

SIGRAFLEX® STANDARD

Sealing Sheet Made from Impregnated Graphite



SGL CARBON GROUP

SIGRAFLEX® STANDARD

Applications

- For gaskets meeting DIN 2690 in raised-face flanges; recommended for diameters up to 350 mm
- For large segmented gaskets of more than 1000 mm diameter; also suitable as top layer for corrugated steel rings
- For internal pressures up to 40 bar and gasket pressures up to 100 N/mm²
- For enamel and glass, especially for inspection glasses
- For highly corrosive media such as HCl, thanks to its outstanding resistance to chemicals
- For repairs and complicated configurations

Any existing industrial property rights must be observed.

The application limits illustrated are conservative recommendations, which can be exceeded under favorable conditions.

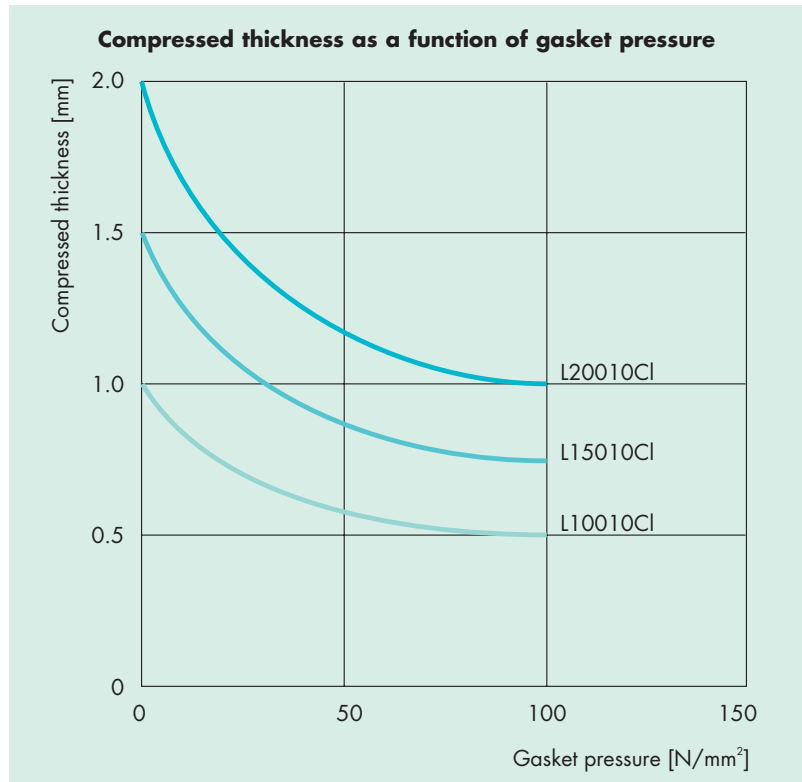
Examples:

Determination of maximum permissible gasket pressure under service condition σ_{BO} :

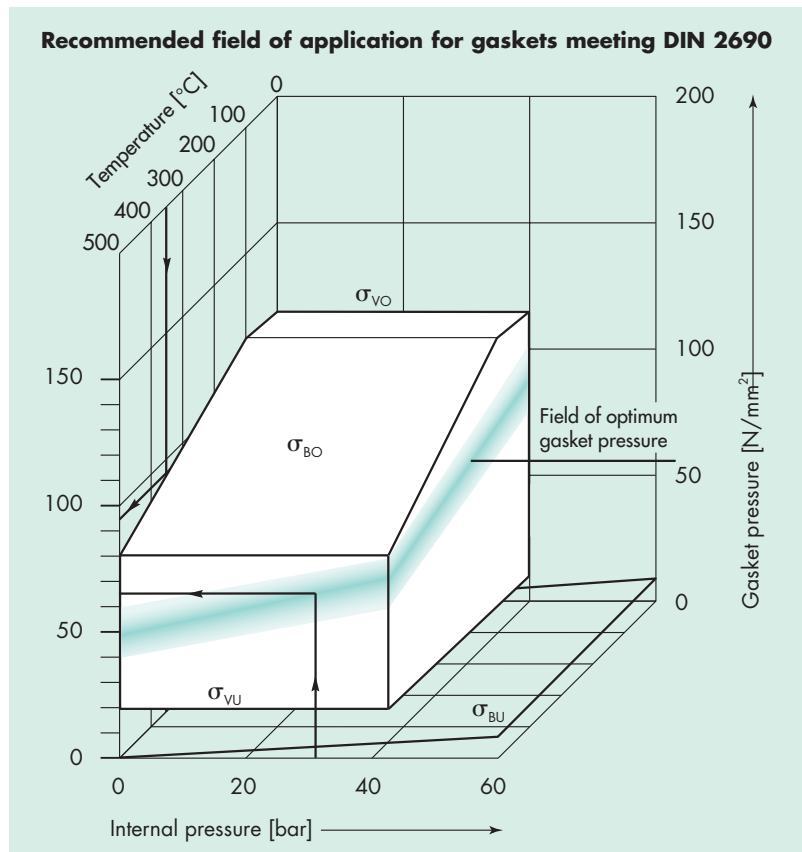
Specified: 350°C → 95 N/mm²

Determination of optimum gasket pressure σ_{OPT} :

Specified: 30 bar → 65 N/mm²



For details of the recovery behavior of gaskets, see SIGRAFLEX brochure, Products Manufactured from Flexible Graphite Foil



Properties

- Good scratch resistance, antistick finish
- Low permeability to gases and liquids
- Suitability for use at temperatures ranging from -250°C to approx. 500°C. For applications at more than 400°C, users should request our advice
- Outstanding resistance to chemicals
- Asbestos-free, presents no health hazard
- No ageing or embrittlement, because of absence of binders
- Long-term stability of compressibility and recovery over a wide temperature range
- No measurable cold or warm flow up to maximum permissible compressive stress
- Very good resistance to thermal shock
- High residual stress
- Ease of cutting or punching
- Ability to compensate for any major unevenness

Approvals

- BAM
- DVGW
- KTW

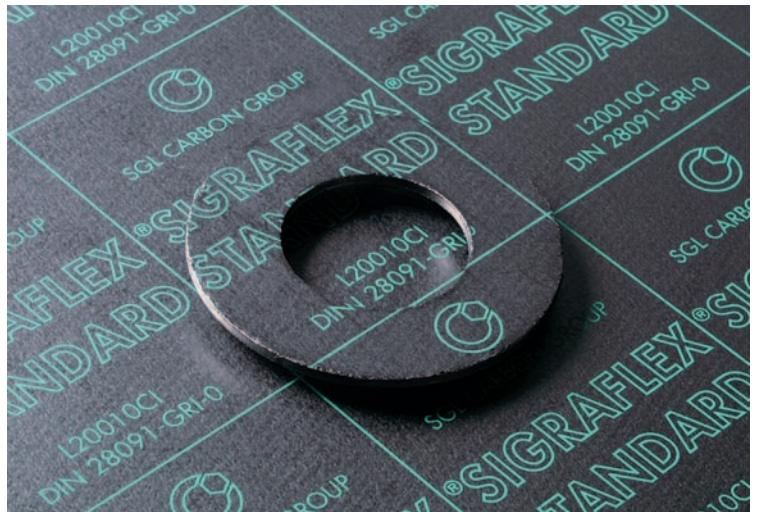
Assembly Instructions

Use dry and undamaged gaskets.

The sealing faces must be clean, dry and free from grease. Do not use release agents.

Position the gasket correctly to avoid mechanical stresses during assembly.

Align the flanges as plane-parallel as possible. Tighten the bolts in cross-wise order, first to about 50 % of the maximum torque value, in the second stage to about 80 % and to the full value in the third stage but not before. All bolts must be tightened to the specified value; hence, the torque should be checked **repeatedly**.



SIGRAFLEX® STANDARD

Material Data

Material type		L10010CI	L15010CI	L20010CI
Thickness	mm	1.0	1.5	2.0
Bulk density of graphite	g/cm ³	1.0		
Ash content of graphite (DIN 51903)	%	≤ 2.0		
Total chloride content of graphite	ppm	≤ 50		
Residual stress (DIN 52913) σ_D 16 h, 300°C, 50 N/mm ²	N/mm ²	> 47		
Gasket factors ¹⁾ (DIN E 2505) Specimen width $b_D=20$ mm				
σ_{VU}	N/mm ²	20	20	20
m		1.3	1.3	1.3
σ_{VO}	N/mm ²	160	140	120
σ_{BO} at 300°C	N/mm ²	140	120	100
ASTM "m" factor		2		
"y" factor	psi	1500		
Compression factors ¹⁾ (DIN 28090-2)				
Compressibility ϵ_{KSW}	%	40 – 50		
Recovery at 20°C ϵ_{KRW}	%	3.5 – 4.5		
Hot creep during operation ϵ_{WSW}	%	< 4		
Recovery at 300°C ϵ_{WRW}	%	2.5 – 3.5		
Compressibility	%	40 – 50		
Recovery ASTM F36A-66	%	10 – 15		

¹⁾ Definitions:

σ_{VU} Minimum gasket assembly pressure.

The given minimum assembly pressures apply to a sealing criterion as previously used for compressed asbestos fiber seals. To reduce the rate of leakage, we recommend a higher gasket pressure, see brochure SIGRAFLEX®, Products Manufactured from Flexible Graphite Foil.

σ_{BU} Minimum gasket pressure under service conditions, where σ_{BU} is the product of internal pressure p and gasket factor m for test and service conditions ($\sigma_{BU} = p \cdot m$)

σ_{VO} Maximum permissible gasket pressure at 20°C

$\sigma_{BO, 300^\circ C}$ Maximum permissible gasket pressure under service conditions

m σ_{BU}/p

"m" factor Similar to m, but defined according to ASTM, hence different value

"y" factor Minimum gasket pressure in psi

ϵ_{KSW} Compression set under a pressure of 35 N/mm²

ϵ_{KRW} Gasket recovery after reduction in pressure from 35 N/mm² to 1 N/mm²

ϵ_{WSW} Gasket creep compression under a pressure of 50 N/mm² at 300°C after 16 h

ϵ_{WRW} Recovery after reduction in pressure from 50 N/mm² to 1 N/mm²

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

Forms Supplied

SIGRAFLEX STANDARD sheets are available in the following dimensions with the stated type designations:

Outside Dimensions	Types
1000 x 1000 x 1.0 mm	L10010CI
1000 x 1000 x 1.5 mm	L15010CI
1000 x 1000 x 2.0 mm	L20010CI

Typical Order

Ash content of graphite	≤ 2.0 %
Bulk density of graphite	1.0 g/cm ³
Thickness	2.0 mm
Length	1000 mm
Width	1000 mm

1000 x 1000 x 2.0 mm	L20010CI
----------------------	----------

Packaging

Depending on the quantity ordered, the sheets are supplied in cartons or on pallets with stackable frames and top cover. The sheets are protected against damage by inserted corrugated cardboard or foam rubber strips. The carton can take up to 50 kg, the pallet up to 1200 kg. The height of the frame structure is adjustable. The consignments can be arranged on the pallets to customers' individual wishes.

Carton:
1180 x 1180 x 60 mm

Pallet with stackable frames:
1090 x 1090 mm

Other Relevant Publications

- SIGRAFLEX®, Products Manufactured from Flexible Graphite Foil
- Data sheets:
 - SIGRAFLEX® FOIL
 - SIGRAFLEX® ECONOMY
 - SIGRAFLEX® UNIVERSAL
 - SIGRAFLEX® UNIVERSAL PRO
 - SIGRAFLEX® SELECT
 - SIGRAFLEX® HOCHDRUCK
 - SIGRAFLEX® HOCHDRUCK PRO
 - SIGRAFLEX® MF
 - SIGRAFLEX® EMAIL
- SIGRAFLOX® H, High-Quality Sealing Sheet Made from Reinforced PTFE
- SIGRAFLEX®, Graphite Foils and Laminated Sheets for Thermal Insulation and Electric Heating Elements

Product Overview

Product	Characteristics	Recommended applications
SIGRAFLEX® FOIL F.....C / Z / APX	▲ Flexible, continuous	-250°C to approx. 500°C; for compressed packings, spiral-wound and kammprofile gaskets
SIGRAFLEX® STANDARD L.....CI	■ Unreinforced, impregnated	Large segmented gaskets; enamel or glass flanges; highly corrosive media
SIGRAFLEX® ECONOMY V.....C4	■ Reinforced with bonded s/s foil	Pumps; fittings; gas; offshore; waste gas pipelines
SIGRAFLEX® UNIVERSAL V.....C2I	■ Reinforced with perforated s/s sheet, impregnated	Pipework and vessels in the chemical and petrochemical industries and in power stations
SIGRAFLEX® UNIVERSAL PRO V.....C2I-P	■ Reinforced with perforated s/s sheet, impregnated	For applications subject to the German TA Luft (Clean Air Act); for pipework and vessels in the chemical and petrochemical industries and in power stations
SIGRAFLEX® SELECT V16010C3I	● High-integrity s/s foil reinforcement, impregnated	For applications subject to the German TA Luft (Clean Air Act); raised-face flanges; pipework in the chemical and petrochemical industries
SIGRAFLEX® HOCHDRUCK V.....Z3I	■ High-integrity ● multilayer laminate, impregnated	Universal gasket for solving sealing problems in pipework, process equipment, tongue-and-groove flanges and special-dimension sealed joints in the chemical and petrochemical industries and in power stations
SIGRAFLEX® HOCHDRUCK PRO V.....Z3I-P	■ High-integrity multilayer laminate, impregnated	Universal gasket sheet for applications subject to the German TA Luft (Clean Air Act) and solving sealing problems in pipework, process equipment, tongue-and-groove flanges and special-dimension sealed joints in the chemical and petrochemical industries and in power stations
SIGRAFLEX® MF V.....Z2MF	■ High-integrity ● laminate made of graphite, s/s and PTFE	Maximum requirements for sealability (German TA Luft), safety, chemical resistance and process hygiene; sealed joints in the chemical, petrochemical, pharmaceutical and food industries
SIGRAFLEX® EMAIL V.....Z3E	■ High-integrity s/s foil reinforcement	PTFE-envelope gaskets in enameled pipework, vessels, stub connections, etc.

Forms supplied: ▲ roll or tape ■ sheet material ● gasket with inner eyelet, for applications subject to the German Clean Air Act

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".

05 2006/1 5NÄ Printed in Germany

® registered trademarks of
SGL Carbon Group companies



SGL CARBON GROUP

Expanded Graphite

SGL TECHNOLOGIES GmbH

Werner-von-Siemens-Str. 18
86405 Meitingen/Germany
Phone +49 8271 83-2276
Fax +49 8271 83-2419
expandedgraphite@sglcarbon.de
www.sglcarbon.com/eg