

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 ^[3] In-Plane • Through-Plane (W/m-K)	300 • 4.5	350 • 4.1	400 • 3.7	500 • 2.8	600 • 3.5
Thickness Capability Range ^[2] (mm)	0.94 ↑ 0.51	0.94 ↑ 0.127	0.94 ↑ 0.040	0.76 ↑ 0.076	0.127 0.102
Typical Roll Thickness ^[2] (mm) • Typical 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		
Specific Heat ^[4] (J/g°C) @ 50°C			0.81		
Operating Temperature (°C)			-40 to +400		
UL Flammability Rating			94V-0		
RoHS Compliant			Yes		
Lead / Halogen Free			Yes		

Product Grade Characteristics^[1]: Synthetic Graphite Products

Characteristic	TG-826ACR	TG-827CR	TG-828CR	TG-829CR	TG-818
Thickness (mm)	0.017 ±0.003	0.025 ±0.005	0.032 ±0.005	0.040 ±0.005	0.050 ±0.010
Typical Roll Dimensions	Width (mm)	200 240	200 240	200	248mm x 390mm Sheets 650 pcs/roll
	Length (m)	100 200	100 200	100	
Typical Thermal Conductivity ^[3] (W/m-K) In-Plane • Through-Plane	1600 • 3.4	1500 • 3.4	1400 • 3.4	1350 • 3.4	1400 • 3.4
Tensile Strength (MPa) Machine Direction • Cross-Machine Direction			25 • 20		
Electrical Conductivity (S/cm) In-Plane • Through-Plane @0.025mm			19,000 • 5		
Coefficient of Thermal Expansion (ppm/°C) In-Plane • Through-Plane			-0.4 • 27		
Operating Temperature (°C)			-40 to +400		
UL Flammability Rating			94V-0		
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] Thickness tolerance on Natural Graphite Products up to and including 0.127mm nominal thickness: ±0.013mm; thickness tolerance on material nominal thickness greater than 0.127mm: ±0.025mm
- [3] In-plane thermal conductivity determined by 'GrafTech Standard Method for Determination of Thermal Conductivity'; through-plane thermal conductivity determined using ASTM D5470 Modified method
- [4] Specific Heat determined by Quasi-Isothermal Modulated Differential Scanning Calorimetry Method

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