

IntraGRAPH HS

Thermally Conductive Graphite Foil (uncoated)

In-Plane Thermal Conductivity: 140 W/m-K

IntraGraph HS consists of more than 98% pure graphite designed with a flake like structure exhibiting anisotropic thermal conductivity in-plane (XY) and in the thru direction (Z). IntraGraph HS offers a soft compliance allowing for excellent contact of surfaces further reducing thermal resistance.

IntraGraph HS Foil's low density compared to copper (15%) or aluminum (50%) make it ideal for applications where either a low weight TIM design is required, very high temperature resistance or efficient in-plane heat dissipation is needed. In comparison to typical graphite foils in the market place, IntraGraph HS offers easy handling (foil itself) without worry of shattering or breaking of the foil during installation.

IntraGraph HS is readily available at 2 standard foil thicknesses in rolls, sheets or die cut to a specific customer required outline. For pre-apply options, IntraGraph HS is available with low tack repositionable pressure sensitive mounting adhesive one side for quick pad placement or vertical mount assemblies. Special multi-layer configurations are available through the use of dielectric barrier film layers (PET, polyimide, thermally conductive silicone films and gap pad).

- Excellent Surface Contact with Soft Foil Design
- Low Weight Foil Design with Easy Handling
- Very High Temperature Resistant
- Low Cost TIM Solution
- EMI-Shielding Application
- Flexible Multi-Layer Design

Typical Applications

- LED Assembly
- Heat Sinks
- Power Inverters
- CPU Microprocessor
- Automotive Power Supplies
- Industrial Power Supplies

Standard Thickness Options

GF.13.....0.005" (0.127mm)
 GF.25.....0.010" (0.254mm)

IntraGraph HS General Properties

Color..... Gray
 Hardness85 (shore A)
 Volume Resistivity..... 11.0×10^{-4} (ohm-cm)
 Dielectric Constant..... < 0.001 (@1 MHz)
 Operating Temperature.....-240°C to 300°C

Type GF.13 Specific Properties

Thermal Conductivity (XY—In Plane).....140 W/m-K
 Thermal Conductivity (Z—Through Plane).....8 W/m-K
 Thermal Impedance @ 10 PSI.....0.120 °C in² / Watt
 Thermal Impedance @ 30 PSI.....0.090 °C in² / Watt
 Thermal Impedance @ 150 PSI.....0.060 °C in² / Watt

Type GF.25 Specific Properties

Thermal Conductivity (XY—In Plane).....140 W/m-K
 Thermal Conductivity (Z—Through Plane).....8 W/m-K
 Thermal Impedance @ 10 PSI.....0.240 °C in² / Watt
 Thermal Impedance @ 30 PSI.....0.160 °C in² / Watt
 Thermal Impedance @ 150 PSI.....0.100 °C in² / Watt

IntraGraph HS Pre-Apply Attachment Options

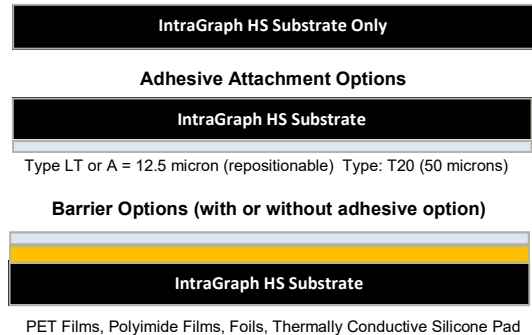
LT.....low tack pressure sensitive (repositionable)
 A.....medium tack pressure sensitive (repositionable)
 T20.....thermally conductive pressure sensitive

Discrete PSA placement or 100% backed options

IntraGraph HS Delivery Formats

Master rolls
 Sheets
 Die cut individuals
 Multiple die cuts per card
 Die cut continuous reels
 Laser Cutting (Tight Tolerance)

Standard IntraGraph HS Cross Section



| Characteristic | IntraGraph HS |
|---------------------------------------|--|
| Base Material | Anisotropic 98% Pure Graphite Foil |
| Color | Gray |
| Available Formats | Rolls, Sheets, Die Cuts |
| Standard Roll Size | 11.81" x 164ft |
| Standard Sheet Size | 11.81" x 24.00" |
| Adhesive Backing Options | Type A or LT (12.5 micron repositionable) Type T20 (50 micron thermally conductive) |
| Barrier Backing Options | PET Film (0.001" to 0.010") Polyimide Film (0.001" to 0.005") Foils (AL, CU, Stainless) (0.001" to 0.005") Thermally Conductive Silicone Films and Gap Pads |
| Coating Options (Phase Change) | Yes, thermally conductive phase change compound coated (1 or 2 sides) - further reduction in surface resistance—Contact TIMTEL for more information |
| TIMTEL Die Cut Dimensional Tolerances | 0.010"(0.25mm) to 0.020"(0.51mm) (depending on thickness) |
| Storage | Cool, dry location at or below 80F/ 27C |
| Shelf Life | 2 years from date of manufacture |

Thermal material evaluation is always critical when designing in a new material or developing a new product. Sheet samples of IntraGraph HS are available for preliminary testing to determine the optimal IntraGraph HS thickness as well as overall material construction best suited within the scope of your application requirements.

TIMTEL
Thermal Management Materials

STREUTER