Technical Data Sheet

Carbice® Pad Silicone Wax (SW) Series

Thermal Interface Material (TIM) Pad Combining Carbon Nanotubes and Silicone Wax

Features & Benefits

- Prefabricated pad is not subject to pump-out like traditional greases
- TIM with advanced performance and surface wettability compared to precured pads
- Enhanced temperature range and stability provided by the silicone wax
- Tacky, but non-adhesive behavior allows for system rework and simple TIM removal
- Eliminates hotspots with thermal conductivity through plane of 12 W/mK and in plane of 200 W/mK
- Aligned CNTs enhance compressibility compared to other carbon-based solutions

Composition

- Vertically aligned carbon nanotubes grown from aluminum foil substrate infiltrated with silicone wax
- Available in thickness of 90, 150, 180, and 300 µm
- Cut to customer specific shape and size

Applications

- TIMs in power & energy, AI and data centers, automotive and EV, telecom 5G
- Interfaces in power modules (IGBT, MOSFET), processors and chips (CPU, GPU, TPU, ARM, ASIC), heat sinks and cold plates (air, liquid, immersion), EV batteries and chargers, antenna and radar, ADAS, camera, and Lidar

Typical Properties

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

Test	Property	Unit	Result
ASTM[1] D5470	Thermal Conductivity — Through Plane	W/mK	12
ASTM B209	Thermal Conductivity — In Plane	W/mK	200
ASTM D5470	Thermal Resistance at 90 micron	°C-cm^2/W	<0.1

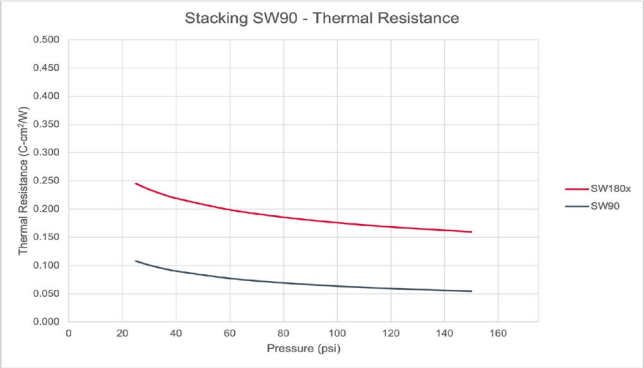
1. ASTM: American Society for Testing and Materials

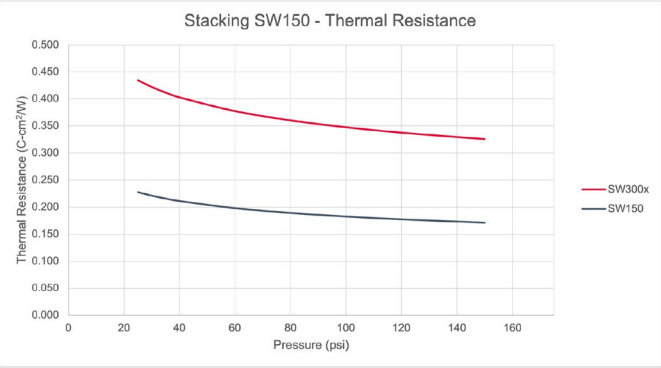
Typical Properties (Cont.)

Test	Property	Unit	Result
CTM[2] 0176, ASTM E284	Color		Black
	Thickness	Micron	As Specified
CTM 0243	Lap Shear Adhesion	MPa	0.02
	Assembly Tack		
	Operating Temperature	°C	-55 to 150
	Activation Temperature	°C	45
CTM 0313, ASTM D257	Volume Resistivity	Ohm-cm	~1E-5

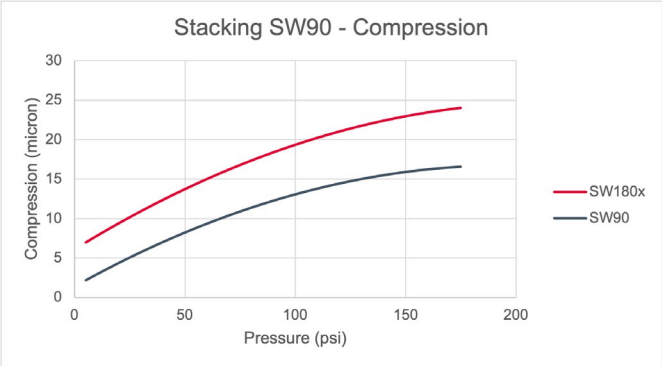
2. CTM: Corporate Test Method; copies of CTMs are available on request.

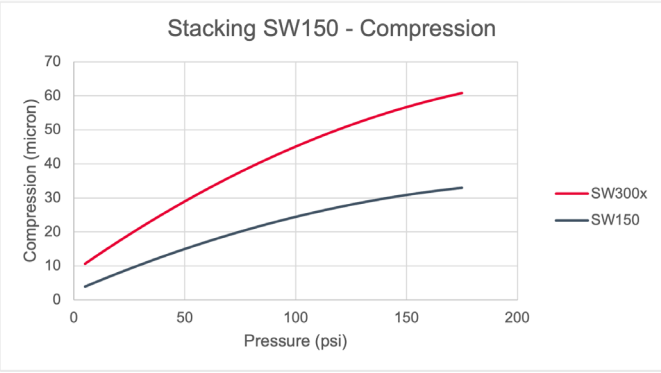
ASTM Thermal Resistance vs. Pressure





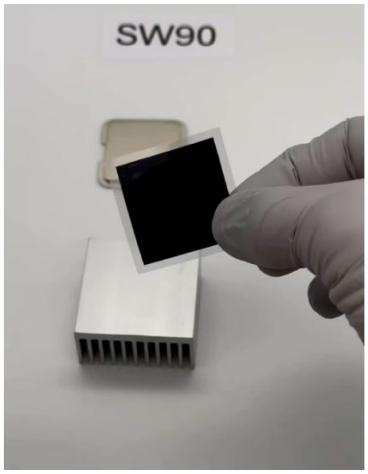
ASTM F36 Compression vs. Pressure

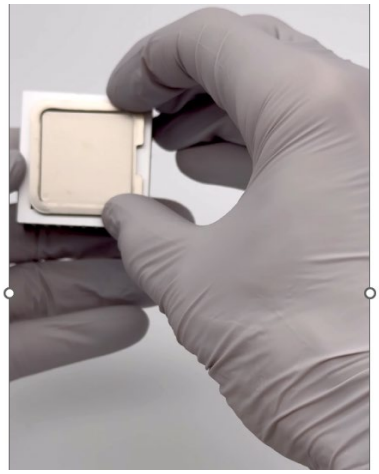




Product Name	Nominal Thickness (micron)	CNT Thickness (micron)	Number of Layers
SW90	90	40	1
SW180x	180	80	2
SW150	150	100	1
SW300x	300	200	2

Application and Installation





Assembly Process

- Manual Peel-and-Stick
- Automated Pick & Place Machine

Handling Information

1. Avoid creasing or wrinkling of pad
2. Pad is provided with protective liners to avoid dust and debris
3. Remove one of the protective liners to attach pad to the interface
4. Press firmly on the remaining liner side to ensure pad adheres well on the interface
5. Remove the remaining protective liner before install

Installation Information

Reflow pad at elevated temperature to achieve the best thermal and mechanical performances,

1. Minimum polymer activation temperature: > 45°C
2. Both heat source and sink sides of the interface should exceed the activation temperature to achieve full performance
3. Recommended time: 30 minutes (for testing or evaluation)
4. Actual optimal reflow times depend on design and can often be accomplished through normal operation of your device

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.

Storage

Room temperature storage avoid elevated T > 40°C until use

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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