Technical Data Sheet

DOWSIL™ TC-4525 Thermally Conductive Gap Filler

FEATURES & BENEFITS

- Thermal conductivity: 2.5 W/m·K
- Room temperature cure
- Long term performance stability during temperature cycling up to 150°C
- Withstand peak exposure at 200°C
- Holds vertical position (cured or uncured state)
- UL 94 V-0 certification
- Glass Beads option (180 micron)
- Control volatility option available

COMPOSITION

- Silicone gel matrix for long term reliability
- Treated alumina to enhance thermal conductivity while managing stability of bulk properties
- Platinum cure system for a fast controlled cure

2.5 W/m·K Silicone Gap Filler material for automotive applications, two part material curing at room temperature

APPLICATIONS

- DOWSIL™ TC-4525 Thermally Conductive Gap Filler is a soft and compressible material once cured, designed to dissipate the heat from components mounted on printed circuit board to heat sink providing a reliable cooling solution for modules like an engine or transmission control unit.
- This material is specifically designed for a smooth assembly process line integration ideally suited for automated dispensing with meter mix equipment.

TYPICAL PROPERTIES

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

Test*	Property	Unit	Result
CTM 0176B	One or two part	-	Two
CTM 0176B	Mix ratio (weight or volume)	-	1:1
CTM 0176B	Color A/B	-	White/blue
CTM 1094C	Viscosity, part A Viscosity, part B Viscosity, mixed	Pa.s Pa.s Pa.s	207 193 217
CTM 1094N	Thixotropic mixed *Steady shear: 1 s^{-1}/10 s^{-1}*	-	4.3
CTM 022B	Specific gravity mixed	-	2.9
ASTM D7750	Working time at 25°C	minutes	40
CTM 0099	Cure time at 25°C at 50°C at 80°C	minutes minutes minutes	120 20 10
CTM 0099	Hardness	Shore 00	55
CTM 1163A	Thermal conductivity *by Transient method*	W/m·K	2.6
ASTM D5470	Thermal resistivity at 85 µm at 115 µm at 309 µm	°C/W	0.42 0.73 1.23

*CTM: Corporate Test Method, copies of CTM's are available on request.
ASTM: American Society for Testing and Materials

TYPICAL PROPERTIES (continued)

Test*	Property	Unit	Result
DIN 51007	Heat capacity at 20°C	J/g·°C	0.9
	at 100°C		1.04
	at 150°C		1.09
ASTM E831	Coefficient of thermal expansion		
	-50 to 80°C	ppm/K	95
	-50 to 150°C	ppm/K	123
JIS K 6249	Volume resistivity	Ohm-cm	2.4E+14
ASTM D149	Dielectric strength	kV/mm	18
JIS K 6249	Dissipation factor at 1 MHz	-	4E-3
JIS K 6249	Dielectric constant at 1 MHz	-	6.6
	Shelf life at 25°C	days	300

*DIN: Deutsche Industrie Norm
JIS: Japanese Industrial Standard

DESCRIPTION

DOWSIL TC-4525 Thermally Conductive Gap Filler is a soft and compressible material capable to dissipate the heat from the heat source (typically a printed circuit board) to the cold source (typically aluminum housing acting as a heat sink).

This material has been specifically designed to provide reliable cooling performance in automotive modules due to the stability of properties during typical environmental exposure simulating the entire operating life of the module.

DOWSIL TC-4525 Thermally Conductive Gap Filler is supplied as a two-part liquid component kits. When the liquid components are thoroughly mixed either by weight or volume, the mixture cures to a soft elastomer. These elastomers cure without exotherm at a constant rate regardless of sectional thickness or degree of confinement. Dow thermally conductive gap fillers require no post-cure and can be placed in service immediately at operating temperatures of -45 to 150°C following the completion of the cure schedule. Exposure at higher temperature up to 200°C is allowed for short period.

Thermally conductive silicones function as heat transfer media, with long-term, reliable protection of sensitive circuits, provide a durable dielectric insulation, and are 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.

HOW TO USE

Two-part materials should be mixed in the proper ratio either by weight or volume. The presence of light-colored streaks or marbling indicates inadequate mixing. Automated airless dispense equipment can be used to reduce or avoid the need to de-air. If de-airing is required to reduce voids in the cured elastomer, consider a vacuum de-air schedule of > 8 inches Hg (or a residual pressure of 10–0 mm of Hg) for 10 minutes or until bubbling subsides.

Although the formulation design of DOWSIL TC-4525 Thermally Conductive Gap Filler is made to minimize the risk of filler settlement, upon standing, in rare occasion some filler may settle to the bottom of the liquid after several weeks. Should that be the case, in order to ensure a uniform product mix, the material in each container should be thoroughly mixed prior to use.

PROCESSING/CURING

Addition-cure materials can be cured at room temperature or with heat. The cure rate is rapidly accelerated with heat (see cure times in Typical Properties table). Cure progresses evenly throughout the material.

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.

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POT LIFE AND CURE RATE

Cure reaction begins with the mixing process. Initially, cure is evidenced by a gradual increase in viscosity, followed by gelation and conversion to its final state. Cure reaction begins with the mixing process. Initially, cure is evidenced by a gradual increase in viscosity, followed by gelation and conversion to its final state. Working time is defined as the time required for viscosity to double after Parts A and B (base and curing agent) are mixed.

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. Any special storage and handling instructions will be printed on the product containers.

For best results, Dow thermally conductive materials should be stored at or below the maximum specified storage temperature. 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. Any special storage and handling instructions will be printed on the product containers.

PACKAGING INFORMATION

Multiple packaging sizes are available for this product.

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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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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