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Technical Data Sheet

Thermstrate® 2000

High Performance Phase Change
Thermal Interface Material

Electronic Products. October 2002

PRODUCT DESCRIPTION

Thermstrate® 2000 is a phase change thermal interface material suitable for use between a heat sink and a variety of heat dissipating components. This product is supplied as a dry compound coated onto an aluminum substrate. The compound flows at the phase change temperature and conforms to the surface features of the heat sink and component. Upon flow, and in conjunction with component mounting pressure air is expelled from the interface, reducing thermal impedance and enabling the material to perform as a highly efficient thermal transfer material.

Thermstrate is supplied as die-cut preforms to match a wide variety of electronic components. Custom parts are also available upon request.

TYPICAL APPLICATIONS

DC/DC converters, solid state relays, power transistors, power modules, IGBT's, RF components etc. Typically used between any heat dissipating electrically isolated component and a heat sink or thermal solution. Thermstrate 2000 is a superior replacement for messy thermal greases and similar interface compounds.

MATERIAL PROPERTIES

Thermstrate 2000 is supplied in a range of compound thicknesses to match surface finish and flatness considerations in the interface area. Data for the two most common thicknesses is supplied below.

	Units	AL	ALXXH
Substrate		Type #1145 Aluminum	
Substrate Thickness	inches	.002	.002
	mm	.051	.051
Compound Thickness (minimal, each side)	inches	.0005	.001
	mm	.013	.025
Total Thickness	inches	.003	.004
	mm	.076	.102
Thermal Impedance @ 20psi ASTM D5470	°C-in ² /W	.030	.058
	@137.8 KPa, ASTM D5470	°C-cm ² /W	.194
Thermal Impedance @100psi ASTM D5470	°C-in ² /W	.020	.036
	°C-cm ² /W	.129	.232

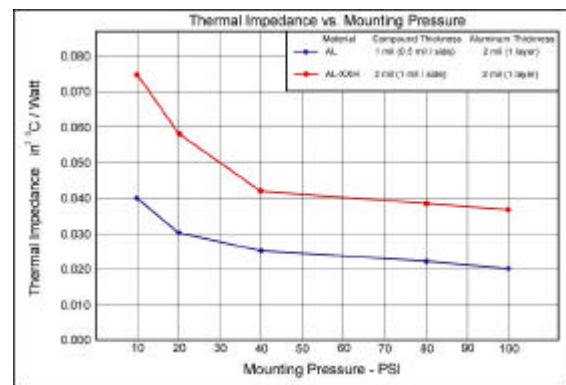
PHYSICAL PROPERTIES, PHASE CHANGE THERMAL COMPOUND

Phase change temperature	60°C
Volumetric expansion upon phase change	15%
Viscosity above phase change temperature	Thixotropic

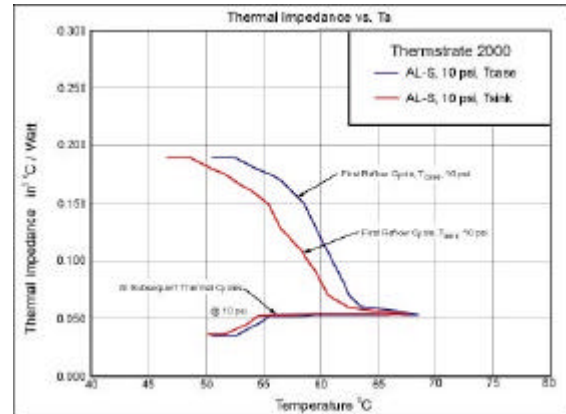
PRODUCT PERFORMANCE

Thermal Impedance vs Mounting Pressure

The performance of any phase-change thermal interface material will be improved by increasing the mounting pressure at the interface. The graph below shows the thermal impedance values generated on an ASTM D5470 platform. The test block dimensions are 2" x 2"(5.08 x 5.08 cm), the finish is 64 microinches and the flatness is .002 inches/inch (.0008 cm/cm). The power level is 80 watts.



PRODUCT CHARACTERISTICS



The graph above shows the typical performance for Thermstrate 2000 when placed between a device and a heat sink, under a clamp load of 10psi. The temperature at the device and the heat sink are recorded. During the first reflow cycle, i.e. prior to phase change, Thermstrate 2000 exhibits relatively high thermal impedance. Once the material has changed phase one time, all subsequent thermal cycles will see the thermal impedance values indicated as the lower curve trace on the graph.

NOT FOR PRODUCT SPECIFICATIONS
THE TECHNICAL DATA CONTAINED HEREIN ARE INTENDED AS REFERENCE ONLY.
PLEASE CONTACT LOCTITE CORPORATION APPLICATION ENGINEERING FOR ASSISTANCE AND RECOMMENDATIONS ON SPECIFICATIONS FOR THIS PRODUCT.

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Operating Temperature Range

Tests have confirmed that Thermstrate® 2000 can be used up to 150°C.

Surface Conditions

There are several versions of Thermstrate. These versions have been developed to address the variables associated with a wide range of applications. As a general recommendation, we suggest:

Surface finish	64 microinches or better 1.6 microns or better
Surface flatness	.002 inches/inch or better .002 cm/cm or better

GENERAL INFORMATION

For safe handling information on this product, consult the Material Safety Data Sheet, (MSDS).

Thermstrate 2000 is completely reworkable without solvents. No foreign residue remains after disassembly. A replacement pad can be installed without any further cleaning. If a clean surface is required, any of the phase change compound present can be easily removed with mineral spirits.

Thermstrate 2000 is not sensitive to mounting orientation due to its thixotropic rheology. This product contains no silicones and will not migrate from the interface area.

Pretooled die cut pads are available for over one thousand commonly used electronic devices. Thermstrate® 2000 is available as single die cut pads or on continuous rolls for high volume production.

Thermstrate 2000 is also available with adhesive edge strips for ease of assembly. In this case, the pad will be oversized so that the adhesive is outside the thermal path. This enables the adhesive to be provided without compromising the thermal performance of the portion of the pad in the contact area of the thermal path.

Directions for use

Complete directions for use are available by calling Loctite Laguna Hills, CA at 949-582-6712.

Reliability Considerations:

Extensive use of Thermstrate in military/aerospace applications, and high performance industrial environments, has demonstrated the long term enhancement of system reliability figures as a result of improving the heat transfer from high power dissipation components.

Storage

Prior to assembly products shall ideally be stored in a cool, dry location in original packaging at temperatures below 40°C (104°F). Under these conditions the shelf life is indefinite. Thermstrate 2000 can be applied to heat sinks, which are then shipped to a final assembly location as long as the temperature does not exceed the level indicated above.

Note

The data contained herein are furnished for information only and are believed to be reliable. We cannot assume responsibility for the results obtained by others over whose methods we have no control. It is the user's responsibility to determine suitability for the user's purpose of any production methods mentioned herein and to adopt such precautions as may be advisable for the protection of property and of persons against any hazards that may be involved in the handling and use thereof. In light of the foregoing, **Loctite Corporation specifically disclaims all warranties**

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