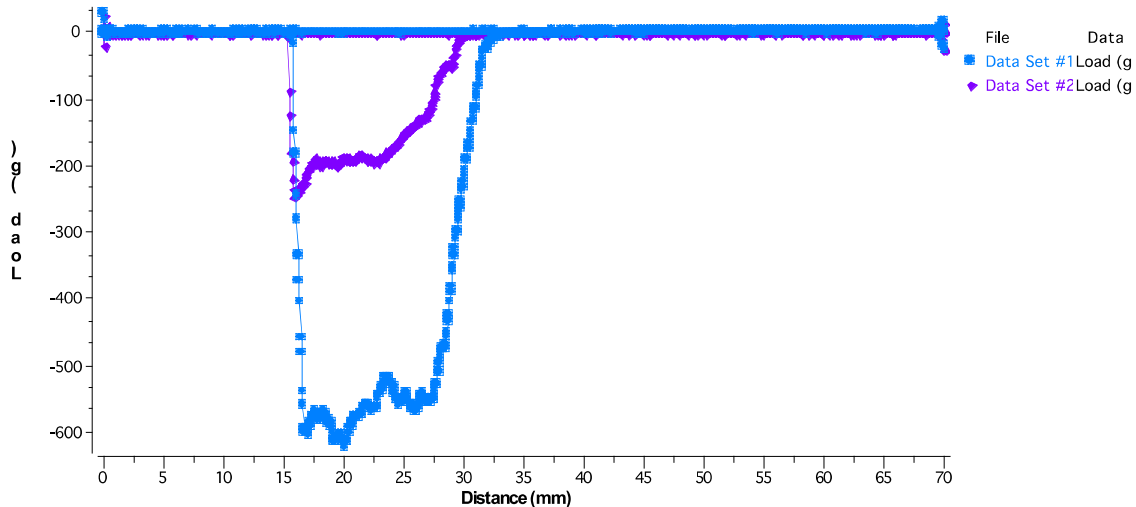


Figure 2

Figure 2 shows the load versus distance for the adhesiveness of two different types of adhesive tape tested at room temperature.

Data Set #1: Sample A

Data Set #2: Sample B

DISCUSSION

The test starts with the upper tensile grip at a starting point of 85 mm above the glass slide. The looped tape then approaches the glass slide at a test speed of 5 mm/s over a distance of 70 mm during which time the looped tape comes in contact with the glass slide to achieve full tape contact across the width of the slide. Once the specified distance has been attained, the grips return to their starting position peeling the tape away from the slide at the test speed. The tack force is the maximum force at the point before the looped tape completely separates from the glass slide. The higher the force value, the more adhesive the sample.

Note: The starting distance can vary so long as the travel distance to the glass slide does not result in the tensile grip touching the slide; otherwise the instrument will overload. The starting distance must also be such that it allows for a good contact between the looped tape and the width of the glass slide.

The glass slides must be thoroughly cleaned between tests to remove all traces of adhesive or moisture. Plates can be refluxed in sulphur-free toluene but other methods that properly remove contamination can be adopted.

To optimize test settings, the most adhesive sample should be tested first in order to anticipate the maximum testing range for subsequent samples