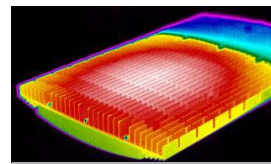


Flexible Graphite Thermal Solutions

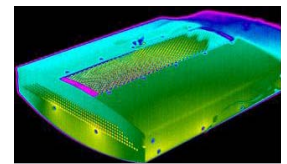
Passive Thermal Management for General Lighting Applications

eGRAF SPREADERSHIELD™ flexible graphite heat spreaders and HITHERM™ thermal interface materials together represent flexible, modular and scalable thermal management solutions for solid state lighting. These products provide luminaire designers flexibility to capitalize on:

- the **convenience** of using existing luminaire designs and materials (including cast, extruded and sheet metal)
- the benefit of **reducing** the overall luminaire **size, weight and total system cost** - without compromising performance



without SPREADERSHIELD



with SPREADERSHIELD



Features

- Conforms to contours
- In-plane conductivity 300-1500 W/mK
- Anisotropic ratio up to 300:1
- 30% lighter than Al and 80% than Cu
- Die cut to specification

Benefits

- Allows complex design shapes
- Spreads heat up to 4x Copper and 7x Aluminum
- Eliminates hot-spots
- Saves weight vs. metal alternatives
- Suitable for high volume production

Applications



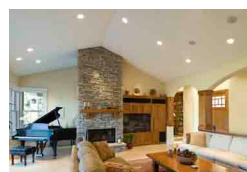
Outdoor Area



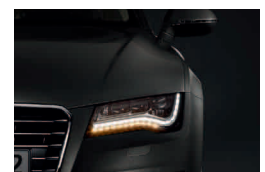
Indoor General



Under Cabinet



Can and Downlight



Automotive

The SPREADERSHIELD Difference

Our portfolio of engineered anisotropic materials delivers superior thermal management solutions for almost any application or design. Simply choose the right product to either optimize your current heat sink system, enable remote heat sinking, or potentially eliminate the heat sink altogether. Just ask us how!

HITHERM™

Thermal Interface Materials

The performance of a phase change material with the cost and convenience of tape.



Thru-Thickness Conduction

- Easy to use (no rework or reflow), eliminates messy grease and gels
- Will not dry out or degrade
- Conformable to product contours
- Through-thickness thermal conductivity of up to 16 W/mK

SPREADERSHIELD™

Heat Spreaders

Superior heat-spreading capability vs copper or aluminum. Completely passive thermal solution that eliminates many difficulties associated with heat pipes.



Lateral Conduction

- In-plane thermal conductivity of up to 1500 W/mK (vs copper ~ 400 W/mK, vs aluminum ~ 200 W/mK)
- 80 percent less mass than copper, 30 percent less mass than aluminum

SPREADERSHIELD-FLX™

Flexible Heat Spreaders

Eliminates the need for a heat sink by thermally activating nonplanar surfaces in solid state lighting designs.



Non-Planar Conduction

- Ideal for applications such as outdoor area lighting, and low-profile or complex curvature luminaires
- Eliminates bulky heat sinks
- Enables retrofit of LED arrays into non-LED lamp enclosures

Our global team of Applications Engineers are knowledgeable about graphite and applications spanning multiple industries. These include metallurgical casting, electronics, chemical, nuclear, defense/aerospace, solar, LED, semiconductor, and other high temperature processes.

Regardless of your product design phase (concept, prototyping, or mass production), we offer technical answers to some of your most challenging problems with a fast response time.



Please contact a GrafTech Applications Engineer today at applicationsengineering@graftech.com

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Redefining limits

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