



Technical Data Sheet

## DOWSIL™ TC-4605 HLV Thermally Conductive Encapsulant

### FEATURES & BENEFITS

- Heat cure 1 hour at 120°C
- 1 W/m·K thermal conductivity
- Excellent dielectric properties
- Low viscosity
- Repairable
- UL 94 V0 at 1.5 mm thickness
- Thermal management
- Mechanical protection
- Hard elastomer after cure

### COMPOSITION

- Two-part silicone elastomer supplied as flowable liquid
- 1 to 1 mix ratio by weight

Two-part, 1 to 1 gray silicone elastomer, heat cure for manufacturing flexibility, thermally conductive encapsulant/pottant for PCB system assemblies, providing protection from different environmental conditions and thermal management.

### APPLICATIONS

- LC module
- Electric motor
- On board charger
- Transformer
- PCB system assembly control unit
- Automotive applications

### TYPICAL PROPERTIES

Specification Writers: These values are not intended for use in preparing specifications.

Property	Unit	Result
Color (Mixed)		Gray
Cure Condition		1 hour at 120°C
Viscosity (Part A)	cP or mPa.s	1600
Viscosity (Part B)	cP or mPa.s	1400
Viscosity (Mixed)	cP or mPa.s	1900
Durometer, Shore A		60
Specific gravity (Cured)	g/cm <sup>3</sup>	1.67
Pot life at room temperature	minutes	130
Thermal conductivity	W/m·K	1.00
Adhesion to aluminum (Anodized)	psi	220
Tensile strength	psi (MPa)	370 (2.55)
Elongation	%	95
Dielectric strength	kV/mm	24
Volume resistivity	Ohm·cm	1.08E+15
UL flammability at 1.5 mm		94 V0
Shelf life	months	6

## DESCRIPTION

### DOWSIL™ TC-4605 HLV

Thermally Conductive Encapsulant is a two-component silicone elastomer material. It is designed especially for use in the manufacture of electrical and PCB system assembly products and modules. It cures at room temperature or with heat to form elastic, thermally conductive and flame retardant rubber.

## APPLICATION METHODS

Manual or automated needle dispense.

## PREPARING SURFACES

In applications requiring adhesion, priming will be required for many of the silicone encapsulants. For best results, the primer should be applied in a very thin, uniform coating and then wiped off after application. After application, it should be thoroughly cured prior to application of the silicone elastomer. Additional instructions for primer usage can be found in the information sheets specific to the individual primers.

## MIXING AND DE-AIRING

Upon standing, some filler may settle to the bottom of the liquid after several weeks. To ensure a uniform product mix, the material in each container should be thoroughly mixed prior to use. 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.

## CURING

Thoroughly mixed Dow silicone encapsulant may be poured/dispensed directly into the container in which it is to be cured. Care should be taken to minimize air entrapment.

When practical, pouring/dispensing should be done under vacuum, particularly if the component being potted or encapsulated has many small voids. If this technique cannot be used, the unit should be evacuated after the silicone encapsulant has been poured/dispensed. Dow silicone encapsulants may be either room temperature (25°C/77°F) or heat cured. Room temperature cure encapsulants may also be heat accelerated for faster cure. Ideal cure conditions for each product are given in the product selection table.

## 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 a solid elastomer. Pot life is defined as the time required for viscosity to double after Parts A and B (base and curing agent) are mixed and is highly temperature and application dependent. Please refer to the data table.

## USEFUL TEMPERATURE RANGES

For most uses, silicone elastomers 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 and should be adequately tested for the particular end use environment. For low-temperature performance, thermal cycling to conditions such as -55°C (-67°F) may be possible, 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 silicone elastomer is time and temperature dependent.

As expected, the higher the temperature, the shorter the time the material will remain useable.

## 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](http://WWW.CONSUMER.DOW.COM), OR FROM YOUR DOW SALES APPLICATION ENGINEER, OR DISTRIBUTOR, OR BY CALLING DOW CUSTOMER SERVICE.**

## USABLE LIFE AND STORAGE

Shelf life is indicated by the "Use Before" date found on the product label. Refer to the product label for storage temperature requirements. Special precautions must be taken to prevent moisture from contacting these materials. Containers should be kept tightly closed and head or air space minimized. Partially filled containers should be purged with dry air or other gases, such as nitrogen. Exposure to moisture could reduce adhesion and cause bubbles to form. Encapsulant materials which contain higher levels of fillers that have been stored for long periods of time should typically be agitated or rolled prior to mixing to prevent separation and settle-out.

## LIMITATIONS

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

UNRESTRICTED – May be shared with anyone

®™ Trademark of The Dow Chemical Company ("Dow") or an affiliated company of Dow

DOWSIL™ TC-4605 HLV Thermally Conductive Encapsulant

© 2017 The Dow Chemical Company. All rights reserved.

## **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](http://www.consumer.dow.com) or consult your local Dow representative.

## **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 customer's 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 inducements to infringe any patent.

Dow'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 SPECIFICALLY DISCLAIMS ANY OTHER EXPRESS OR IMPLIED WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE OR MERCHANTABILITY.**

**DOW DISCLAIMS LIABILITY FOR ANY INCIDENTAL OR CONSEQUENTIAL DAMAGES.**

## **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 [\*\*www.consumer.dow.com\*\*](http://www.consumer.dow.com).

To discuss how we could work together to meet your specific needs, go to [\*\*www.consumer.dow.com\*\*](http://www.consumer.dow.com) for a contact close to your location. Dow has customer service teams, science and technology centers, application support teams, sales offices, and manufacturing sites around the globe.

[\*\*www.consumer.dow.com\*\*](http://www.consumer.dow.com)

