Technical data sheet

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Manufacturer:	DOWSIL
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DOWSIL™ TC-6020 THERMALLY CONDUCTIVE

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Technical Data Sheet

DOWSIL™ TC-6020 Thermally Conductive Encapsulant

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

Features & Benefits

- Adhesion to aluminum (Al)
- High thermal conductivity 2.7 W/m*K
- Excellent dielectric properties
- Good flowability, easy dispensing

Composition

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

Applications

DOWSIL™ TC-6020 Thermally Conductive Encapsulant is suitable for:

- Industry power module
- Automotive control unit

Typical Properties

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

Property	Unit	Result
Color (mixed)		Gray
Viscosity (Part A)	cP	10800
Viscosity (Part B)	cP	9960
Viscosity (Mixed)	cP	10640
Pot life	minutes	77
Cure Time @ 60°C, T90	minutes	23
Cure Time @ 80°C, T90	minutes	13
Cure Time @ 100°C, T90	minutes	5
Durometer	Shore A	63
Thermal Conductivity	W/m*K	2.72
Specific Gravity	g/cm^3	2.926
Tensile Strength	psi	139
Elongation	%	20.6
Lap shear to Al	psi	40.5

Typical Properties (Cont.)

Property	Unit	Result
Volume Resistivity	Ohm·cm	8.22E+15
Dielectric constant at 100 Hz		4.46
Dielectric constant at 100 KHz		4.12
Dissipation factor at 100 Hz		0.016
Dissipation factor at 100 KHz		0.002
Dielectric Strength	kV/mm	24.1

Description

DOWSIL™ TC-6020 Thermally Conductive Encapsulant is a two component silicone rubber material. It is designed especially for use in the manufacture of electrical and PCB products and modules. It cures at room temperature or with heat to form elastic and thermal conductive rubber.

Application Method

Manual or automated needle dispense

Mixing and De-Airing

Upon standing, yellow oil bleeding and filler may settle to pail bottom and form hard caking after several weeks, a natural property for this product. To ensure a uniform product mix, the material in each container should be thoroughly mixed prior to use. Mixing equipment is needed rather than hand re-mixing. 6~10 minutes mixing with mixing equipment 5995E5 from Red Devil is highly recommended. 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 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.

Packaging Information

Please contact your local distributor or Dow representative for information on packaging size and availability.

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, consumer.dow.com or consult your local Dow representative.

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.

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To discuss how we could work together to meet your specific needs, go to **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.

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