Technical Data Sheet

DOWSIL™ TC-1500 Adhesive

One-part thermally conductive silicone adhesive curing at room temperature with moisture exposure

FEATURES & BENEFITS

- Neutral cure
- Short tack-free time
- High thermal conductivity at 1.55 W/mK
- Easy to use without mixing
- Room temperature curing without heating

COMPOSITION

- 1-part, white
- Polydimethylsiloxane

APPLICATION METHODS

- Manual or automated dispensing

APPLICATIONS

- Electric motor assembly
- Controller module
- Power module etc.

TYPICAL PROPERTIES

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

Property	Unit	Result
Appearance		white
Specific Gravity (Uncured)		2.32
Tack-Free Time at 25°C	minutes	2
Extrusion Rate	g/min	400
Flow Rate - Slump	in cm	0.1 0.2
Tensile Strength	psi MPa kg/cm^2	394 2.7 27
Durometer Shore A		82
Unprimed Adhesion - Lap Shear (Al)	psi MPa N/cm^2	210 1.4 140
Thermal Conductivity (hot disk)	btu/hr ft °F W/mK	0.9 1.55
Dielectric Constant at 100 Hz		4.3
Dissipation Factor at 100 Hz		0.06
Dielectric Constant at 100 kHz		3.5
Dissipation Factor at 100 kHz		0.08
Volume Resistivity	ohm*cm	5E+15
Dielectric Strength	volts/mil kV/mm	450 18

DESCRIPTION

DOWSIL™ TC-1500 Adhesive one-part RTV-cure thermally conductive material cures with moisture exposure to produce durable, relatively low-stress elastomer with a noncorrosive byproduct.

Long-term, reliable protection of sensitive circuits and components is important in many of today's delicate and demanding PCB system assemblies. With the increase in processing power and the trend toward smaller, more compact modules, the need for thermal management is growing. Thermally conductive silicones function as heat transfer media, durable dielectric insulation, barriers against environmental contaminants and as stress-relieving shock and vibration absorbers over a wide temperature and humidity range.

In addition to sustaining their physical and electrical properties over a broad range of operating conditions, silicones are resistant to ozone and ultraviolet degradation and have good chemical stability. Good heat transfer is dependent on a good interface between the heat producing device and the heat transfer media. Silicones have a low surface tension that enables them to wet most surfaces, which can lower the thermal contact resistance between the substrate and the material.

SUBSTRATE TESTING

To ensure maximum bond strength or 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

The one-part moisture-cure adhesives are generally cured at room temperature and in a range of 0 to 80 percent relative humidity. Greater than 90 percent of their full physical properties should be attained within 4 to 7 hours depending on the product chosen. These materials are not typically used for highly confined or deep section cures. Materials will generally cure about 0. 5 inch (6.35 mm) per 7 days.

ADHESION

Dow 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 fluorinated materials, 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 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 air dried prior to application of the silicone elastomer. Alternatively, use a low-viscosity primerless adhesive to pot your components. 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 silicones is time and temperature dependent. As expected, the higher the temperature, the shorter the time the material will remain useable.

SOLVENT EXPOSURE

Although highly filled silicones such as those discussed in this data sheet are generally more resistant to solvent or fuel exposure, standard silicones are intended only to survive splash or intermittent exposures. Testing should be done to confirm performance of the adhesives in the application and under the specified environmental conditions.

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 By” date found on the product label. Forbest results, Dow thermally conductive materials should be stored at or below 30°C (86°F).

DOWSIL TC-1500 Adhesive has a shelf life of 6 months from date of production. Special precautions must be taken to prevent moisture from contacting these materials. Containers should be kept tightly closed and head or air space minimized.

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.

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