



Technical Data Sheet

DOWSIL™ 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

DOWSIL™ TC-4016 Dispensable Thermal Pad is suitable for:

- Thermal interface material used for cooling PCB system assemblies 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.

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 (CONT.)

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 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 PCB system assemblies where heat dissipation is critical. These elastomers cure without exotherm at a constant rate regardless of sectional thickness or degree of confinement. Dow 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. PCB system assemblies 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 PCB system assemblies 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 representative for any specific application questions.

MIXING AND DE-AIRING

Dow 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 SAFETY DATA SHEETS AND CONTAINER LABELS FOR SAFE USE, PHYSICAL AND HEALTH HAZARD INFORMATION. THE SAFETY DATA SHEET IS AVAILABLE ON THE DOW WEBSITE AT WWW.CONSUMER.DOW.COM, OR FROM YOUR DOW SALES APPLICATION ENGINEER, OR DISTRIBUTOR, OR BY CALLING DOW 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 has an extensive Product Stewardship organization and a team of product safety and regulatory compliance specialists available in each area.

For further information, please see our website, www.consumer.dow.com or consult your local Dow representative.

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