

# T766 THERMFLOW™ Application Note

## Introduction

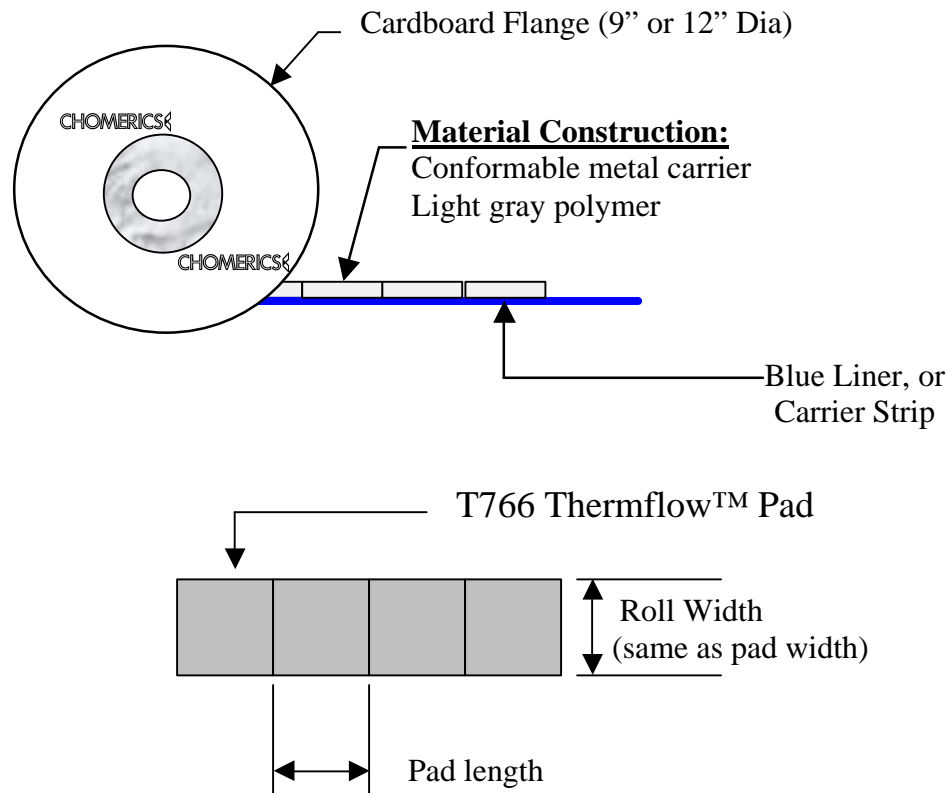
Chomerics' patent pending THERMFLOW T766 phase change thermal interface material is recommended for applications where rework and ease of disassembly are important. The material provides the high thermal performance properties of typical phase change materials with the added benefit of easy removal. It consists of a tacky, electrically non-conductive phase change film on a conformable metal foil carrier. T766 phase change interface material can be assembled onto a heat sink or heat spreader, leaving the metal foil exposed. The natural tack of the phase change polymer will hold the T766 to the heat sink. The foil layer eliminates the need of a protective liner, which simplifies the final assembly process and minimizes shipping concerns and contamination issues.

This Application Note contains recommendations on how to best specify, handle and install T766 thermal interface pads. If a specific application raises questions not addressed in this document, please call Chomerics' Applications Engineering Department at 781-939-4620.

## T766 Thermal Interface Material Form

T766 has two layers. The top layer is the conformable metal carrier used as the clean break surface and the bottom layer is a thermally conductive phase change polymer. This layer is intended to go against the heat sink.

T766 thermal interface material is supplied as kiss-cut parts on a roll. Rolls contain two cardboard protective flanges that are 9 inches (200mm) or 12 inches (300mm) in outside diameter. The inside diameter of the metal "end bells" in the cardboard flanges is 1.5 inches (38mm).



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## Mounting Surface Preparation

The mounting surface, usually the heat sink, should be clean and free from machining oils and dust. The surface can be cleaned with any common solvent, such as isopropyl alcohol (IPA). Please allow the surface to dry thoroughly before pad installation.

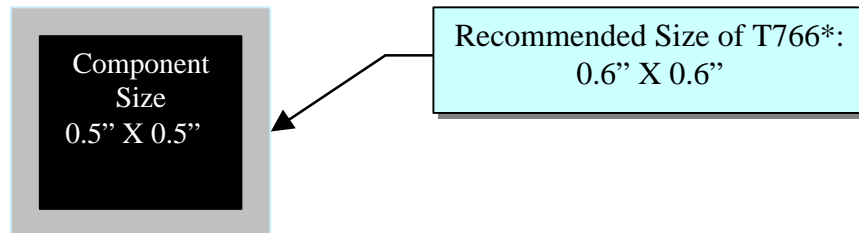
## T766 Pad Size Selection

A T766 pad will soften and flow under the temperature and pressure conditions between a hot component and its heat sink. In certain instances, some of the phase change polymer may flow beyond the conformable metal carrier. To keep this overflow to a minimum and maintain a clean break surface, it is recommended that the pad be oversized from the area of the component to protect it from the tacky phase change polymer. It is recommended that, when possible, the pad should be sized a minimum of 20% greater than the length and width of the component.

As examples, see the table below.

<b>Component Size</b>	<b>Recommended Minimum T766 Pad Size*</b>
0.5 inches (12.7mm) square	0.60 inches (15.2) square
1.0 inch (25mm) square	1.2 inches (30.5mm) square
1.5 inches (38mm) square	1.8 inches (46mm) square

\*It may be more convenient to choose the next largest standard size pad for the application. Choosing standard sizes would provide the most cost effective solution and shortest lead time.



## Installation of T766 Pads

T766 thermal interface material does not require pre-heating of the heat sink prior to installing the T766 pad onto the heat sink. The inherent “sticky or tacky” nature of T766 is sufficient to adhere the pad to the heat sink surface. The temperature of the roll of T766 and the temperature of the heat sink should be in the range of 60°F to 100°F. The pressure applied to the pad should be 5 psi to 50 psi.

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## Typical T766 Pad Installation Steps

1. If necessary, clean the heat sink base by removing any machine oils, greases, hand oils, or other contaminants. Wiping with a solvent such as isopropyl alcohol, MEK, or toluene will work.
2. Peel the T766 pad from the blue carrier strip.
3. Place the T766 pad on the heat sink with the tacky light gray side down. Apply pressure on the conformable metal carrier side to ensure intimate “wetting” of the T766 pad to the heat sink surface. This pressure, approximately 3,000 grams (6 pounds) on a 1 inch by 1 inch pad can typically be achieved manually by rolling a soft rubber wheel (like a small wallpaper roller) back and forth over the pad. At this point, the heat sink / pad assembly can be shipped to the board assembly area or manufacturer and is ready for assembly.
4. With heat sink and pad in place on the component, install heat sink using a spring clip, screws or mechanical fasteners.

## Material Storage and Shipping

T766 is a temperature sensitive material, and as such, should be stored below 35°C (95°F). Short term exposure to higher temperatures, up to 45°C (113°F) during product shipment will not effect product performance.

Since the phase change polymer is protected by the conformable metal carrier, no release liner is required when shipping the heat sink to the end customer.

## Initial Phase Change of T766

As with any phase change polymer, T766 thermal interface material must cycle through its phase change temperature once to attain its minimum thermal impedance. This temperature cycle must be done in the assembled state, at application pressure. This one time cycle allows the material to attain a minimum thickness and wet the surfaces in which it contacts, filling the interstitial voids in the surfaces. After this one time cycle, the material does not need to reach the phase change temperature again for best thermal performance. Phase change of the material will occur between 51°C and 58°C.

The significance of temperature and pressure on thermal impedance characteristics of the material is described in the table below, as tested per ASTM D5470, modified.

<b>T766 Thermal Impedance Temperature and Pressure Characteristics</b>			
<b>Pressure</b>	<b>Thermal Impedance (°Cin<sup>2</sup>/Watt) @ 50°C</b>	<b>Thermal Impedance (°Cin<sup>2</sup>/Watt) @ 60°C</b>	<b>Thermal Impedance (°Cin<sup>2</sup>/Watt) @ 70°C</b>
20 psi	0.30	0.10	0.06
50 psi	0.25	0.08	0.04
100 psi	0.25	0.08	0.03

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## Rework Information

Removing the heat sink from the component is much easier due to the clean break metal carrier. The conformable metal carrier prevents a vacuum from forming between the heat sink and component. The surface of the metal carrier is dry and does not leave a residue on the component.

To remove the pad from the heat sink, scrape the pad from the heat sink using a razor blade or similar edge. The heat sink then needs to be cleaned using a solvent, such as IPA. A fresh pad can then be placed onto the heat sink.