Troubleshooting Adhesive Issues in Edge Banding

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Topics

- Hot Melt Characteristics
- Ideal Operating Parameters
- Troubleshooting
Definition of a Hot Melt Adhesive

• A hot melt is an adhesive that is applied in a molten state and forms a bond on cooling to a solid state
## Heat and Water Resistance of Different Hot Melt Chemistries

<table>
<thead>
<tr>
<th>Basic Polymer</th>
<th>Heat Resistance</th>
<th>Water Resistance</th>
<th>Solvent Resistance</th>
<th>Thermal Stability</th>
<th>Price Relationship</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ethylene Vinylacetate Coploymer (EVA)</td>
<td>satisfactory</td>
<td>satisfactory</td>
<td>satisfactory</td>
<td>good</td>
<td>1</td>
</tr>
<tr>
<td>Polyamide (PA)</td>
<td>good</td>
<td>poor</td>
<td>poor</td>
<td>poor</td>
<td>4</td>
</tr>
<tr>
<td>Polyolefin (PO/APAO)</td>
<td>good</td>
<td>satisfactory</td>
<td>satisfactory</td>
<td>good</td>
<td>1.5 - 2</td>
</tr>
<tr>
<td>Reactive Polyurethane (PUR)</td>
<td>excellent</td>
<td>excellent</td>
<td>excellent</td>
<td>excellent</td>
<td>5 - 7</td>
</tr>
</tbody>
</table>
Performance Characteristics of Different Hot Melt Chemistries

<table>
<thead>
<tr>
<th>Base</th>
<th>EVA</th>
<th>PUR</th>
<th>Polyamide</th>
<th>APAO / Polyolefin</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adhesion</td>
<td>good</td>
<td>excellent</td>
<td>good</td>
<td>good</td>
</tr>
<tr>
<td>Heat resistance [°C] - Joint opening test</td>
<td>80-120</td>
<td>&gt; 150</td>
<td>ca. 140</td>
<td>120-140</td>
</tr>
<tr>
<td>Water resistance</td>
<td>sufficient</td>
<td>excellent</td>
<td>insufficient</td>
<td>sufficient</td>
</tr>
<tr>
<td>Processing</td>
<td>normal</td>
<td>complicated</td>
<td>complicated</td>
<td>normal</td>
</tr>
</tbody>
</table>
Operating Guidelines to Effective Edge Banding

- Adhesives stored in cool/dry location
- Application temperature should be controlled, with temperature at rollers as recommended by adhesive manufacturer
- Hot melt applicator to be cleaned regularly
- Pressure rollers to be set properly
- Travel of pressure elements to be set properly

Know How – The foundation for your success
Operating Guidelines to Effective Edge Banding (2)

- Correct adhesive application weight
  - Porous middle layer of PB to be filled
- Ambient temperature of substrates min 18°C
- Avoid drafts around adhesive applicators
- Wood moisture to be 8-10%
- Avoid dust
  - Adhesive stored in dust-free area. Solid wood edges planed or sawed
Factors Influencing Hot Melt Open Time

- Application Temperature
- Adhesive Coat Weight
- Substrate Temperatures
- Ambient Temperature
- Machine Line Speed
- Additional Thermal Sources
  - IR Heaters, or Hot Air Blowers
Troubleshooting Common Edge Banding Problems
Laminate Does not Bond to Board

• **Adhesive cooled to quickly**
  - Application temperature too low – increase temperature
  - Line speed too slow – increase line speed
  - Insufficient adhesive coat weight – increase coat weight
  - Board too cold (thermal shock) – pre-heat board (IR)

• **Contamination of laminate**
  - Dust on wood edges – plane or saw immediately prior to bonding

• **Improper priming of PVC**
  - Check shelf life of tape from supplier
Laminate Does not Bond to Board

• Oils in wood have come to surface
  – Wash wood surface with solvent to remove oils, wait 15 minutes for solvent to flash off. Cleaned surface must be bonded within 2 hours.

• Poor HPL edges
  – Prime HPL with contact cement prior to edge banding
Spotty Bonds – Laminate Bonds in Some Areas, and not Others

• If pattern is regular, likely a mechanical issue
  – Char in applicator head – clean as needed
  – Pulsating pump drive – repair pump
  – Pressure wheels jammed – clear of foreign material

• Poorly sawn board
  – Check edge of board with square – repair saw, and re-edge

• Char, dust, or chips in applicator pot/roller
  – Purge foreign material by increasing coat weight to maximum
  – Remove pot/head and clean char
Spotty Bonds – Laminate Bonds in Some Areas, and not Others

- Inconsistent primer application on PVC
- Silicone sprays used in bonding areas of edge bander
  - Clean, or physically remove silicone from area, and discard affected material
Bond Diminished Toward End of Panel

• Adhesive pre-melter not up to specified temperature
  – Char build-up on walls insulates hot melt – clean pre-melter
  – Burned out heater in pre-melter – determine which is bad and replace

• Applicator not up to specified temperature
  – Check for char – clean if necessary
  – Burned out heater in applicator – replace if necessary
Bond Diminished Toward End of Panel

- Pump not feeding head fast enough
  - Pump well not up to temperature – char, heater setting
  - Pump worn – replace defective parts
  - Adhesive viscosity too high for system – use lower viscosity adhesive

- Operating feed at too high of a speed
  - Adjust feed speed of panel to accommodate feed of hot melt

- Inappropriate adhesive being used
  - Consult adhesive supplier for alternate grade
Bond on Top or Bottom Edge Marginal to Poor

- Head not square with panel or feed bed
  - Adjust tilt of head via adjustment bolt
- In-feed gate, glue adjustment head loose
  - Adjust as needed to meter correct coat weight across panel
- Head worn in uneven pattern
  - Replace worn head
- Poorly sawn board

Know How – The foundation for your success

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Stringing of Adhesive Down the Line

- Insufficient adhesive application temperature
  - Check with supplier, and increase temperature as recommended
- Poor thermal stability of adhesive
  - Clean our pre-melter and head and replace with fresh adhesive
  - Check with supplier for alternate grade
- Adhesive application coat weight too high
- Out-feed gate poorly adjusted
  - Adjust so adhesive remaining on applicator roll can re-enter head well
Excessive Smoking from Pre-Melter or Applicator Head

• Temperature set too high
  – Set and check temperature with pyrometer
• Poor thermal stability of adhesive
  – Check with adhesive supplier for alternate grade
Remember!

• Most adhesive related issues have their source in either temperature or line speed!
Thank You!

- Questions?