

Flexible expanded graphite sheets for flat gaskets operating in severe operating conditions. Excellent creep resistance, excellent chemical stability. Valid seal even with low clamping loads and flanges with irregular surfaces. Complies with DIN 28091-4 specifications (technical delivery conditions for graphite-based joints)

Ideal for high temperature and pressure uses, with thermo-mechanical cycles or shocks; in the presence of saturated and superheated steam and chemically aggressive fluids, with the exception of strongly oxidizing agents (see the chemical resistance table).

Technical data:(Typical values refer to a thickness of 1.5 mm)

S = expanded graphite without metallic reinforcement **R** = expanded graphite with 0.05 thick stainless steel foil insert

GR = expanded graphite with tanged perforated stainless steel sheet insert

typology			S	R	GR
Density	DIN 3754	g/cm3	1,0	1÷1,1	1÷1,1
Maximum safety temperature for continuous operation*		°C	450	450	450
If confined fluid is air or oxidizing substance		°C	550	550	550
If fluid is inert or reducing but the joint is exposed to air		°C	3000	800	800
If fluid and the joint environment are inert or reducing		°C			
Minimum continuous operating temperature*		°C	- 200	- 200	- 200
Maximum continuous operating safety pressure*		bar	50	40	120
Compressibility	ASTM F36	%	45	45	35
Elastic return	ASTM F36	%	10÷15	10÷15	15÷20
Stress retention 16 ore, 300°C, 50 N/mm ²	DIN 52913	N/mm ²	47	45	48
Stress relaxation 22 ore, 400°C, 20 N/mm ²	ASTM F 38	%	< 5	< 5	< 5
Crushing resistance				100	160
σ _{vo} (RT)	DIN 28090	N/mm ²	120	60	140
σ _{Bo} (300°C)			100		
Tensile strength (min)	ASTM F 104	N/mm ²	4,5	25	25
Nitrogen permeability 40 bar, RT	DIN 3535/4	ml/min	< 0,6	< 0,6	< 0,6

CHEMICAL COMPOSITION OF GRAPHITE

Purity quality:			STANDARD	PREMIUM
Ash content	ASTM C 561	%	< 1,0	< 0,5
Leachable chloride content	ASTM F 1277	ppm	< 40	< 10
Leachable fluoride content	ASTM F 1277	ppm	< 40	< 10

References

Ministero Difesa approval for uses on steam and high-temperature fluids 550°C, 25 bar - cl. GUA/5 bis. (Fg. Mariperman ITE/2046 19/2/93)

Tecnimont oapproval for uses with petroleum products and acids up to 450°C, 40 bar - class 96 (spec. TM 539.1/95).

Enichem compliance with spec. 9302.10/93, class 28, for uses up to 450°.

Trenitalia approval for use on heads and manifolds of endothermic engines up to 650°C, 100 bar (spec. 306345)

Ecole Polytechnique of Montreal Fire resistance certification, FITT test.

*ATTENZIONE: Valori ricavati da test eseguiti su normale giunto flangiato dove la superficie di appoggio è molto maggiore dello spessore. Per guarnizioni dalla fascia piccola (Esempio raccorderia, ...) occorre fare i test sul campo. *Values derived from tests performed on a normal flanged joint where the surface of the support is much greater than the thickness. For small-band gaskets (for example fittings, ...), specific application tests must be performed.*

GASKET FACTORS

Follow the recommended installation procedures by regulations. If in doubt please contact Us or visit the web site:
<http://www.laguarnizione.it/php/it/istruzioni.php>

	EN/DIN/ASME			PVRC-ROTT			Max. Assembly stress
	$y/\sigma_{vu}/Q_{min}$	m/1	m/0,1	GB (MPa)	a	Gs (MPa)	σ_{vo}/Q_{max} (MPa)
GRAFLEX GR							
1,5 mm	18	3,0	4,0	6,7	0,4	3x10 ⁻⁴	320
2 mm	20	3,5	4,5				300
3 mm	23	4,5	5,0				230
GRAFLEX R							
1,5 mm	13	3,0	4,0	6,3	0,4	8x10 ⁻⁴	240
2 mm	15	3,5	4,5				220
3 mm	18	4,0	5,0				160

$m/1$: leakage rate = 1 mg/s x m $m/0,1$: leakage rate = 0,1 mg/s x m

APPROVALS

The products we make are obtained with a cold cutting process which does not alter the chemical/physical properties of the material. However, it is a NON-aseptic industrial process which can leave traces of powders (Talc, ...) which do not alter its properties. Cleaning/sterilization is therefore necessary before use where necessary.

ATTENTION: The gaskets and our products in general are not safety devices. Where there are dangers to the safety of people (high pressures, high temperatures, dangerous fluids, ...) provide additional certified safety devices.

It is the task of the system designer to choose the appropriate type of material and evaluate any dangers of breakage of the product (gasket, strip, bumpers, ...) and prevent them.

Approvals:

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GRAFLEX Chemical Resistance Chart

The information in this chart is intended to be a guideline for selection of the suitable gasket quality. Because the function and durability of the products depend upon a number of factors that could not be included in the chart, the data may not be used to support any warranty claims.

A suitable for application **B** suitability depends on operating conditions **C** not suitable

chemical compatibility of graphite alone

Acetaldehydes	A	Dichromates	C
Acetic acid	A	Diesel oil	A
Acetic acid amil ester	A	Diethyl ether and glycol	A
Acetone	A	Diethylamine	A
Acetylene	A	Dimethyl ether	A
Acrylic acid	A	Dimethyl formamide	A
Acrylic acid ethyl ester	A	Dimethyl sulphoxide	A
Acrylonitrile	A	Dioxane	A
Adipic acid	A	Diphenyl ether	A
Air <450°C	B	Epichlorohydrine	A
Aluminium	A	Ethane	A
Ammonia	A	Ethanol	A
Ammonium hydroxide	A	Ethyl acetate	A
Aniline	A	Ethyl alcohol	A
Aqua regia (nitromuriatic acid)	C	Ethyl benzene	A
Benzaldehyde	A	Ethyl butyl ester	A
Benzene	A	Ethyl chloride	A
Bleach liquor	A	Ethyl methyl ketone	A
Soda	A	Ethylene	A
Potash	A	Ethylene chloride	A
Borates	A	Ethylene glycol	A
Boric acid	A	Fluorides	A
Bromic acid	A	Fluorine	C
Bromides	A	Formaldehyde	A
Bromine	C	Formic acid	A
Butane	A	Freons	A
Calcium chloride	A	Fuel oil	A
Calcium hydroxide	A	Glycerine	A
Calcium nitrate (lime nitrate)	C	Glycols	A
Carbon dioxide <600°C	B	Gold	A
Carbon disulphide	A	Heat transfer oils	A
Carbon monoxide	A	Hexane	A
Carbon tetrachloride	A	Hexachlorophenyl acetic acid	A
Carbonates	A	Hydraulic oils	A
Caustic potash solution	A	Hydrazine	A
Caustic soda solution	A	Hydrochloric acid	A
Chlorides	A	Hydrofluoric acid	A
Chlorine, dry	A	Hydrogen	A
Chlorine, moist <30°C	B	Hydrogen bromide	A
Chlorine dioxide and trioxide	C	Hydrogen chloride	A
Chlorine trifluoride	C	Hydrogen dioxide < 600°C	B
Chlorobenzene	A	Hydrogen fluoride	A
Chloroform	A	Hydrogen peroxide < 85%	B
Chromates <20%	B	Hydrogen sulphide	A
Cromic acid	C	Iodides	A
Cromic anhydride	C	Iron, melt	C
Chromosulphuric <20%	B	Iso-octane	A
Citric acid	A	Isobutyl alcohol	A
Copper	A	Isopropyl alcohol	A
Cyclohexanol	A	Lead	A

Magnesium, pure and salts	A	Potassium nitrate	C
Maleic acid	A	Propane	A
Mercaptans	A	Propyl alcohol	A
Mercury, pure and salts	A	Propylene	A
Methane	A	Salicylic acid	A
Methanol	A	Sea water	A
Methyl alcohol	A	Silicones	A
Methyl chloride	A	Siloxanes	A
Methyl ethyl ether	A	Silver, melt and salts	A
Methyl isobutyl ketone	A	Sodium <350°C	B
Methylen chloride	A	Sodium chlorate <4%	B
Monochloroacetic acid	A	Sodium hydroxide <400°C	B
Motor oils	A	Sodium peroxide	C
Naphta	A	Steam	A
Natural gas	A	Stearic acid	A
Nickel, melt and salts	A	Styrene	A
Nitrates	A	Sulphates	A
Nitrating acid	C	Sulphonic	A
Nitric acid	B	Sulphur	A
conc. temp.		Sulphur dioxide	A
0-10% <100°C		Sulphur hexafluoride	A
11-65% <50°C		Sulphur trioxide	C
>65% never		Sulphuric acid	B
Nitric oxide, moist	C	conc. temp.	
Nitrites	A	70-85% <170°C	
Nitrocalcite	C	86-90% <145°C	
Nitrobenzene	A	91-95% <70°C	
Nitrogen	A	>95% never	
Nitrogen dioxide (dry) <600°C	B	Sulphurous acid	A
Nitrous oxide (dry)	A	Tannic acid	A
Oleum	C	Tartaric acid	A
Oxygen <350°C	B	Thermal oils	A
Ozone	C	Thyonil chloride	A
Paint thinner	A	Tin	A
Paraffin oil (Kerosene)	A	Toulene	A
Perborates	C	Transformer oil	A
Perchloroetylene	A	Trichloroacetic acid	A
Perchloric acid <20%	B	Trichloroethylene	A
Persulphates	C	Triethylaminoethanol	A
Petrol (gasoline)	A	Vegetable oils	A
Phenol	A	Wood's alloy	A
Phenylacetic acid	A	Xylene	A
Phosgene	A	Zinc, melt and salts	A
Phosphates	A		
Phosphoric acid	A		
Phthalic acid	A		
Potassium, melt <350°C	B		
Potassium chlorate	C		
Potassium chromate, bichromate	C		
Potassium hydrogen sulphate	A		