

## SIGRAFLEX® ECONOMY

SIGRAFLEX flexible graphite foil reinforced  
with flat stainless steel



SIGRAFLEX ECONOMY is a gasket sheet made of SIGRAFLEX flexible graphite foils adhesively bonded to one or two 0.05 mm thick flat stainless steel reinforcements.

### Applications

- For pumps, fittings and valves, especially for thin gaskets
- For unstable flanges with low gasket stresses and for waste gas pipelines, e.g. in incineration plants
- For raised-face flanges meeting DIN EN 1514 and DIN 2690
- For operating pressures from vacuum up to 100 bar
- For corrosive media
- Operating temperatures range from  $-269^{\circ}\text{C}$  up to  $550^{\circ}\text{C}$  depending on chemical resistance. Life time might be limited at high temperatures. Consult the manufacturer when application temperatures exceed  $450^{\circ}\text{C}$ . Please refer to our technical guideline regarding thermal stability.



↑ Cross-section

## Properties

- Thin material thicknesses are suitable for TA Luft applications
- Excellent oxidation resistance
- Soft, highly adaptable
- 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 of the graphite layers
- Thin adhesive film of less than 10 µm with low chloride content
- Ease of processing
- Asbestos-free [no associated health risks]

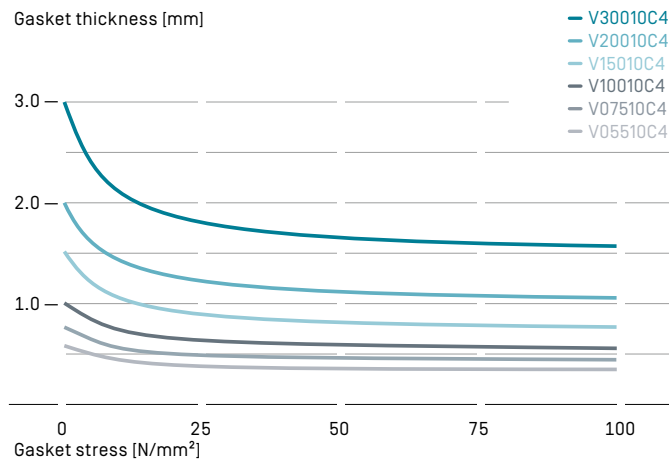


↑ Gaskets made from SIGRAFLEX ECONOMY



↑ SIGRAFLEX ECONOMY sealing sheets and gaskets

## Compressibility of SIGRAFLEX ECONOMY



## Approvals/Test reports

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

- BAM oxygen
- RST test report about the burning behaviour of automotive interior

## Assembly instructions

Our detailed assembly instructions are available on request.

## Material data of SIGRAFLEX® ECONOMY

Typical properties		Units	V05510C4	V07510C4	V10010C4	V15010C4	V20010C4	V30010C4
Thickness		mm	0.55	0.75	1.0	1.5	2.0	3.0
Dimensions		m	1.0 x 1.0	1.0 x 1.0	1.0 x 1.0	1.0 x 1.0	1.0 x 1.0	1.0 x 1.0
up to 1 mm thickness also supplied on rolls								
Bulk density of graphite		g/cm <sup>3</sup>	1.0	1.0	1.0	1.0	1.0	1.0
Ash content of graphite (DIN 51903)		%	≤ 2.0	≤ 2.0	≤ 2.0	≤ 2.0	≤ 2.0	≤ 2.0
Purity		%	≥ 98	≥ 98	≥ 98	≥ 98	≥ 98	≥ 98
Total chloride content		ppm	≤ 25	≤ 25	≤ 25	≤ 25	≤ 25	≤ 25
Total halogen content (Cl, F, B, I)		ppm	≤ 100	≤ 100	≤ 100	≤ 100	≤ 100	≤ 100
Total sulphur content		ppm	< 300	< 300	< 300	< 300	< 300	< 300
Oxidation rate in air at 670 °C (TGA)		%/h	< 4	< 4	< 4	< 4	< 4	< 4
Oxidation inhibitor			yes	yes	yes	yes	yes	yes
Passive corrosion inhibitor (ASTM F 2168-13)			yes	yes	yes	yes	yes	yes
Reinforcing steel sheet details			Smooth stainless steel foil					
	ASTM material number		316L	316L	316L	316L	316L	316L
	Thickness	mm	0.05	0.05	0.05	0.05	0.05	0.05
	Number of sheets		1	1	1	1	1	2
Residual stress (DIN 52913)	$\sigma_{D 16 h, 300^\circ C, 50 N/mm^2}$	N/mm <sup>2</sup>	≥ 45	≥ 45	≥ 45	≥ 45	≥ 45	≥ 45
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>	10	10	10	10	18
		16 bar	N/mm <sup>2</sup>	10	10	10	12	26
		25 bar	N/mm <sup>2</sup>	10	10	13	17	34
		40 bar	N/mm <sup>2</sup>	11	15	20	27	46
	m			1.3	1.3	1.3	1.3	1.3
	$\sigma_{V0}$		N/mm <sup>2</sup>	220	200	180	160	140
	$\sigma_{B0 at 300^\circ C}$		N/mm <sup>2</sup>	200	180	160	140	100
Gasket factors (DIN EN 13555)			see <a href="http://www.esadata.org">www.esadata.org</a> or <a href="http://www.gasketdata.org">www.gasketdata.org</a>					
Compression factors (DIN 28090-2)								
Compressibility	$\epsilon_{KSW}$	%	40	40	40	40	40	40
Recovery at 20 °C	$\epsilon_{KRW}$	%	5	5	5	5	5	5
Hot creep	$\epsilon_{WSW}$	%	< 5	< 5	< 5	< 5	< 5	< 5
Recovery at 300 °C	$\epsilon_{WRW}$	%	3	3	3	3	3	3
Young's modulus at 20 N/mm <sup>2</sup> (DIN 28090-1)		N/mm <sup>2</sup>	750	750	750	750	750	750
ASTM	„m“-factor		2.0	2.0	2.0	2.0	2.0	2.0
	„y“-factor	psi	1500	1500	1500	1500	1500	1500
Compressibility (ASTM F36)		%	42	42	42	42	42	42
Recovery (ASTM F36)		%	12	12	12	12	12	12
The gasket factor conversion formulas as per AD Merkblatt B7 are as follows						$k_D \times K_D = \sigma_{VU} \times b_D$ $k_1 = m \times b_D$		

### Definitions

$\sigma_{VU/0,1}$	Minimum gasket assembly stress needed to comply with leakage class L 0.1 (according to DIN 28090-1) Recommended gasket assembly stress: ≥ 20 N/mm <sup>2</sup> up to $\sigma_{B0}$	$\epsilon_{KSW}$	Compression set under a gasket stress of 35 N/mm <sup>2</sup>
$\sigma_{BU}$	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 ( $\sigma_{BU} = p_i \times m$ )	$\epsilon_{KRW}$	Gasket recovery after reduction in gasket stress from 35 N/mm <sup>2</sup> to 1 N/mm <sup>2</sup>
$\sigma_{V0}$	Maximum permissible gasket stress at 20 °C	$\epsilon_{WSW}$	Gasket creep compression under a gasket stress of 50 N/mm <sup>2</sup> at 300 °C after 16 h
$\sigma_{B0 at 300^\circ C}$	Maximum permissible gasket stress in service	$\epsilon_{WRW}$	Recovery after reduction in gasket stress from 50 N/mm <sup>2</sup> to 1 N/mm <sup>2</sup>
$m$	$m = \sigma_{BU} / p_i$	The percentage changes in thickness of $\epsilon_{KSW}$ , $\epsilon_{KRW}$ , $\epsilon_{WSW}$ und $\epsilon_{WRW}$ are relative to the initial thickness.	
„m“-factor	Similar to $m$ , but defined acc. to ASTM, hence different value	Unless stated otherwise, all values are valid at room temperature, typical, non-binding and subject to change. Please note some values correspond to the graphite foil only. For engineering or design purposes please contact our technical sales team.	
„y“-factor	Minimum gasket stress in psi		
$k_D$	in mm, factor for gasket assembly stress		
$k_1$	in mm, factor for gasket stress in service		
$K_D$	in N/mm <sup>2</sup> , max. gasket stress-bearing capacity under assembly conditions		

## Product overview

Products	Characteristics	Recommended applications
SIGRAFLEX FOIL F.../C/E/Z/APX/APX2®	Flexible, soft, continuous	- 250 °C to approx. 550 °C, for die-formed packing rings, filler material for spiral wound gaskets, facing material for kammprofile and corrugated 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...C2IP	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...Z3IP	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.sigraflex.com/downloads](http://www.sigraflex.com/downloads)



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