

# SIGRAFLEX®

## Flexible graphite foil for industrial sealing [metric]

SIGRAFLEX flexible graphite foil is manufactured from high quality expanded natural graphite free of adhesives and binders. Inhibitors can be added to enhance the performance. Advanced grades like SIGRAFLEX APX2 foil offer maximum protection against oxidation for greater reliability and longer service life.

### Properties

- Soft and flexible, inert and highly impermeable to gases and liquids, fire safe
- Asbestos-free, no associated health risks
- Free of any polymers or organic binders
- No aging or fatigue under dynamic load even at elevated temperatures

- Even in long term services, no noticeable changes in properties
- No measurable cold or warm flow characteristics up to the maximum permissible gasket stress
- Electrically conductive, no static charge
- Excellent chemical resistance and high thermal shock capability
- Operating temperatures range from –250 °C up to 550 °C depending on chemical resistance. Life time might be limited at high temperatures. Consult the manufacturer when application temperatures exceed 450 °C. Please refer to our technical guideline regarding thermal stability.
- Easy handling and processability during assembly or punching

### Material data of SIGRAFLEX® Foil<sup>1)</sup>

Typical properties	Units	APX2	APX	E	C	Z
Bulk density	g/cm <sup>3</sup>	Standard 1.0 (capability of 0.7 – 1.3)				
Ash content (DIN 51903)	%	≤ 2.0	≤ 2.0	≤ 1.0	≤ 2.0	≤ 0.15
Carbon content	%	≥ 98	≥ 98	≥ 99	≥ 98	≥ 99.85
Total chloride content	ppm	≤ 25	≤ 25	≤ 10	≤ 25	≤ 10
Total fluoride content	ppm	≤ 10 <sup>2)</sup>	≤ 10	≤ 10	≤ 25	≤ 10
Total halogen content	ppm	≤ 70	≤ 70	≤ 40	≤ 100	≤ 40
Total sulfur content	ppm	< 300	< 300	< 300	< 300	< 300
Oxidation rate in air at 670 °C [TGA] <sup>3)</sup>	%/hour	≤ 1	≤ 3	< 4	≤ 5	< 4
Oxidation inhibitor		yes	yes	yes	yes	yes
Passive corrosion inhibitor (ASTM F 2168-13)		yes	yes	yes	yes	yes
Material thickness [supplied as sheets, 1000 x 1000 mm, bulk density 1.0 g/cm <sup>3</sup> ] under the label SIGRAFLEX BASIS	mm				1.0/1.5 2.0/3.0	1.0/1.5 2.0/3.0
Material thickness [supplied on rolls]	mm	0.2 – 1	0.35 – 1	0.35 – 1	0.35 – 1	0.15 – 1
Roll width	mm	750/1500	500/1000/1500	500/1000/1500	500/1000/1500	500/1000/1500
Tape width	mm	≥ 4	≥ 4	≥ 4	≥ 4	≥ 4
Standard roll length	m	50	50	50	50	50

<sup>1)</sup> Data are valid for the bigger part of the product range. Other values or dimensions on request.

<sup>2)</sup> On request

<sup>3)</sup> Based on a thickness of ≥ 0.5 mm and a density of ≥ 1.0 g/cm<sup>3</sup>

## Material data of SIGRAFLEX® grade Z with bulk density of 1.0 g/cm<sup>3</sup>

Typical properties	Units	Values
Thermal conductivity at 20 °C	in plane	220
	through plane	5
Resistivity at 20 °C	in plane	11
	through plane	700
Coefficient of thermal expansion (20 – 1000 °C)	in plane	approx. 1
	through plane	approx. 50
Permeability coefficient for air	through plane	cm <sup>2</sup> /s < 2 x 10 <sup>-5</sup>
Shore hardness (D)		30
Tensile strength	N/mm <sup>2</sup>	≥4
Elongation at break	%	≥1
Compression factors (DIN 28090-2)		
Compressibility	ε <sub>KSW</sub>	45
Recovery at 20 °C	ε <sub>KRW</sub>	5
Hot creep	ε <sub>WSW</sub>	< 3
Recovery at 300 °C	ε <sub>WRW</sub>	4
Young's modulus at 20 N/mm <sup>2</sup> (DIN 28090-1)	N/mm <sup>2</sup>	700
ASTM	"m"-factor	2
	"y"-factor	N/mm <sup>2</sup> 1000
Compressibility (ASTM F36)		45
Recovery (ASTM F36)	%	11
Residual stress (DIN 52913) σ <sub>D 16 h, 300 °C, 50 N/mm<sup>2</sup></sub>	N/mm <sup>2</sup>	48
Coefficient of friction against steel, roughness ≤ 10 μm		0.1

### Applications

- Sheet products such as SIGRAFLEX HOCHDRUCK
- Metallic gaskets such as spiral wound gaskets, corrugated metal gaskets and kammprofile gaskets
- Compression packing for stuffing boxes

### Compressive strength of SIGRAFLEX® grade Z with bulk density of 1 g/cm<sup>3</sup> and material width 20 mm (DIN 28090-1)

Material thickness	mm	0.35	0.5	1	1.5	2	3
20 °C (σ <sub>V0</sub> )	N/mm <sup>2</sup>	> 300	300	180	140	120	70
300 °C (σ <sub>B0</sub> )	N/mm <sup>2</sup>	> 300	250	160	120	100	70



### Different types of SIGRAFLEX flexible graphite

**E, C, Z, APX, APX2:** Homogeneous flexible graphite grades

**CS, ZS:** Pressure sensitive adhesive backing

**TF<sup>1)</sup>:** PTFE-coated for stuffing box packing (maximum 300 °C)

**ZX<sup>1)</sup>:** Highly effective corrosion inhibitor (maximum 350 °C)

<sup>1)</sup> See separate technical informations

### Approvals/Test reports

Please see [www.sigraflex.com/downloads](http://www.sigraflex.com/downloads) for details.

- BAM oxygen
- DVGW (DIN 3535-6)
- KTW
- WRAS
- Evaluation for compliance with food legislation requirements (TÜV Rheinland and Fraunhofer IVV)



Graphite Materials & Systems | SGL CARBON GmbH | SGL TECHNIC Inc.  
Sales Europe/Middle East/Africa | [sigraflex-europe@sglcarbon.com](mailto:sigraflex-europe@sglcarbon.com)  
Sales Americas | [sigraflex-americas@sglcarbon.com](mailto:sigraflex-americas@sglcarbon.com)  
Sales Asia/Pacific | [sigraflex-asia@sglcarbon.com](mailto:sigraflex-asia@sglcarbon.com)  
[www.sigraflex.com](http://www.sigraflex.com) | [www.sglcarbon.com](http://www.sglcarbon.com)

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