

The sheets and gaskets made from flexible graphite are designed to the executing of technical seals with high parameters, mainly working in energetic and industrial installations. This material inherits properties of the graphitic foil and metallic reinforcements, it combines features both, the flexibility of soft seals with strength of metal seals.



A following kind of sealing material is sheet made from pure, homogeneous graphite, which is rolled and strengthened by the planar orientation, sometimes by fibreglass insert, by carbon fibre possibly is reinforced by dispersed varies mineral fibres. This is material designed for lower parameters, in the low and middle range of

pressures, but his indubitable advantage is the easiness of cutting gaskets with the use of simple tools.

Graphitic seals are modern and at the same time economic solution but require the high technical knowledge form users. There have a lot of undoubted advantages, such as:

the high chemical resistance, the resistance of degradable processes in long time, the possibility of work in wide range of temperatures. Furthermore, the graphitic seals do not contain harmful substances, are neutral for health and environment, and their exploitation time is significantly longer than the traditional gaskets basis on fibrous and rubber materials.

### The range of sizes

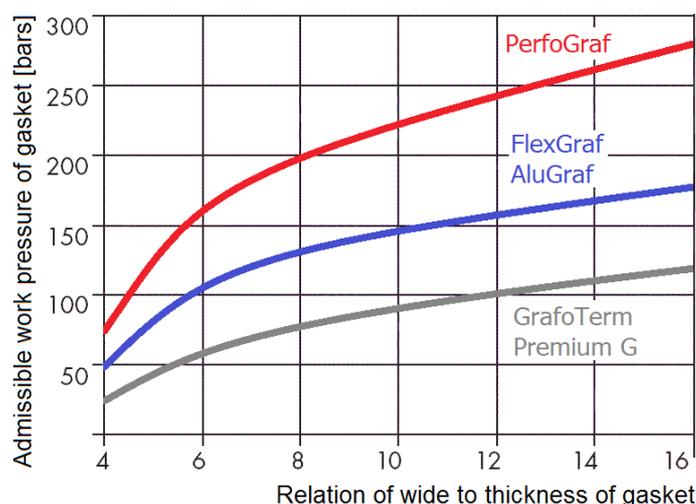
Standard sheets are delivered in format 1x1m and wide range of thicknesses: 0,8; 1; 1,5; 2; 3; 4 and 5mm, what correspondence with the most of users needs. The sheets can be delivered also in other sizes, according to the special requirements, in the maximum format up to 1,5x2,5 meters.

There is possible to delivery the finished graphite gaskets with the required reinforcement and metal covered edges, which prevent of erosion in contact with the high

dynamic medium. Gaskets can be delivered according to specification for metric flanges DIN or EN on pressures up to 450 bars also as inch ANSI specification, in all classes of pressure from 150 to 2500 lbs. Both the sheets and the finished gaskets have certificates, warranty note and can be delivered with the special document of acceptance type 3.1, according to a standard EN 10204.

### The application and the designing of pressure joints.

Semimetallic graphite gaskets are one of the most resistant solutions of static seals, meantime the flange joints, more over the gaskets fulfil rigorous requirements of DIN 28091-4 standard guaranteeing low emission and the long of usage. They can be applied within the range very high pressures, however the permissible pressure, in large scope, depends on construction of a gasket and the maximum stress in montage should not exceed value 100 N/mm<sup>2</sup>. The temperature range is very wide, bat for the steam is limited to 550°C and for oxidising media to 450°C. The chemical resistance of graphite seals is covered the full range 0-14 pH in case of inserts made of acid-proof steel.



The right graphite gaskets installation-stress and torc for the bolts of pressure joint ought to calculate based on the obligatory rules at the designing of pressure devices. Calculations should be carried out on basis standards EN 13445-3, harmonized with the Union directive: 97/23/EC or standards ASME Code; Section VIII; Division 1; Appendix 2 and given in the table of computational coefficients  $\gamma$  and  $m$  obligatory in this range both for ASME Code as and EN and her equivalent in other countries. In calculations ought to take into account, that the friction factor for the graphite it is very low. In this field one can makes for with the Sinograf's special instruction „The Method of calculation for flanged joints ...“. In case of replacement of used graphite gasket, if the replaced gaskets are made from the same material about similar structure, calculations are not necessary and the permissible service pressure and torc for the bolts of can remain without changes.

### The analytic coefficients and data for designing of pressure gaskets:

Type of sealing sheet	Standards	item	PerfoGraf	FlexGraf	AluGraf	GrafoTerm	Premium G
<b>Reinforcement structure</b>	-	-	perforated sheet SS316	acid-proof plane sheet	plane aluminium sheet	planar oriented graphite crystal	NBR elastomer matrix
<b>Temperatures range</b>	continuous	°C	-200 do 650	-200 do 650	-200 do 450	-200 do 2500	-200 do 400
<b>Chemical resistance</b>	acid / alkali	pH	0-14	0-14	4-8	0-14	1-13
<b>Initial press (y factor)*</b>	ASME code /	N/mm <sup>2</sup>	24	8	10	6	11S
<b>Stress transfer (m factor)</b>	EN 13445-3	-	2,4	2,0	2,2	1,8	2,0
<b>Gas permeability</b>	ASTM F37	ml/h	60	30	35	60	60
<b>Friction factor</b>	ASTM D3028	-	0,2	0,18	0,18	0,15	0,25
<b>Compressibility</b>	ASTM F36A-66	%	30-45	40-50	30-40	40-50	35-45
<b>Mechanical strength</b>	ASTM F152	MPa	20	16	12	4	6

\*) the values of stress are given in N/mm<sup>2</sup> correspondence ratio N/mm<sup>2</sup> = 145 psi