

maktek

Makina Karbon ve Sızdırmazlık Sanayi Ltd. Şti.

Non asbestos jointing materials
Expanded graphite sheets



Non asbestos jointing materials

The strongest applications in the different industrial sectors have brought our laboratories to develop high tech materials for gaskets.

This has allowed us to extend our range of A.F. sheets for gaskets so now the users or designers could choose the best material, with the best price, for every specific working conditions.

The quality of raw materials used, has allowed the homologation of our A.F. sheets from the most prestigious corporations of international certification.

General information:

Sheets size:

- Standard 1500 x1500 mm.
- On request: dim. 1500 x 3000 mm or 1500 x 4500 mm.

Thickness range:

- 0,5 / 1 / 1,5 / 2 / 2,5 / 3 mm. in stock.
- 0,8 / 4 / 5 mm.; on request.

Tollerances:

- thickness <1,0 mm. = $\pm 0,1$ mm.
- thickness >1,0 mm. = $\pm 10\%$
- length = ± 50 mm.
- width = ± 50 mm.

Surface finishing (on request):

- anti-stick - silicone
- p.t.f.e. - graphite

Asme gasket constants:

mm	thick. 1,5	thick. 3	
y value	25	11	Mpa
M value	2,75	2	

**CHARACTERISTICS**

High quality asbestos-free jointing sheet, made out of aramide fibers and high temperature resistant mineral fillers, bonded by NBR elastomer with high ACN content.

APPLICATIONS

It has got universal uses, for solvents, gases, oils, hydrocarbons, HFC, steam with low pressure, alkali and weak acids. This material is suitable for food industries and water treatment plants.

TYPE APPROVAL

DVGW and SVGW for gas installations, WRC and KTW for drinking water, BAM for uses with oxygen and HTB for high thermal loading.

ENICHEM class 30 and TECNIMONT class 90 for universal uses.

special version BENZOVET / ARMED

CHARACTERISTICS


High quality asbestos-free jointing sheet, made out of high temperature resistant inorganic fibers, aramide fibers, glass fibers and bonded by NBR elastomer with high ACN content.

APPLICATIONS

Suitable for applications involving high temperatures and pressures, with steam, gases, oils, hydrocarbons and weak acids.

 Suitable area

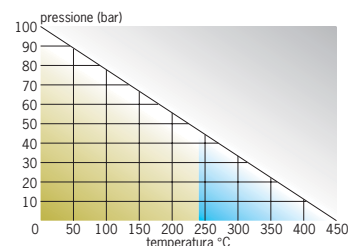
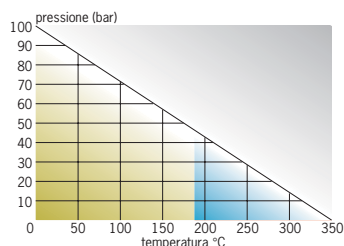
 Suitable area, but technical advice is recommended

 Area in which is not suggested the used

DATI TECNICI / TECHNICAL DATA

typical values for thick 2 mm.

			BENZOVET	BENZOVET / HT
Service limits				
peak temperature		°C/°F	350/662	440/824
continuous temperature		°C/°F	250/482	350/662
continuous temperature with steam		°C/°F	200/392	250/482
pressure		bar/psi	100/1450	100/1450
Compressibility	ASTM F 36/J	%	8	8
Recovery	ASTM F 36/J	%	55	50
Tensile strenght	DIN 52910	N/mm2	11	8
Stress resistance	DIN 52913			
-16 ore, 300°C, 50 N/mm ²		N/mm2	22	30
-16 ore, 175°C, 50 N/mm ²		N/mm2	28	35
Gas permeability	DIN 3535/6	ml/min	0,5	0,8
Thickness increase	ASTM F 146			
-in olio 3 ore, 150°C - in oil for 3 hours at 150°C		%	5	8
-in benzina 5 ore, 23°C - in fuel for 5 hours at 23°C		%	5	8



Benzovet/S



CHARACTERISTICS

Good quality asbestos-free jointing sheet, composed of organic fibers, mineral fillers, bonded by NBR elastomer. It is used on flanges with low pressures and temperatures.

APPLICATIONS

It is suggested for vegetal and animal oils, fuels, air, water, steam (till 5 bar), weak acids and alkali.

Benzovet antiacido



CHARACTERISTICS

Asbestos-free jointing sheet of high quality especially for chemical industries. It is composed of aramide fibers, high temperature resistant mineral fillers, bonded by CSM elastomer. The formulation gives the material excellent resistance to acid and alkali solutions, also with high concentration, and to aggressive fluids.

APPLICATIONS

Suitable with organic and inorganic acids, alkali, solvents and fenols. It is used in chemical, petrochemical and pharmaceutical industries.

Superkev



CHARACTERISTICS

High quality asbestos-free jointing sheet, made of aramide fibers, graphite, mineral fillers and NBR elastomeric binder.

APPLICATIONS

The SUPERKEV is suitable for saturated steam, fuels, lubricants, alkali and weak acids.

TYPE APPROVAL

ENICHEM class 31 and TECNIMONT class 94 for uses with steam.

special version SUPERKEV/ARMED

Carbo - Fiber



CHARACTERISTICS

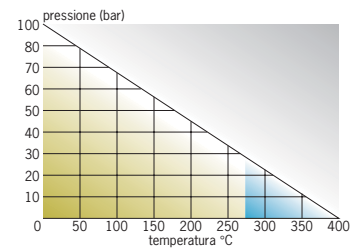
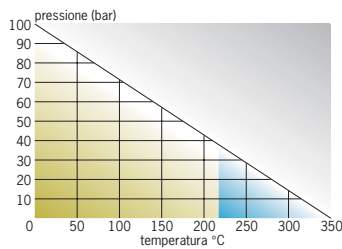
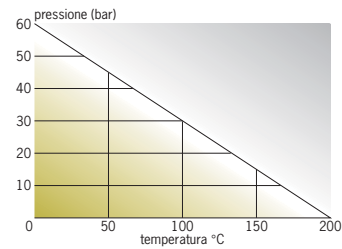
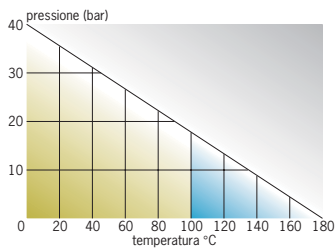
Asbestos-free jointing sheet of high quality, made out carbon fibers, aramide fibers, and NBR elastomeric binder.

APPLICATIONS

Good performance with steam, gases, hydrocarbons, alkali and acids. The formulation gives the material excellent resistance to inflammable and pollutant fluids.

TYPE APPROVAL

TECNIMONT class 93 for uses with steam.



BENZOVET / S	BENZOVET / S antiacido	SUPERKEV	CARBO - FIBER
180/356 140/284 120/248 40/580	200/392 150/302 60/870	350/662 280/536 250/482 100/1450	400/752 300/572 280/536 100/1450
8	8	7	9
50	45	50	55
7	10	9	8
20	25	25 30	25 30
0,8	0,6	0,8	0,5
10 10		5 8	7

COGRAF Expanded graphite sheets

The expanded graphite represents today the most evolute solution for the materials for gaskets.

The purity of graphite used (98%) and the compression working process, without using filler or binder materials, grant the high level of quality of the final product.

The particular fragility of graphite, during the handling fases, has brought to produce sheets with stainless steel insert smooth or tanged.

General information:

Sheets size:

- Standard dimensions: 1000 x 1000 mm.
- On request: dim. 1500 x 1500 mm.

Thickness range:

- 0,5 / 1 / 1,5 / 2 mm type Cograf/S
- 1,5 / 2 / 3 mm type Cograf/R - with SS316 sheets of 0,05 mm. thick as insert
- 1,5 / 2 / 3 mm type Cograf/GR - with SS316 tanged sheets of 0,1 mm. thick as insert
- Thick. > 3 mm. on request

Surface finishing (on request):

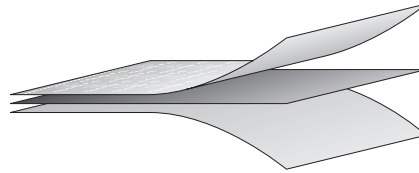
- External treatment of hardening with resins.

Cograf/S



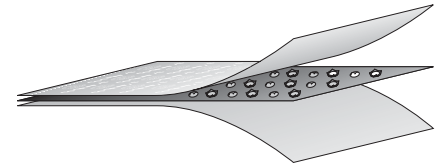
Expanded graphite sheets not reinforced.

Cograf/R



Reinforced graphite sheets, inserted with 316 stainless steel sheet of 0,05 mm. thick.

Cograf/GR




Tanged reinforced graphite sheets with SS316 stainless steel of 0,1 mm, thick.

Density	DIN 3754	~1/1.1	1,1~1,2	~1,4/1,5	gr/cm ³
max Temperature					
-if the interned fluid is air or oxidizing sustance		370	370	370	°C
-if the fluid is inert or reducing, but the joint is exposed to the air		550	550	500	°C
-if the fluid or the joint media are inert or reducing		2500	700	700	°C
Min. temperature		-200	-200	-200	°C
Max pressure		80	100	200	bar
Compressibility	ASTM F36	45	45	35	%
Spring back	ASTM F36	10 ~ 15	10 ~ 15	17	%
Stress retention	DIN 52913	49	49	49	N/mm ²
Stress relaxation a 400°C	BSI F 125	< 5	< 5	< 5	%
Squashing Resistance		150	120	165	N/mm ²
Tensile Strenght	ASTM F104	4,5	25	25	N/mm ²
Permeability	DIN 3535/4	<0,2			
to elium 40 bar, RT		<0,2			
to hydrogen 40 bar, 400°C			< 5	< 5	ml/min
Carbon content	standard	≥ 98	≥98	≥98	%
Leachable chloride ion content	standard	< 50	< 50	< 50	ppm
Leachable fluoride ion content	standard	< 50	< 50	< 50	ppm
Sulphur content	standard	< 800	< 800	< 800	ppm
ASME gasket costants					
-y		5	6	17	N/mm ²
-M		2	2	2	

Chemical resistance chart

 *Raccomended*

 *Limited application*

 *Not suitable*

Q

This catalogue shows results based on laboratory tests and experience of product use; so Colombo S.p.A. cannot accept therefore any liability for improper use.

	Benzovet	Superkev	Carbo - Fiber	Benzovet/HT	Benzovet/S	Benzovet/S antiacido		Benzovet	Superkev	Carbo - Fiber	Benzovet/HT	Benzovet/S	Benzovet/S antiacido
Acetamide	Green	Green	Green	Green	Green	Green	Hydrogen	Green	Green	Green	Green	Green	Green
Acetic acid 10%	Green	Green	Green	Green	Green	Green	Isobutane	Green	Green	Green	Green	Green	Green
Acetic acid 100%	Green	Green	Green	Green	Green	Green	Isocetane	Green	Green	Green	Green	Green	Yellow
Acetic ester	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Isopropyl alcohol	Green	Green	Green	Green	Green	Green
Acetone	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Kerosene	Green	Green	Green	Green	Green	Green
Acetylene	Green	Green	Yellow	Green	Green	Green	Lead acetate	Green	Green	Green	Green	Green	Green
Adipic acid	Green	Green	Green	Green	Green	Green	Lead arsenate	Green	Green	Green	Green	Green	Green
Air	Green	Green	Green	Green	Green	Green	Magnesium sulphate	Green	Green	Green	Green	Green	Green
Alum	Green	Green	Green	Green	Green	Green	Mallic acid	Green	Green	Green	Green	Green	Green
Aluminium acetate	Green	Green	Green	Green	Green	Green	Methane	Green	Green	Green	Green	Green	Green
Aluminium chlorate	Green	Green	Green	Green	Green	Green	Methanol	Green	Green	Green	Green	Green	Green
Aluminium chloride	Green	Green	Green	Yellow	Green	Green	Methyl chloride	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow
Ammonia	Green	Green	Green	Yellow	Yellow	Green	Methylene dichloride	Red	Red	Red	Red	Red	Yellow
Ammonium bicarbonate	Green	Green	Green	Yellow	Green	Green	Methyl ethyl ketone	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow
Ammonium chloride	Green	Green	Green	Yellow	Green	Green	Milk	Green	Green	Green	Green	Green	Green
Ammonium hydroxide	Green	Green	Green	Yellow	Green	Green	Mineral oil type ASTM no. 1	Green	Green	Green	Green	Green	Green
Amyl acetate	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Naphtha	Green	Green	Green	Green	Yellow	Yellow
Aniline	Red	Red	Red	Red	Red	Red	Nitric acid 20%	Yellow	Yellow	Yellow	Green	Yellow	Green
Asphalt	Green	Green	Green	Green	Green	Yellow	Nitric acid 40%	Yellow	Green	Red	Green	Red	Green
Barium chloride	Green	Green	Green	Green	Green	Green	Nitric acid 96%	Red	Red	Red	Red	Red	Red
Benzene	Green	Green	Green	Green	Yellow	Red	Nitrobenzene	Red	Red	Red	Red	Red	Red
Benzoic acid	Green	Green	Green	Green	Green	Green	Nitrogen	Green	Green	Green	Green	Green	Green
Boric acid	Green	Green	Green	Green	Green	Green	Octane	Green	Green	Green	Green	Yellow	Green
Borax	Green	Green	Green	Green	Green	Green	Oleic acid	Green	Green	Green	Green	Green	Green
Butane	Green	Green	Green	Green	Green	Green	Oleum	Red	Red	Red	Red	Red	Red
Butyl alcohol	Green	Green	Green	Green	Green	Yellow	Oxalic acid	Yellow	Yellow	Yellow	Yellow	Yellow	Green
Butyric acid	Green	Green	Green	Green	Green	Green	Oxigen	Green	Green	Green	Green	Green	Green
Calcium chloride	Green	Green	Green	Green	Green	Green	Palmitic acid	Green	Green	Green	Green	Green	Green
Calcium hydroxide	Green	Green	Green	Yellow	Green	Green	Pentane	Green	Green	Green	Green	Yellow	Green
Carbon disulphide	Red	Red	Yellow	Red	Red	Red	Perchloroethylene	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow
Carbon dioxide	Green	Green	Green	Green	Green	Green	Phenol	Red	Red	Red	Red	Red	Yellow
Chloroform	Yellow	Yellow	Yellow	Green	Yellow	Yellow	Phosphoric acid	Green	Green	Green	Green	Green	Green
Chlorine, dry	Green	Green	Green	Red	Yellow	Yellow	Phosphoroc acetate	Green	Green	Green	Green	Green	Green
Chlorine, wet	Yellow	Yellow	Yellow	Red	Red	Yellow	Potassium acetate	Green	Green	Green	Green	Green	Green
Chromic acid	Yellow	Yellow	Yellow	Red	Red	Yellow	Potassium bicarbonate	Green	Green	Green	Green	Green	Green
Citric acid	Green	Green	Green	Green	Green	Green	Potassium carbonate	Green	Green	Green	Green	Green	Green
Copper acetate	Green	Green	Green	Green	Green	Green	Potassium chloride	Green	Green	Green	Green	Green	Green
Creosote	Red	Red	Red	Red	Red	Red	Potassium dichromate	Green	Green	Green	Green	Green	Green
Cresol	Yellow	Yellow	Yellow	Yellow	Red	Yellow	Potassium hydroxide	Green	Green	Green	Green	Green	Green
Cyclohexanol	Green	Green	Green	Green	Green	Green	Potassium iodide	Green	Green	Green	Green	Green	Green
Cyclohexanone	Yellow	Yellow	Yellow	Yellow	Red	Yellow	Potassium nitrate	Green	Green	Green	Green	Green	Green
Decaline	Green	Green	Green	Green	Yellow	Green	Potassium permanganate	Green	Green	Green	Green	Green	Green
Dibenzyl ether	Red	Red	Red	Red	Red	Red	Propane	Green	Green	Green	Green	Yellow	Green
Dimethyl formamide	Red	Red	Red	Red	Red	Red	Pyridine	Red	Red	Red	Red	Red	Red
Dowtherm	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Salicylic acid	Green	Green	Green	Green	Green	Green
Ethane	Green	Green	Green	Green	Green	Green	Silicone oil	Green	Green	Green	Green	Green	Green
Ethyl acetate	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Soap	Green	Green	Green	Green	Green	Green
Ethyl alcohol	Green	Green	Green	Green	Green	Green	Sodium aluminate	Green	Green	Green	Green	Green	Green
Ethyl chloride	Yellow	Yellow	Yellow	Yellow	Red	Red	Sodium bicarbonate	Green	Green	Green	Green	Green	Green
Ethylene	Green	Green	Green	Green	Green	Green	Sodium bisulphite	Green	Green	Green	Green	Green	Green
Ethylene glycol	Green	Green	Green	Green	Green	Green	Sodium carbonate	Green	Green	Green	Green	Green	Green
Formic acid 10%	Green	Green	Green	Yellow	Green	Green	Sodium chloride	Green	Green	Green	Green	Green	Green
Formic acid 85%	Green	Green	Green	Green	Green	Green	Sodium cyanide	Green	Green	Green	Green	Green	Green
Formaldehyde	Green	Green	Green	Green	Green	Green	Sodium hydroxide	Yellow	Yellow	Green	Red	Yellow	Green
Freon 12	Green	Green	Green	Green	Green	Green	Sodium sulphate	Green	Green	Green	Green	Green	Green
Freon 22	Yellow	Yellow	Yellow	Yellow	Red	Green	Sodium sulphide	Green	Green	Green	Green	Green	Green
Fuel oil	Green	Green	Green	Green	Green	Green	Starch	Green	Green	Green	Green	Green	Green
Gasoline	Green	Green	Green	Green	Yellow	Green	Steam	Green	Green	Green	Green	Yellow	Green
Glycerine	Green	Green	Green	Green	Green	Green	Stearic acid	Green	Green	Green	Green	Green	Green
Heptane	Green	Green	Green	Green	Yellow	Green	Sugar	Green	Green	Green	Green	Green	Green
Hydraulic oil (Mineral)	Green	Green	Green	Green	Yellow	Green	Sulphuric acid 20%	Yellow	Green	Yellow	Red	Red	Green
Hydraulic oil (Phosphate ester type)	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Sulphuric acid 96%	Red	Red	Red	Red	Red	Green
Hydraulic (Glycol based)	Green	Green	Green	Green	Green	Green	Tar	Green	Green	Green	Green	Green	Green
Hydrazine	Green	Green	Green	Green	Green	Green	Tartaric acid	Green	Green	Green	Green	Green	Green
Hydrochloric acid 20%	Yellow	Green	Yellow	Green	Yellow	Green	Toluene	Green	Green	Green	Green	Green	Green
Hydrochloric acid 36%	Red	Red	Red	Red	Yellow	Green	Transformer oil	Green	Green	Green	Green	Green	Green
Hydrofluoric acid 10%	Red	Red	Red	Red	Red	Yellow	Trichlorethylene	Yellow	Yellow	Green	Green	Yellow	Yellow
Hydrofluoric acid 40%	Red	Red	Red	Red	Red	Red	Water	Green	Green	Green	Green	Green	Green
							White Spirit	Green	Green	Green	Green	Yellow	Green
							Xilene	Yellow	Red	Green	Yellow	Green	Green