MBK
TAPE SOLUTIONS

Fabricators of Adhesive Tapes & Flexible Materials

How to Evaluate and Test Pressure Sensitive Adhesive Tape Performance

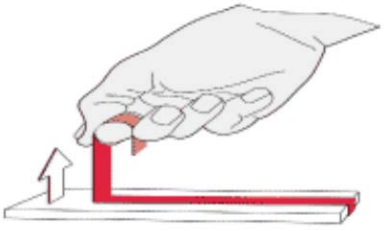
PSTC and ASTM adhesive test methods are helpful in the evaluation and testing of adhesive tapes. The standards help to identify adhesive performance properties, including adhesion, tensile strength, shear and elongation. The standards are also instrumental in determining various applications such as in electrical, insulation, sealing.

PEEL ADHESION

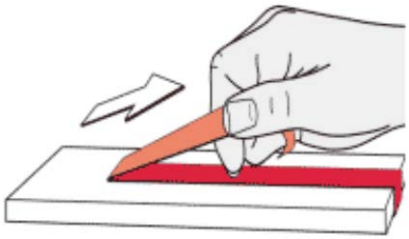
Adhesion is the strength of the bond between a tape and the application surface. To measure adhesion, tape is applied to a stainless steel panel. The tape is then removed. The force required to remove (or peel) the tape determines its adhesion level. The force is measured in ounces per one inch of tape.

Peel adhesion can be tested by two methods. The 90-degree peel method or pulling the tape perpendicularly to itself is the best measurement of peel adhesion of diverse substrates. This is typically used for fastening tapes. The 180-degree peel method (PSTC 3 and PSTC 1) or pulling the tape back onto itself is often used to measure the adhesion of masking and packaging tapes.

Peel adhesion is not a perfect correlation to the strength of the adhesive bond. Why? Because the test measures the initial bond, and many tapes have adhesives that build bond strength over time. Also, the test utilizes stainless steel as the surface for which the tape is applied. Typically, tape is not applied to stainless steel in real-life applications. However, the test is a good indicator of relative adhesion strength from one tape to another.



90° Peel



180° Peel

COHESION

Cohesion is the internal strength of an adhesive. Cohesive failure can be observed when removing an applied tape and finding adhesive residue on both the tape backing and the applied surface. This would indicate that the adhesive has poor internal strength, or poor cohesion.

Poor Adhesion

SHEAR

Shear is a measure of the internal or cohesive strength of the adhesive, not a measure of the bond between the adhesive and substrate. Shear is the ability of an adhesive to resist creep or slippage.

This property is measured by adhering a one-inch piece of tape to a stainless steel panel, then hanging a weight on one end of the tape. Shear is expressed in units of time prior to the tape slipping from the steel panel.

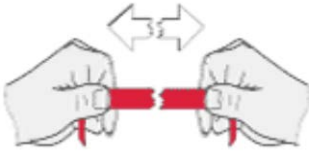
Good shear properties are especially important for applications like splicing where the tape is used for holding two substrates together, with force being applied in opposite directions.

TACK

Tack, often referred to as Quick Stick, is the ability of a tape to create an immediate bond, during the initial contact of the adhesive with the substrate, without applying external pressure.

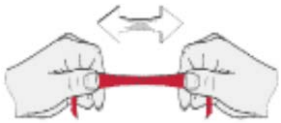
TENSILE STRENGTH

Tensile strength is the force (or load) required to break a tape. This property is measured by taking a one-inch-wide piece of tape, grabbing it at both ends, and then pulling in opposite directions until the tape breaks. Tensile strength is measured in pounds per one inch of tape.



ELONGATION

Elongation is the percent in which a tape can be stretched just before breaking. Some tapes have a creped, or somewhat wrinkled, backing that allows the tape to have more stretch and conformability. This property is measured using the same method for measuring tensile strength.



THICKNESS

The thickness of a tape is the distance between the two opposite surfaces of the whole tape. Thickness is expressed in mils, or thousandths of an inch.

Standard PSA Test Methods

The Standard PSA Test Methods are included in the most recent edition
of the PSTC Test Methods Manual. This information is provided for reference only.

ADHESION TEST METHODS	
PSTC-101	International Standard for Peel Adhesion of Pressure Sensitive Tape*
PSTC-4	Relative Performance of Release Coatings
PSTC-5	Quick Stick of Pressure Sensitive Tapes
PSTC-6	Tack Rolling Ball
PSTC-107	International Standard for Shear Adhesion of Pressure Sensitive Tape*
PSTC-8	Unwind Force of Pressure Sensitive Tapes
PSTC-9	Accelerated Aging of Pressure Sensitive Tapes
PSTC-11	Adherence to Linerboard of Pressure Sensitive Tapes at Low Temperatures
PSTC-13	High Speed Unwind Adhesion of Pressure Sensitive Tapes
PSTC-14	Adhesion of Pressure Sensitive Tapes to Fiberboard at 90° Angle and Constant Stress
PSTC-15	Determination of Adhesion to Release Coated Substrates: Wet Spread Method
PSTC-16	Loop Tack
STAIN RESISTANCE TEST METHODS	
PSTC-21	Stain Test for Finishes
PSTC-22	Latent Staining of Surface Finishes
MISCELLANEOUS TEST METHODS	
PSTC-131	International Tensile Strength and Elongation of Pressure Sensitive Tapes*
PSTC-133	International Thickness (Caliper) of Pressure Sensitive Tapes*
PSTC-34	Water Vapor Transmission Rate of Pressure Sensitive Tapes
PSTC-35	Water Penetration Rate of Pressure Sensitive Tapes
PSTC-38	Tear Resistance
PSTC-39	Tear Resistance of Plastic Film Tapes
ELECTRICAL TAPE TEST METHODS	
PSTC-50	Shear Strength after Solvent Immersion of Electrical Grade Tapes
PSTC-51	Dielectric Breakdown of Electrical Grade Tapes
PSTC-53	Thermosetting Properties
PSTC-54	Flagging of Electrical Grade Tapes
PSTC-55	Oil Resistance of Electrical Grade Tapes
PSTC-56	Resistance to Penetration at Elevated Temperatures of Electrical Grade Tapes
PSTC-57	Flammability of Electrical Grade Tapes
WIDTH AND LENGTH TEST METHOD	
PSTC-171	International Width and Length of Pressure Sensitive Tapes*

**PSTC continues to work with Global Tape Forum on harmonizing test methods into global standards.*