

SIGRAFLEX® UNIVERSAL

Impregnated sealing sheet made from natural graphite with tanged stainless steel reinforcement



SIGRAFLEX UNIVERSAL is an adhesive-free graphite sealingsheet made from flexible graphite foil with one or two tanged stainless steel reinforcements. The sealing sheet is impregnated to reduce leakage and improve handling.

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 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.
- Gaskets for the chemical, petrochemical and refinery industries
- Steam pipework in power generation plants and heating equipment
- Existing plants



Properties

- High operational reliability, increased plant availability
- Excellent oxidation resistance
- High blow-out resistance and mechanical strength
- Very high fault tolerance during assembly and operation
- Good 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)
- Asbestos-free (no associated health risks)

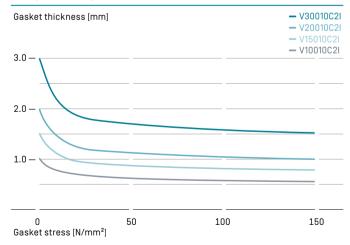


↑ Gaskets made from SIGRAFLEX UNIVERSAL



↑ Flange with SIGRAFLEX UNIVERSAL gasket

Compressibility of SIGRAFLEX UNIVERSAL



Approvals/Test reports

Please see www.sigraflex.com/downloads for details

- Fire safe according to BS 6755-2
- Blow-out resistance (TÜV at 2.5 times the nominal pressure)
- BAM oxygen
- BAM ethylene oxide/propylene oxide
- Germanischer Lloyd
- US Coastguard
- DVGW (DIN 3535-6)

Assembly instructions

Our detailed assembly instructions are available on request.

Material data of SIGRAFLEX® UNIVERSAL

Typical properties	Units	V10010C2I	V15010C2I	V20010C2I	V30010C2I
Thickness	mm	1.0	1.5	2.0	3.0
Dimensions	m	1.5 x 1.5	1.5 x 1.5	1.5 x 1.5	1.5 x 1.5
		1.0 x 1.0	1.0 x 1.0	1.0 x 1.0	1.0 x 1.0
Bulk density of graphite	g/cm³	1.0	1.0	1.0	1.0
Ash content of graphite (DIN 51903)	%	≤ 2.0	≤ 2.0	≤ 2.0	≤ 2.0
Purity	%	≥ 98	≥ 98	≥ 98	≥ 98
Total chloride content	ppm	≤ 25	≤ 25	≤ 25	≤ 25
Total halogen content	ppm	≤ 70	≤ 70	≤ 70	≤ 70
Total sulphur content	ppm	< 300	< 300	< 300	< 300
Oxidation rate in air at 670 °C [TGA]	%/h	< 4	< 4	< 4	< 4
Oxidation inhibitor		yes	yes	yes	yes
Passive corrosion inhibitor (ASTM F 2168-13)		yes	yes	yes	yes
Reinforcing steel sheet details			Tanged stainless s	teel sheet	
ASTM material numbe	r	316 (L)	316 (L)	316 (L)	316 (L)
Thickness	s mm	0.1	0.1	0.1	0.1
Number of sheets	3	1	1	1	2
Residual stress (DIN 52913) $\sigma_{\text{D 16 h, 300 °C, 50 N/mm}}$		≥ 45	≥ 45	≥ 45	≥ 45
Gasket factors [DIN E 2505/DIN 28090-1]					
Gasket width b _D = 20 mm at an internal pressure of					
$\sigma_{ extsf{VU/0.1}}$ 10 ba	r N/mm²	10	10	12	18
16 ba	r N/mm²	14	14	15	23
25 ba	r N/mm²	17	17	18	30
40 ba		20	20	22	35
m		1.3	1.3	1.3	1.3
$\sigma_{\scriptscriptstyle{ m VO}}$	N/mm²	200	180	160	140
σ _{BO at 300°C}	N/mm²	180	160	140	120
Gasket factors (DIN EN 13555)			see www.gasketdata.org		
Compression factors (DIN 28090-2)					
Compressibility $oldsymbol{arepsilon}_{KSI}$	w %	35	40	40	40
Recovery at 20 °C € KRI	•	5	5	5	5
Hot creep €wsi		< 4	< 4	< 4	< 4
Recovery at 300 °C € wRI		4	4	4	4
E-Modul bei 20 N/mm² [DIN 28090-1]	N/mm²	850	850	850	850
ASTM "m"-facto		2.5	2.5	2.5	2.5
"y"-facto		2000	2000	2000	2000
Compressibility (ASTM F36)	%	35	40	40	40
Recovery (ASTM F36)	%	15	12	12	12
The gasket factor conversion formulas			$k_0 \times K_D = \sigma$		
as per AD Merkblatt B7 are as follows			$k_1 = m \times b_D$		
Definitions					
$\sigma_{ ext{ Vu}/0.1}$ Minimum gasket assembly stress needed to comply with leakage			in mm, factor for gasket assembly stress		
class L 0.1 (according to DIN 28090-1)		$egin{aligned} \mathbf{k}_0 \ \mathbf{k}_1 \end{aligned}$	in mm, factor for gasket stress in service		
Recommended gasket assembly stress: $\geq 20 \text{ N/mm}^2 \text{ up to } \sigma_{\text{B0}}$ σ_{BI} Minimum gasket assembly stress in service, where σ_{BI} is the product		K _□	in N/mm², max. gasket stress-bearing capacity under assembly conditions		
σ_{BU} Minimum gasket assembly stress in service, where σ_{BU} is the of internal pressure p_i and gasket factor m for test and in set		Cl €ksw	Compression set under a gasket stress of 35 N/mm ²		
$[\sigma_{BU} = p_i \times m]$			Gasket recovery after	reduction in gasket str	
σ_{vo} Maximum permissible gasket stress at 20 °C			35 N/mm² to 1 N/mm²		
$\sigma_{\text{B0 at 300°C}}$ Maximum permissible gasket stress in service m = $\sigma_{\text{BU}}/p_{\text{I}}$			Gasket creep compres at 300 °C after 16 h	ssion under a gasket st	ress of 50 N/mm²
"m"-factor Similar to m, but defined acc. to ASTM, hence different value			Recovery after reduct	ion in gasket stress fro	m 50 N/mm²
"y"-factor Minimum gasket stress in psi			to 1 N/mm²		

The percentage changes in thickness of $\epsilon_{\text{KSW}},\,\epsilon_{\text{KRW}},\,\epsilon_{\text{WSW}}$ und ϵ_{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 LCI	Unreinforced, impregnated	Raised-face flanges, enamel or glass flanges, highly corrosive media		
SIGRAFLEX ECONOMY VC4	Reinforced with bonded stainless steel foil	Pumps, fittings, gas supply and waste gas pipelines		
SIGRAFLEX UNIVERSAL VC2I	Reinforced with tanged stainless steel, impregnated	Pipework and vessels in the chemical and petrochemical industries and in power generation plants		
SIGRAFLEX UNIVERSAL PRO VC2IP	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 VZ3I	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 VZ3IP	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 VW3	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 VMF	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 VZ3E	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



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