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.

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 SIGRATHERM® flexible graphite foils and sheets

<table>
<thead>
<tr>
<th>Properties</th>
<th>Units</th>
<th>Typical values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard density</td>
<td>g/cm³</td>
<td>0.7 – 1.8</td>
</tr>
<tr>
<td>Standard thickness</td>
<td>mm</td>
<td>0.15 – 3.0</td>
</tr>
<tr>
<td>Standard size sheets</td>
<td></td>
<td>0.15 – 3.0</td>
</tr>
<tr>
<td>Standard size roll goods</td>
<td>mm</td>
<td>1000 x 1000</td>
</tr>
<tr>
<td>Ash content (DIN 51903)</td>
<td>%</td>
<td>&lt; 5</td>
</tr>
<tr>
<td>Carbon content</td>
<td>%</td>
<td>&gt; 95</td>
</tr>
<tr>
<td>Halogen content</td>
<td></td>
<td>Free from halogens</td>
</tr>
<tr>
<td>Temperature resistance in air</td>
<td>°C</td>
<td>− 250 to approx. 400/600*</td>
</tr>
<tr>
<td>Thermal conductivity</td>
<td>Wm⁻¹K⁻¹</td>
<td>Strongly depending on</td>
</tr>
<tr>
<td>Specific heat capacity (20 °C)</td>
<td>kJkg⁻¹K⁻¹</td>
<td>direction and density,</td>
</tr>
<tr>
<td></td>
<td></td>
<td>please see following</td>
</tr>
<tr>
<td></td>
<td></td>
<td>graphs</td>
</tr>
</tbody>
</table>

* 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 SIGRATHERM parallel to surface at room temperature as a function of density

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

Thermal conductivity of SIGRATHERM with density 1.0 g/cm³ parallel to surface as a function of temperature

Thermal conductivity of SIGRATHERM with density 1.0 g/cm³ perpendicular to surface as a function of temperature
Specific electrical resistivity of SIGRATHERM parallel to surface at room temperature as a function of density

Specific electrical resistivity [µΩm]

Density [g/cm³]

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

Specific electrical resistivity [µΩm]

Density [g/cm³]

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

Specific electrical resistivity [µΩm]

Temperature [°C]

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

Total emission coefficient [ε]

Temperature [°C]