Conformal Coatings

Enhanced PCB Protection

Features and Benefits

- Clear, thin, flexible, and durable
- Protects against dust, humidity, salt spray, corrosion, and chemical fogs
- Protects against electrical arching, shorts, static discharges, and thermal shocks
- Contains a UV indicator for optical inspection
- Applied by brushing, dipping, manual and selective spraying
- Available in liquid, aerosol, and pen
- IPC and UL certified versions

Applications

- Improves reliability, and lengthens the life of electronic circuitry
- Protects circuitry in coastal, tropical, marine, and other humid environments
- Allows electronic devices to operate in harsh environments
- Allows traces to be placed closer together by preventing arcing

Acrylic - One-part conformal coating which is cost-effective, and easily reworkable.

419D – Certified to IPC-CC-830B and UL94 V-0
419E – Certified to IPC-CC-830C and UL746E

Silicone-Modified Acrylic - One-part conformal coating that is both soft and flexible, and provides a wide service temperature range.

422B – Certified to UL94 V-0
422C – Certified to UL94 V-0

Polyurethane - One-part conformal coating that provides strong protection against solvents, and corrosive gases.

4223F – Certified to IPC-CC-830B and UL746E

Epoxy - Two-part conformal coating that is flexible, and provides strong protection against chemicals.

4225 – Certified to IPC-CC-830C

UV Curable - One-part UV curable conformal coating suitable for high-throughput applications.

4200UV – Certified to IPC-CC-830C and UL746E
## Conformal Coatings

### Binder System
- **419D**: Acrylic
- **419E**: Acrylic
- **422B**: Silicone-modified Acrylic
- **422C**: Silicone-modified Acrylic
- **4223F**: Polyurethane
- **4225**: Epoxy
- **4200UV**: Urethane Acrylate

### Uncured Properties

<table>
<thead>
<tr>
<th>Property</th>
<th>419D</th>
<th>419E</th>
<th>422B</th>
<th>422C</th>
<th>4223F</th>
<th>4225</th>
<th>4200UV</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solids %</td>
<td>30</td>
<td>29</td>
<td>28</td>
<td>30</td>
<td>45</td>
<td>41</td>
<td>96</td>
</tr>
<tr>
<td>Viscosity @ 25 °C</td>
<td>115 cP</td>
<td>160 cP</td>
<td>10 cP</td>
<td>14 cP</td>
<td>290 cP</td>
<td>20 cP</td>
<td>160 cP</td>
</tr>
<tr>
<td>Recoat time</td>
<td>3 min</td>
<td>3 min</td>
<td>3 min</td>
<td>2 min</td>
<td>5 min</td>
<td>15 min</td>
<td>N/A</td>
</tr>
<tr>
<td>Dry time to handle</td>
<td>10 min</td>
<td>15 min</td>
<td>8 min</td>
<td>10 min</td>
<td>15 min</td>
<td>7 h</td>
<td>N/A</td>
</tr>
<tr>
<td>Cure time @ 22 °C</td>
<td>24 h</td>
<td>24 h</td>
<td>48 h</td>
<td>24 h</td>
<td>Heat cure only</td>
<td>48 h</td>
<td>UV cure</td>
</tr>
<tr>
<td>Cure time @ 65 °C</td>
<td>30 min</td>
<td>30 min</td>
<td>20 min</td>
<td>30 min</td>
<td>—</td>
<td>4 h</td>
<td>UV cure</td>
</tr>
<tr>
<td>Cure time @ 80 °C</td>
<td>20 min</td>
<td>15 min</td>
<td>—</td>
<td>10 min</td>
<td>16 h</td>
<td>2 h</td>
<td>UV cure</td>
</tr>
<tr>
<td>Cure time @ 100 °C</td>
<td>10 min</td>
<td>5 min</td>
<td>—</td>
<td>5 min</td>
<td>2 h</td>
<td>40 min</td>
<td>UV cure</td>
</tr>
</tbody>
</table>

### Cured Properties

<table>
<thead>
<tr>
<th>Property</th>
<th>419D</th>
<th>419E</th>
<th>422B</th>
<th>422C</th>
<th>4223F</th>
<th>4225</th>
<th>4200UV</th>
</tr>
</thead>
<tbody>
<tr>
<td>IPC-CC-830</td>
<td>B revision</td>
<td>B revision</td>
<td>—</td>
<td>—</td>
<td>B revision</td>
<td>C revision</td>
<td>C revision</td>
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<tr>
<td>UL</td>
<td>94 V-0</td>
<td>746E</td>
<td>94 V-0</td>
<td>94 V-0</td>
<td>746E</td>
<td>Meets UL 94 V-0</td>
<td>746E</td>
</tr>
<tr>
<td>Dielectric strength</td>
<td>1 000 V/mil</td>
<td>1 100 V/mil</td>
<td>1 056 V/mil</td>
<td>1 076 V/mil</td>
<td>1 000 V/mil</td>
<td>566 V/mil</td>
<td>1000 V/mil</td>
</tr>
<tr>
<td>Dielectric withstand volt.</td>
<td>&gt; 1 500 V</td>
<td>&gt; 1 500 V</td>
<td>&gt; 1 500 V</td>
<td>&gt; 1 500 V</td>
<td>&gt; 1 500 V</td>
<td>&gt; 1 500 V</td>
<td>&gt; 1 500 V</td>
</tr>
<tr>
<td>Resistivity</td>
<td>4.6 x 10^14 Ω·cm</td>
<td>3.5 x 10^13 Ω·cm</td>
<td>1.2 x 10^15 Ω·cm</td>
<td>3.5 x 10^15 Ω·cm</td>
<td>3.5 x 10^15 Ω·cm</td>
<td>1.8 x 10^15 Ω·cm</td>
<td>3.4 x 10^14 Ω·cm</td>
</tr>
<tr>
<td>Constant service temp.</td>
<td>-65 — 125 °C</td>
<td>-65 — 130 °C</td>
<td>-40 — 200 °C</td>
<td>-40 — 200 °C</td>
<td>-65 — 125 °C</td>
<td>-40 — 140 °C</td>
<td>-65 — 150 °C</td>
</tr>
<tr>
<td>Glass transition temp. (T_g)</td>
<td>27 °C</td>
<td>38 °C</td>
<td>29 °C</td>
<td>31 °C</td>
<td>57 °C</td>
<td>42 °C</td>
<td>72 °C</td>
</tr>
<tr>
<td>CTE prior T_g</td>
<td>72 ppm/°C</td>
<td>160 ppm/°C</td>
<td>275 ppm/°C</td>
<td>111 ppm/°C</td>
<td>130 ppm/°C</td>
<td>210 ppm/°C</td>
<td>78 ppm/°C</td>
</tr>
<tr>
<td>Solderability</td>
<td>Excellent</td>
<td>Excellent</td>
<td>Fair</td>
<td>Fair</td>
<td>Good</td>
<td>Poor</td>
<td>Poor</td>
</tr>
<tr>
<td>Chemical resistance</td>
<td>Poor</td>
<td>Poor</td>
<td>Poor</td>
<td>Excellent</td>
<td>Excellent</td>
<td>Excellent</td>
<td></td>
</tr>
</tbody>
</table>

### Available Packaging

<table>
<thead>
<tr>
<th>Type</th>
<th>419D</th>
<th>419E</th>
<th>422B</th>
<th>422C</th>
<th>4223F</th>
<th>4225</th>
<th>4200UV</th>
</tr>
</thead>
<tbody>
<tr>
<td>Net contents</td>
<td>55 mL bottle</td>
<td>—</td>
<td>1 L can</td>
<td>55 mL bottle</td>
<td>55 mL bottle</td>
<td>1.35 L 2-can kit</td>
<td>—</td>
</tr>
<tr>
<td>945 mL can</td>
<td>945 mL can</td>
<td>3.78 L can</td>
<td>945 mL can</td>
<td>945 mL can</td>
<td>945 mL can</td>
<td>10.8 L 3-can kit</td>
<td>945 mL can</td>
</tr>
<tr>
<td>3.78 L can</td>
<td>3.78 L can</td>
<td>20 L pail</td>
<td>3.78 L can</td>
<td>3.78 L can</td>
<td>3.78 L can</td>
<td>60 L 3-can kit</td>
<td>3.78 L can</td>
</tr>
<tr>
<td>18.9 L pail</td>
<td>18.9 L pail</td>
<td>340 g aerosol</td>
<td>18.9 L pail</td>
<td>18.9 L pail</td>
<td>540 L 3-can kit</td>
<td>—</td>
<td></td>
</tr>
<tr>
<td>340 g aerosol</td>
<td>340 g aerosol</td>
<td>—</td>
<td>340 g aerosol</td>
<td>312 g aerosol</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>5 mL pen</td>
<td>—</td>
<td>—</td>
<td>5 mL pen</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
</tbody>
</table>