

+

# SIGRAFLEX® STANDARD

*Impregnated sealing sheet made from natural graphite*



SIGRAFLEX STANDARD is a homogeneous sealing sheet made from flexible graphite. The sealing sheet is impregnated to reduce leakage and improve handling.

### Applications

- For raised-face flanges meeting DIN EN 1514 and DIN 2690
- For enamelled flanges and inspection glasses
- For emergency repairs and complicated configurations
- For operating pressures from vacuum up to 40 bar
- For highly corrosive media such as HCl
- Operating temperatures range from  $-250^{\circ}\text{C}$  up to  $450^{\circ}\text{C}$  depending on chemical resistance, and possibly to  $550^{\circ}\text{C}$  after consulting the manufacturer. Life time might be limited by actual equipment temperatures and operating conditions. Please refer to our technical guidelines regarding thermal stability.



† Cross-section

## Properties

- Excellent oxidation resistance
- Very high fault tolerance during assembly and operation
- Excellent chemical resistance
- Long-term stability of compressibility and recovery, even under fluctuating temperatures
- Good scratch resistance and antistick properties due to special impregnation
- No measurable cold or warm flow characteristics up to the maximum permissible gasket stress
- No aging or embrittlement (no adhesives or binders)
- Ease of cutting and punching
- Asbestos-free (no associated health risks)

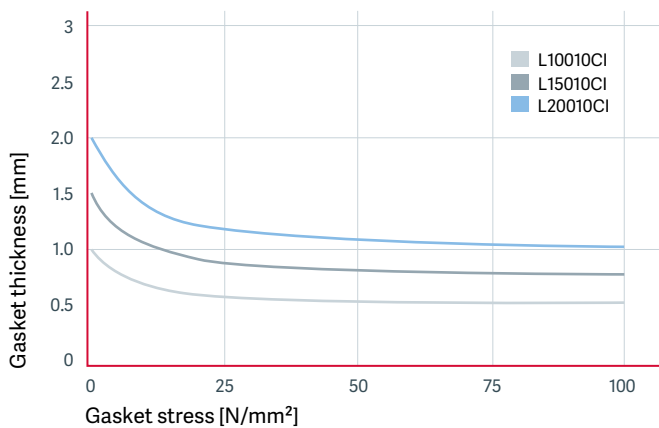


↑ SIGRAFLEX STANDARD sealing sheets and gaskets



↑ Gaskets made from SIGRAFLEX STANDARD

## Compressibility of SIGRAFLEX STANDARD



## Approvals/Test reports

- BAM oxygen
- DVGW (DIN 3535-6)
- KTW (TZW)

## Assembly instructions

Our detailed assembly instructions are available on request.

## Material data of SIGRAFLEX® STANDARD

Typical properties	Units	SIGRAFLEX			
		L10010CI	L15010CI	L20010CI	
Thickness	mm	1.0	1.5	2.0	
Dimensions	m	1.0 x 1.0	1.0 x 1.0	1.0 x 1.0	
Bulk density of graphite	g/cm <sup>3</sup>	1.0	1.0	1.0	
Ash content of graphite (DIN 51903)	%	≤ 2.0	≤ 2.0	≤ 2.0	
Purity	%	≥ 98	≥ 98	≥ 98	
Total chloride content	ppm	≤ 25	≤ 25	≤ 25	
Total halogen content	ppm	≤ 100	≤ 100	≤ 100	
Total sulphur content	ppm	< 300	< 300	< 300	
Oxidation rate in air at 670 °C (TGA)	%/h	< 4	< 4	< 4	
Oxidation inhibitor		yes	yes	yes	
Passive corrosion inhibitor (ASTM F 2168-13)		yes	yes	yes	
Residual stress (DIN 52913) $\sigma_{D 16 h, 300^{\circ} C, 50 N/mm^2}$	N/mm <sup>2</sup>	≥ 47	≥ 47	≥ 47	
Gasket factors (DIN E 2505 / DIN 28090-1)					
Gasket width $b_D = 20$ mm at an internal pressure of					
$\sigma_{VU/0.1}$	10 bar	N/mm <sup>2</sup>	11	12	14
	16 bar	N/mm <sup>2</sup>	13	15	17
	25 bar	N/mm <sup>2</sup>	16	19	22
	40 bar	N/mm <sup>2</sup>	20	26	30
$m$			1.3	1.3	1.3
$\sigma_{VO}$		N/mm <sup>2</sup>	160	140	120
$\sigma_{BO \text{ at } 300^{\circ} C}$		N/mm <sup>2</sup>	140	120	100
Gasket factors according to DIN EN 13555			see <a href="http://www.gasketdata.org">www.gasketdata.org</a>		
Compression factors (DIN 28090-2)					
Compressibility	$\epsilon_{KSW}$	%	45	45	45
Recovery at 20 °C	$\epsilon_{KRW}$	%	5	5	5
Hot creep	$\epsilon_{WSW}$	%	< 3	< 3	< 3
Recovery at 300 °C	$\epsilon_{WRW}$	%	4	4	4
Young´s modulus at 20 N/mm <sup>2</sup> (DIN 28090-1)		N/mm <sup>2</sup>	700	700	700
ASTM	„m“-factor		2	2	2
	„y“-factor	psi	1500	1500	1500
Compressibility (ASTM F36)		%	45	45	45
Recovery (ASTM F36)		%	14	14	14
The gasket factor conversion formulas as per AD Merkblatt B7 are as follows			$k_0 \times K_D = \sigma_{VU} \times b_D$ $k_1 = m \times b_D$		

### Definitions

$\sigma_{VU/0.1}$	Minimum gasket assembly stress needed to comply with leakage class L 0.1 (according to DIN 28090-1)	$k_0$	in mm, factor for gasket assembly stress
	Recommended gasket assembly stress: $\geq 20$ N/mm <sup>2</sup> up to $\sigma_{BO}$	$k_1$	in mm, factor for gasket stress in service
$\sigma_{BU}$	Minimum gasket assembly stress in service, where $\sigma_{BU}$ is the product of internal pressure $p_i$ and gasket factor $m$ for test and in service ( $\sigma_{BU} = p_i \times m$ )	$K_D$	in N/mm <sup>2</sup> , max. gasket stress-bearing capacity under assembly conditions
$\sigma_{VO}$	Maximum permissible gasket stress at 20 °C	$\epsilon_{KSW}$	Compression set under a gasket stress of 35 N/mm <sup>2</sup>
$\sigma_{BO \text{ at } 300^{\circ} C}$	Maximum permissible gasket stress in service	$\epsilon_{KRW}$	Gasket recovery after reduction in gasket stress from 35 N/mm <sup>2</sup> to 1 N/mm <sup>2</sup>
$m$	$m = \sigma_{BU} / p_i$	$\epsilon_{WSW}$	Gasket creep compression under a gasket stress of 50 N/mm <sup>2</sup> at 300 °C after 16 h
„m“-factor	Similar to $m$ , but defined acc. to ASTM, hence different value	$\epsilon_{WRW}$	Recovery after reduction in gasket stress from 50 N/mm <sup>2</sup> to 1 N/mm <sup>2</sup>
„y“-factor	Minimum gasket stress in psi		

The percentage changes in thickness of  $\epsilon_{KSW}$ ,  $\epsilon_{KRW}$ ,  $\epsilon_{WSW}$  and  $\epsilon_{WRW}$  are relative to the initial thickness.

## Product overview

Products	Characteristics	Recommended applications
SIGRAFLEX FOIL F.../C/E/Z/APX/APX2	Flexible, continuous	-250 °C to approx. 550 °C, for die-formed packing rings, spiral-wound and kammprofile gaskets
SIGRAFLEX STANDARD L...CI	Unreinforced, impregnated	Raised-face flanges, enamel or glass flanges, highly corrosive media
SIGRAFLEX ECONOMY V...C4	Reinforced with bonded stainless steel foil	Pumps, fittings, gas supply and waste gas pipelines
SIGRAFLEX UNIVERSAL V...C2I	Reinforced with tanged stainless steel, impregnated	Pipework and vessels in the chemical and petrochemical industries and in power generation plants
SIGRAFLEX UNIVERSAL PRO V...C2I-P	Reinforced with tanged stainless steel, impregnated	TA Luft applications, for pipework and vessels in the chemical and petrochemical industries and in power generation plants
SIGRAFLEX SELECT V16010C3I	Reinforced with stainless steel foil, adhesive-free, impregnated	TA Luft applications, raised-face flanges, pipework in the chemical and petrochemical industries
SIGRAFLEX HOCHDRUCK V...Z3I	Multilayer material, reinforced with stainless steel foil, adhesive-free, impregnated	Universal sealing sheet, also for solving sealing problems in pipework, process equipment, tongue-and-groove flanges and non-standard joints in the chemical, petrochemical and nuclear industries and in power generation plants
SIGRAFLEX HOCHDRUCK PRO V...Z3I-P	Multilayer material, reinforced with stainless steel foil, adhesive-free, impregnated	Universal sealing sheet for TA Luft applications, also for solving sealing problems in pipework, process equipment, tongue-and-groove flanges and non-standard joints in the chemical, petrochemical and nuclear industries and in power generation plants
SIGRAFLEX APX2 HOCHDRUCK V...W3	Multilayer material, reinforced with stainless steel foil, adhesive-free	Universal sealing sheet, also for solving sealing problems in high temperature applications in pipework, process equipment, tongue-and-groove flanges and non-standard joints in the chemical and petrochemical industries and in power generation plants
SIGRAFLEX MF V...MF	Adhesive-free laminate made of graphite, stainless steel and PTFE	Maximum requirements for sealability (TA Luft), safety and process hygiene; sealed joints in the chemical, petrochemical, pharmaceutical and food industries
SIGRAFLEX EMAIL V...Z3E	Reinforced with stainless steel foil, adhesive-free	PTFE-envelope gaskets for enameled pipework, vessels and stub connections, etc.



**Additional information** on our SIGRAFLEX sealing materials can be found under "Download Center" on our homepage.

[www.sglgroup.com/sigraflex-downloads](http://www.sglgroup.com/sigraflex-downloads)

TDS STANDARD\_Sheet.00

\* registered trademarks of SGL CARBON SE

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".

04 2015/0.5 E Printed in Germany

**Graphite Materials & Systems | SGL CARBON GmbH | SGL TECHNIC Inc.**

Sales Europe/Middle East/Africa | [sigraflex-europe@sglgroup.com](mailto:sigraflex-europe@sglgroup.com)

Sales Americas | [sigraflex-americas@sglgroup.com](mailto:sigraflex-americas@sglgroup.com)

Sales Asia/Pacific | [sigraflex-asia@sglgroup.com](mailto:sigraflex-asia@sglgroup.com)

[www.expanded-graphite.com](http://www.expanded-graphite.com) | [www.sglgroup.com/gms](http://www.sglgroup.com/gms)

