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Technical Data Sheet

DOWSIL™ EE-1010 Low Viscosity Encapsulant

Two-part, 1:1 mix encapsulant with extended working time and low viscosity

Features & Benefits

- Long working time
- Room temperature cure or accelerated heat cure
- High hardness/durometer compared to other PCB system assemblies encapsulants
- Moderate thermal conductivity
- Different colors for Part A and Part B for easy identification of mixing
- In complex geometries, low viscosity enhances flow and fill in narrow spaces and long working time enables air displacement
- Rapid, versatile cure processing controlled by temperature

Composition

- Two-part
- 1 to 1 mix ratio
- Polydimethylsiloxane silicone elastomer

Applications

- DOWSIL™ EE-1010 Low Viscosity Encapsulant is suitable for use in applications where there are frequent start/stops during the manufacturing process or where board and component complexity require more time for entrapped air to be displaced, rise to the surface, and break without requiring a vacuum de-airing step
- Material can be dispensed manually or through meter mixing

Typical Properties

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

Property	Unit	Result
One or two-part		Two
Mix ratio		1 to 1
Viscosity (Part A)	cP	1020
	mPa-sec	1020
	Pa-sec	1.02
Viscosity (Part B)	cP	600
	mPa-sec	600
	Pa-sec	6
Viscosity (Mixed)	cP	840
	mPa-sec	840
	Pa-sec	8.4

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Typical Properties (Cont.)

Property	Unit	Result
Specific Gravity (Uncured Part A)		1.26
Specific Gravity (Uncured Part B)		1.25
Working Time at 25°C (Pot Life - minutes)	Minutes	50
Working Time at 25°C (Snap Time)	Hours	4.2
Cure Time at 25°C	Hours	24
Heat Cure Time at 100°C	Minutes	3
Heat Cure Time at 150°C	Minutes	2
Specific Gravity (Cured)		1.25
Durometer Shore A		60
Dielectric Strength	volts/mil kV/mm	450 18
Volume Resistivity	ohm *cm	1.19E+15
Dielectric Constant at 100 kHz		3.17
Dielectric Constant at 1 MHz		3.17
Dissipation Factor at 100 Hz		0.017
Dissipation Factor at 100 kHz		0.001
Dissipation Factor at 1 MHz		0.002
Thermal Conductivity	W/mK	0.35
Linear CTE (by TMA)	ppm/°C	300
Hardening Transition by DSC	°F °C	-58 -50

Description

DOWSIL™ EE-1010 Low Viscosity Encapsulant is supplied as a two-part liquid component kit. When liquid components are thoroughly mixed, the mixture cures to a flexible elastomer, which is well suited for the protection of electrical PCB system assembly applications. Dow silicone encapsulants cure without exotherm at a constant rate regardless of sectional thickness or degree of confinement. Dow silicone elastomers require no post cure and can be placed in service immediately following the completion of the cure schedule. Standard silicone encapsulants require a surface treatment with a primer in addition to good cleaning for adhesion while primerless silicone encapsulants require only good cleaning.

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.

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Processing/Curing

Thoroughly mixed Dow silicone encapsulants 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.

Compatibility

Certain materials, chemicals, curing agents and plasticizers can inhibit the cure of addition cure gels. Most notable of these include: organotin and other organometallic compounds, silicone rubber containing organotin catalyst, sulfur, polysulfides, polysulfones or other sulfur containing materials, unsaturated hydrocarbon plasticizers, and some solder flux residues. If a substrate or material is questionable with respect to potentially causing inhibition of cure, it is recommended that a small scale compatibility test be run to ascertain suitability in a given application. The presence of liquid or uncured product at the interface between the questionable substrate and the cured gel indicates incompatibility and inhibition of cure.

Repairability

In the manufacture of electrical devices and PCB system assemblies it is often desirable to salvage or reclaim damaged or defective units. With most non-silicone rigid potting/encapsulating materials, removal or entry is difficult or impossible without causing excessive damage to internal circuitry. Dow silicone encapsulants can be selectively removed with relative ease, depending on the chosen remove method and technique and repairs or changes accomplished, and the repaired area repotted in place with additional product. To remove silicone elastomers, simply cut with a sharp blade or knife and tear and remove unwanted material from the area to be repaired.

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Repairability (Cont.)

Sections of the adhered elastomer are best removed from substrates and circuitry by mechanical action such as scraping or rubbing and can be assisted by applying Dow OS Fluids to swell the elastomer. Before applying additional encapsulant to a repaired device, roughen the exposed surfaces of the cured encapsulant with an abrasive paper and rinse with a suitable solvent and dry. This will enhance adhesion and permit the repaired material to become an integral matrix with the existing encapsulant. Silicone prime coats are not recommended for adhering products to themselves.

Packaging Information

Multiple packaging sizes are available for this product.

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. 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.

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.

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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