Technical Data Sheet

DOWSIL™ EG-3810 Dielectric Gel

FEATURES & BENEFITS

- Clear
- Heat cure gel
- Suitable for operating temperatures ranging from -60°C to +200°C
- No mixing required

COMPOSITION

- One-part dielectric gel

One-part, low/high temperature gel

APPLICATIONS

- DOWSIL™ EG-3810 Dielectric Gel is suitable for potting and protecting of PCB system assemblies, especially power semiconductor modules to protect 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.

Property	Unit	Result
One or Two-part		One
Color		Clear/Colorless
Viscosity	cP mPa.s	690 690
Specific Gravity (Uncured)	-	0.97
Heat Cure Time at 125°C	minutes	15
Heat Cure Time at 150°C	minutes	10
Gel Hardness (measured at 10 mm)	grams	78
Penetration	1/10 mm	80
Penetration ¼ cone	1/10 mm	84
Dielectric Strength	volts/mil kV/mm	533 21
Dielectric Constant at 110 Hz	-	2.9
Dielectric Constant at 100 kHz	-	2.9
Dielectric Constant at 1 MHz	-	2.9
Volume Resistivity	ohm*cm	2E+15
Dissipation Factor at 110 Hz	-	1.6E-04
Dissipation Factor at 100 kHz	-	2.2E-05
Dissipation factor at 1 MHz	-	4.5E-04

DESCRIPTION

Dow one-part, low temperature gels exhibit the stability of their properties at temperatures down to -60°C or lower, allowing PCB system assemblies 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. More recently, gels have found application in optoelectronics due to their stress relieving capability and high refractive index, as well as the stability of these properties over time.

MIXING AND DE-AIRING

Gels can be dispensed manually or by using one of the available types of meter mix equipment. If possible, the potential for entrapment and incorporation of gas (typically air) should be considered during design of the part and selection of a process to dispense the gel. This is especially important with higher-viscosity and faster-curing gels. Degassing at >28 inches (10-20 mm) Hg vacuum may be necessary to ensure a void-free, protective layer.

POT LIFE AND CURE RATE

Working time (or pot life) is the time required for the initial mixed viscosity to double at room temperature (RT). For one-part products the viscosity either increases at a much lower rate or does not change significantly at RT. Cure conditions are shown in the typical properties table. Cure is defined as the time required for a specific gel to reach 90% of its final properties. Gels will reach a no-flow state prior to full cure. 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 gels should be operational over a temperature range of -60 to 200°C (-76 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 -60°C (-112°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 PCB system assemblies, salvage or rework of damaged or defective units is often required. Removal of Dow dielectric gels to allow necessary repairs can be assisted by using Dow OS Fluids. Additional information regarding these products is available from Dow. In addition, if only one component needs to be replaced, a soldering iron may be applied directly through the gel to remove the component. After work has been completed, the repaired area should be cleaned with forced air or a brush, dried, and patched with additional silicone gel.

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.

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.

PACKAGING INFORMATION

In general, Dow dielectric gels are available in batch-matched kits containing both Part A and Part B components. Multiple packaging sizes are available for these products.

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.

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.

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

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