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Technical Data Sheet

DOWSIL™ 3-6635 Dielectric Gel

One-part, clear, low temperature gel

Features & Benefits

- 1-part gel with no mixing required
- Heat cure
- Suitable for very low temperatures (-80 to 200°C / 112 to 392°F)
- Less waste and potential for error with a 1-part material
- Gel remains flexible in very low temperature applications
- Low viscosity allows good flow under components

Application Methods

- Manual or automated equipment

Typical Properties

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

Property	Unit	Result
Viscosity	cP	700
	mPa-sec	700
	Pa-sec	0.7
Specific Gravity (Uncured)		1
Gel Time @ 135°C	minutes	10.8
Rheometer T90 Cure Time @ 100°C	minutes	48
Rheometer T90 Cure Time @ 125°C	minutes	6.6
Rheometer T90 Cure Time @ 150°C	minutes	6.4
Heat Cure Time @ 100°C	minutes	120
Gel Hardness	grams	70
Penetration	1/10 mm	85
Dielectric Strength	volts/mil	525
	kV/mm	20
Dielectric Constant at 100 Hz		2.83
Dielectric Constant at 100 kHz		2.84
Volume Resistivity	ohm*cm	4.8 E+13

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Typical Properties (Cont.)

Property	Unit	Result
Dissipation Factor at 100 hz		0.0002
Dissipation Factor at 100 kHz		< 0.0001
Shelf Life at 25°C	months	6

Description

One-part, low temperature gels such as DOWSIL™ 3-6635 Dielectric Gel exhibit the stability of their properties at temperatures down to -80°C 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

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. 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.

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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. 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 adhesives. 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 plasitcizers, 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. Digestive stripping agents, such as SU100 from Silicones Unlimited, can also be used. 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.

Packaging Information

In general, Dow dielectric gels are available in batch-matched kits containing both Part A and Part B components. Packages that are typically available include 210 mL dual cartridges, one gallon pails, five gallon pails and 55 gallon drums. Not all gels may be available in all packages, and some additional packages and package sizes may be available.

Usable Life And Storage

Storage conditions and shelf life (“Use By” date) are indicated on the product label.

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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Limitations

This product is neither tested nor represented as suitable for medical or pharmaceutical uses.

Handling Precautions

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How Can We Help You Today?

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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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