



# THERMSTRATE 2000

October 2012

## PRODUCT DESCRIPTION

THERMSTRATE 2000 provides the following product characteristics:

<b>Technology</b>	Phase Change
<b>Appearance</b>	Gray
<b>Operating Temperature Range</b>	up to 150°C
<b>Application</b>	Thermal management
<b>Typical Assembly Applications</b>	DC-DC converters, Solid state relays, Power transistors, Power modules, IGBT, RF components or Used between any non-isolated heat dissipating component and a heat sink or chassis

THERMSTRATE 2000 phase-change thermal interface material is 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 is designed to flow at the phase change temperature, conforming 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, performing as a highly efficient thermal transfer material.

THERMSTRATE 2000 is a superior replacement for messy thermal greases and similar interface compounds.

## MATERIAL PROPERTIES

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

AL	
Substrate Type	Type 1145 Aluminum
Thickness:	
Substrate	mm 0.51 (inches) (0.002)
Compound Thickness, min, each side	mm 0.013 (inches) (0.0005)
Total	mm 0.76 (inches) (0.003)
Thermal Impedance, ASTM-D-5470:	
@ 20 psi	°C-cm <sup>2</sup> /W 0.194 (°C-in <sup>2</sup> /W) (0.03)
@ 100 psi	°C-cm <sup>2</sup> /W 0.129 (°C-in <sup>2</sup> /W) (0.02)

ALXXH	
Substrate Type	Type 1145 Aluminum
Thickness:	
Substrate	mm 0.51 (inches) (0.002)
Compound Thickness, min, each side	mm 0.25 (inches) (0.001)
Total	mm 0.102 (inches) (0.004)

Thermal Impedance, ASTM-D-5470:

@ 20 psi	°C-cm <sup>2</sup> /W 0.374 (°C-in <sup>2</sup> /W) (0.058)
@ 100 psi	°C-cm <sup>2</sup> /W 0.036 (°C-in <sup>2</sup> /W) (0.232)

## PHYSICAL PROPERTIES

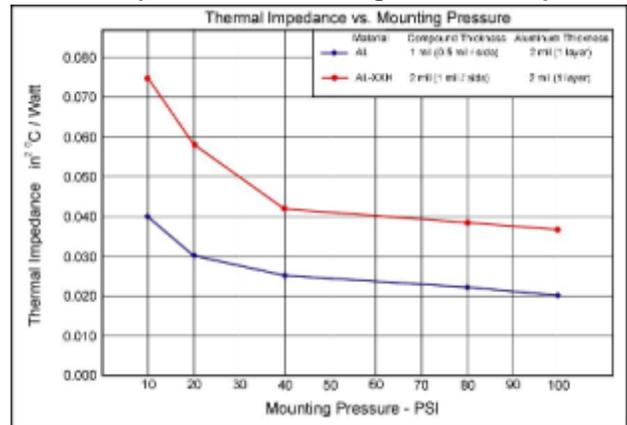
Phase Change Temperature, °C	60
Volumetric expansion of thermal compound upon phase change, %	15
Viscosity above phase change temperature	Thixotropic

## 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 a platform. The test block dimensions are 2" x 2", the finish is 64 microinches and the flatness is 0.002 in/in. The power level is 80 watts.

### Thermal Impedance vs. Mounting Pressure Graph



## GENERAL INFORMATION

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

## SURFACE CONDITIONS

Different versions of THERMSTRATE have been developed to address the variables associated with a wide range of applications. As a general recommendation, we suggest:

Surface Finishes	64 microinches or better 1.6 microns or better
Surface Flatness	0.002 inches/inch or better 0.002 cm/cm or better

**DIRECTIONS FOR USE**

1. THERMSTRATE 2000 is completely re-workable. No foreign residue remains after disassembly. A replacement pad can be installed without further cleaning.
2. If a clean surface is required, any presence of a compound can be easily removed with mineral spirits.
3. THERMSTRATE 2000 is not sensitive to mounting orientation due to its thixotropic rheology.
4. This product does not contain silicones and will not migrate from the interface area.

**AVAILABILITY**

Pre-tooled pads are available for many commonly used electronic devices.

THERMSTRATE 2000 may be available as single die cut pads, multi-pad sheets, 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.

**Storage**

Store product in the unopened container in a dry location. Storage information may be indicated on the product container labeling.

**Optimal Storage: 23 °C. Storage greater than 40 °C can adversely affect product properties.**

Material removed from containers may be contaminated during use. Do not return product to the original container. Henkel Corporation cannot assume responsibility for product which has been contaminated or stored under conditions other than those previously indicated. If additional information is required, please contact your local Technical Service Center or Customer Service Representative

**Not for product specifications**

The technical data contained herein are intended as reference only. Please contact your local quality department for assistance and recommendations on specifications for this product.

**Conversions**

$(^{\circ}\text{C} \times 1.8) + 32 = ^{\circ}\text{F}$   
 $\text{kV/mm} \times 25.4 = \text{V/mil}$   
 $\text{mm} / 25.4 = \text{inches}$   
 $\text{N} \times 0.225 = \text{lb}$   
 $\text{N/mm} \times 5.71 = \text{lb/in}$   
 $\text{N/mm}^2 \times 145 = \text{psi}$   
 $\text{MPa} \times 145 = \text{psi}$   
 $\text{N}\cdot\text{m} \times 8.851 = \text{lb}\cdot\text{in}$   
 $\text{N}\cdot\text{m} \times 0.738 = \text{lb}\cdot\text{ft}$   
 $\text{N}\cdot\text{mm} \times 0.142 = \text{oz}\cdot\text{in}$   
 $\text{mPa}\cdot\text{s} = \text{cP}$

**Disclaimer****Note:**

The information provided in this Technical Data Sheet (TDS) including the recommendations for use and application of the product are based on our knowledge and experience of the product as at the date of this TDS. The product can have a variety of different applications as well as differing application and working conditions in your environment that are beyond our control. Henkel is, therefore, not liable for the suitability of our product for the production processes and conditions in respect of which you use them, as well as the intended applications and results. We strongly recommend that you carry out your own prior trials to confirm such suitability of our product.

Any liability in respect of the information in the Technical Data Sheet or any other written or oral recommendation(s) regarding the concerned product is excluded, except if otherwise explicitly agreed and except in relation to death or personal injury caused by our negligence and any liability under any applicable mandatory product liability law.

**In case products are delivered by Henkel Belgium NV, Henkel Electronic Materials NV, Henkel Nederland BV, Henkel Technologies France SAS and Henkel France SA please additionally note the following:**

In case Henkel would be nevertheless held liable, on whatever legal ground, Henkel's liability will in no event exceed the amount of the concerned delivery.

**In case products are delivered by Henkel Colombiana, S.A.S. the following disclaimer is applicable:**

The information provided in this Technical Data Sheet (TDS) including the recommendations for use and application of the product are based on our knowledge and experience of the product as at the date of this TDS. Henkel is, therefore, not liable for the suitability of our product for the production processes and conditions in respect of which you use them, as well as the intended applications and results. We strongly recommend that you carry out your own prior trials to confirm such suitability of our product.

Any liability in respect of the information in the Technical Data Sheet or any other written or oral recommendation(s) regarding the concerned product is excluded, except if otherwise explicitly agreed and except in relation to death or personal injury caused by our negligence and any liability under any applicable mandatory product liability law.

**In case products are delivered by Henkel Corporation, Resin Technology Group, Inc., or Henkel Canada Corporation, the following disclaimer is applicable:**

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, **Henkel Corporation specifically disclaims all warranties expressed or implied, including warranties of merchantability or fitness for a particular purpose, arising from sale or use of Henkel Corporation's products. Henkel 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 domination of patents owned by others or as a license under any Henkel 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.

**Trademark usage**

Except as otherwise noted, all trademarks in this document are trademarks of Henkel Corporation in the U.S. and elsewhere. ® denotes a trademark registered in the U.S. Patent and Trademark Office.

Reference 0.1