

## SIGRATHERM®

### Flexible graphite foils and sheets for thermal management applications

SIGRATHERM flexible graphite foils and sheets manufactured from expanded natural graphite are free of adhesives and binders. Thermal management applications using this homogeneous material profit from its high thermal conductivity and anisotropy.

Our flexible graphite foils can support both the dissipation and transport of heat and cold while acting as a thermal protection shield. Due to the flexibility and compressibility, our SIGRATHERM flexible graphite foils show excellent form locking properties on surfaces. Additionally, the graphite foil flexibility leads to an easy processing and handling.

Demonstrating its outstanding thermal conductivity, SIGRATHERM graphite foils are used for challenging heat dissipation applications such as for batteries, automotive or electronic devices. Due to in plane thermal conductivity values of 400 – 500 W/(m\*K), local hot spots can be eliminated.

Weight savings compared to conventional thermal management systems can be achieved. Further advantages of SIGRATHERM graphite foils are its superior chemical and corrosion resistance as well as its high temperature resistance. Adding to that, its electrical properties are very well appreciated in some applications.

Our SIGRATHERM flexible graphite foils are available in various dimensions and densities and are supplied as sheets or rolls. Our flexible graphite foils can be further enhanced with metals to produce SIGRATHERM graphite/metal composites.



↑ SIGRATHERM flexible graphite foil

#### Properties

- Soft and flexible, inert, highly impermeable
- Light weight, simple machining, cutting and punching
- Thermal dissipation, electrically conductive, no static charges
- Positive locking
- Excellent chemical resistance
- High purity
- No aging
- Very good resistance to thermal shock

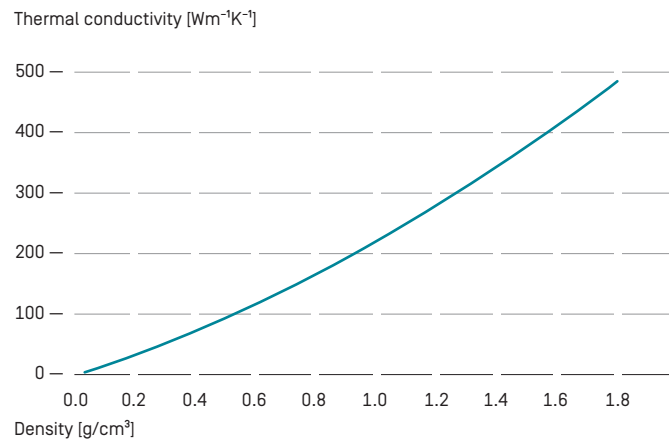
## Material data of SGRATHERM® flexible graphite foils and sheets

Properties	Units	Typical values
Standard density	g/cm <sup>3</sup>	0.7 – 1.8
Standard thickness	mm	0.15 – 3.0
Standard size	sheets	1000 x 1000
	roll goods	mm
		1500/1000/500 x 50000 [typical for materials ≤ 1]
Ash content (DIN 51903)	%	< 5
Carbon content	%	> 95
Halogen content		Free from halogens according to IEC 61249-2-21
Temperature resistance in air	°C	- 250 to approx. 400/600*
Thermal conductivity	Wm <sup>-1</sup> K <sup>-1</sup>	Strongly depending on direction and density, please see following graphs
Specific heat capacity [20 °C]	kJkg <sup>-1</sup> K <sup>-1</sup>	0.7

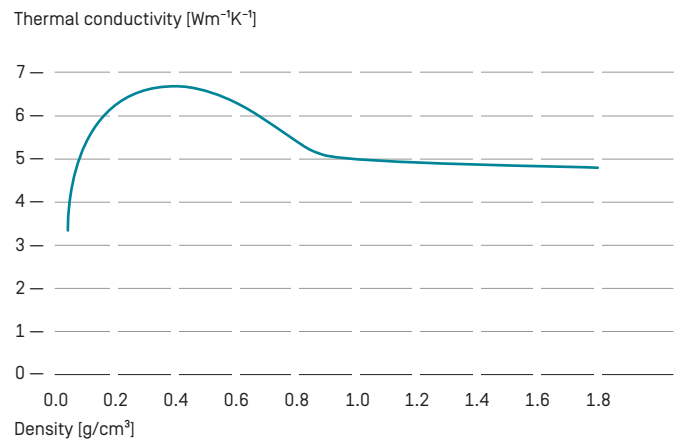
\* Life time above 400 °C in air might be limited. Please refer to our technical guideline regarding thermal stability or ask for advice.

Values are typical. Other dimensions on request.

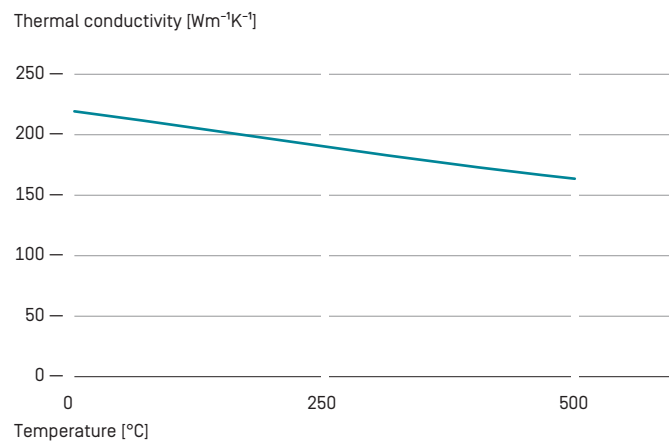
### Thermal conductivity of SGRATHERM parallel to surface at room temperature as a function of density



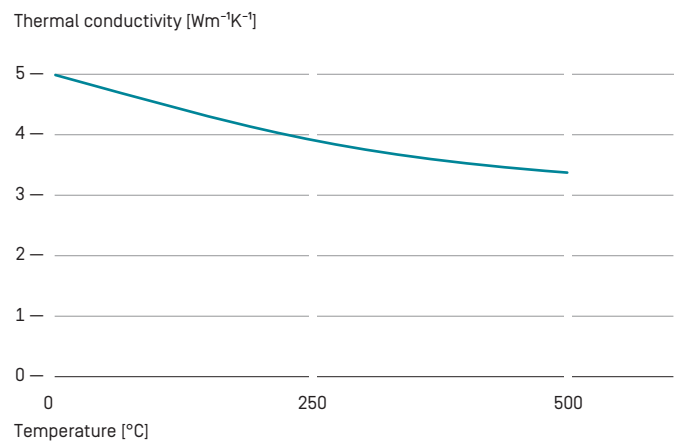
### Thermal conductivity of SGRATHERM perpendicular to surface at room temperature as a function of density



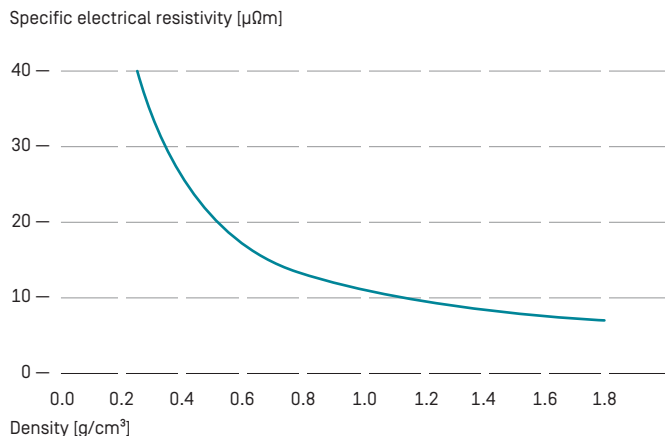
### Thermal conductivity of SGRATHERM with density 1.0 g/cm<sup>3</sup> parallel to surface as a function of temperature



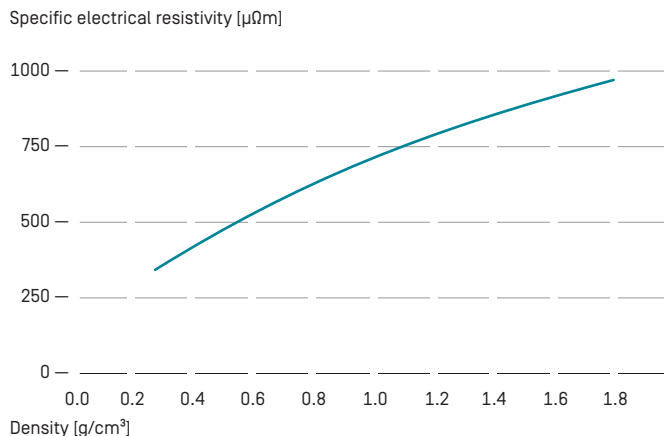
### Thermal conductivity of SGRATHERM with density 1.0 g/cm<sup>3</sup> perpendicular to surface as a function of temperature



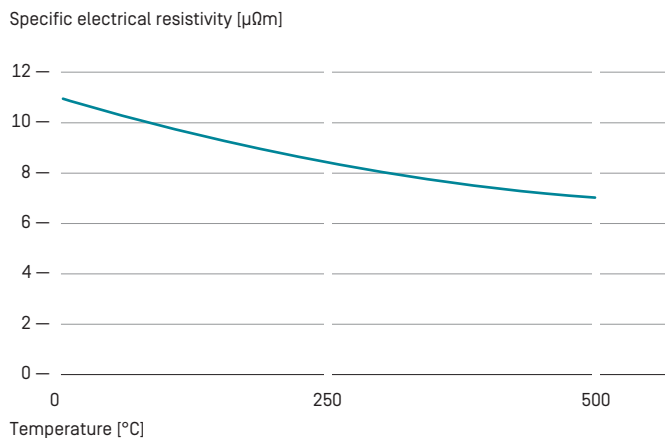
### Specific electrical resistivity of SGRATHERM parallel to surface at room temperature as a function of density



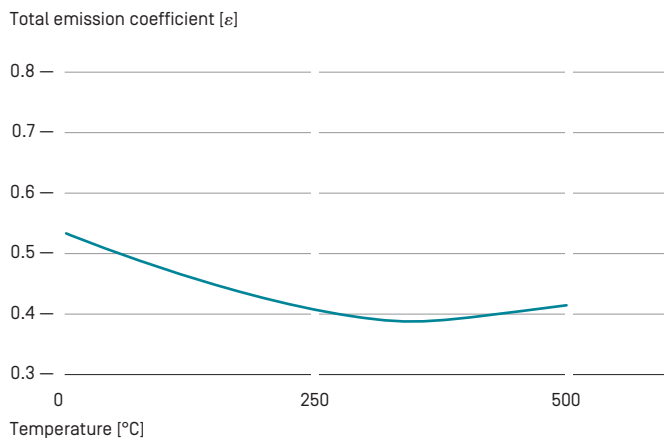
### Specific electrical resistivity of SGRATHERM perpendicular to surface at room temperature as a function of density



### Specific electrical resistivity of SGRATHERM with density 1.0 g/cm³ parallel to surface as a function of temperature



### Total emission coefficient of SGRATHERM with density 1.0 g/cm³ as a function of temperature



Graphite Materials & Systems | SGL CARBON GmbH | SGL Technic LLC  
 Sales Europe/Middle East/Africa | sigraflex-europe@sglcarbon.com  
 Sales Americas | sigraflex-americas@sglcarbon.com  
 Sales Asia/Pacific | sigraflex-asia@sglcarbon.com  
 www.expandedgraphite.com | www.sglcarbon.com

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