Technical Data Sheet

DOWSIL™ 3-6655 Thermally Conductive Encapsulant

FEATURES

- Medium viscosity
- Fast heat cure
- Low durometer
- UL 94 V-0

BENEFITS

- Easy dispensing
- Controlled flowability – stays where it is dispensed
- Very soft, low stress elastomer

COMPOSITION

- Siloxane Polymer
- Alumina Filler

DOWSIL™ 3-6655 Thermally Conductive Encapsulant is a two part, 1 to 1 mix ratio, gray thermally conductive silicone encapsulant

APPLICATIONS

- Suitable for potting or encapsulating power supplies, power convertors and other PCB system assembly applications where heat dissipation is critical.

TYPICAL PROPERTIES

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

Property	Unit	Result
One part or Two part		Two
Color		Gray
Viscosity (Part A or base)	cP Pa-sec	28,000 28
Viscosity (Part B or catalyst)	cP Pa-sec	19,000 19
Viscosity (Mixed)	cP Pa-sec	32,000 32
Flow Rate - Slump	in cm	0.1 0.2
Durometer Shore 00		75
Rheometer T90 Cure Time at 125°C	minutes	6.0
Specific Gravity (Cured)		2.7
Working Time at 25°C (Pot Life - hours)	hr	3
Thermal Conductivity	Btu/hr-ft-°F W/mK	1.04 1.8
Agency Listing		UL 94 V-0

DESCRIPTION

Dow thermally conductive silicone encapsulants 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 and PCB system assembly applications where heat dissipation is critical. These encapsulants cure without exotherm at a constant rate regardless of sectional thickness or degree of confinement. Dow thermally conductive encapsulants 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 systems assemblies are continually designed to deliver higher performance. Especially in the area of consumer PCB system assembly, 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 systems 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 compounds 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 thin Bond Line Thicknesses (BLTs) which can help to improve the transfer of heat away from the device.

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.

PROCESSING/CURING

Addition-cure silicones should be cured at 100°C (212°F) or above. The cure rate is rapidly accelerated with heat (see heat-cure times in Typical Properties table). For thicker sections, a pre-cure at 70°C (158°F) may be necessary to reduce voids in the elastomer. Length of pre-cure will depend on section thickness and confinement of adhesive. It is recommended that 30 minutes at 70°C (158°F) be used as a starting point for determining necessary pre-cure time. Addition-curing materials contain all the ingredients needed for cure with no by-products from the cure mechanism. Deep-section or confined cures are possible. Cure progresses evenly throughout the material. 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 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 encapsulants 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 silicone is time and temperature dependent. As expected, the higher the temperature, the shorter the time the material will remain useable.

REPAIRABILITY

When repairing an area using an encapsulant, roughen the exposed surfaces of the cured encapsulant with an abrasive paper and rinse with a suitable solvent. This will enhance adhesion and permit the repaired material to become an integral matrix with the existing encapsulant.

SOLVENT EXPOSURE

In general, the product is resistance 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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