<u>An Instant Bond: Silicone Reactive Hot Melt for Plastics</u>
Additional Notes

Slide 1: Introduction Slide

Slide 2: Outline of Presentation

Slide 3: 100% Silicone Reactive Hot Melt

- Silicone is a non-organic (carbon-based) polymer backbone.

Slide 4: Comparison of Bonding Techniques

- This slide provides an overview of the advantages and disadvantages of bonding techniques for backbedding of windows
- Tapes are generally applied manually with high labor costs, liners are removed and produce waste, tapes are based on organic adhesives which are not very low in surface energy and may have adhesion problems
- Traditional sealants have poor green strength and may result in squeeze out during application
- Mechanical fasteners can lead to high stress points due to thermal expansion of the window components.
- Silicone reactive hot melts seek to resolve these disadvantages by providing automated application, low surface energy to enable primerless adhesion, high green strength to minimize squeeze out, and good movement capability to reduce stress in the window.

Slide 5: Mechanical Properties – Stress Strain

- The nature of mechanical properties of hot melt is such that the stress-strain response is dependent on the rate of deformation (strain).

Slide 6: Mechanical Properties - Viscoelasticity

- The hot melt is a viscoelastic material where the elastic component is G' and the viscous component is G".
- The graph illustrates how the mechanical properties vary with rate of deformation or temperature. At high rates of deformation, or low temperature, the hot melt behaves as a very rigid material. At low rates of deformation, or high temperature, the hot melt behaves as a soft elastomer providing good movement capability to absorb differences in thermal expansion between the window components.
- The loss tangent profile in the graph describes the ability of the hot melt to mechanically and physically bond to surfaces.

Slide 7: Mechanical Properties – Elastic Recovery

- Hot melt exhibits greater than 90% elastic recovery which provides excellent movement capability to relieve stresses that may build up as a consequence of differential thermal expansion between the window components.

Slide 8: Features and Benefits

- In general the hot melt retains the performance features generally associated with dimethyl silicones including low surface energy, broad temperature resistance, and weather durability.

Slide 9: Cost Savings

- Reactive hot melt silicones can provide more efficient manufacturing when applied in an automated process. After hot application on unprimed surfaces, there is a rapid increase in viscosity and strength of the hot melt.
- The shear strength after seven days cure and 24 hours of water immersion is significantly greater than traditional silicone sealants and bonding tapes.

Slide 10: Cost Savings (continued)

- Automated dispensing equipment lead to reduced material waste by improving beading consistency. The high strength and temperature resistance of the silicone hot melt reduces squeeze out and provides for a 24 hour pot life.
- The excellent durability and weathering resistance provides for extended performance life.

Slide 11: Expanding Applications

Slide 12: Assembly Trends

- Silicone hot melt was specifically designed to address the following market trends for assembly of fenestration products.

Slide 13: Expanding Applications

- The unique physical properties of reactive hot melt silicones are particularly suited for the bonding of plastics and replacement of mechanical fasteners.

Slide 14: Expanding Applications (continued)

- Potential applications that require plastic bonding or replacement of mechanical fasteners include the following:

Slide 15: Summary

- The properties that reactive silicone hot melts bring will expand the range of bonding applications in a variety of markets.
- The use of automated dispensing equipment for reactive silicone hot melts will improve overall productivity.