Imagine improving the manufacturability, reliability and cost of solar electronics and system assemblies.
Regardless of design, application or region, solar energy must continue to push its cost per watt towards grid parity in order to occupy a larger share of the overall mix of energy resources. As solar manufacturers seek solutions to deliver higher system value and lower system costs, many are discovering that advanced silicone technologies offer pathways toward both goals.

For more than 70 years, Dow has helped pioneer successive generations of increasingly sophisticated PCB module components. We continue that tradition today, by delivering the world-class materials our customers need to increase the performance, reliability and value of high-end solar PCB system assemblies.

With Dow on your team, you get more than a broad and growing portfolio of high-performance silicone encapsulants, coatings, adhesives and thermal interface materials for advanced solar applications. You also get industry-leading expertise on how to improve the manufacturability, reliability and lifetime of solar components, such as inverters, power optimizers and other high-value printed circuit board (PCB) system assemblies.

A proactive and collaborative innovation partner, Dow couples its unmatched materials know-how with proven process and application expertise, a reliable global supply base, and world-renowned customer service. If your application involves the manufacture, assembly, protection or enhancement for solar PCB system components you will likely find a Dow material or process solution that meets your specific needs.
Encapsulant and Potting Solutions

Solar inverters must deliver long-lasting, reliable performance under very harsh conditions in order to maximize their value. Dow’s advanced silicone encapsulants can help by providing best-in-class protection of sensitive solar inverter components against repeated thermal and mechanical stress, as well as moisture and other punishing environmental factors. Our proven silicone technologies and processing know-how can help improve the total cost of ownership before solar PCB system components are even deployed. Compared to conventional polyurethane encapsulants, Dow’s high-performance silicones contribute to lower processing costs by eliminating the pre-heating step that polyurethanes require and enabling PCB system assemblies to be filled more quickly. In addition, where polyurethane encapsulants can take more than 60 minutes to cure, select silicone products from Dow offer simple room-temperature cure with the option to reduce that time to 20 minutes at temperatures of 50°C, further minimizing processing costs.

<table>
<thead>
<tr>
<th>Product</th>
<th>Viscosity, cps</th>
<th>Hardness</th>
<th>Thermal Conductivity, W/mK</th>
<th>Room Temperature Cure, hr</th>
<th>UL 94</th>
<th>Specific Gravity</th>
</tr>
</thead>
<tbody>
<tr>
<td>DOWSIL™ EA-1010 Low Viscosity Encapsulant Kit</td>
<td>840</td>
<td>Type A 65</td>
<td>0.35</td>
<td>24</td>
<td>Not Listed</td>
<td>1.25</td>
</tr>
<tr>
<td>DOWSIL™ EE-3200 Low Stress Silicone Encapsulant Kit</td>
<td>1,700</td>
<td>Type 00 20</td>
<td>0.51</td>
<td>3</td>
<td>V-0</td>
<td>1.48</td>
</tr>
<tr>
<td>SYLGARD™ 170 Silicone Elastomer</td>
<td>2,140</td>
<td>Type A 47</td>
<td>0.48</td>
<td>24</td>
<td>V-0</td>
<td>1.37</td>
</tr>
<tr>
<td>DOWSIL™ CN-8760 G Encapsulant Kit</td>
<td>3,200</td>
<td>Type A 45</td>
<td>0.67</td>
<td>24</td>
<td>V-0</td>
<td>1.58</td>
</tr>
<tr>
<td>SYLGARD™ 160 Silicone Elastomer Kit</td>
<td>4,865</td>
<td>Type A 56</td>
<td>0.62</td>
<td>24</td>
<td>V-0</td>
<td>1.61</td>
</tr>
</tbody>
</table>
Conformal Coating Solutions

Seasons, sun and other environmental assaults impose repetitive thermal cycling and mechanical stress on the printed circuit boards (PCBs) that drive solar inverters. Yet, the consistent, long-term performance and durability of these PCBs is critical to ensuring a solar system delivers its full value and return on investment over 25 years.

The extreme-performance silicone technologies and proven expertise that back Dow’s conformal coatings can help PCBs perform reliably over their expected lifetimes, even under very harsh conditions. Unlike competitive coating materials, such as acrylics, high-performance silicones from Dow process easily without residual moisture that extends cycle times and compromises coating quality. In addition, silicones deliver comparatively higher thermal stability and strong resistance to humidity to promote better long-term durability of energy conversion components. Further, by offering both solvent-based and solventless silicone solutions, Dow’s coatings offer options for reduced health and environmental risks.

<table>
<thead>
<tr>
<th>Product*</th>
<th>Viscosity, cps</th>
<th>Hardness</th>
<th>Cure Temperature</th>
<th>Tack-free Time, min</th>
<th>UL 94</th>
</tr>
</thead>
<tbody>
<tr>
<td>DOWSIL™ 1-2620 Dispersion</td>
<td>150</td>
<td>Type A 80</td>
<td>25°C</td>
<td>5</td>
<td>V-0</td>
</tr>
<tr>
<td>DOWSIL™ 3-1953 Conformal Coating</td>
<td>350</td>
<td>Type A 34</td>
<td>25°C</td>
<td>8</td>
<td>V-0</td>
</tr>
<tr>
<td>DOWSIL™ 1-2577 Low VOC Conformal Coating</td>
<td>950</td>
<td>Type A 80</td>
<td>25°C</td>
<td>7</td>
<td>V-0</td>
</tr>
</tbody>
</table>

*Low-VOC options also available.
Adhesive and Sealant Solutions

The longer solar inverters operate reliably, the more value they return on the original investment. Delivering excellent unprimed adhesion to a variety of substrates, Dow’s advanced silicone adhesives and sealants protect delicate PCB module components within inverter assemblies to help maximize their performance, durability and value under the toughest of conditions.

Dow’s silicone adhesives and sealants offer simple room-temperature cure with the option to accelerate cure time for improved economies and broader manufacturing latitudes. Plus, unlike many competitive materials, our silicone formulations are solvent-free, minimizing the need for special storage, handling or ventilation.

After cure, Dow’s silicone solutions deliver proven, long-lasting protection against mechanical and thermal stress, even after repeated exposure to strong electrical fields, extremes in humidity and temperatures ranging from -45° to 200°C.

<table>
<thead>
<tr>
<th>Product</th>
<th>Viscosity, cps</th>
<th>Hardness</th>
<th>Cure System</th>
<th>Cure Temperature</th>
<th>Tack-free Time, min</th>
<th>UL 94</th>
</tr>
</thead>
<tbody>
<tr>
<td>DOWSIL™ 3165 Fast Tack RV Adhesive Sealant</td>
<td>Thixotropic</td>
<td>Type A 35</td>
<td>Moisture</td>
<td>25°C</td>
<td>5</td>
<td>V-0</td>
</tr>
<tr>
<td>DOWSIL™ 7091 Adhesive Sealant</td>
<td>Thixotropic</td>
<td>Type A 40</td>
<td>Moisture</td>
<td>25°C</td>
<td>30</td>
<td>HB</td>
</tr>
<tr>
<td>DOWSIL™ 748 Non-Corrosive Sealant</td>
<td>Thixotropic</td>
<td>Type A 35</td>
<td>Moisture</td>
<td>25°C</td>
<td>45</td>
<td>HB</td>
</tr>
<tr>
<td>DOWSIL™ 3-6265 Thixotropic Adhesive</td>
<td>Thixotropic</td>
<td>Type A 60</td>
<td>Addition Cure</td>
<td>125°C</td>
<td>60 (full cure)</td>
<td>Not Listed</td>
</tr>
</tbody>
</table>
Solar BCB system assemblies, by nature, encounter extreme exterior temperatures. Yet, internal temperatures within solar assemblies are also on the rise as PCB system components increase in number, size, density and operating frequencies. The additional heat is challenging conventional materials and putting at risk the performance, durability and value of next-generation solar inverters.

Offering an innovative and growing portfolio of thermally conductive silicone adhesives, compounds, encapsulants and dispensable thermal pads, Dow can help you identify a thermal management solution that enables greater integration, withstands higher power densities, and optimizes processing and system costs for your high-value solar PCB system assemblies.

Our robust portfolio of thermally conductive silicone adhesives cures to form strong yet flexible elastomers that deliver unprimed and reliable adhesion to a variety of common substrates, including metals, ceramics and filled plastics.

Low-viscosity, thermally conductive compounds from Dow flow easily and wet irregular substrate surfaces, such as circuit boards, to provide an effective thermal bridge that draws heat away from sensitive components.

Our thermally conductive silicone elastomers and gels encapsulate delicate components within solar PCB system to deliver reliable physical protection as well as strong thermal conductivity. These adaptable materials combine versatile thermal management with variable levels of hardness or stress relief to fit your application’s need.

Our dispensable thermal pad solution enables you to quickly and precisely print a layer of thermally conductive silicone compound in controllable thicknesses on complex substrate shapes. This helps to ensure excellent thermal management and lower cost of ownership compared to prefabricated thermal pads.

Combined with Dow’s seasoned processing and application expertise, our expansive portfolio of thermal management solutions can help you meet your design goals for heat dissipation, processability and low cost of ownership.
<table>
<thead>
<tr>
<th>Product</th>
<th>Viscosity, cps</th>
<th>Thermal Conductivity, W/mK</th>
<th>Hardness</th>
<th>Cure Temperature</th>
<th>Cure Time, min</th>
<th>UL 94</th>
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<tbody>
<tr>
<td>DOWSIL™ TC-4015 Dispensable Thermal Pad Kit</td>
<td>100,000</td>
<td>1.7</td>
<td>Type 00 50</td>
<td>125°C</td>
<td>10</td>
<td>V-0</td>
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<tr>
<td>DOWSIL™ 1-4173 Thermally Conductive Adhesive</td>
<td>62,000</td>
<td>1.8</td>
<td>Type A 92</td>
<td>125°C</td>
<td>30</td>
<td>V-0</td>
</tr>
<tr>
<td>DOWSIL™ TC-4025 Dispensable Thermal Pad</td>
<td>70,000</td>
<td>2.5</td>
<td>Type 00 50</td>
<td>125°C</td>
<td>10</td>
<td>V-0</td>
</tr>
<tr>
<td>DOWSIL™ TC-2030 Adhesive Kit</td>
<td>220,000</td>
<td>2.7</td>
<td>Type A 92</td>
<td>130°C</td>
<td>60</td>
<td>Not Listed</td>
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<tr>
<td>DOWSIL™ TC-2035 Adhesive Kit</td>
<td>130,000</td>
<td>3.3</td>
<td>Type A 95</td>
<td>125°C</td>
<td>30</td>
<td>Not Listed</td>
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</tbody>
</table>
Learn More

We bring more than just an industry-leading portfolio of advanced silicone-based materials. As your dedicated innovation leader, we bring proven process and application expertise, a network of technical experts, a reliable global supply base and world-class customer service. To find out how we can support your applications, visit consumer.dow.com/pcb.