Innovative Silicone Conformal Coatings from Dow Corning

IMAGINE
Flexible Options for Processing, Protection and Performance from a Conformal Coating
# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Topic</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Why Dow Corning?</td>
<td>3</td>
</tr>
<tr>
<td>Why Silicone Coatings from Dow Corning?</td>
<td>3</td>
</tr>
<tr>
<td>Viscosity</td>
<td>4</td>
</tr>
<tr>
<td>Cure Profile</td>
<td>4</td>
</tr>
<tr>
<td>Hardness</td>
<td>6</td>
</tr>
<tr>
<td>Solventless Silicone Coatings</td>
<td>6</td>
</tr>
<tr>
<td>Product Properties</td>
<td>7</td>
</tr>
</tbody>
</table>

---

**RELIABILITY**
Why Dow Corning?
Dow Corning has been a global leader in silicone-based technology for more than 70 years. Why do our customers consistently choose to work with us?

UNIQUE PRODUCT TECHNOLOGY
Dow Corning was founded to explore the power and versatility of the silicon atom. Today, we make that power and versatility available to you through our portfolio of more than 7,000 proven products and services built on our versatile silicone chemistry.

EXTENSIVE KNOW-HOW
Dow Corning multiplies the value of our products with in-house expertise and an extended network of industry resources.

COLLABORATIVE CULTURE
We work closely with our customers to help reduce time, risk and cost at every stage of your product development.

GLOBAL REACH
Headquartered in Midland, Michigan, USA, Dow Corning is a truly global company with approximately 11,000 employees working across the world, plus a comprehensive distributor network.

PROVEN
Dow Corning has reliably supported its customers’ innovation for more than seven decades and has been a global leader that invests in manufacturing and quality for silicon-based materials to ensure a steady, consistent supply of high-quality products to our customers.

Why Silicone Coatings from Dow Corning?
In one word: reliability. The versatility of silicone chemistry expands design freedom, increases processing options, broadens performance parameters and introduces unique options for sustainability. Compared specifically to organic-based coatings, silicone solutions offer several valuable benefits.

GREATER THERMAL STABILITY
Silicones perform reliably at sustained temperatures as low as -45°C and as high as 150°C – a far broader range than organic coatings, which degrade at such extreme temperatures. Many silicones can even withstand brief exposure to temperatures up to 250°C.

STRESS RELIEF
Silicone conformal coatings offer an extraordinarily broad range of hardness, as well as extremely low-modulus options. That means they deliver better stress-relief on delicate board components during thermal cycling.

SIMPLE SOLVENTLESS OPTIONS
Silicones are nearly all solventless, making them the material of choice where emerging regulations impose complex and costly special requirements for handling and processing.
Choose Your Viscosity

Dow Corning offers conformal coatings in a range of viscosities to help you meet all of your processing and application demands.

**LOW VISCOITY FOR HIGH-SPEED PRODUCTION**

Our low-viscosity silicone coatings support high-speed production methods, including manual or automated spraying, flow or jetting techniques. These faster-flowing materials also are suitable options when you want your coating to flow through vias or under chips.

**HIGHER VISCOITY FOR GREATER CONTROL**

Offering incrementally higher viscosities, this category of silicone coatings provides increasing control over the speed and distance of flow to prevent their spread into “no-go” areas. Higher-viscosity silicones also enable thicker coating layers in one pass, and some grades even offer a stable coat on tall vertical surfaces.

Choose Your Cure Profile

Dow Corning’s versatile silicones offer flexible cure profiles to allow you to select the optimal solution for your production line setup, volume or application.

**FAST MOISTURE-CURE**

These coatings cure quickly at room temperature to provide a “dispense-and-forget” solution that is tack-free and ready to move down the production line in less than 10 minutes, making them the ideal option for high-volume assembly operations.

**EXTENDED-WORKING-TIME MOISTURE CURE**

Silicone coatings in this category also cure at room temperature but permit more time for the material to flow further over large or complex boards. They also are the preferred solution for applications that require a thicker coating.

**HEAT CURE**

Sometimes labeled “command cure” for the control they allow over the rate of cure, coatings in this category are the material of choice when your processing operation demands full cure in under five minutes. They also may impose lower stress on board components during thermal cycling.
Viscosity/Cure Profile

1 Dow Corning® 3140 RTV Coating
2 Dow Corning® CC-4555 Long Bath Life Conformal Coating(1)
3 Dow Corning® HC 2000
4 Dow Corning® CC-3040 Conformal Coating NEW
5 Dow Corning® HC 2100 Coating
6 Dow Corning® Q1-4010 Conformal Coating(1)
7 Dow Corning® HC 1000 Gray Conformal Coating
8 Dow Corning® 3-1944 RTV Coating
9 Dow Corning® 3-1953 Conformal Coating
10 Dow Corning® SE 9187 L Black, Clear or White Adhesive
11 Dow Corning® HC 1100
12 Dow Corning® LDC 2577D Dispersion Coating
13 Dow Corning® 1-2577 Conformal Coating
14 Dow Corning® SE 9189 L Gray or White RTV Adhesive
15 Dow Corning® SE 9186L Coating
16 Dow Corning® 3-1944 HP RTV Coating
17 Dow Corning® 3-1965 Conformal Coating
18 Dow Corning® 1-2577 Low VOC Conformal Coating
19 Dow Corning® SE 9157
20 Dow Corning® 1-2620 Dispersion
21 Dow Corning® 1-2620 Low VOC Conformal Coating
22 Sylgard® 1-4128 Conformal Coating Kit(1)
23 Dow Corning® 1-4105 Conformal Coating(1)

(1) Heat cure.

Solventless system: >95% solid content
Solvent based
Choose Your Hardness

Silicones can deliver lower modulus than any organic conformal-coating material. This makes them ideal for minimizing stress on small, fine wires or sensitive solder joints. Yet silicone’s versatile chemistry enables hard coatings that exhibit abrasion resistance approaching acrylic or urethane solutions. Regardless of what your application requires, Dow Corning can provide a conformal coating with the right durometer to meet your demands.

HIGHEST STRESS RELIEF (<15 SHORE A)
Our softest silicone coating materials maximize stress-relief on very fine wires or dense components that can be most susceptible to thermal cycling.

STRESS RELIEF (15 SHORE A TO 40 SHORE A)
The ideal alternative to brittle organic coatings, silicones in this category offer an optimal combination of stress relief and protection against harsher environmental elements, such as moisture, dust, vibration and impact.

ABRASION RESISTANT (40 SHORE A TO 25 SHORE D)
Silicones in this class cure to form hard, tough coatings comparable to acrylics – except silicones offer greater flexibility and perform reliably at much higher and lower temperatures.

Choose Solventless Silicones

While Dow Corning offers solvent-based elastoplastic coatings that mimic the hardness of acrylic, most of our silicone products are solventless.

This is becoming an important selection criterion for coatings, as it impacts worker safety protocols, special equipment, handling and processing for flammable solvents and meeting environmental regulations. Choosing solventless silicone coatings can eliminate complexity, cost and time for your manufacturing operations.
<table>
<thead>
<tr>
<th>Product Type</th>
<th>Product Name</th>
<th>Benefits &amp; Features</th>
<th>Viscosity, cp</th>
<th>Diameter, Shore A</th>
<th>Tack-Free Time, minutes</th>
<th>Room Temperature Cure Time, minutes, % RH</th>
<th>Heat Cure Condition, minutes, % RH</th>
<th>Heat Cure Temp, °C</th>
<th>Specific Gravity</th>
<th>UL 94 Rating</th>
<th>UL 746 Approval</th>
<th>Mil Spec Type, Class Group</th>
<th>IPC-CC Test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solventless RTV Conformal Coating</td>
<td>Dow Corning® 3-1953 Conformal Coating</td>
<td>Medium viscosity</td>
<td>350</td>
<td>34</td>
<td>8</td>
<td>60</td>
<td>0.5</td>
<td>60°C/15% RH</td>
<td>0.98</td>
<td>V-0</td>
<td>Yes</td>
<td></td>
<td>IPC-CC-830</td>
</tr>
<tr>
<td></td>
<td>Dow Corning® 3-1965 Conformal Coating</td>
<td>Thinner cured coating; greater coverage area per kg; faster dispensing; easier to jet-dispense</td>
<td>115</td>
<td>33</td>
<td>6</td>
<td>60</td>
<td>0.5</td>
<td>60°C/15% RH</td>
<td>0.99</td>
<td>V-0</td>
<td>Pending</td>
<td></td>
<td>IPC-CC-830</td>
</tr>
<tr>
<td></td>
<td>Dow Corning® 3-1944 RTV Coating</td>
<td>Coverage of taller components, wire bonds &amp; edges</td>
<td>64,000</td>
<td>36</td>
<td>14</td>
<td>60</td>
<td>1.03</td>
<td>V-0</td>
<td>Yes</td>
<td></td>
<td></td>
<td></td>
<td>IPC-CC-830</td>
</tr>
<tr>
<td></td>
<td>Dow Corning® 3-1944 HP RTV Coating</td>
<td>Allows higher-thickness coverage in critical areas</td>
<td>49,000</td>
<td>36</td>
<td>7</td>
<td>60</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Dow Corning® 3140 RTV Coating</td>
<td>Allows higher one-pass coating thickness</td>
<td>34,400</td>
<td>32</td>
<td>116</td>
<td>72 hours</td>
<td>1.05</td>
<td>V-1</td>
<td>Yes</td>
<td></td>
<td></td>
<td></td>
<td>MIL-I-46058C Amend 7</td>
</tr>
<tr>
<td></td>
<td>Dow Corning® Q1-4010 Conformal Coating</td>
<td>High viscosity; controlled volatility</td>
<td>24,500</td>
<td>33</td>
<td>8</td>
<td>300</td>
<td>1.19</td>
<td>V-0</td>
<td>No</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Dow Corning® SE 9189 L Gray or White RTV Adhesive</td>
<td>Medium viscosity; controlled volatility</td>
<td>1,100</td>
<td>17</td>
<td>8</td>
<td>300</td>
<td>1</td>
<td>V-0</td>
<td>Yes</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Dow Corning® SE 9187 L Black, Clear or White Adhesive</td>
<td>High viscosity; controlled volatility</td>
<td>27,000</td>
<td>25</td>
<td>8</td>
<td>300</td>
<td>1.02</td>
<td>No</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Dow Corning® SE 9186L Coating, Black or Clear</td>
<td>Middle-level viscosity</td>
<td>5,675</td>
<td>25</td>
<td>6</td>
<td>300</td>
<td>1</td>
<td>No</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Dow Corning® HC 1000 Gray Conformal Coating</td>
<td>High viscosity; controlled volatility</td>
<td>12,000</td>
<td>24</td>
<td>11</td>
<td>30</td>
<td>1.07</td>
<td>V-0</td>
<td>No</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Dow Corning® HC 2000 Conformal Coating</td>
<td>Low viscosity; controlled volatility</td>
<td>150</td>
<td>25</td>
<td>18</td>
<td>210</td>
<td>1.01</td>
<td>Pending</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Dow Corning® HC 1100, Gray</td>
<td>Middle-level viscosity; controlled volatility</td>
<td>2,375</td>
<td>22</td>
<td>9</td>
<td>30</td>
<td>1.08</td>
<td>V-0</td>
<td>No</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Dow Corning® HC 2100 Coating</td>
<td>Low viscosity; controlled volatility</td>
<td>400</td>
<td>10</td>
<td>10</td>
<td>30</td>
<td>0.98</td>
<td>Pending</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Dow Corning® 1-4105 Conformal Coating</td>
<td>Long open time; “command cure”; uses CTE to its advantage to hold chips down to board</td>
<td>450</td>
<td>65</td>
<td>5</td>
<td>100°C</td>
<td>0.97</td>
<td>V-1</td>
<td>Yes</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Dow Corning® Q1-4101 Conformal Coating</td>
<td>Allows higher one-pass coating thickness</td>
<td>825</td>
<td>33</td>
<td>10</td>
<td>100°C</td>
<td>1</td>
<td>V-1</td>
<td>Yes</td>
<td></td>
<td></td>
<td></td>
<td>MIL-I-46058C Amend 7</td>
</tr>
<tr>
<td></td>
<td>Sylgard® 1-1428 Conformal Coating Kit</td>
<td>Two parts; much longer room-temperature shelf life</td>
<td>470</td>
<td>65</td>
<td>5</td>
<td>105°C</td>
<td>0.97</td>
<td>No</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Dow Corning® CC-4555 Long Bath Life Conformal Coating</td>
<td>Optimized version for dip-coating</td>
<td>225</td>
<td>78</td>
<td>20</td>
<td>120°C</td>
<td>0.98</td>
<td>No</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Solventless Heat Cure Conformal Coating</td>
<td>Dow Corning® 1-2577 Conformal Coating/ Dow Corning Toray Pelgan Z Spray</td>
<td>Medium viscosity with firm, abrasion-resistant surface after cure</td>
<td>950</td>
<td>20</td>
<td>7</td>
<td>60</td>
<td>2</td>
<td>60°C/15% RH</td>
<td>1.11</td>
<td>V-0</td>
<td>Yes</td>
<td></td>
<td>MIL-I-46058C Amend 7</td>
</tr>
<tr>
<td></td>
<td>Dow Corning® 1-2577 Low VOC Conformal Coating</td>
<td>Solvent is not considered a volatile organic compound; low odor; not ozone-depleting</td>
<td>1,050</td>
<td>25</td>
<td>6</td>
<td>60</td>
<td>2</td>
<td>60°C/15% RH</td>
<td>1.12</td>
<td>V-0</td>
<td>Yes</td>
<td></td>
<td>MIL-I-46058C Amend 7</td>
</tr>
<tr>
<td></td>
<td>Dow Corning® 1-2620 Dispersion</td>
<td>Thinner cured coating; greater coverage area per kg; faster dispensing</td>
<td>150</td>
<td>25</td>
<td>5</td>
<td>60</td>
<td>2</td>
<td>60°C/15% RH</td>
<td>1.11</td>
<td>V-0</td>
<td>Yes</td>
<td></td>
<td>MIL-I-46058C Amend 7</td>
</tr>
<tr>
<td></td>
<td>Dow Corning® 1-2620 Low VOC Conformal Coating</td>
<td>Low viscosity</td>
<td>350</td>
<td>25</td>
<td>5</td>
<td>60</td>
<td>2</td>
<td>60°C/15% RH</td>
<td>1.12</td>
<td>V-0</td>
<td>Yes</td>
<td></td>
<td>MIL-I-46058C Amend 7</td>
</tr>
<tr>
<td></td>
<td>Dow Corning® LDC 2577D Dispersion Coating</td>
<td>Thinner cured coating; greater coverage area per kg; faster dispensing</td>
<td>105</td>
<td>25</td>
<td>7</td>
<td>60</td>
<td>60°C/15% RH</td>
<td>1.12</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Dow Corning® CC-2570 Conformal Coating</td>
<td>No fluorescence; better optical performance</td>
<td>950</td>
<td>25</td>
<td>7</td>
<td>60</td>
<td>2</td>
<td>60°C/15% RH</td>
<td>1.11</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Dow Corning® CC-3040 Conformal Coating</td>
<td>Tougher conformal coating with good anti-scratch resistance</td>
<td>260</td>
<td>38</td>
<td>11</td>
<td>60</td>
<td>1.1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

2 Highly dependent on thickness, temperature, humidity and other cure conditions.
3 For translucent.
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.

**NEW**

*Dow Corning® CC-3040 Conformal Coating*

- Tougher conformal coating with anti-scratch property
- Flexible and transparent
- High flowability

Target properties for this new product are:

- Viscosity: 260 cP
- Durometer: 38 Shore A
- Tack-free time: 11 minutes

**HANDLING PRECAUTIONS**

PRODUCT SAFETY INFORMATION REQUIRED FOR SAFE USE IS NOT INCLUDED IN THIS DOCUMENT. BEFORE HANDLING, READ PRODUCT AND MATERIAL SAFETY DATA SHEETS AND CONTAINER LABELS FOR SAFE USE, PHYSICAL AND HEALTH HAZARD INFORMATION. THE MATERIAL SAFETY DATA SHEET IS AVAILABLE ON THE DOW CORNING WEBSITE AT DOWCORNING.COM, OR FROM YOUR DOW CORNING SALES APPLICATION ENGINEER, DISTRIBUTOR, OR BY CALLING DOW CORNING CUSTOMER SERVICE.

**LIMITED WARRANTY INFORMATION – PLEASE READ CAREFULLY**

The information contained herein is offered in good faith and is believed to be accurate. However, because conditions and methods of use of our products are beyond our control, this information should not be used in substitution for customers’ tests to ensure that our products are safe, effective and fully satisfactory for the intended end use. Suggestions of use shall not be taken as induce -ments to infringe any patent.

Dow Corning’s sole warranty is that our products will meet the sales specifications in effect at the time of shipment. Your exclusive remedy for breach of such warranty is limited to refund of purchase price or replacement of any product shown to be other than as warranted.

TO THE FULLEST EXTENT PERMITTED BY APPLICABLE LAW, DOW CORNING SPECIFICALLY DISCLAIMS ANY OTHER EXPRESS OR IMPLIED WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE OR MERCHANTABILITY.

Dow Corning DISCLAIMS LIABILITY FOR ANY INCIDENTAL OR CONSEQUENTIAL DAMAGES.

*Dow Corning* and *Sylgard* are registered trademarks of Dow Corning Corporation. We help you invent the future is a trademark of Dow Corning Corporation.

©2016 Dow Corning Corporation. All rights reserved.

AGF14547 Form No. 11-3666-01