



Technical Data Sheet

DOWSIL™ TC-5533 Thermally Conductive Gap Filler

Two part, room temperature curing, controlled volatility, 3 W/m·K thermally conductive silicone gap filler designed for effective thermal management of battery modules

Features & Benefits

- Thermal conductivity: 3 W/m·K
- Room temperature or heat-accelerated cure
- Controlled siloxane volatility
- Stays in place
- Long term performance stability during temperature and humidity cycling
- Holds vertical position (cured or uncured state)
- Low assembly forces
- Dispensing equipment friendly – low abrasion, wide application process range

Composition

- Silicone polymer matrix for long-term reliability
- Treated ceramic fillers to enhance thermal conductivity and low abrasion
- Platinum cure system for a fast controlled cure

Applications

- DOWSIL™ TC-5533 Thermally Conductive Gap Filler is a soft and compliant material once cured, designed to dissipate heat from EV modules or other heat-generating components

Typical Properties

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

Test ¹	Property	Unit	Result
CTM 0176	One or Two-part		Two
CTM 076	Mix Ratio (Weight or Volume)		1:1
CTM 0176, ASTM E284	Color – Part A		White
	Color – Part B		Blue
CTM 1094, ASTM D4287	Viscosity at 10 s ⁻¹ , Part A	Pa·s	50
CTM 1094, ASTM D4287	Viscosity at 10 s ⁻¹ , Part B	Pa·s	50
CTM 1094, ASTM D4287	Viscosity at 10 s ⁻¹ , Mixed	Pa·s	50
CTM 1094, ASTM D4287	Thixotropic Index, Mixed (1 s ⁻¹ /10 s ⁻¹)		5–6

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

Typical Properties (Cont.)

Test	Property	Unit	Result
CTM 1094, ASTM D4287	Working Time at 25°C	Min	60
CTM 0044, ASTM D792	Density (Cured) at 25°C		2.6
CTM 0099, ASTM D 2240	Cure Time at 25°C ²	Hours	24
CTM 0099, ASTM D 2240	Hardness	Shore 00	65
ASTM D5470	Thermal Conductivity	W/m·K	3.0
CTM 0114, ASTM D149	Dielectric Strength (Cured)	kV/mm	11
UL ³ 94	UL Flame Classification		UL 94 V0
	Shelf Life at 25°C	Month	6

2. Time required to achieve vertical stability for thin bond lines. Full cure may take up to 7 days at 25°C.
3. Underwriters Laboratories

Description

DOWSIL™ TC-5533 Thermally Conductive Gap Filler is a soft and compressible material capable of dissipating a heat from a heat source (typically a battery module) to the cold source (typically a cooling unit of EV Batteries). This material has been specifically designed to provide effective thermal management in EV batteries due to the stability of properties during typical environmental exposure simulating the entire operating life of the battery unit.

DOWSIL™ TC-5533 Thermally Conductive Gap Filler is supplied as a two-part liquid component kit. When the liquid components are thoroughly mixed 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-5533 Thermally Conductive Gap Filler requires no post-cure and can be placed into service immediately at operating temperatures of -45°C to 125°C. High temperature exposure (up to 200°C) is acceptable for short periods.

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 temperature and humidity range typical for EV batteries.

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 mixing is recommended for manual and automated mixing. The presence of light-colored streaks or marbling indicates inadequate mixing and a more effective static mixer should be used.

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 material, consider a vacuum de-air process.

How to Use (Cont.)	Upon standing a clear fluid layer may appear on the surface of the material. Dow suggests purging/burping this fluid along with any air that may have been introduced when loading new containers. Most material transfer pumps contain purge taps/ports on the pump discharge to bleed trapped air and/or fluids during material change-over.
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.
Material Cure	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 (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 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-5533 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.
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.

dow.com

NOTICE: No freedom from infringement of any patent owned by Dow or others is to be inferred. Because use conditions and applicable laws may differ from one location to another and may change with time, Customer is responsible for determining whether products and the information in this document are appropriate for Customer's use and for ensuring that Customer's workplace and disposal practices are in compliance with applicable laws and other government enactments. The product shown in this literature may not be available for sale and/or available in all geographies where Dow is represented. The claims made may not have been approved for use in all countries. Dow assumes no obligation or liability for the information in this document. References to "Dow" or the "Company" mean the Dow legal entity selling the products to Customer unless otherwise expressly noted. NO WARRANTIES ARE GIVEN; ALL IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE ARE EXPRESSLY EXCLUDED.

