GRAFTech International | eGRAF®

Application Guide

HITHERM™ Thermal Interface for Chip on Board Devices

Product Overview

HITHERM™ thermal interface material for Chip on Board "COB" devices is designed to be a cost effective, highly reliable Thermal Interface Material (TIM) for modular LED luminaire designs. HITHERM flexible graphite TIMs are especially engineered for long life, mission critical applications. HITHERM™ TIMs are specifically designed to be the most compliant graphite thermal interface providing minimal thermal resistance. HITHERM also eliminates the complexity associated with dispensed thermal interface materials.

Part Overview

HITHERM™ Thermal Interface parts are flexible graphite films ready to be attached to specific COB devices with an adhesive coating on one side to facilitate assembly. A sheet of Chip on Board HITHERM™ TIM parts contains multiple pre-cut parts and the overcut material on an adhesive release liner as shown in Figure 1.

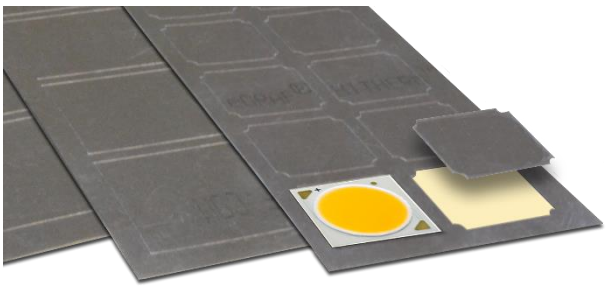

Figure 1: Image of HITHERM™ TIM COB Sheet

Storage and Disposal

Storage Recommendations

With Pressure Sensitive Adhesive (PSA) backed products, cosmetic changes may take place after a period of one year. It is recommended that adhesive backed tape products be examined after this period to make sure that "adhesion characteristics" of the material have not changed. A potential failure mode to inspect for is the release liner may begin to "bunch up" and separate from the graphite due to the hygroscopic properties of the release paper.

For optimal storage, we recommend that the adhesive backed products be stored in an area where ambient temperature is around 22°C and the relative humidity is reasonable. One-year shelf life is based on date of shipment from GrafTech or distributor.

Waste Disposal

The release liner and overcut graphite can be safely disposed of in landfill waste. No special handling or disposal considerations need to be followed.

Design Considerations

Heatsink Surface Treatment

GrafTech recommends the mating heatsink surface be machined flat with a smooth finish. Extruded surfaces are not recommended due to the extreme surface roughness and lack of flatness controls. The thermal performance information provided in this document will degrade as the surface is less than ideal.

Operating Temperature

HITHERM™ TIMs for COB are an engineered graphite film product that does not contain any fillers or binders. The graphite material can operate in a range of -100°C to +400°C without any changes to the material.

The Pressure Sensitive Adhesive coating is rated to operate in a range of -50°C to 125°C. Above the maximum temperature range, the adhesive will begin to release water and other gases. For more information regarding outgassing potential please review the HITHERM Technical Data Sheet or contact the GrafTech Application Engineering team.

Adhesive Orientation

The preferred orientation of the part is adhesive facing the heat sink. Testing has demonstrated negligible advantage to orienting the adhesive side of the part towards the heat sink compared to the LED substrate. However if there is a manufacturing advantage to bonding the adhesive to the LED, it is recommended the thermal designer evaluate both orientations to compare the manufacturing / performance tradeoff.

Production Guidelines

Operator Personal Protection Equipment (PPE)

No special protection equipment is required in a production environment when using HITHERM™ TIMs. It is recommended operators wear gloves or use tweezers to avoid graphite rubbing off onto their fingers.

Workstation Considerations

Any exposed electrical circuits must be kept away from the installation workstation. In the case the graphite does tear resulting in flakes being released, additional care must be taken due to their electrically conductive nature. A mild detergent or alcohol wipe can be used to remove any traces of these flakes.

Installation

It is recommended to peel the part off the liner from a corner. Peel the part from the release liner in smooth, even motion. Position corner of part being removed between thumb and side of index finger while holding the sheet with opposite hand. Roll part off liner against index finger to prevent part from tearing as shown in Figure 3. It is expected that the part will roll around index finger while being removed from the release liner. Graphite has similar handling properties to paper of the same thickness and can wrinkle or even tear if mishandled.

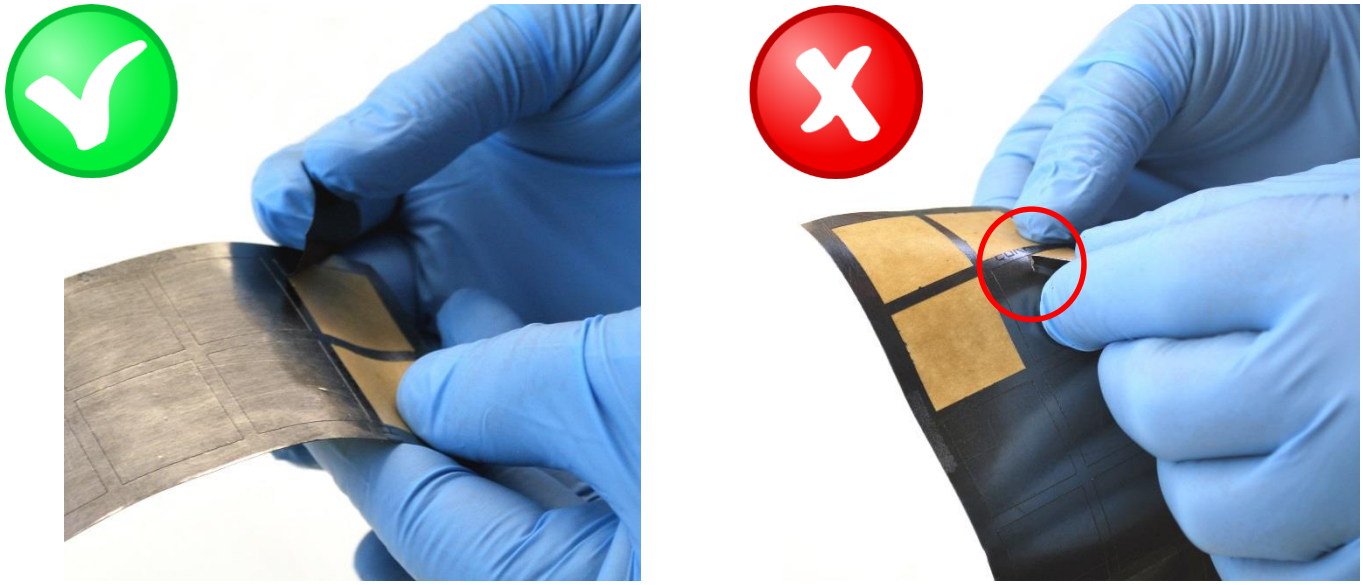

Figure 2: Images of part being peeled from liner

To install the part, locate one corner on the surface of the heat sink or COB part then carefully roll the part down to prevent any tearing or creasing of the part as demonstrated in Figure 3.

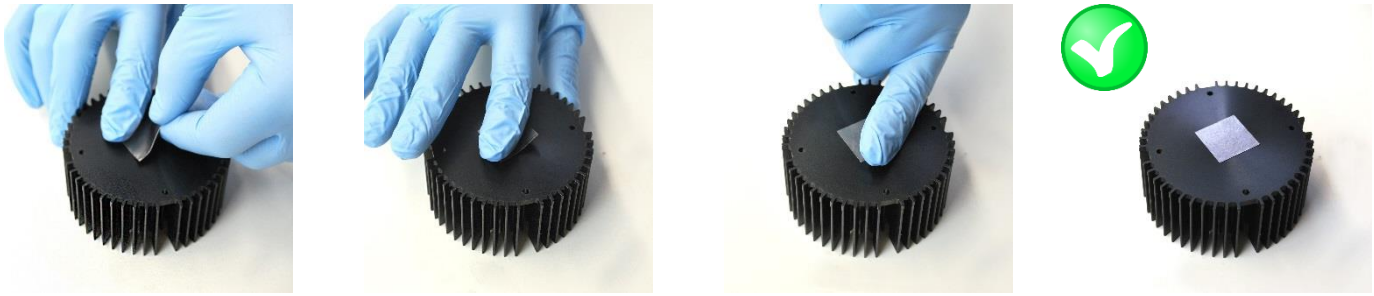

Figure 3: Proper installation example

If a fold or crease appears while applying the graphite part as shown in Figure 4, remove the part and discard it. Creases will result in an uneven surface or ridge between the LED and heat sink resulting in the COB device exceeding temperature threshold values.

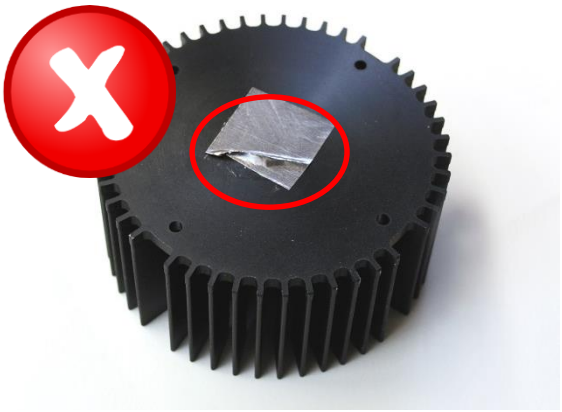

Figure 4: Incorrect installation example

The temperature gradient across the HITHERM™ thermal interface material is dependent upon many variables including overall clamping force, clamping force profile over the area of the LED, heatsink surface roughness, and heatsink surface flatness.

Always adhere to the holder's recommended torque range. It is recommended a manual or electrically driven calibrated torque driver be used. Testing has demonstrated that exceeding the recommending torque on the screws does not provide additional thermal benefit. In some cases, the holder may begin to deform and decrease the effective clamping force on the thermal interface material.

Additional Support

Reference Documents

HITHERM Thermal Interface Materials: Technical Data Sheet 318. Documents available at http://www.egraf.com

Application Engineering

If you would like to discuss your application further please contact the GrafTech Application Engineering team at http://www.graftech.com/contact/

+1 (800) 253-8003 (Toll-Free in USA)
+1 (216) 529-3777 (International)

Redefining limits

Learn more about all **eGRAF**® products and download our latest technical data sheets:
www.graftech.com | www.egraf.com
egraf@graftech.com

Aug 2015