SIGRASEAL®
Flexible graphite foil reinforced with tanged stainless steel

SIGRASEAL is an adhesive-free gasket sheet made of flexible graphite foils reinforced with tanged stainless steel.

Applications
- For all common pipework and vessel flange designs
- For one-piece gasket designs up to an outside diameter of 1500 mm; for diameters above 1500 mm, for example two-layer structures with segmented sections and staggered joints are recommended
- For operating pressures from vacuum up to 100 bar
- For corrosive media
- Operating temperatures range from –250 °C up to 500 °C depending on chemical resistance. Life time might be limited at high temperatures. Consult the manufacturer when application temperatures exceed 400 °C. Please refer to our technical guideline regarding thermal stability.
- Gaskets for the chemical, petrochemical and refinery industries
- Steam pipework in power generation plants and heating equipment
- Existing plants

Properties
- High blow-out resistance and mechanical strength
- High fault tolerance during assembly and operation
- Good chemical resistance
- Long-term stability of compressibility and recovery, even under fluctuating temperatures
- No measurable cold or warm flow characteristics up to the maximum permissible gasket stress
- No aging or embrittlement (no adhesives or binders)
- Asbestos-free (no associated health risks)

Approvals/Test reports
Please see www.sigratflex.com/downloads for details
- BAM oxygen
- FDA and LFGB (SGS Institut Fresenius)

Assembly instructions
Our detailed assembly instructions are available on request.

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## Material data of SIGRASEAL®

### Typical properties

<table>
<thead>
<tr>
<th>Property</th>
<th>Units</th>
<th>V10010M2</th>
<th>V15010M2</th>
<th>V20010M2</th>
<th>V30010M2</th>
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</thead>
<tbody>
<tr>
<td>Thickness</td>
<td>mm</td>
<td>1.0</td>
<td>1.5</td>
<td>2.0</td>
<td>3.0</td>
</tr>
<tr>
<td>Dimensions</td>
<td>m</td>
<td>1.5 x 1.5</td>
<td>1.5 x 1.5</td>
<td>1.5 x 1.5</td>
<td>1.5 x 1.5</td>
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<tr>
<td>Bulk density of graphite</td>
<td>g/cm³</td>
<td>1.0</td>
<td>1.0</td>
<td>1.0</td>
<td>1.0</td>
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<tr>
<td>Ash content of graphite (DIN 51903)</td>
<td>%</td>
<td>≤ 2.0</td>
<td>≤ 2.0</td>
<td>≤ 2.0</td>
<td>≤ 2.0</td>
</tr>
<tr>
<td>Purity</td>
<td>%</td>
<td>≥ 98</td>
<td>≥ 98</td>
<td>≥ 98</td>
<td>≥ 98</td>
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<tr>
<td>Total chlorine content</td>
<td>ppm</td>
<td>≤ 50</td>
<td>≤ 50</td>
<td>≤ 50</td>
<td>≤ 50</td>
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<tr>
<td>Total halogen content</td>
<td>ppm</td>
<td>≤ 200</td>
<td>≤ 200</td>
<td>≤ 200</td>
<td>≤ 200</td>
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<tr>
<td>Oxidation rate in air at 670 °C (TGA)</td>
<td>%/h</td>
<td>&lt; 4</td>
<td>&lt; 4</td>
<td>&lt; 4</td>
<td>&lt; 4</td>
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<tr>
<td>Oxidation inhibitor</td>
<td></td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>Passive corrosion inhibitor (ASTM F 2168-13)</td>
<td></td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
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<tr>
<td>Reinforcing steel sheet details</td>
<td></td>
<td>Tanged stainless steel sheet</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ASTM material number</td>
<td></td>
<td>316L</td>
<td>316L</td>
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</tr>
<tr>
<td>Thickness</td>
<td>mm</td>
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<td>0.1</td>
<td>0.1</td>
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</tr>
<tr>
<td>Number of sheets</td>
<td></td>
<td>1</td>
<td>1</td>
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<td>1</td>
</tr>
<tr>
<td>Residual stress (DIN 52913)</td>
<td>N/mm²</td>
<td>≥ 45</td>
<td>≥ 45</td>
<td>≥ 45</td>
<td>≥ 45</td>
</tr>
<tr>
<td>Gasket factors (DIN E 2505/DIN 28090-1)</td>
<td></td>
<td>see <a href="http://www.esadata.org">www.esadata.org</a> or <a href="http://www.gasketdata.org">www.gasketdata.org</a></td>
<td></td>
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<tr>
<td>Gasket width</td>
<td>mm²</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
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<tr>
<td>Gasket factor (DIN EN 13555)</td>
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<td></td>
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<tr>
<td>Compressibility</td>
<td>%</td>
<td>35</td>
<td>40</td>
<td>40</td>
<td>40</td>
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<tr>
<td>Recovery at 20 °C</td>
<td>%</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
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<tr>
<td>Hot creep</td>
<td>%</td>
<td>&lt; 4</td>
<td>&lt; 4</td>
<td>&lt; 4</td>
<td>&lt; 4</td>
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<tr>
<td>Recovery at 300 °C</td>
<td>%</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Young's modulus at 20 N/mm²</td>
<td>N/mm²</td>
<td>850</td>
<td>850</td>
<td>850</td>
<td>850</td>
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<tr>
<td>ASTM &quot;m&quot;-factor</td>
<td>psi</td>
<td>2.5</td>
<td>2.5</td>
<td>2.5</td>
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<tr>
<td>ASTM &quot;y&quot;-factor</td>
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<td>3000</td>
<td>3000</td>
<td>3000</td>
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<tr>
<td>Compressibility (ASTM F36)</td>
<td>%</td>
<td>37</td>
<td>42</td>
<td>42</td>
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<tr>
<td>Recovery (ASTM F36)</td>
<td>%</td>
<td>15</td>
<td>14</td>
<td>14</td>
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</tbody>
</table>

### Definitions

- \( \sigma_{u} \) Minimum gasket assembly stress. Recommended gasket assembly stress: ≥ 20 N/mm² if \( \sigma_{u} \) = minimum gasket assembly stress in service, where \( \sigma_{u} = p x m \)
- \( \sigma_{v} \) Maximum gasket assembly stress in service, where \( \sigma_{u} = p x m \)
- \( \sigma_{o} \) Maximum permissible gasket stress at 20 °C
- \( \sigma_{o,300°C} \) Maximum permissible gasket stress in service at 300 °C
- \( \sigma_{u} \) Similar to \( \sigma_{u} \), but defined acc. to ASTM, hence different value
- \( \sigma_{o,300°C} \) Minimum gasket stress in psi
- \( k_{0} \) in mm, factor for gasket assembly stress
- \( k_{1} \) in mm, factor for gasket stress in service
- \( \epsilon_{k0} \) Compression set under a gasket stress of 35 N/mm²
- \( \epsilon_{k1} \) Gasket recovery after reduction in gasket stress from 35 N/mm² to 1 N/mm²
- \( \epsilon_{r} \) Gasket creep under a gasket stress of 50 N/mm² at 300 °C after 16 h
- \( \epsilon_{r} \) Recovery after reduction in gasket stress from 50 N/mm² to 1 N/mm²

### Calculations

- \( k_{0} x k_{0} = \sigma_{u} x b_{0} \)
- \( k_{1} = m x b_{0} \)

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This information is based on our present state of knowledge and is intended to provide general notes on our products and their uses. It should therefore not be construed as guaranteeing specific properties of the products described or their suitability for a particular application. Any existing industrial property rights must be observed. The quality of our products is guaranteed under our "General Conditions of Sale".

Additional information on our SIGRAFLEX sealing materials can be found under "Download Center" on our homepage. [www.sigraflex.com/downloads](http://www.sigraflex.com/downloads)

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.sigraflex.com | www.sglcarbon.com

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