



Technical Data Sheet

DOWSIL™ TC-4515 Thermal Gap Filler

Thermal Silicone Gap Filler, two part material curing at room temperature

Features & Benefits

- Thermal conductivity: > 1.8 W/m.K
- Room temperature cure or heat accelerated cure
- Long term performance stability during temperature cycling up to 150°C
- Holds vertical position (cured or uncured state)
- UL 94 V-0 and CTI ≥ 600 certifications
- Glass Beads option (180 & 250 micron)

Applications

DOWSIL™ TC-4515 Thermally Conductive Gap Filler is a soft and compressible material once cured, designed to dissipate the heat from electronics 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 0176 B	One or Two-part		Two
CTM 0176 B	Mix Ratio (weight or volume)		1:1
CTM 0176 B	Color A/B		White / Blue
CTM 1094 R	Viscosity at 10 s ⁻¹ , Part A / Part B	Pa.s	215 / 230
CTM 1094 R	Viscosity at 10 s ⁻¹ , Mixed	Pa.s	240
CTM 1094 N	Thixotropic index (1 s ⁻¹ /10 s ⁻¹), Mixed		5
CTM 1094 R	Working Time @ 25°C	minutes	60
CTM 0540 A	Specific Gravity (uncure), Part A / Part B		2.7 / 2.7
CTM 0099	Cure time at 25°C / 80°C	minutes	150 / 30
CTM 0099	Hardness	Shore 00	50
ASTM D5470 /CTM69	Thermal Conductivity	W/m.K	> 1.8
ASTM E1269-11	Specific Heat Capacity at 40°C / 150°C	J/g.°C	1.0 / 1.2
ASTM E831	Coefficient of Thermal Expansion (-50 to 150°C)	ppm/K	160
CTM 1140	Minimum BLT at 0.1 MPa (without GB)	micron	40
DMA in shear mode	E-modulus	MPa	0.3

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Typical Properties (Cont.)

Test	Property	Unit	Result
CTM 0114	Dielectric Strength	kV/mm	16
CTM 0249	Volume Resistivity	Ohm.cm	8.13E+14
CTM 0112	Dielectric Constant / Dissipation Factor at 1kHz		4.3 / 4E-3
	Shelf life at 25°C	months	9

Description

DOWSIL™ TC-4515 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 electronic modules due to the stability of properties during typical environmental exposure simulating the entire operating life of the module.

DOWSIL™ TC-4515 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 exothermal reaction at a constant rate regardless of sectional thickness or degree of confinement.

DOWSIL™ TC-4515 Thermally Conductive Gap Filler 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. 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. Static Mixer is recommended for manual and automated mixing.

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-4515 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.

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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.

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 are mixed.

Useful Temperature Ranges

For most uses, DOWSIL™ TC-4515 Thermally Conductive Gap Filler should be operational over a temperature range of -50 to 150°C 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.

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 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, DOWSIL™ TC-4515 Thermally Conductive Gap Filler 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. Please contact your local distributor or Dow.
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, consumer.dow.com or consult your local Dow representative.
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 www.consumer.dow.com . 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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