Product Information
Electronics

DOW CORNING

Dow Corning® EG-3896 Dielectric Gel

FEATURES & BENEFITS

- Slightly hazy to clear
- Fast heat cure gel
- UL 94 V-1 flammability classification
- Suitable for operating temperatures ranging from -40°C to +185°C
- Improved resistance to crack formation
- Excellent flowability

COMPOSITION

- Two-part polydimethylsiloxane gel

Two-part, 1 to 1 mix ratio gel, toughened gel: self priming gel

APPLICATIONS

- *Dow Corning*® EG-3896 Dielectric Gel is suitable for potting and protecting of electronics devices, 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. Please contact your local Dow Corning sales office or your Global Dow Corning Connection before writing specifications on this product.

Property	Unit	Result
One part or Two-part	-	Two
Color	-	Slightly hazy to clear
Viscosity (Base)	cP mPa.s	560 560
Viscosity (Curing agent)	cP mPa.s	330 330
Viscosity (Mixed)	cP mPa.s	520 520
Specific Gravity (Uncured Part A)	-	0.98
Specific Gravity (Uncured Part B)	-	0.97
Working Time at 25°C	hours	>4
Heat Cure Time at 70°C	minutes	30
Heat Cure Time at 100°C	minutes	10
Heat Cure Time at 150°C	minutes	5
Gel Hardness (Measured at 10 mm)	grams	220
Penetration	1/10 mm	30
Penetration ¼ cone	1/10mm	55
Dielectric Strength	volts/mil kV/mm	559 22
Dielectric Constant at 110 Hz	-	2.8
Dielectric Constant at 100 kHz	-	2.9
Dielectric Constant at 1 MHz	-	2.9

TYPICAL PROPERTIES (Cont.)

Property	Unit	Result
Volume Resistivity	Ohm-cm	2E+15
Dissipation Factor at 110 Hz	-	1.5E-04
Dissipation Factor at 100 kHz	-	4.6E-05
Dissipation Factor at 1 MHz	-	1.0E-04

DESCRIPTION

Dow Corning® brand two-part, low temperature gels exhibit the stability of their properties at temperatures down to -40°C or lower, allowing electronics 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

Some gels are supplied in bladder packs that avoid direct air contact with the liquid gel components, allowing use of air pressure over the pack in a pressure pot for dispensing. Do not apply air pressure directly to the liquid gel surface (without the bladder pack) as the gel can become supersaturated with air and bubbling can occur when the material is dispensed and cured. Use of bladder packs prevents bubbling, maintains cleanliness and avoids gel contamination. Gels can be dispensed manually or by using one of the available types of meter mix equipment. Typically, the two components are of matched viscosities and are readily mixed with static or dynamic mixers, with automated meter-mix normally used for high volume processes. For low-volume applications, manual weighing and simple hand mixing may be appropriate. Inaccurate proportioning or inadequate mixing may cause localized or widespread problems affecting the gel properties or cure characteristics. 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 mix and 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). The cure reaction begins when Parts A and B are mixed. As the cure progresses, viscosity increases until the material becomes a soft gel. 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. Addition-cure silicone gels may be RT 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 of -40°C to 185°C (-40°C to 365°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 -40°C (-40°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 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 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 electronic devices, salvage or rework of damaged or defective units is often required. Removal of *Dow Corning*® brand dielectric gels to allow necessary repairs can be assisted by using *Dow Corning*® brands OS Fluids. Additional information regarding these products is available from Dow Corning. 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 MATERIAL SAFETY DATA SHEETS AND CONTAINER LABELS FOR SAFE USE, PHYSICAL AND HEALTH HAZARD INFORMATION. THE MATERIAL SAFETY DATA SHEET IS AVAILABLE ON THE DOW CORNING WEBSITE AT DOWCORNING.COM, OR FROM YOUR DOW CORNING SALES APPLICATION ENGINEER, OR DISTRIBUTOR, OR BY CALLING DOW CORNING 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 Corning dielectric gels are available in batch-matched kits containing both Part A and Part B components. Multiple packaging sizes are available for these products. Please contact your local distributor or Dow Corning 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 Corning has an extensive Product Stewardship organization and a team of Product Safety and Regulatory Compliance (PS&RC) specialists available in each area.

For further information, please see our website, dowcorning.com or consult your local Dow Corning 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 Corning'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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DOW CORNING DISCLAIMS LIABILITY FOR ANY INCIDENTAL OR CONSEQUENTIAL DAMAGES.

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 **dowcorning.com**.

To discuss how we could work together to meet your specific needs, email **electronics@dowcorning.com** or go to **dowcorning.com/contactus** for a contact close to your location. Dow Corning has customer service teams, science and technology centers, application support teams, sales offices and manufacturing sites around the globe.

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