

IntraGRAPH PCM 50 Thermally Conductive Phase Change Graphite Film

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

IntraGraph PCM 50 combines the features of phase-change technology with low cost but effective graphite film substrate. The IntraGraph PCM 50 substrate is a 98% pure graphite designed with a flake like structure exhibiting anisotropic thermal conductivity in both the XY (in-plane) and Z (through-plane) directions. When packaged with the PCM 50 phase change coating, IntraGraph offers lower overall thermal resistance compared to an uncoated graphite film. Upon phase change at 50C, the compound coating begins to flow adjusting for flatness, expelling air from within the interface and filling in any surface imperfections that may exist all leading to enhanced thermal transfer performance from device to sink.

IntraGraph PCM 50's offers a low density substrate that makes it an ideal candidate for applications where weight sensitivities may exist. IntraGraph PCM 50 offers excellent handling in roll or die cut pad form without worry of breaking or shattering that can often occur in other commercial type graphite film products during converting or installation.

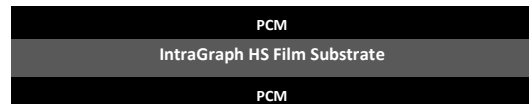
IntraGraph PCM 50 is readily available in 2 standard thicknesses in rolls, sheets or die cut to a specific customer outline.

- Low Surface Thermal Resistance (PCM)
 - Excellent Surface Contact with Soft Substrate
 - Low Weight Film Design | Easy Handling
 - Custom PCM Coating Thicknesses
 - Adhesive Tack Options
 - Additional Substrate Laminations
- PCM = phase change material

Typical Applications

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

Standard IntraGraph PCM 50 Construction



Standard Double Coated Product is 0.0005" (0.013mm) of 50C phase change coating per side. Thicker coatings available upon request.

Standard Thickness Options

GF.13-F50-05.....0.006" (0.152mm)
 GF.25-F50-05.....0.011" (0.279mm)

IntraGraph PCM 50 General Properties

Phase Change Temperature.....50°C
 Volumetric Expansion.....15%
 Color..... Black
 Hardness85 (shore A)
 Volume Resistivity.....11.0 x 10⁻⁴ (ohm-cm)
 Dielectric Constant.....< 0.001 (@1 MHz)
 Operating Temperature.....-40°C to 150°C

Type GF.13-F50-05 Thermal Performance

Thermal Conductivity (XY—In Plane).....140 W/m-K
 Thermal Conductivity (Z—Through Plane).....8 W/m-K
 Thermal Impedance @ 20 PSI.....0.090 °C in² / Watt
 Thermal Impedance @ 40 PSI.....0.079 °C in² / Watt
 Thermal Impedance @ 80 PSI.....0.058 °C in² / Watt
 Thermal Impedance @ 100 PSI.....0.053 °C in² / Watt
 Thermal Impedance @ 120 PSI.....0.049 °C in² / Watt

Type GF.25-F50-05 Thermal Performance

Thermal Conductivity (XY—In Plane).....140 W/m-K
 Thermal Conductivity (Z—Through Plane).....8 W/m-K
 Thermal Impedance @ 20 PSI.....0.120 °C in² / Watt
 Thermal Impedance @ 40 PSI.....0.090 °C in² / Watt
 Thermal Impedance @ 80 PSI.....0.079 °C in² / Watt
 Thermal Impedance @ 100 PSI.....0.075 °C in² / Watt
 Thermal Impedance @ 120 PSI.....0.073 °C in² / Watt

Thermal impedance testing performed per ASTM D5470

IntraGraph PCM 50 Delivery Formats

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

| Characteristic | IntraGraph PCM 50 |
|---|--|
| Base Substrate | Anisotropic 98% Pure Graphite Foil |
| PCM 50 Coating | Graphite Filled Thixotropic Behavior |
| Color | Black |
| Available Formats | Rolls, Sheets, Die Cuts |
| Standard PCM Coating Thickness | 0.0005" (0.013mm) per side (Code F50-05) |
| Additional PCM Coating Thickness Options (for interface surfaces with conditions greater than 0.002" (0.051mm) across the interface plane) | 0.0006" (0.015mm) per side (Code F50-06) 0.001" (0.025mm) per side (Code F50-10) 0.00125" (0.032mm) per side (Code F50-13) |
| Available Formats | Rolls, Sheets, Die Cuts |
| Standard Roll Width | 11.00" (white paper interlined) 3.00" ID Core |
| Standard Sheet Size | 11.00" x 24.00" |
| 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 PCM 50 are available for preliminary testing to determine the optimal IntraGraph PCM 50 thickness as well as overall material construction best suited within the scope of your application requirements.

