



GASKETS AND SEALING PRODUCTS
MANUFACTURER

PRODUCT CATALOG

SEMI-METALLIC GASKETS



SPIRAL WOUND
KAMMPROFILE
CORRUGATED
METAL JACKETED

GRAFEX GS

GRAFEX GSI

GRAFEX GCI

GRAFEX GC

GRAFEX JG

GRAFEX CG

GRAFEX GG

www.grafex.ro



ETANȘĂRI GRAFEX is a Romanian private company, gasket and asbestos free sealing products manufacturer for any application, from the most common to nuclear industry.

The company's development is based on our know-how and experience in this area and our constant concern to manufacture customized products, according to the requirements and appropriate to the application.

Our experience extends beyond the products we manufacture to the equipments and installations where they are used. We wish a complete collaboration in order to ensure a reliable solution, that will improve your performances at the highest level of quality and fiability.

Semi-metallic gaskets

are composite gaskets consisting of both metallic and non-metallic materials, the metal generally providing the strength and resilience of the gasket.

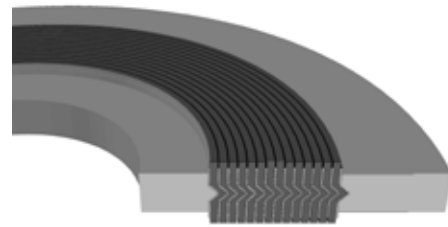
Suitable for both low and high temperature and pressure applications.

SPIRAL WOUND GASKETS

Spiral wound gaskets are the most familiar semi-metallic gaskets and are widely used on high pressure joints.

Spiral wound gaskets are manufactured by winding an alternating combination of v-shaped metal strip and soft filler material such as pure flexible graphite or PTFE.

- Available thickness: 2,5mm; 3,2mm; 4,5mm; 6,4mm; 7,2mm
- Maximum diameter of the gasket: 4700mm

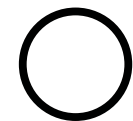


Main standards for the spiral wound gaskets:

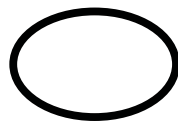
- ASME B16.20
- EN 1514-2
- EN 12560-2

Any other configuration can be supplied upon customer request.

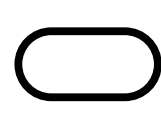
Spiral wound gasket shapes



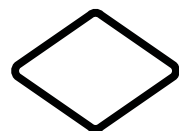
ROUND



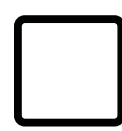
OVAL



OBLONG



DIAMOND



SQUARE



RECTANGLE

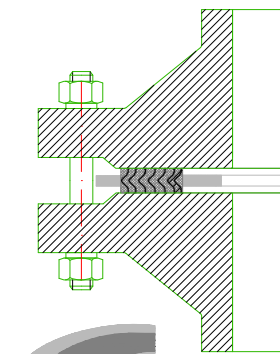
Standard gasket materials

For other materials, please inquire

Winding / inner ring	Filler	Centering ring
SS 304	Flexible graphite	Carbon steel
SS 316L	PTFE	SS 304
SS 321	Mica	SS 316L
SS 304L	Ceramic	SS 321
Carbon steel		SS 304L
Monel®		Monel®
Inconel®		Inconel®
Alloy 20		Alloy 20

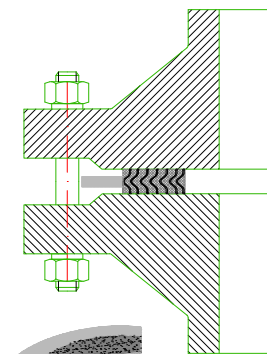
Spiral wound gasket types

GRAFEX GCI



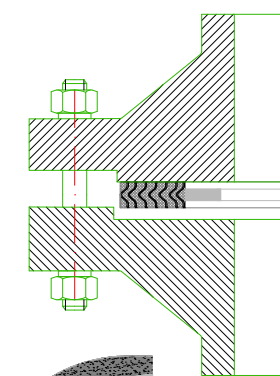
Spiral wound gasket with both inner and outer ring. Used for raised face and flat face flanges.

GRAFEX GC



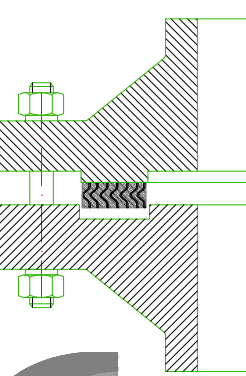
Spiral wound gasket only with outer ring. Used for raised face flanges and flat face flanges.

GRAFEX GSI



Spiral wound gasket only with inner ring. Used for male and female flanges.

GRAFEX GS

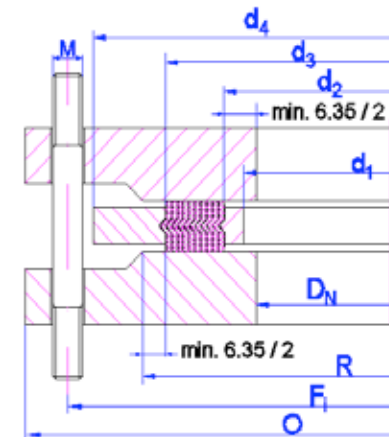


Spiral wound gasket without rings. Used for tongue and groove or male and female flanges.

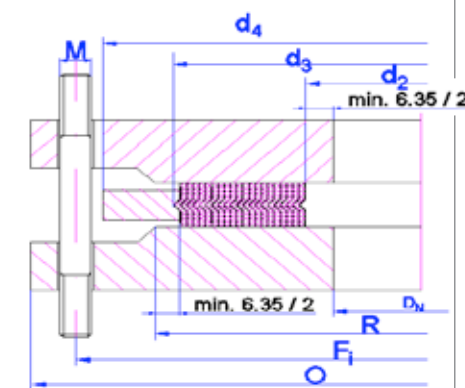
Sizing of spiral wound gaskets

RF Raised face

GRAFEX GCI

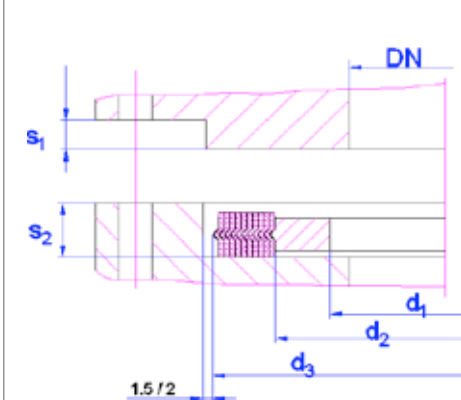


GRAFEX GC

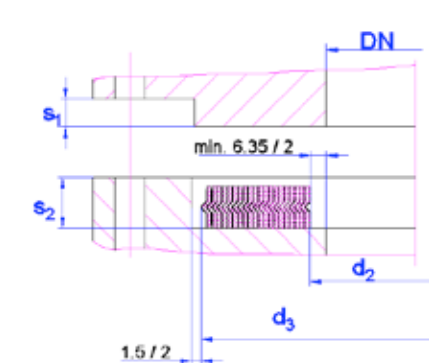


MF Male / female

GRAFEX GSI

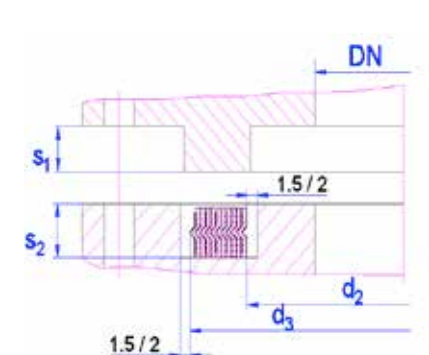


GRAFEX GS



TG Tongue and groove

GRAFEX GS



RECOMMENDED DESIGN PARAMETERS							
GASKET THICKNESS		MAXIMUM INSIDE DIAMETER		RECOMMENDED WIDTH		RECOMMENDED COMPRESSED THK.	
inch	mm	inch	mm	inch	mm	inch	mm
0.125	3.2	20	500	1	25.4	0.090/0.100	2.3/2.5
0.175	4.5	40	1000	1	25.4	0.125/0.135	3.2/3.4
0.25	6.4	90	2300	1	25.4	0.180/0.200	4.6/5.1
0.285	7.2	185	4700	1	25.4	0.200/0.220	5.1/5.6

GASKET DIAMETER		TOLERANCES			
		INSIDE DIAMETER		OUTSIDE DIAMETER	
inch	mm	inch	mm	inch	mm
< 10	< 250	± 1/64	± 0.4	± 1/64	± 1.6
10...24	250...600	± 1/32	± 0.8	± 1/64	± 1.6
24...60	600...1500	± 3/64	± 1.2	± 1/64	± 1.6
> 60	> 1500	± 1/16	± 1.6	± 1/64	± 1.6

Working parameters

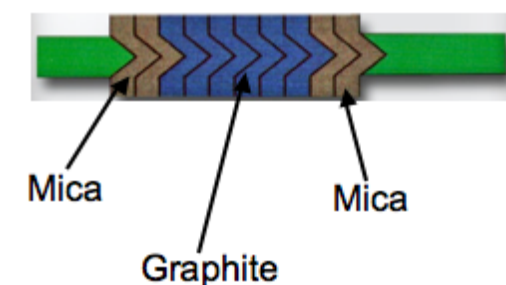
They are strongly related to materials to be used in the construction of the spiral wound gasket

- Temperature: -200°C...800°C
- Pressure: max 350 bar
- pH: 0...14

HT GASKETS

Ideal for oxidizing environments

- Layers of pure mica protect graphite filler and resist oxidation
- Good choice for plant steam drums, hydrocarbon catcrackzckers, hydrogen units, and exhaust manifolds



KAMMPROFILE GASKETS

Kammprofile gaskets consist of a metal core, usually stainless steel with concentric grooves on both sides. A soft sealing layer is applied on the faces. They are also known as grooved gaskets or serrated gaskets.



Kammprofile gaskets resist to pressures up to 350 bars and depending on the sealing layers can resist to temperatures up to 800°C.

- Their application is for difficult sealing environments where performance is critical or where sealing stresses are low.
- Some of the kampprofiles advantages are:
- The gaskets can be refurbished with a new facing layer and reused depending on condition of core;
 - Outstanding sealing characteristics at a wide range of seating stress levels;
 - Helps compensate for wide swings of temperature and pressure;
 - Excellent for narrow flanges;
 - Easier handling.

Main standars for the kammprofile gaskets:

- ASME B16.20
- EN 1514-6
- EN 12560-6

Recommended core thickness
3 mm or 4mm.

Recommended sealing layers thickness
2 x 0,5 mm or 2 x 1,0 mm

Standard gasket materials

For other materials, please inquire

Metal core	Sealing layers
SS 304	Flexible graphite
SS 316L	PTFE
SS 321	Mica
SS 304L	Ceramic
Carbon steel	

Kammprofile gasket types

GRAFEX GG-CRO



It is a stand-alone sealing element. Usually used for tongue & groove or male & female flanged connection; Not recommended for RF or FF flange types due to misalignment issues.

GRAFEX GG-CR1



The profiled core and a guide ring machined from one piece of metal. It is used to seal Raised Face (RF) or Full Face (FF) flanged connections, where the outer ring provides axial alignment to the pipe bore.

GRAFEX GG-CR2



Profiled-core with a loose guide ring that is conected onto the outside diameter of the core. Used in RF and FF flanged connections where the core material is very expensive / hard to machine, and a separate more cost-effective outer ring of a simple structural metal is preferred.

Convex profiles are also available. Parallel profile core is the standard design. Convex profile core compensates for weaker flanges and resulting flange rotation.

CORRUGATED GASKETS

These types of gaskets consist of a supporting ring with both faces covered with PTFE, graphite or mica.

When mounting, the soft plastic layer settles into the corrugation recesses, improving the sealing of the element.



The corrugation pitch and gasket height depend upon the diameter and width of the gasket.

The graphite layers may cover the total width of the supporting ring or, if requested, only the inner part so that the gasket will have a centering ring.

Working parameters

They are strongly related to materials to be used in the construction of the corrugated gasket

- Temperature: -200°C...550°C
- Pressure: max 160 bar
- pH: 0...14

Recommended core thickness
0,5 mm

Recommended sealing layers thickness
2 x 1,0 mm

Some of the corrugated gaskets advantagesare:

- Excelent sealing characteristics at low bolt loads;
- Resistance at radial shear;
- Very good resistance to thermal cycling;
- Can be used for flanges with imperfections.

Standard gasket materials

For other materials, please inquire

Metal core	Sealing layers
SS 304	Flexible graphite
SS 316L	PTFE
SS 321	Mica
SS 304L	Ceramic
Carbon steel	

Corrugated gasket types

GRAFEX CG



Manufactured from corrugated steel rings covered on both sides with soft sealing material (graphite or PTFE). It is a high performance gasket for standard flange or heat exchanger applications.

GRAFEX CG-CR1



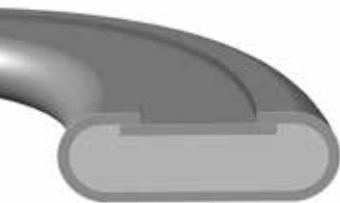
For flat flanges, for an optimized width of the gasket's sealing area, CG-CR1 can be used.

GRAFEX CG with INNER EYELET



Better sealability, blowout resistance and physiological safety.

Metal jacketed gaskets consist of a metal cover and a soft sealing material as filler. A wide variety of materials is available in order to guarantee excellent sealing conditions.



Metal jacketed gaskets require machined flange faces, high bolt loads and exact flange alignment to ensure an effective seal

They are strongly related to materials to be used in the construction of the corrugated gasket

- Temperature: -200°C...800°C
- Pressure: max 160 bar
- pH: 0...14

3 mm / 4 mm

Some of the metal jacketed gaskets advantages are:

- Suitable for narrow flanges;
- Easy to handle and instal;
- Suitable for high temperatures.

For other materials, please inquire

Metal core	Sealing layers
SS 304	Flexible graphite
SS 316L	PTFE
SS 321	Mica
SS 304L	Ceramic
Carbon steel	AF materials
Copper	
Aluminium	

Metal jacketed gasket types

GRAFEX® JG

TECHNICAL INFO

Notes for best performance of your application:

- Ensure that the correct bolting material is utilized to suit the operating conditions, taking into account the limitation of low yield strength bolts and the gasket to be used.
- Controlled tightening procedures should be used when installing a gasket.
- Only certified personnel should perform the mounting/dismounting of the gaskets.

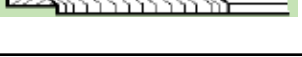
EN 1591-4:2013

Flanges and their joints.
Qualification of personnel competency in the assembly of the bolted connections of critical service pressurized systems.

Semi-metallic gasket selection by flange type

	GC	GCI	GSI	GS	GG-CR0	GG-CR1	GG-CR2	CG	JG
Flat Face	Yes	Yes	No	No	Yes	Yes	Yes	Yes	No
Raised Face	Yes	Yes	No	No	Yes	Yes	Yes	Yes	No
Male-Female	No	No	Yes	Yes	No	No	No	Yes	Yes
Tongue-&-Groove	No	No	No	Yes	Yes	Yes	Yes	Yes	No

Gasket selection by working conditions

Gasket type	Denomination	Gasket cross-section	Parameters
Plate gaskets AF type	AF 302 AF 153 AF 200 Univ AF Oil AF 400 GRAFEX® Carb		T<300°C* p<120 bar* *depending on exact material and medium to be sealed
Plate gaskets Reinforced flexible graphite	GRAFEX® I 980 PI		T<450°C p<120 bar
Gaskets	GRAFEX® CG Corrugated Gasket		T<450°C p<160 bar
	GRAFEX® GG Grooved / Kammprofile Gasket		T<550°C p<350 bar
	GRAFEX® JG Jacketed Gasket		T<650°C p<160 bar
Spiral wound gaskets	GRAFEX® GS SWG without rings		Only male&female and tongue & groove flanges T<550°C p<350 bar
	GRAFEX® GC - SWG only with outer ring		Only RF flanges T<550°C p<160 bar
	GRAFEX® GCI - SWG with both inner and outer rings		Only RF flanges T<550°C p<350 bar
	GRAFEX® GSI - SWG only with inner ring		Only male&female flanges T<550°C p<350 bar
High temperature gaskets	GRAFEX® GCI – HT - SWG with both inner and outer rings (winding graphite+mica)		Only RF flanges T<800°C p<25 bar
	GRAFEX® GC – HT - SWG with outer ring (winding graphite+mica)		Only RF flanges T<800°C p<6 bar
	GRAFEX® GG – HT Kammprofile gaskets with mica layer		T<800°C p<25 bar
	GRAFEX® JG – HT Double jacketed gaskets with mica filler		T<800°C p<25 bar

Temperature limits for common metals

Material	Temperature range (°C)	Abreviation	Guide Ring Color Code
304 Stainless Steel	-195...760	304	Yellow
316L Stainless Steel	-100...760	316L	Green
321 Stainless Steel	-195...760	321	Turquoise
Carbon Steel	-40...760	CRS	Silver
HASTELLOY® B 2	-185...1090	HAST B	Brown
HASTELLOY® C 276	-185...1090	HAST C	Beige
INCONEL® 600	-100...1090	INC 600	Gold
INCONEL® 625	-100...1090	INC 625	Gold
MONEL® 400	-130...820	MON	Orange
Nickel 200	-195...760	NI	Red
Titanium	-195...1090	TI	Purple

The data quoted have been compiled with our best knowledge. In view of the multiplicity of possible installation and operating conditions, one cannot draw conclusions in all applications cases regarding the behavior in a gasketed joint. The data cannot be used as basis for warranty claims. Whenever there is doubt, please contact us and specify operating requirements.

Relevant units and conversion factors

Quantity	Name of unit	Symbol	Expressed in terms of other SI units
Energy (work)	Joule	J	J=N × m=kg × m² × s ⁻²
Force	Newton	N	N=kg × m × s ⁻²
Length	Metre	m	////////////////////////////////////
Mass	Kilogram	kg	////////////////////////////////////
Pressure	Pascal	Pa	Pa=N × m ⁻² =MN × mm ⁻²
Power	Watt	W	W=kg × m² × s ⁻³
Temperature (thermodynamic)	Kelvin	K	K=°C + 273.15
Time	second	s	////////////////////////////////////

Multiples of SI units

Prefix name	Prefix symbol	Factor by which the primary unit is multiplied
Exa-	E	10 ¹⁸
Peta-	P	10 ¹⁵
Tera-	T	10 ¹²
Giga-	G	10 ⁹
Mega-	M	10 ⁶
Kilo-	K	10 ³
Hecto-	H	10 ²
Deca-	da	10 ¹
Deci-	d	10 ⁻¹
Centi-	c	10 ⁻²
Milli-	m	10 ⁻³
Micro-	μ	10 ⁻⁶
Nano-	n	10 ⁻⁹
Pico-	p	10 ⁻¹²
Femto-	f	10 ⁻¹⁵
Atto-	a	10 ⁻¹⁸

Units of common usage in flange gasket terminology

Unit	SI equivalent	Other non-SI unit equivalents			
		bar	Kp × cm ⁻²	N × mm ⁻²	psi
1 at	0.1013 MPa	1.013	1.033	0.1013	14.695
1 bar	0.1 MPa	////////////////////////////////	////////////////////////////////	0.10	14.504
°C	-273.15 K	////////////////////////////////	////////////////////////////////	////////////////////////////////	////////////////////////////////
1 in²	645.2 mm2	////////////////////////////////	////////////////////////////////	////////////////////////////////	////////////////////////////////
1 kgf	9.81 N	////////////////////////////////	////////////////////////////////	////////////////////////////////	////////////////////////////////
1 lb (pound)	4.45 N	////////////////////////////////	////////////////////////////////	////////////////////////////////	////////////////////////////////
1 ppm	35.92 ^{-0.733} g × h ⁻¹	////////////////////////////////	////////////////////////////////	////////////////////////////////	////////////////////////////////
1 psi	6.895 KPa	0.0689	0.0703	0.00689	////////////////////////////////
1 tonf	9964 N	////////////////////////////////	////////////////////////////////	////////////////////////////////	////////////////////////////////

PRODUCT CATALOG

SEMI-METALLIC GASKETS

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