Technical Data Sheet

Thermstrate ® TC

November 2002

PRODUCT DESCRIPTION

Thermstrate® TC 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 in bar form, packaged in a unique easy to use applicator, which flows in the installation at the phase change temperature and conforms to the surface features of the heat sink and component. Upon flow, air is expelled from the interface, reducing thermal impedance and the material performs as a highly efficient thermal transfer medium.

Thermstrate TC is a convenient alternative to die cut preforms. Custom parts of the equivalent preformed material, Thermstrate 2000, are available upon request for a wide range of applications.

TYPICAL APPLICATIONS

Micro processors, hybrid power modules, 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.

MATERIAL PROPERTIES

One application of Thermstrate TC results in a compound coating thickness of approximately 0.25 mils (0.00635mm). Data for this coating thickness is provided below.

	Units	Thermstrate TC
Substrate		
Compound Thickness (Nominal)	inches mm	.00025 .00635
Thermal Impedance @ 20psi ASTM D5470 @137.8 KPa, ASTM D5470	°C-in^2/W °C-cm^2/W	.015 .097
Thermal Impedance @100psiASTM D5470 @689.5 KPa, ASTM D5470	°C-in^2/W °C-cm^2/W	.010 .065

PHYSICAL PROPERTIES

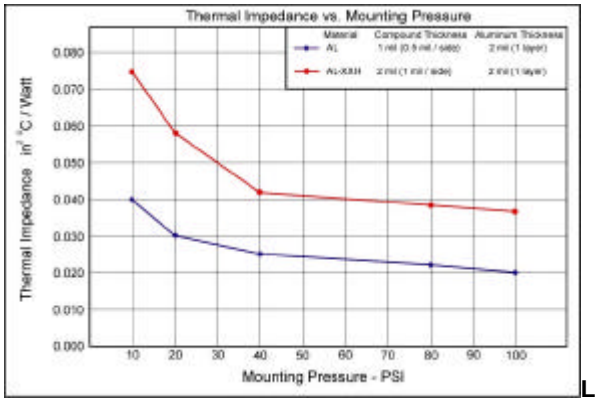
Part Number (Standard)	TC-175-125
Phase change temperature	60°C
Volumetric expansion upon phase change	15%
Viscosity above phase change temperature	Thixotropic
Color	Opaque White

No silicones in the compound formulation.

PRODUCT PERFORMANCE

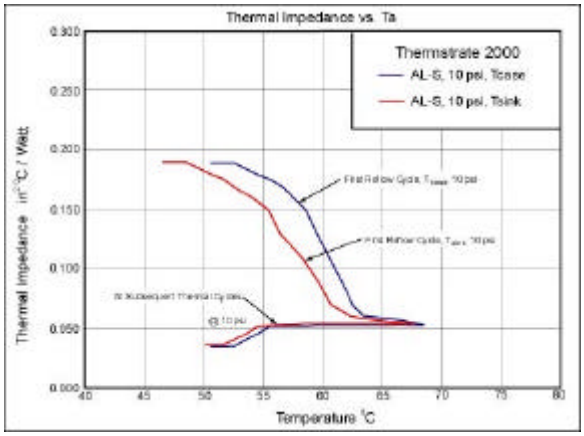
Thermal Impedance vs Mounting Pressure

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", the finish is 64 microinches and the flatness is .002 inches/inch. The power level is 80 watts.



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PRODUCT CHARACTERISTICS



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

NOT FOR PRODUCT SPECIFICATIONS
THE TECHNICAL INFORMATION CONTAINED HEREIN IS INTENDED AS REFERENCE ONLY. PLEASE CONTACT LOCTITE CORPORATION QUALITY DEPARTMENT FOR ASSISTANCE AND RECOMMENDATIONS ON SPECIFICATIONS FOR THIS

Henkel Technologies

Operating Temperature Range
Tests have confirmed that Thermstrate TC can be used reliably up to 150°C.

Surface Conditions
Typical interface surface conditions are quoted below:

Surface finish	64 microinches or better 1.6 microns or better
Surface flatness	.002 inches/inch or better .001 cm/cm or better

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

Thermstrate TC is completely reworkable. No foreign residue remains after disassembly. If, due to the need for repair or rework of the installation, a second application of the Thermstrate TC can be made without the need for cleaning of interface surfaces. If a clean surface is required, any residual phase change compound present can be easily removed with mineral spirits.

While Thermstrate TC is supplied as a convenient to use applicator bar, pretooled pads are available for over one thousand commonly used electronic devices. Thermstrate 2000 may be available as single die cut pads, on multi-pad sheets, or on continuous rolls for high volume production

Application Recommendations
Reasonable flatness and surface conditions should apply to both mating surfaces. Flatness specification for one mating surface of 0.002 in/in is typical of a reasonable flatness and finish specifications work well with this product.

These applicator bars are designed in a width that has been highly successful as a low-cost application for microprocessor heat sinks. They are typically used with one “swipe” to make a very acceptable compound application of appropriate thickness and consistency for typical microprocessor heat sinks.

Application of this material should be simple with little requirement for repeated application on the same surface. No dispensing or squeegeeing equipment is required.

The TC Applicator Bar can be used on an unlimited variety of heat sinks, cold plates, or other component designs, maximizing flexibility. They are intended to be used to deliver a minimum coating thickness on any heat transfer device.

Complete directions for use are available via contact with Loctite Laguna Hills, CA at (949) 582-6712.

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 can be applied to heat sinks which are then shipped to a final assembly location as long as the temperature does not exceed that stated above.

Note
The data contained hereon 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 the light of the foregoing**, Loctite Corporation specifically disclaims all warranties expressed or implied, including warranties of merchantability or fitness for a particular purpose, arising from the sale or use of Loctite Corporation’s products. Loctite Corporation specifically disclaims any liability for consequential or incidental damages of any kind including lost profits.** The discussion herein of various processes or compositions is not to be interpreted as representation that they are free from license under any Loctite Corporation patents that may cover such processes or compositions. We recommend that each prospective user test his proposed application before repetitive use, using this data as a guide. This product may be covered by one or more United States or foreign patents or patent applications.

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Henkel Loctite Corporation, 26941 Cabot Road, Bldg 124, Laguna Hills, CA 92653, U.S.A.
U.S.A.: 949.582.6712 Canada: 905.814.6511 Brazil: 011.55.11.4143.7000
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