Technical Data Sheet

DOWSIL™ TC-4060 Thermally Conductive Gel

6 W/m.K silicone gel, two part material curing at room temperature

Features & Benefits

- Room temperature cure with optional heat acceleration.
- 100% silicone (PDMS).
- Glass beads option (250 micorn).
- Easy processing.
- Meets ASTM E595 outgassing requirements.

Applications

- DOWSIL™ TC-4060 Thermally Conductive Gel is a soft and compressible material once cured, designed to dissipate the heat from component mounted on printed circuit board to heat sink providing a reliable cooling solution.
- This material is designed for a smooth assembly process line integration ideally suited for automated dispensing with meter mix equipment.
- Common applications: Telecom power supply units, high-frequency devices (5G), converter/inverter, onboard chargers, electronic control units.

Typical Properties

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

Test[1]	Property	Unit	Result
	One or Two-part		Two
	Mix Ratio		1:1
CTM 0176B	Appearance A/B		White/blue
ASTM D 4440	Viscosity Part A $1s^{-1}$	mPa-Sec	450.000
ASTM D 4440	Viscosity Part A $10s^{-1}$	mPa-Sec	120.000
ASTM D792	Specific Gravity Part A		3,5
ASTM D 4440	Viscosity Part B $1s^{-1}$	mPa-Sec	540.000
ASTM D 4440	Viscosity Part B $10s^{-1}$	mPa-Sec	130.000
ASTM D792	Specific Gravity Part B		3,5
ASTM D 4440	Viscosity Mixed $1s^{-1}$	mPa-Sec	450.000
	Cure Time at 22°C	hour	24
	Cure Time at 80°C	min	30
ASTM D 1824	Pot Life at 22°C	min	80

1. CTM: Corporate Test Method; copies of CTMs are available on request.
ASTM: American Society for Testing and Materials.

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Form No. 11-4241-01-0626A S2D

Typical Properties (Cont.)

Test	Property	Unit	Result
ASTM D 2240	Durometer after 24 h at 25°C	Shore 00	55
ASTM D 2240	Durometer after 1 h at 110°C	Shore 00	58
CTM 1163 A ASTM D5470	Thermal Conductivity	W/m.K W/m.K	6 5,6
	CTE	ppm/°C	230
	Dielectric Strength	kV/mm	9
	Volume Resistivity	Ohm.cm	4E+12

Description

DOWSIL™ TC-4060 Thermally Conductive Gel 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. 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.

Application Methods

- Automated metered mixing and dispensing

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 > 203 mm of Hg (or a residual pressure of 10 to 0 mm of Hg) for 10 minutes or until bubbling subsides.

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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. 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.

The minimum bond line thickness (BLT) of uncured material can be achieved as followed on the below.

Uncured DOWSIL™ TC-4060 Thermally Conductive Gel vs Pressure

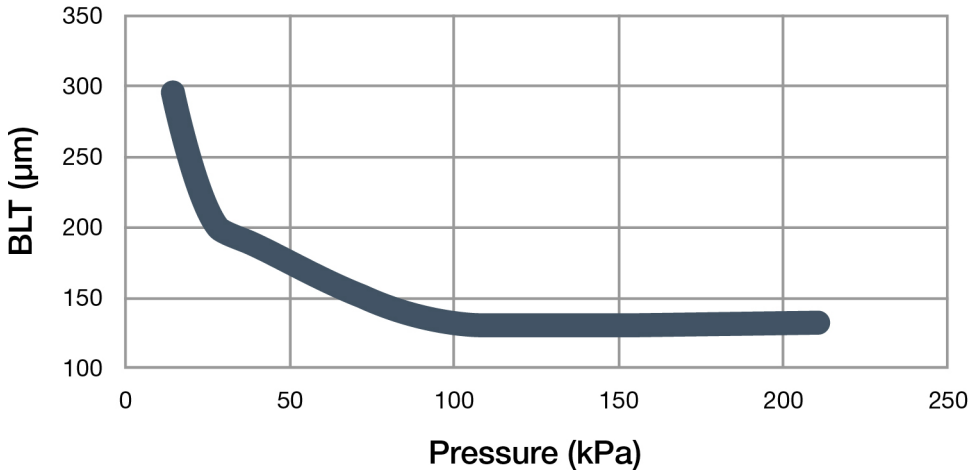


Figure 1: BLT of uncured DOWSIL™ TC-4060 Thermally Conductive Gel

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. Pot life is defined as the time required for viscosity to double after parts A and B are mixed.

Useful Temperature Ranges

Silicone thermal gels can withstand temperatures from -40 to 200 °C under certain conditions; thermal stability is dependent on exposure duration and application-specific factors.

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 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.

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.

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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, dow.com, or consult your local Dow representative.

Disposal Considerations

Dispose in accordance with all local, state (provincial) and federal regulations. Empty containers may contain hazardous residues. This material and its container must be disposed in a safe and legal manner.

It is the user's responsibility to verify that treatment and disposal procedures comply with local, state (provincial) and federal regulations. Contact your Dow Technical Representative for more information.

Product Stewardship

Dow has a fundamental concern for all who make, distribute, and use its products, and for the environment in which we live. This concern is the basis for our product stewardship philosophy by which we assess the safety, health, and environmental information on our products and then take appropriate steps to protect employee and public health and our environment. The success of our product stewardship program rests with each and every individual involved with Dow products — from the initial concept and research, to manufacture, use, sale, disposal, and recycle of each product.

Customer Notice

Dow strongly encourages its customers to review both their manufacturing processes and their applications of Dow products from the standpoint of human health and environmental quality to ensure that Dow products are not used in ways for which they are not intended or tested. Dow personnel are available to answer your questions and to provide reasonable technical support. Dow product literature, including safety data sheets, should be consulted prior to use of Dow products. Current safety data sheets are available from Dow.

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To discuss how we could work together to address your specific needs, go to **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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