



Heat Activation of Tack-Free Adhesives

Adhesives that must be melted into a liquid in order to form a bond are called “heat activated adhesives.” Unlike pressure sensitive adhesives, they are tack-free at room temperature. Common bonding processes include using a platen press, extruding, injection molding, and radio frequency heating. Each method has unique requirements, but in all cases the temperature, duration of heat application, and pressure are critical factors in achieving a good bond. These processes frequently use the heated polymer from an extruder or injection molder to activate the adhesive, but to guarantee a reliable bond it also may be necessary to preheat the adherend. However, too much heat and pressure may distort the material being bonded.

Heat activated adhesives are frequently gravure coated onto metal foils and plastic roll stock, which can be economically slit and/or cut to the appropriate dimension. These metal foils and plastic films are typically gravure coated at 0.2 to 0.5 mils dry thickness at several hundred feet per minute.

Common Heat Activated Adhesive Problems

A poor or “zippy” bond: This may indicate the adhesive was not completely melted. A higher temperature or longer time of hot platen contact may be required. However, a poor bond may also indicate that the liquid adhesive flowed away from the contact area. If so, lower contact pressure or reduced temperature may enhance the adhesion.

Adhesive Transfer: Adhesive transferring to the material being coated normally indicates a dirty bonding surface. If this surface is thin metal, it may be necessary to pass it through a cleaning bath. Contaminated surfaces can cause reduced peel adhesion or erratic peel values, due to the weak boundary layer on the metal.

Plasticizer Migration: Materials containing plasticized PVCs should be tested to assure that the plasticizer does not migrate over time from the PVC into the adhesive and degrade the bond. Heat aging the bonded assembly for 1 and 3 weeks at 158°F followed by peel adhesion tests is suggested. A peel reduction of no more than 30% is desired.