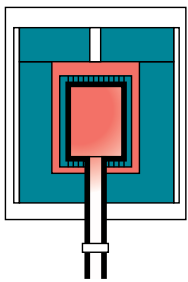
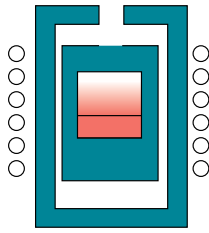


SIGRAFLEX®

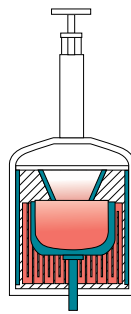
Flexible graphite foils and sheets for semiconductor and LED industry



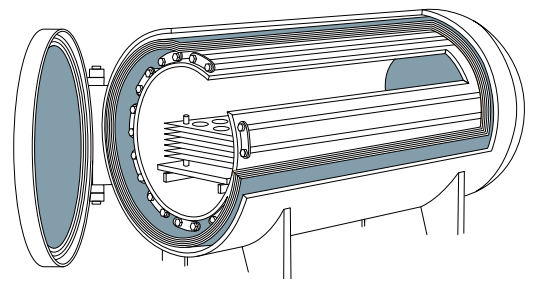
↑ Sapphire single crystal growth



↑ SiC sublimation growth



↑ Si mono-crystal growth [CZ]



SIGRAFLEX products manufactured from expanded natural graphite improve the performance of systems and processes in high temperature applications, minimize energy consumption and stand for reliability.

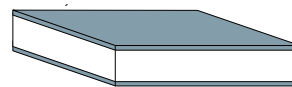
All processes used to grow semiconductor crystals operate at high temperatures in aggressive environments – whether CZ for silicon, HEM for sapphire or PVT for SiC bulk growth. This is why the hot zones of industrial crystal growth furnaces are generally equipped with heat- and corrosion-resistant graphite components.

SIGRAFLEX flexible graphite foils are free of adhesives and binders. Demonstrating its extraordinary properties, it can be used in ultra-high temperature applications ranging up to 3000 °C in inert atmosphere or vacuum. Superior thermal and electrical conductivity makes it a suitable material for a wide range of parts and components in poly crystalline silicon and semiconductor, solar and other ceramic production equipment.

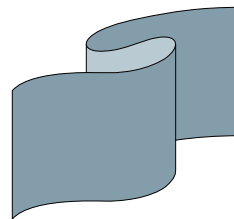
It can be provided in high purity [SIGRAFLEX TH or HP] and ultra-high purity [SIGRAFLEX THP or UHP] to prevent product contamination. SIGRAFLEX is often used in combination with SIGRATHERM® soft and rigid felts, SIGRABOND® carbon fiber reinforced carbon and SIGRAFINE® synthetic graphite.

Properties

- Soft and flexible, inert, highly impermeable
- Light weight, simple machining, cutting and punching
- Thermal dissipation, electrically conductive, no static charges
- Excellent chemical resistance
- High purity
- Sheets are available with pinholes for outgassing
- No embrittlement
- Very good resistance to thermal shock



← Protective liners and diffusion barriers – Off-gas from production parts can build up undesired deposits and dendrites or could corrode or oxidize graphite furnace parts. SIGRAFLEX is used as a protective liner on carbon and graphite components like rigid felt resulting in a longer service life.



← Release liners – A low friction coefficient, being bendable and thermally conductive makes SIGRAFLEX a perfect material for this application. These properties allow high efficiencies and short turnaround times.

Material data of SIGRAFLEX® flexible graphite foils and sheets

Typical properties	Units	TH	THP	HP	UHP
Standard density	g/cm ³	0.7/1.0/1.2/1.3	1.0	1.12	1.12
Ash content (ASTM C561 or DIN 51903)	%	≤ 0.15	≤ 10 ppm	≤ 0.20	≤ 200 ppm
Carbon content	%	≥ 99.85	≥ 99.999	≥ 99.8	≥ 99.98
Material thickness (supplied as sheets)	mm	1.0/1.5/2.0/3.0	1.0/1.5 2.0/3.0	0.76/1.52/3.05	0.76/1.52/3.05
Material thickness (supplied on rolls)	mm	0.15/0.2/0.25/0.35 0.50/0.80/1.0	0.25/0.35 0.5/0.75	0.25/0.51 0.76/1.52	0.25/0.51 0.76/1.52
Roll width	mm	500/1000	500/1000	508/762/1524	up to 50
Standard roll length	m	50	50	96	30
Sheet sizes	mm	500 x 1000 1000 x 1000 up to 1500 x 2500	500 x 1000 1000 x 1000	up to 1524 x 1524	up to 1524 x 1524
Availability		EU grade	EU grade	US grade	US grade

Material data of SIGRAFLEX® TH with a bulk density of 1.0 g/cm³

Typical properties	Units	Values
Sublimation temperature	°C	> 3000
Temperature resistance	°C	in air approx. 400 in inert gas and vacuum approx. 3000
Specific electrical resistivity [20 °C]	μΩm	perpendicular to surface 700 parallel to surface 11
Thermal conductivity [20 °C]	Wm ⁻¹ K ⁻¹	perpendicular to surface 5 parallel to surface 220
Specific heat capacity [20 °C]	kJkg ⁻¹ K ⁻¹	0.7
Thermal expansion coefficient [20 – 1000 °C]	10 ⁻⁶ K ⁻¹	perpendicular to surface approx. 50 parallel to surface approx. 1
Permeability coefficient for air	cm ² /s	perpendicular to surface 2 x 10 ⁻⁵
Coefficient of emission [1500 °C]		0.65

Typical element contents of SIGRAFLEX® TH and THP

Typical impurities	Units	TH	THP
Alkali metals	ppm	60	< 1
Alkaline earth metals	ppm	50	< 1
Halogens	ppm	10	< 1
Sulfur	ppm	5	< 1
Silicon	ppm	60	1
Ash content (DIN 51903)	ppm	≤ 1500	≤ 10

Values and properties are typical and are valid for the bigger part of the product range. Other values or dimensions on request. Graphite used for production is of natural origin, therefore especially impurities vary.

For any engineering/design purposes please always contact our technical sales team.



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