**Dow Corning® Brand Silicone Hot Melt Adhesives EA-4600 for Electronics Device Assembly**

**Application Guide**

**IMAGINE**

**Greater Efficiency**

*Dow Corning®* Silicone Hot Melt Adhesives offer excellent reliability and reworkability with a long open time and pot life. This can help improve process efficiency and quality. Compared with double-sided tape, *Dow Corning* Silicone Hot Melt Adhesives can help lower total cost of ownership.

These properties have made Dow Corning the leading supplier of silicone hot melt adhesives to the electronics industry. *Dow Corning* Silicone Hot Melt Adhesives help many of the world’s leading innovators in the electronics industry make their products more durable, reliable and waterproof.

*Dow Corning* Silicone Hot Melt Adhesives offer:
- Easy removal and reapplication within 24 hours
- Formulation for instant initial adhesion without primer
- Long open time and pot life
- Lower total cost of ownership than double-sided tape

They also provide waterproofing and ingress protection and allow precision micro-beading with less than a 0.5 mm bead width. They are low in odor and have less than 15 g/L of VOCs, and contain no skin-sensitizing monomeric diisocyanates.

**Hot Melt Application**

**ASSEMBLY CONCEPT**

1. Dispense melted silicone hot melt on parts
2. Assemble parts with silicone hot melt immediately after dispensing (Apply fixture pressure)
3. Hot melt will cool, immediately achieving instant adhesion or green strength
4. Strength builds over time
Application

*Dow Corning* Silicone Hot Melt Adhesives are reactive, neutral cure adhesives that can be melted and applied as a liquid melt. They then cool to become solid at room temperature and react with ambient moisture to become a viscoelastic material with enhanced physical properties. When exposed to high temperature, the material will soften but return to its typical properties after cooling.

### PROCESS RECOMMENDATION

**Surface Preparation**

Dry and clean with cleaning solvents (IPA, MEK or *Dow Corning*® OS Cleaning Solvents) and dry cloth. If necessary, surface modification can be used, e.g., plasma treatment or laser etching.

**Heating: 100~140 °C (STD: 120 °C)**

For 10-20 min. prior to dispensing. **Optional:** pre-heat hot melt <100 °C for 10-20 min. in a pre-warmer.

**Dispensing**

Use dry air to dispense. <0.5 mm micro-beading is possible.

**Assembly**

**Moisture Curing**

Moisture cure after the initial strong adhesion (green strength).

### APPLICATION TROUBLESHOOTING

Exposure of opened containers to ambient air should be minimized. The recommended application air temperature is 120~140 °C.

Application at less than recommended temperature (<100 °C) can cause:

- Build-up of material on the side of the nozzle causing offset dispensing
- Difficulty pumping
- Uneven flow from nozzle

Application at greater than recommended temperature (>150 °C) can cause:

- Material degradation
- Reduced tackiness
- Bubbles in adhesive

### PACKAGING AND STORAGE

*Dow Corning* Silicone Hot Melt Adhesives are available in a 300 cc cartridge and a 30 cc syringe. Store at or below 32 °C.
### Typical Properties

<table>
<thead>
<tr>
<th>Property</th>
<th>Dow Corning® EA-45XX Hot Melt Adhesive</th>
<th>Dow Corning® EA-4600 Hot Melt Adhesive</th>
</tr>
</thead>
<tbody>
<tr>
<td>Color</td>
<td>Black</td>
<td>Black</td>
</tr>
<tr>
<td>Non Volatile Content (%)</td>
<td>&gt;98.5</td>
<td>&gt;98.5</td>
</tr>
<tr>
<td>UV Indicator</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Open Time/Assembly Time (min.)</td>
<td>15</td>
<td>15</td>
</tr>
<tr>
<td>Hardness (Duro Shore A)</td>
<td>39</td>
<td>56</td>
</tr>
<tr>
<td>Specific Gravity</td>
<td>1.08</td>
<td>1.08</td>
</tr>
<tr>
<td>Tensile Strength (MPa)</td>
<td>4.1</td>
<td>4.6</td>
</tr>
<tr>
<td>Elongation at Break (%)</td>
<td>1,900</td>
<td>1,000</td>
</tr>
<tr>
<td>Melt Viscosity (Pa-s)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>100 °C</td>
<td>385</td>
<td>328</td>
</tr>
<tr>
<td>120 °C</td>
<td>146</td>
<td>60</td>
</tr>
<tr>
<td>140 °C</td>
<td>49</td>
<td>31</td>
</tr>
<tr>
<td>Green Strength†</td>
<td>15 min.</td>
<td>**</td>
</tr>
<tr>
<td>Adhesion Strength†</td>
<td>30 min.</td>
<td>**</td>
</tr>
<tr>
<td>Service Temperature Range (°C)</td>
<td>-40 to 150</td>
<td>-40 to 150</td>
</tr>
<tr>
<td>Dispensability</td>
<td>***</td>
<td>***</td>
</tr>
<tr>
<td>Narrow Beading Formability (mm)</td>
<td>&lt;0.5</td>
<td>&lt;0.5</td>
</tr>
<tr>
<td>Shock Resistance</td>
<td>***</td>
<td>***</td>
</tr>
<tr>
<td>Reworkability</td>
<td>***</td>
<td>**</td>
</tr>
<tr>
<td>Strong Adhesion</td>
<td>**</td>
<td>***</td>
</tr>
<tr>
<td>Waterproof</td>
<td>***</td>
<td>***</td>
</tr>
<tr>
<td>Chemical Resistance</td>
<td>***</td>
<td>***</td>
</tr>
<tr>
<td>Pot Life (days)</td>
<td>1.5</td>
<td>1</td>
</tr>
</tbody>
</table>

† On PC or polycarbonate substrates

### Design Flexibility: Adhesion to Various Substrates

**Under UV exposure**

(high-intensity black light lamp, long wave ultraviolet 365 nm)

**Micro-bending allows design flexibility**

The ability to create precise micro-beads offers greater design flexibility. *Dow Corning* Silicone Hot Melt Adhesives have demonstrated precision narrow beading — to a bead less than 0.5 mm before device assembly.

### Design Flexibility:

**Adhesion to Various Substrates**

Lap shear adhesion strength to various substrates as a function of cure time at ambient conditions (15 min. and 3 days) for *Dow Corning* Silicone Hot Melt Adhesives. TPSIV® is a patented thermoplastic vulcanizate from Multibase, a Dow Corning company.

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**Related Links**

[http://krayden.com](http://krayden.com) 1-800-448-0466

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Adhesion Strength Performance

Silicone hot melt adhesives offer excellent adhesion on common plastic and metal substrates, including: polytetrafluoroethylene (Teflon®), PVC, wood and fiberglass.

Lap shear adhesion with polycarbonate after seven days curing (MPa):
- Dow Corning® EA-45XX Hot Melt Adhesive (0.5 MPa)
- Dow Corning® EA-4600 Hot Melt Adhesive (1.7 MPa)

Adhesion strength of Dow Corning Silicone Hot Melt Adhesives is consistent among a wide variety of common substrates.

The adhesion of Dow Corning Silicone Hot Melt Adhesives is largely unaffected by immersion in most of the liquids that commonly come in contact with electronic devices.

How can we help you today?

Tell us about your performance, design and manufacturing challenges. Let us put our silicon-based materials expertise, application knowledge and processing experience to work for you.

For more information about our materials and capabilities, visit dowcorning.com.

To discuss how we could work together to meet your specific needs, email electronics@dowcorning.com or go to dowcorning.com/contactus for a contact close to your location. Dow Corning has customer service teams, science and technology centers, application support teams, sales offices and manufacturing sites around the globe.

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