

ANGLE EFFECT OF PEEL ADHESION ON PRESSURE SENSITIVE TAPES AND LABELS

Most peel adhesion tests are carried out at 180 or 90 degree. However, in the real world application, nobody pays attention on the actual peel angles.

The peel adhesion force of all PSA tapes and labels are greatly affected by peel angles. Unfortunately, there is no simple quantitative relationship between peel force and peel angle. Some PSAs show the highest force at the lowest peel angle. Others may present the highest peel force at 30 to 40 degree peel angle. Normally, the minimum peel force appears at a peel angle of 120 to 140 degree. These differences are primarily caused by the radius of curvature of peeling backing materials at various peel angles.

In fact, besides peel test, both shear adhesion and tack are also related to test angles. Lap shear adhesion test is actually a zero (0) degree peel angle test. Shear adhesion force is extremely high because the total area of shearing is much greater than merely a peeling line of the typical peel test. A probe tack tester can determine the force change of a circular contact area. The circular contact area is diminished as the peel angle is altered upon separation. Loop tack test starts with a square contact area. The contact area is gradually reduced into a contact line upon separation. The peel angle of both probe and loop tack continues to change during the entire separation process. As a result, adhesion forces determined from both probe and loop tack tests constantly change during the separation process.

Although almost no tapes and labels are actually peeled at an angle of 180 or 90 degrees in our daily life, the true peel forces at different peel angles were never evaluated or reported by tape and label suppliers. To further understand the effect of peel angle, more fundamental studies are needed.

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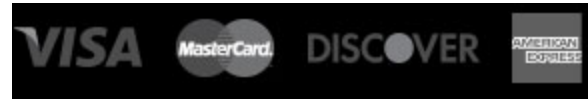
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