Technical Data Sheet

DOWSIL™ EG-4120 Dielectric Gel

DOWSIL™ EG-4120 Dielectric Gel is a two-part material, 1 to 1 mixing ratio, tough self-priming gel.

Features & Benefits

- Heat cure gel
- Suitable for operating temperatures ranging from -40°C to +200°C in continuous mode and >3,000 hours at 215°C
- Low viscosity allowing good flow under components
- Tough gel for increased resistance to delamination under thermal cycling

Composition

- Polydimethylsiloxane

Applications

DOWSIL™ EG-4120 Dielectric Gel is a silicone dielectric gel suitable for potting and protecting devices, especially in PCB and power modules to protect the dies and interconnects from environmental conditions and to provide dielectric insulation.

Typical Properties

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

Test[1]	Property	Unit	Result
	One or two part		Two
	Mix ratio (weight)		1:1
CTM 0176	Color A		Colorless to slightly yellow
CTM 0176	Color B		Colorless to slightly yellow
CTM 0050	Viscosity Part A	mPa.s	500
CTM 0050	Viscosity Part B	mPa.s	500
	Cure time at 150°C	Min	60
CTM 0300	Penetration (1/4 cone)	10/mm	40
CTM 1107	Hardness		380
CTM 0114	Dielectric strength	kV/mm	15

1. CTM: Corporate Test Method, copies of CTM's are available on request.

Form No. 11-3933-01 A

Description

Dow two-part, low temperature gels exhibit the stability of their properties at temperatures down to -40°C, allowing devices to operate at these extreme temperatures. The soft nature of these gels can also assist in managing the CTE mismatch between components or materials during such low temperature excursions. This low temperature performance could assist in lowering field failures and warranty costs. Gels are a special class of encapsulants that cure to an extremely soft material. Gels cure in place to form cushioning, self-healing, resilient materials. Cured gels retain much of the stress relief and self-healing qualities of a liquid while providing the dimensional stability of an elastomer which is increasingly needed for delicate components. Gels have been used to isolate circuits from the harmful effects of moisture and other contaminants and provide electrical insulation for high voltages.

Another use is providing stress relief to protect circuits and interconnections from thermal and mechanical stresses.

Gels are usually applied in thick layers to totally encapsulate higher architectures.

This high temperature resistant gel has been demonstrated to operate efficiently for more than 3,000 hours at 215°C, without cracking, delamination, electrical failure or formation of void in the material. This ensures proper usage at a continuous temperature of 200°C per UL-1557 standard.

Mixing and De-Airing

Two-part materials should be mixed in the proper ratio by weight. Automated airless dispense equipment can be used to reduce or avoid the need to de-air. Manual dispensing can also be used, making the de-airing mandatory. If de-airing is required to avoid presence of bubbles due to dispensing at the cured state, consider a vacuum de-air pressure of < 8 inches Hg (or a residual pressure of 10–20 mm of Hg) for 10 minutes.

Processing/ Curing

The cure reaction begins when Parts A and B are mixed. As the cure progresses, viscosity increases until the material becomes a soft gel.

Gels will reach a no-flow state prior to full cure. Addition-cure silicone gels may be room temperature and heat cure, or exclusively heat cure. Adding heat accelerates the cure reaction. Additional time should be allowed for heating the part to near oven temperature. Cure schedules should be verified in each new application.

Useful Temperature Ranges

For most uses, silicone gel should be operational over a temperature range from -40°C to 215°C 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 -40°C 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 gel 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 organo-metallic 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.

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 By” date found on the product label. Any special storage and handling instructions will be printed on the product containers.

For best results, Dow silicone dielectric gel materials should be stored at or below the maximum specified storage temperature. 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. Any special storage and handling instructions will be printed on the product containers.

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.

For more information about our materials and capabilities, visit **consumer.dow.com.**

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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