

SPREADERSHIELD™ Heat Spreaders

Technical Data Sheet 321

Product Overview

eGRAF[®] SPREADERSHIELD™ flexible graphite products function as both a passive heat spreader and heat shield. These products offer a variety of in-plane thermal conductivity solutions. The flexible graphite materials can be die-cut, press-formed, or laminated with plastics and/or adhesives.

Part Designation

Every eGRAF[®] SPREADERSHIELD™ flexible graphite heat spreader part number defines the grade and coating options of the material. It is constructed based on the following example. [For additional coating information, please reference Technical Data Sheet 322 - SPREADERSHIELD™ Design Options.](#)

Graphite Heat Spreader		Plastic/Adhesive Coatings			Envelope Seal
SS400	0.25	P1	G	P1A1	EN
Product Grade	Graphite Layer Thickness in mm (excludes coatings)	Top Coating Type (if any)	G (graphite)	Bottom Coating Type (if any)	Envelope Seal Designation (if used)

Product Grade Characteristics^[1]: Natural Graphite Products

Characteristic	SS300	SS350	SS400	SS500	SS600
Typical Thermal Conductivity ^[2] In-Plane • Through-Plane (W/m-K)	300 • 4.5	350 • 4.1	400 • 3.7	500 • 2.8	600 • 3.5
Available Thickness Range (mm)	0.94 ↕ 0.51	0.94 ↕ 0.127	0.94 ↕ 0.040	0.76 ↕ 0.076	0.127 0.102
Standard Thickness (mm) • Standard Roll Width (mm) <i>Width of graphite material only, finished roll width will slightly decrease with coating and adhesive options</i>	0.94 • 610 0.51 • 1000	0.94 • 610 0.48 • 610 0.20 • 610	0.94 • 610 0.51 • 584 0.25 • 584 0.20 • 610 0.127 • 610 0.076 • 559 0.051 • 355 0.040 • 355	0.76 • 305 0.40 • 508 0.20 • 457 0.127 • 440 0.076 • 400	0.127 • 182 0.102 • 182
Thermal Contact Impedance Per Side (°C cm ² /W) @ specified thickness (mm)	0.30 @ 0.51	0.34 @ 0.51	0.38 @ 0.51	0.90 @ 0.102	0.44 @ 0.102
Tensile Strength (MPa)	-	-	9.7	7.7	9.7
Electrical Resistivity In-Plane (μΩm)	6.5	5.8	5.2	4.2	3.4
Electrical Conductivity In-Plane • Through-Plane (S/cm)	1,600 • 28	1750 • 23	1,900 • 18	2,400 • 15	2,900 • 10

(continued on next page)

Product Grade Characteristics^[1]: Natural Graphite Products

Characteristic	SS300	SS350	SS400	SS500	SS600
Coefficient of Thermal Expansion (ppm/°C) In-Plane • Through-Plane			-0.4 • 27.0		
UL Flammability Rating			94V-0		
Operating Temperature (°C)			-40 to +400		
Specific Heat ^[2] (J/gC) @ 25°C			0.77		
RoHS Compliant			Yes		
Lead / Halogen Free			Yes		

Product Grade Characteristics^[1]: Synthetic Graphite Products

Characteristic	SS1500 -0.017	SS1500 -0.025	SS1700 -0.040	SS1700 -0.050
Thicknesses (mm)	0.017 ±0.003	0.025 ±0.005	0.040 ±0.005	0.050 ±0.005
Sheet Size (Width x Length (mm))	248 x 390	248 x 390	248 x 390	248 x 390
Typical Thermal Conductivity ^[3] (W/m-K) In-Plane • Through-Plane	1800 • 3.4	1600 • 3.4	1700 • 3.4	1700 • 3.4
Thermal Contact Impedance, per side (°C cm ² /W) at 100kPa/14.5 psi/1 bar @ 0.025 mm ²			0.1	
Tensile Strength (MPa) @ 0.025 mm ³			37	
Electrical Resistivity In-Plane (μΩm) @ 0.025 mm ³			0.5	
Electrical Conductivity (S/cm) In-Plane • Through-Plane			19,000 • 5	
Coefficient of Thermal Expansion (ppm/°C) In-Plane • Through-Plane			-0.4 • 27	
UL Flammability Rating			94V-0	
Operating Temperature (°C)			-40 to +410	
Specific Heat ^[2] (J/gC) @ 25°C			0.87	
RoHS Compliant			Yes	
Lead / Halogen Free			Yes	

Notes:

[1] Properties listed are typical and cannot be used as acceptance or rejection criteria. Product characteristics exclude coatings and adhesives.

[2] Quasi-Isothermal Modulated Differential Scanning Calorimetry Method.

[3] In-plane conductivity at ambient temperature determined using Angstrom's method; through-plane determined using ASTM D5470 Modified method.

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

Learn more about **eGRAF**[®] products and download our latest technical data sheets:

www.egraf.com | www.graftechAET.com
egraf@graftech.com



Redefining limits

© 2016 GrafTech International Holdings Inc. This information is based on data believed to be reliable but GrafTech makes no warranties, express or implied, as to its accuracy and assumes no liability arising out of its use. The data listed falls within the normal range of product properties but should not be used to establish specification limits or used alone as the basis of design. GrafTech's liability to purchasers is expressly limited to the terms and conditions of sale. eGRAF[®] and SPREADERSHIELD[™] are trademarks of GrafTech International Holdings Inc. eGRAF[®] thermal management products, materials, and processes are covered by several US patents. For patent information visit www.egraf.com/patents.

2.1.2016