

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 ¹⁾

Typical properties	Units	APX2	APX	E	C	Z
Bulk density	g/cm ³	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 ²⁾	≤ 10	≤ 10	≤ 25	≤ 10
Total halogen content (Cl, F, Br, I)	ppm	≤ 70	≤ 70	≤ 40	≤ 100	≤ 40
Total sulfur content	ppm	< 300	< 300	< 300	< 300	< 10 ... < 300 ³⁾
Oxidation rate in air at 670 °C [TGA] ⁴⁾	%/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 ³] 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

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

²⁾ On request

³⁾ Sulphur < 300 ppm as standard, < 200 ppm for the nuclear industry (low sulphur nuclear grade), but also < 10 ppm on request

⁴⁾ Based on a thickness of ≥ 0.5 mm and a density of ≥ 1.0 g/cm³

Material data of SIGRAFLEX® grade Z with bulk density of 1.0 g/cm³

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 ² /s < 2 x 10 ⁻⁵
Shore hardness (D)		30
Tensile strength	N/mm ²	≥ 4
Elongation at break	%	≥ 1
Compression factors (DIN 28090-2)		
Compressibility	ε _{KSW}	45
Recovery at 20 °C	ε _{KRW}	5
Hot creep	ε _{WSW}	< 3
Recovery at 300 °C	ε _{WRW}	4
Young's modulus at 20 N/mm ² (DIN 28090-1)	N/mm ²	700
ASTM	"m"-factor	2
	"y"-factor	1000
Compressibility (ASTM F36)		45
Recovery (ASTM F36)	%	11
Residual stress [DIN 52913] σ _{D 16 h, 300 °C, 50 N/mm²}	N/mm ²	48
Coefficient of friction against steel, roughness ≤ 10 µm		0.1

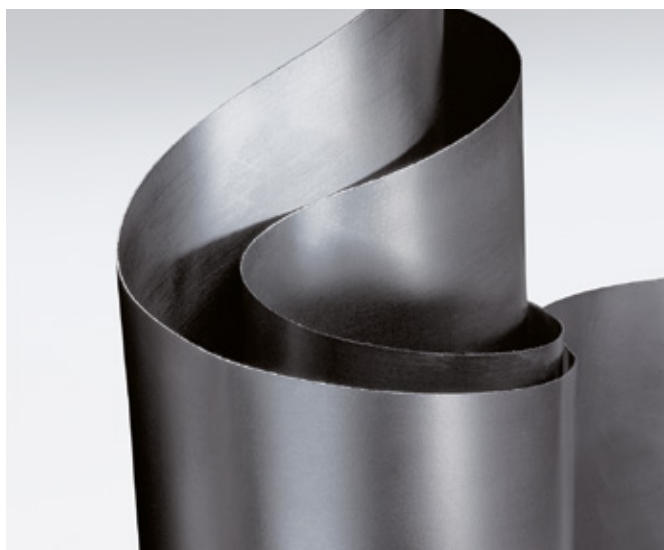
Unless stated otherwise, all values are valid at room temperature, typical, non-binding and subject to change. For engineering or design purposes please contact our technical sales team.

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
- Low sulphur Z grade also for sealing products in nuclear power plants and in other sensitive applications

Compressive strength of SIGRAFLEX® grade Z with bulk density of 1 g/cm³ and material width 20 mm [DIN 28090-1]

Material thickness	mm	0.35	0.5	1	1.5	2	3
20 °C (σ _{VO})	N/mm ²	> 300	300	180	140	120	70
300 °C (σ _{BO})	N/mm ²	> 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

TF¹⁾: PTFE-coated for stuffing box packing (maximum 300 °C)

ZX¹⁾: Highly effective corrosion inhibitor (maximum 350 °C)

¹⁾ See separate technical informations

Approvals/Test reports

Please see www.sigraflex.com/downloads for details.

- BAM oxygen
- DVGW (DIN 3535-6)
- Proof of drinking water hygiene suitability (former KTW) (HY)
- WRAS
- Evaluation for compliance with food legislation requirements (TÜV Rheinland and Fraunhofer IVV)
- FDA (SGS Institut Fresenius)



Graphite Solutions | 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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