Product Information
Electronics

DOW CORNING

Dow Corning® 3-1818 Thermally Conductive Adhesive

FEATURES & BENEFITS

- Thixotropic - increased flowability under shear/dispense
- One part heat cure
- Thermally conductive adhesive
- UL 94 V-0 flammability rating
- No added solvents
- No mixing of separate components required
- Rapid, versatile cure processing controlled by temperature
- Able to flow, fill or self-level after dispensing
- Heat flow away from electronic components can increase reliability
- Can be considered for uses requiring added flame resistance
- Contains 7 mil glass beads for controlled Bond Line Thickness

COMPOSITION

- Silicone
- Aluminum Oxide

One-part gray, thixotropic thermally conductive adhesive with good flame resistance

APPLICATIONS

- *Dow Corning*® 3-1818 Thermally Conductive Adhesive is suitable for use in sealing and adhering module assembly components.

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	-	One
Color	-	Gray
Viscosity	cP	76,000
	mPa-sec	76,000
	Pa-sec	76
Thixotropy	NA	3.4
Specific Gravity (Uncured)	-	2.63
Durometer Shore A	-	88
Tensile Strength	psi	625
	MPa	4.3
	kg/cm2	43
Elongation	%	20
Unprimed Adhesion - Lap Shear (Al)	psi	560
	MPa	3.9
	N/cm2	386
Heat Cure Time at 100ºC	minutes	60
Heat Cure Time at 125ºC	minutes	45
Heat Cure Time at 150ºC	minutes	10
Rheometer T90 Cure Time at 125C	minutes	5.6
Dielectric Strength	volts/mil	400
	kV/mm	16
Dielectric Constant at 100 Hz	-	5.6
Dielectric Constant at 100 kHz	-	5.5
Volume Resistivity	ohm*cm	6.85 E+13
Dissipation Factor at 100 hz	-	0.0059
Dissipation Factor at 100 kHz	-	<0.00022
Arc Track Resistance	seconds	328
Linear CTE (by TMA)	ppm/ºC	125
Thermal Conductivity	btu/hr ft degF	0.983
	W/mK	1.7
UL Flammability Classification	NA	94 V-0

DESCRIPTION

The heat-cure, thermally conductive adhesives produce no by-products in the cure process, allowing their use in deep section and complete confinement. These adhesives will develop good, primerless adhesion to a variety of common substrates including metals, ceramics, epoxy laminate boards, reactive materials and filled plastics. Electronic devices are continually designed to deliver higher performance. Especially in the area of consumer electronics, there is also a continual trend towards smaller, more compact designs. In combination these factors typically mean that more heat is generated in the device. Thermal management of electronic devices is a primary concern of design engineers. A cooler device allows for more efficient operation and better reliability over the life of the device. As such, thermally conductive compounds play an integral role here. Thermally conductive materials act as a thermal "bridge" to remove heat from a heat source (device) to the ambient via a heat transfer media (i.e. heat sink). These materials have properties such as low thermal resistance, high thermal conductivity, and can achieve thin Bond Line Thicknesses (BLTs) which can help to improve the transfer of heat away from the device.

SUBSTRATE TESTING

To ensure maximum bond strength for adhesives on a particular substrate, 100 percent cohesive failure of the adhesive in a lap shear or similar adhesive strength test is needed. This ensures compatibility of the adhesive with the substrate being considered. Also, this test can be used to determine minimum cure time or to detect the presence of surface contaminants such as mold release agents, oils, greases and oxide films.

PROCESSING/CURING

Addition-cure silicones should be cured at 100 °C (212 ºF) or aboveThe cure rate is rapidly accelerated with heat (see heat-cure times in Typical Properties table). For thicker sections, a pre-cure at 70 °C (158 ºF) may be necessary to reduce voids in the elastomer Length of pre-cure will depend on section thickness and confinement of adhesive. It is recommended that 30 minutes at 70 °C (158 ºF) be used as a starting point for determining necessary pre-cure time. Addition-curing materials contain all the ingredients needed for cure with no by-products from the cure mechanism. Deep-section or confined cures are possible. Cure progresses evenly throughout the material. These products generally have long working times.

ADHESION

Dow Corning silicone adhesives are specially formulated to provide unprimed adhesion to many reactive metals, ceramics and glass, as well as to selected laminates, resins and plastics. However, good adhesion cannot be expected on non-reactive metal substrates or non-reactive plastic surfaces such as Teflon®, polyethylene or polypropylene. Special surface treatments such as chemical etching or plasma treatment can sometimes provide a reactive surface and promote adhesion to these types of substrates. *Dow Corning*® brand Primers can be used to increase the chemical activity on difficult substrates. For best results, the primer should be applied in a very thin, uniform coating and then wiped off after application. After application, primers should be thoroughly cured prior to application of the silicone elastomer. Poor adhesion can be experienced on plastic or rubber substrates that are highly plasticized, since the mobile plasticizers act as release agents. Small-scale laboratory evaluation of all substrates is recommended before production trials are made. In general, increasing the cure temperature and/or cure time will improve the ultimate adhesion.

USEFUL TEMPERATURE RANGES

For most uses, silicone adhesives 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, for most products, 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 is time and temperature dependent. As expected, the higher the temperature, the shorter the time the material will remain useable.

SOLVENT EXPOSURE

In general, the product is resistance to minimal or intermittent solvent exposure, however best practice is to avoid solvent exposure altogether.

USABLE LIFE AND STORAGE

The product should be stored in its original packaging with the cover tightly attached to avoid any contamination. Store in accordance with any special instructions listed on the product label. The product should be used by the indicated Exp. Date found on the label.

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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 WEB SITE AT DOW CORNING.COM, OR FROM YOUR DOW CORNING SALES APPLICATION ENGINEER, OR DISTRIBUTOR, OR BY CALLING DOW CORNING 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 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.

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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.

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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.

We help you invent the future.™

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