

# ***Dow Corning*<sup>®</sup> TC-4016**

## **Dispensable Thermal Pad**

### **FEATURES & BENEFITS**

- Use as printable or dispensable pad to replace traditional fabricated pad
- Dispensed or printed through a variety of manual or automated processes
- Capable of printing smaller shapes and features than a fabricated pad can be cut and placed
- Glass beads added to control the thickness
- Lower cost of ownership than fabricated pad
- Excellent thermal performance
- Soft, stress relieving, shock dampening
- Desired thickness is maintained after application through cure
- Reworkable

### **COMPOSITION**

- Two-part
- Polydimethylsiloxane

Two-part, 1 to 1 mix ratio, thermally conductive dispensable pad

### **APPLICATIONS**

*Dow Corning*<sup>®</sup> TC-4016 Dispensable Thermal Pad is suitable for:

- Thermal interface material used for cooling electronic devices in LED lamps and luminaries, automotive and consumer applications.
- Screen printed or dispensed into a variety of shapes.

### **TYPICAL PROPERTIES**

Specification Writers: These values are not intended for use in preparing specifications. Please contact your local Dow Corning sales office or your Global Dow Corning Connection before writing specifications on this product.

| Property                        | Unit           | Result      |
|---------------------------------|----------------|-------------|
| One or Two Part                 |                | Two         |
| Color                           |                |             |
| Part (A)                        |                | White paste |
| Part (B)                        |                | Blue paste  |
| Viscosity (Part A)              | cP             | 104,000     |
|                                 | Pa-sec         | 104         |
| Viscosity (Part B)              | cP             | 124,000     |
|                                 | Pa-sec         | 124         |
| Viscosity (Mixed)               | cP             | 103,000     |
|                                 | Pa-sec         | 103         |
| Specific Gravity (Cured)        |                | 2.6         |
| Cure Time at 25 °C              | hours          | 24          |
| Working Time (Pot Life – hours) |                |             |
| at 25 °C                        | hours          | 4           |
| at 40 °C                        | minutes        | 32          |
| Heat Cure Time                  |                |             |
| at 40 °C                        | minutes        | 150         |
| at 75 °C                        | minutes        | 48          |
| at 100 °C                       | minutes        | 16          |
| at 125 °C                       | minutes        | 10          |
| Durometer Shore 00              |                | 50          |
| Tensile Strength                | psi            | 35          |
| Thermal Conductivity            | btu/hr ft degF | 0.98        |
|                                 | W/mK           | 1.7         |

## TYPICAL PROPERTIES (Continued)

| Property                       | Unit      | Result   |
|--------------------------------|-----------|----------|
| Elongation                     | %         | 262      |
| Dielectric Strength            | volts/mil | 450      |
|                                | kV/mm     | 18       |
| UL Flammability                |           | V-0      |
| Volume Resistivity             | ohm*cm    | 5.18E+12 |
| Dissipation Factor at 100 hz   |           | 0.174    |
| Dissipation Factor at 100 kHz  |           | 0.002    |
| Dissipation Factor at 1 MHz    |           | 0.001    |
| Dielectric Constant at 100 Hz  |           | 6.28     |
| Dielectric Constant at 100 kHz |           | 5.78     |
| Dielectric Constant at 1 MHz   |           | 5.78     |
| UL RTI Rating                  | °C        | 150      |

### DESCRIPTION

*Dow Corning®* brand dispensable thermal pads are supplied as two-part liquid component kits. When the liquid components are thoroughly mixed, the mixture cures to a flexible elastomer, suitable for the protection of electrical/ electronic applications where heat dissipation is critical. These elastomers cure without exotherm at a constant rate regardless of sectional thickness or degree of confinement. *Dow Corning®* brand thermally conductive elastomers require no post-cure and can be placed in service immediately at operating temperatures of -45 to 200 °C (-49 to 392 °F) following the completion of the cure schedule. Electronic devices are continually designed to deliver higher performance. There is also a continual trend towards smaller, more compact designs. In combination these factors typically mean that more heat is generated in the device. Thermal management of electronic devices is a primary concern of design engineers. A cooler device allows for more efficient operation and better reliability over the life of the device. As such, thermally conductive pads play an integral role here. Thermally conductive materials act as a thermal “bridge” to remove heat from a heat source (device) to the ambient via a heat transfer media (i.e. heat sink).

These materials have properties such as low thermal resistance, high thermal conductivity, and can achieve various Bond Line Thicknesses (BLT's) which can help to improve the transfer of heat away from the device.

### APPLICATION METHODS

This material is designed to be applied by various methods including:

- Automated dispensing
- Stencil printing
- Screen printing

Please contact your local Dow Corning representative for any specific application questions.

### MIXING AND DE-AIRING

*Dow Corning®* brand dispensable thermal pads exhibit minor polymer separation during transportation. Before each use ensure the material is homogeneous. Recommendations for re-homogenization can be found in the application guides. Two-part materials should be mixed in the proper ratio either by weight or volume. The presence of light-colored streaks or marbling indicates inadequate mixing. Automated airless dispense equipment can be used to reduce or avoid the need to de-air. If de-airing is required

to reduce voids in the cured elastomer, consider a vacuum de-air schedule of > 8 inches Hg (or a residual pressure of 10- 0 mm of Hg) for 10 minutes or until bubbling subsides.

### PROCESSING/CURING

The cure rate is rapidly accelerated with heat (see heat-cure times in Typical Properties table). Addition cure materials contain all the ingredients needed for cure with no by-products from the cure mechanism. These products generally have long working times.

### POT LIFE AND CURE RATE

Cure reaction begins with the mixing process. Initially, cure is evidenced by a gradual increase in viscosity, followed by gelation and conversion to its final elastomeric state. Pot life is defined as the time required for viscosity to double after Parts A and B (base and curing agent) are mixed.

### USEFUL TEMPERATURE RANGES

For most uses, silicone dispensable thermal pads should be operational over a temperature range of -45 to 200 °C (-49 to 392 °F) for long periods of time. However, at both the low and high temperature ends of the

spectrum, behavior of the materials and performance in particular applications can become more complex and require additional considerations. For low-temperature performance, thermal cycling to conditions such as -55 °C (-67 °F) may be possible for most products, but performance should be verified for your parts or assemblies. Factors that may influence performance are configuration and stress sensitivity of components, cooling rates and hold times, and prior temperature history. At the high-temperature end, the durability of the cured silicones is time and temperature dependent. As expected, the higher the temperature, the shorter the time the material will remain useable.

### **SOLVENT EXPOSURE**

In general, the product is resistant to minimal or intermittent solvent exposure, however best practice is to avoid solvent exposure altogether.

### **USABLE LIFE AND STORAGE**

The product should be stored in its original packaging with the cover tightly attached to avoid any contamination. Store in accordance with any special instructions listed on the product label. The product should be used by the indicated Exp. Date found on the label.

### **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 DOW CORNING.COM, OR FROM YOUR DOW CORNING SALES APPLICATION ENGINEER, OR DISTRIBUTOR, OR BY CALLING**

### **DOW CORNING CUSTOMER SERVICE.**

#### **LIMITATIONS**

This product is neither tested nor represented as suitable for medical or pharmaceutical uses.

#### **HEALTH AND ENVIRONMENTAL INFORMATION**

To support customers in their product safety needs, Dow Corning has an extensive Product Stewardship organization and a team of Product Safety and Regulatory Compliance (PS&RC) specialists available in each area.

For further information, please see our website, [dowcorning.com](http://dowcorning.com) or consult your local Dow Corning representative.

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To discuss how we could work together to meet your specific needs, email **[electronics@dowcorning.com](mailto:electronics@dowcorning.com)** or go to **[dowcorning.com/contactus](http://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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