



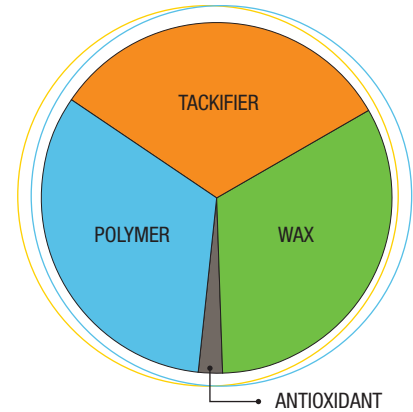
# Packaging Hot Melt Adhesives 101

Are you new to working with hot melt adhesives? Use this quick reference guide to understand the defining characteristics and performance properties of hot melt adhesives.

## WHAT IS HOT MELT ADHESIVE?

100% solid thermoplastic compound, conveyed with heat, made from four primary components. A mechanical bond is formed as molten adhesive penetrates the substrate surface, cools and solidifies.

POLYMER	Affects strength, flexibility, thermal stability, specific adhesion and compatibility.
TACKIFIER	Affects specific adhesion, thermal stability, tensile strength and elongation, odor, color and open time.
WAX	Affects open & set times, residual tack, softening point, heat resistance and melt rate.
ANTIOXIDANT	Improves thermal stability (pot life) of the adhesive.



## IMPORTANT HOT MELT PROPERTIES

SPECIFIC ADHESION	The ability of an adhesive to stick to the surface of a specific material.
MECHANICAL ADHESION	Penetration of molten adhesive into interlocking substrate fibers.
TACK	“Stickiness” or the ability to grab a substrate and immediately hold a bond before setting.
VISCOSITY	Thickness, or resistance to flow, which is indirectly correlated to temperature. Higher viscosities improve strength & heat resistance, lower viscosities improve cut off & machining. Generally, reducing adhesive temperature by 50°F will double viscosity.
OPEN TIME	The time after application, during which the adhesive is molten enough to form a bond.
SET SPEED	The time after application and substrate compression, at which point the adhesive is solid enough to produce a destructive bond.
THERMAL STABILITY	The ability of a hot melt to resist degradation (such as char, gel and viscosity changes) from heat and time.
HEAT RESISTANCE	The ability of an adhesive to maintain a bond in high temperatures environments (>120°F).
COLD RESISTANCE	The ability of an adhesive to maintain a bond in low temperatures environments (<0°F).

## HOT MELT PRODUCT SIZE

H.B. Fuller hot melt adhesives are available in two forms.



**PELLETS**  
Ideal for auto-fed hot melt dispensing equipment



**PILLOWS\***  
Ideal for manual handling and scooping into hot melt dispensing equipment, proven to increase melt rate

\* Exclusive to H.B. Fuller

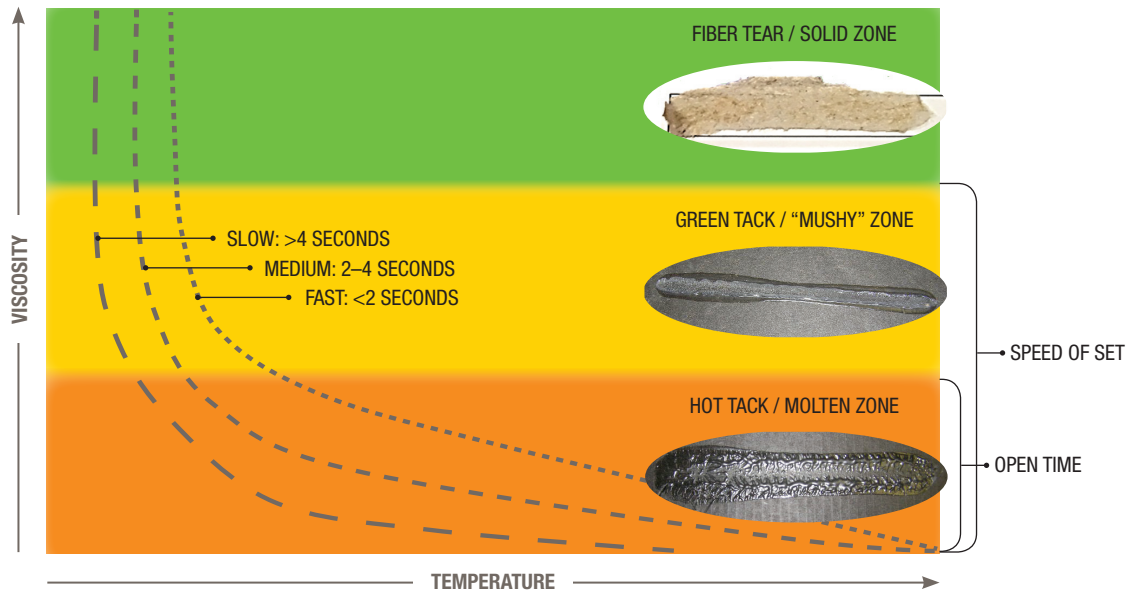
# THE SCIENCE OF A SUCCESSFUL HOT MELT BOND

After application and compression, the adhesive must solidify to create a destructive bond. The adhesive becomes more solid as its viscosity increases, which happens as it cools. Different products build viscosity (and therefore, bond strength) at different rates, determining the set speed of the adhesive.

**FIBER TEAR**  
A successful fully destructive adhesive bond

**GREEN TACK**  
A destructive bond has not formed yet, but the hot melt is still holding the box shut

**HOT TACK**  
The hot melt is tacky enough to overcome flap memory, but still molten



## SUCCESSFUL BOND

**FIBER TEAR**  
A destructive bond demonstrates that the adhesive is not the weakest point in the bond system.



CAUSE	RESULTS
Proper adhesive wet out, evenly spread out on the substrate	Adhesive being applied at the correct temperature
Penetration into the substrate, facilitating a mechanical bond	Adequate compression being applied to the bond area

## MODES OF FAILURE

**COHESIVE FAILURE**  
Adhesive separates from itself, with partially set adhesive on both substrate surfaces.



CAUSE	RESULTS
Too much adhesive applied, or adhesive applied too hot	Incorrect temperature and/or pressure settings
Insufficient compression time and/or compression quality	Incorrect adhesive product, if compression time/quality cannot be improved
Movement of the bond joint, especially during the "mushy" phase of the adhesive	Incorrect bead placement, or a disruption of the bond immediately after compression

**ADHESIVE FAILURE**  
Adhesive releases cleanly from one of the substrate surfaces, typically the secondary.



CAUSE	RESULTS
Poor adhesive penetration into the substrate	Adhesive amount is insufficient and/or applied too cool
Open time is too short	Incorrect adhesive product
Packaging environment or substrate materials too cold	Incorrect adhesive product or improper storage of substrate materials

Call 800-711-2417 or email [techsupport@hbfuller.com](mailto:techsupport@hbfuller.com) for immediate technical hot melt assistance. Our technical support team is on standby Mon-Fri; 7:30am-4:30pm CT to assist you.

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