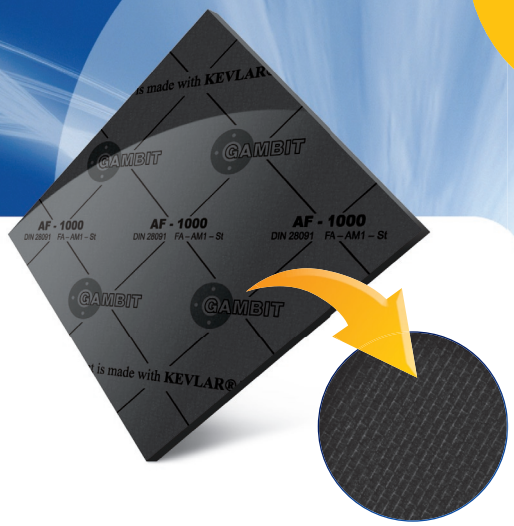
GASKET SHEETS



TECHNICAL SPECIFICATION

Gasket sheet Gambit AF-1000

Material

Gasket sheet **GAMBIT AF-1000** is based on Kevlar® aramide fibres, mineral fibres, and fillers bound with NBR rubber-based binder; reinforced with galvanized steel mesh.

Designation according to DIN 28091-2: **FA-AM1-ST**

Kevlar® is a registered trademark of E. I. du Pont de Nemours and Company or its affiliates.

General properties and applications

Used in high temperature flange joints, in systems with high fluctuations in pressure and medium flow rate. Features high mechanical resistance. Can be used in automotive industry. It is not recommended with acids and bases. When working with steam mind using suitable mounting clamps. Water, steam, kerosene, gasoline, fuel, and oil resistant.

Admissions / Certificates

Germanischer Lloyd

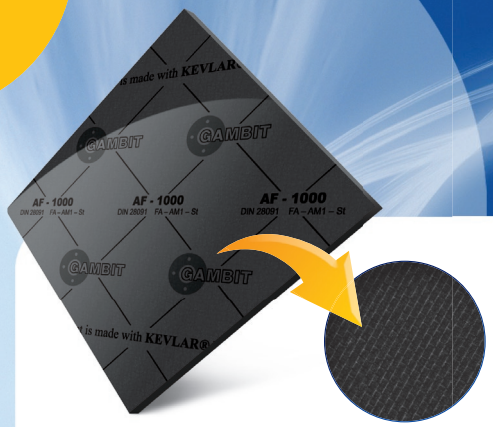
Maximum working conditions

Peak temperature	**°C**	420
Temperature under continuous operation	**°C**	350
Temperature under continuous operation with steam	**°C**	250
Pressure	**MPa**	12

Dimensions

Standard thicknesses of sheets /thicknesses above 5.0 mm are produced by gluing/	**mm**	0,8 1,0; 1,5; 2,0; 2,5 3,0; 4,0, 5,0; 6,0	± 0,1 ± 10% ± 10%
Standard dimensions of sheets /custom dimensions available within the total range of 1500x3000 mm/	**mm**	1500x1500	± 10,0

Non-standard thicknesses and graphiting of sheet surfaces available upon request.

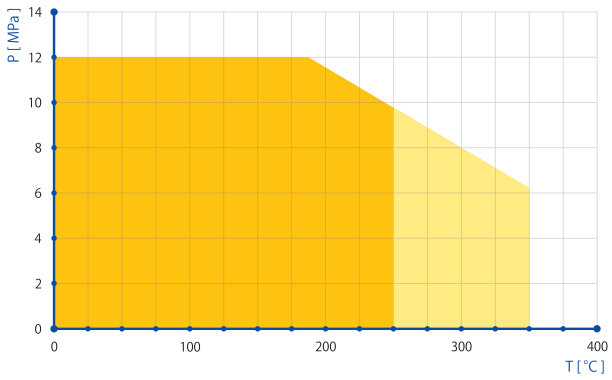


GASKET SHEETS

Physical and chemical properties

Density		**g/cm³**	2,2 - 2,45	DIN 28090-2
Compressibility	typical value	**%**	9	ASTM F36
Elastic recovery	min.	**%**	50	ASTM F36
Residual stresses 50 MPa/16 h/300 °C/	min.	**MPa**	32	DIN 52913
Residual stresses 50 MPa/16 h/175 °C/	min.	**MPa**	35	DIN 52913
INCREASE IN THICKNESS				
Oil IRM 903 150 °C/5h	max.	**%**	8	ASTM F146
Model fuel B 20 °C/5 h	max.	**%**	7	ASTM F146
Kerosene 20 °C/24 h	max.	**%**	6	ASTM F146
Colour		**graphite**		

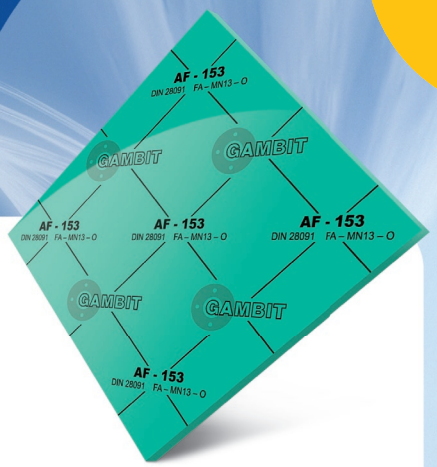
(Values as detailed in table refer to 2.0 mm thick gasket sheets)



It is not recommended that maximum temperature and pressure are applied simultaneously. Pressure to temperature correlation for sheet thickness 2.0 mm is shown in the diagram.

- There is no requirement for trials.
- Trials should be run if the application involves steam.

GASKET SHEETS



TECHNICAL SPECIFICATION

Gasket sheet Gambit AF-153

Material

Gasket sheet **GAMBIT AF-153** is based on natural fibres, mineral fibres, and fillers bound with NBR, NR and SBR rubber-based binder.

Designation according to DIN 28091-2: **FA-MN13-O**

General properties and applications

Low-parameter sheet, recommended mostly for water supply and sewage mains.

Admissions / Certificates

WRAS*
PZH

Maximum working conditions

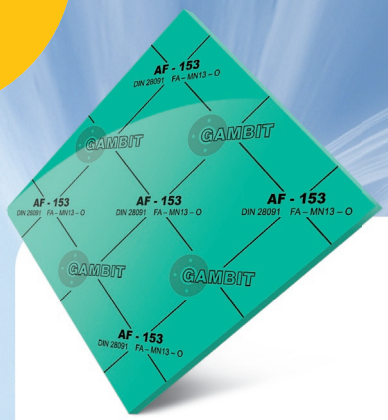
Peak temperature	**°C**	180
Temperature under continuous operation	**°C**	155
Temperature under continuous operation with steam	**°C**	130
Pressure	**MPa**	4

Dimensions

Standard thicknesses of sheets /thicknesses above 4.0 mm are produced by gluing/	**mm**	0,5; 0,8 1,0; 1,5; 2,0; 2,5 3,0; 4,0; 5,0; 6,0	± 0,1 ± 10% ± 10%
Standard dimensions of sheets /custom dimensions available within the total range of 1500x3000 mm/	**mm**	1500x1500	±10,0

Non-standard thicknesses, graphiting of sheet surfaces, and reinforcement with metallic mesh available upon request.

* Certified version available upon request.

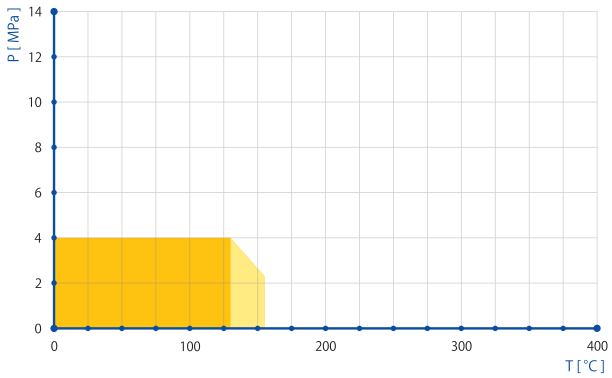


GASKET SHEETS

Physical and chemical properties

Density	± 5%	**g/cm³**	1,9	DIN 28090-2
Transverse tensile strength	min.	**MPa**	5	DIN 52910
Compressibility	typical value	**%**	10	ASTM F36
Elastic recovery	min.	**%**	50	ASTM F36
Residual stresses 50 MPa/16 h/175 °C/	min.	**MPa**	20	DIN 52913
Colour		**light green**		

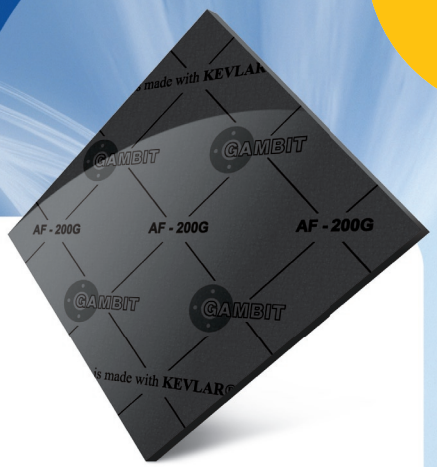
(Values as detailed in table refer to 2.0 mm thick gasket sheets)



It is not recommended that maximum temperature and pressure are applied simultaneously. Pressure to temperature correlation for sheet thickness 2.0 mm is shown in the diagram.

- There is no requirement for trials.
- Trials should be run if the application involves steam.

GASKET SHEETS



TECHNICAL SPECIFICATION

Gasket sheet Gambit AF-200G

Material

Gasket sheet **GAMBIT AF-200G** is based on Kevlar® aramide fibres, mineral fibres, and fillers bound with NBR rubber-based binder

Designation according to DIN 28091-2: **FA-AM1-O**

Kevlar® is a registered trademark of E. I. du Pont de Nemours and Company or its affiliates.

General properties and applications

High parameter sheet, containing special combination of aramide fibres and graphite. The sheet features high elasticity. Recommended for applications with steam. Water, fuel, and oil resistant, among others.

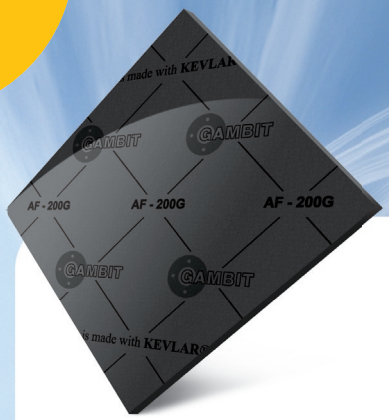
Maximum working conditions

Peak temperature	**°C**	380
Temperature under continuous operation	**°C**	320
Temperature under continuous operation with steam	**°C**	250
Pressure	**MPa**	8

Dimensions

Standard thicknesses of sheets /thicknesses above 5.0 mm are produced by gluing/	**mm**	0,3; 0,5; 0,8 1,0; 1,5; 2,0; 2,5 3,0; 4,0; 5,0; 6,0	± 0,1 ± 10% ± 10%
Standard dimensions of sheets /custom dimensions available within the total range of 1500x3000 mm/	**mm**	1500x1500	± 10,0

Non-standard thicknesses, graphiting of sheet surfaces, and reinforcement with metallic mesh available upon request.
Metallic mesh reinforcement increases the maximum working pressure by 2 MPa (other physical and chemical properties are also changed).

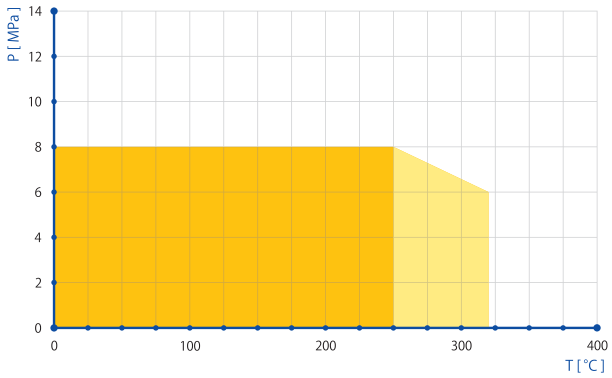


GASKET SHEETS

Physical and chemical properties

Density	± 5%	**g/cm³**	1,9	DIN 28090-2
Transverse tensile strength	min.	**MPa**	9	DIN 52910
Compressibility	typical value	**%**	10	ASTM F36
Elastic recovery	min.	**%**	50	ASTM F36
Residual stresses 50 MPa/16 h/300 °C/	min.	**MPa**	25	DIN 52913
Residual stresses 50 MPa/16 h/175 °C/	min.	**MPa**	30	DIN 52913
INCREASE IN THICKNESS				
Oil IRM 903 150 °C/5 h	max.	**%**	5	ASTM F146
Model fuel B 20 °C/5 h	max.	**%**	6	ASTM F146
Colour		**graphite**		

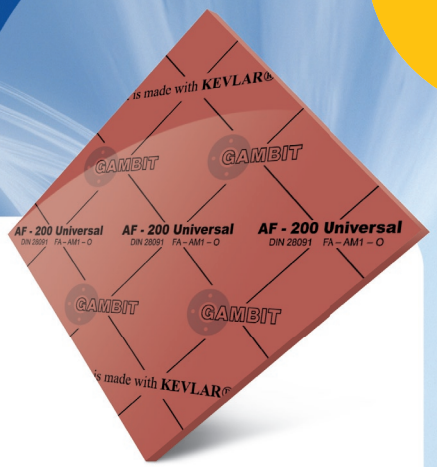
(Values as detailed in table refer to 2.0 mm thick gasket sheets)



It is not recommended that maximum temperature and pressure are applied simultaneously. Pressure to temperature correlation for sheet thickness 2.0 mm is shown in the diagram.

- There is no requirement for trials.
- Trials should be run if the application involves steam.

GASKET SHEETS



TECHNICAL SPECIFICATION

Gasket sheet Gambit AF-200 UNIVERSAL

Material

Gasket sheet **GAMBIT AF-200** Universal is based on Kevlar® aramide fibres, mineral fibres, and fillers bound with NBR rubber-based binder.

Designation according to DIN 28091-2: **FA-AM1-O**

Kevlar® is a registered trademark of E. I. du Pont de Nemours and Company or its affiliates.

General properties and applications

Versatile, oil resistant sheet designed for applications with the majority of media under medium temperatures and pressures. Environmentally friendly sheet type, free from N-nitrosamines.

Admissions / Certificates

DVGW
Germanischer Lloyd
INIG
KTW

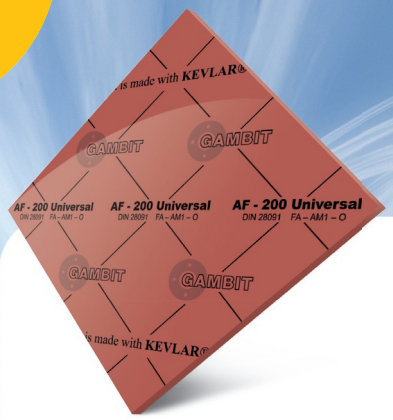
Maximum working conditions

Tetmperatura chwilowa	**°C**	300
Temperature under continuous operation	**°C**	220
Temperature under continuous operation with steam	**°C**	180
Pressure	**MPa**	6

Dimensions

Standard thicknesses of sheets /thicknesses above 5.0 mm are produced by gluing/	**mm**	0,3; 0,5; 0,8 1,0; 1,5; 2,0; 2,5 3,0; 4,0; 5,0; 6,0	± 0,1 ± 10% ± 10%
Standard dimensions of sheets /custom dimensions available within the total range of 1500x3000 mm/	**mm**	1500x1500	± 10,0

Non-standard thicknesses, graphiting of sheet surfaces, and reinforcement with metallic mesh available upon request.



GASKET SHEETS

Physical and chemical properties

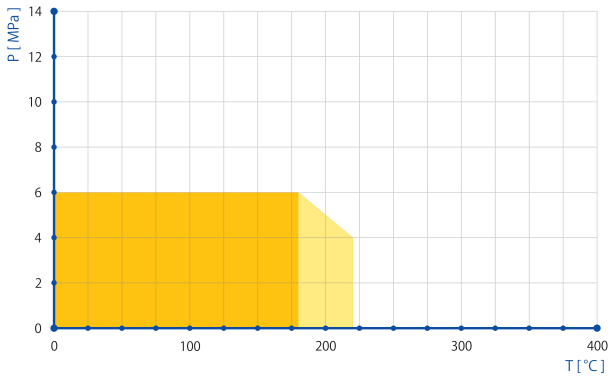
Density	± 5%	**g/cm³**	2,0	DIN 28090-2
Transverse tensile strength	min.	**MPa**	7	DIN 52910
Compressibility	typical value	**%**	10	ASTM F36
Elastic recovery	min.	**%**	55	ASTM F36
Residual stresses 50 MPa/16 h/300 °C/	min.	**MPa**	22	DIN 52913
Residual stresses 50 MPa/16 h/175 °C/	min.	**MPa**	28	DIN 52913
INCREASE IN THICKNESS				
Oil IRM 903 150 °C/5 h	max.	**%**	5	ASTM F146
Model fuel B 20 °C/5 h	max.	**%**	5	ASTM F146
Colour		**red**		

(Values as detailed in table refer to 2.0 mm thick gasket sheets)

Calculation coefficients

Coefficients DT – UC – 90/WO-0/19								
σ_m			σ_r			b		
1 mm	2 mm	3 mm	1 mm	2 mm	3 mm	20 °C	200 °C	300 °C
40 MPa	21 MPa	12 MPa	6,4 p_0	5 p_0	4,1 p_0	1,1	1,8	3,0

Coefficients ASME			
Tightness class	Thickness	m	y
L0,1	2 mm	4,0	3,5 MPa
L1,0	2 mm	1,7	1,1 MPa



It is not recommended that maximum temperature and pressure are applied simultaneously. Pressure to temperature correlation for sheet thickness 2.0 mm is shown in the diagram.

- There is no requirement for trials.
- Trials should be run if the application involves steam.

All information in this catalogue is based on years of experience in manufacture and use of the discussed products. Since sealing performance in the joint is subject to multiple factors such as mounting method, system parameters, and sealed medium, technical parameters specified herein are of informative nature only and cannot be used as grounds for any claims; any special uses of products are subject to consulting with the manufacturer.

Test Results of Gambit AF–200 UNIVERSAL Published on Gasketdata.org

The below tests were run according to EN 13555, the most up-to-date norm in this domain. The results confirm the quality of our products and assist the design of flanges according to norm EN 1591-1+A1:2009/AC:2011.

The results have been approved by Center of Sealing Technologies (CST) at Münster University of Applied Sciences (MUAS) and published on www.gasketdata.org together with the datasheets of the world's leading manufacturers of sealing materials.

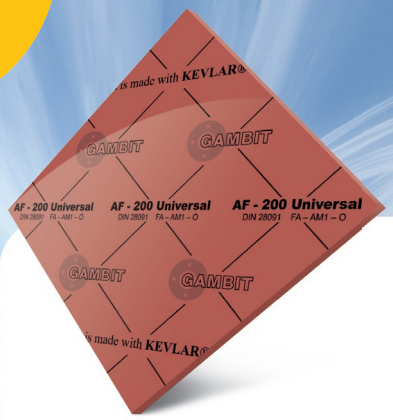
CST is an independent laboratory focused on the research and development in the field of sealing materials in order to assist both the producers and the users.

Gasket characteristics acc. EN 13555 (05/2005) required for design calculations acc. EN 1591-1+A1:2009/AC:2011
Sealing element dimensions [mm] 92 x 49 x 2

Relaxation ratio P_{QR} for stiffness C = 500 kN/mm			
Gasket stress, MPa	Ambient temperature	Temperature 1 (175 °C)	Temperature 2 (300 °C)
Stress level 1 (30 MPa)	0,96	0,84	0,54
Stress level 2 (50 MPa)	0,97	0,78	0,57
P_{QR} at Q_{Smax} (220/60/60 MPa)	0,98	0,76	0,53

Maximal applicable gasket stress Q_{Smax}, MPa		
Q_{Smax}, MPa – ambient temperature	Q_{Smax}, MPa – temperature 1 (175 °C)	Q_{Smax}, MPa – temperature 2 (300 °C)
220	60	60

Sekant unloading modulus of the gasket E_G, MPa and gasket thickness e_G, mm						
Gasket stress, MPa	Ambient temperature		Temperature 1 (175 °C)		Temperature 2 (300 °C)	
	E_G, MPa	e_G, mm	E_G, MPa	e_G, mm	E_G, MPa	e_G, mm
0	-	-	-	-	-	-
1	-	2,134	-	2,027	-	2,036
20	1534	2,008	2314	1,880	5157	1,866
30	2547	1,982	2622	1,862	3929	1,848
40	3542	1,961	2839	1,836	3882	1,829
50	4325	1,942	3032	1,802	3981	1,806
60	4909	1,924	3252	1,761	4472	1,778
80	5837	1,891	-	-	-	-
100	6465	1,860	-	-	-	-
120	6887	1,832	-	-	-	-
140	7219	1,807	-	-	-	-
160	7401	1,783	-	-	-	-
180	7715	1,761	-	-	-	-
200	7989	1,741	-	-	-	-
220	8217	1,722	-	-	-	-

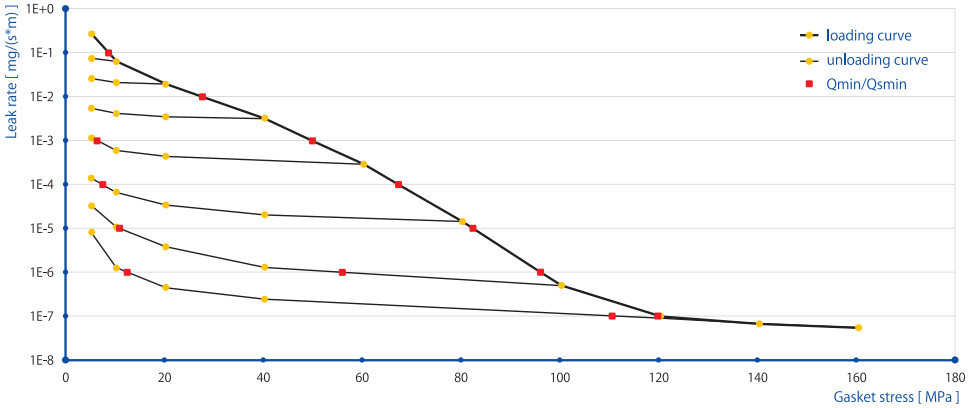


GASKET SHEETS

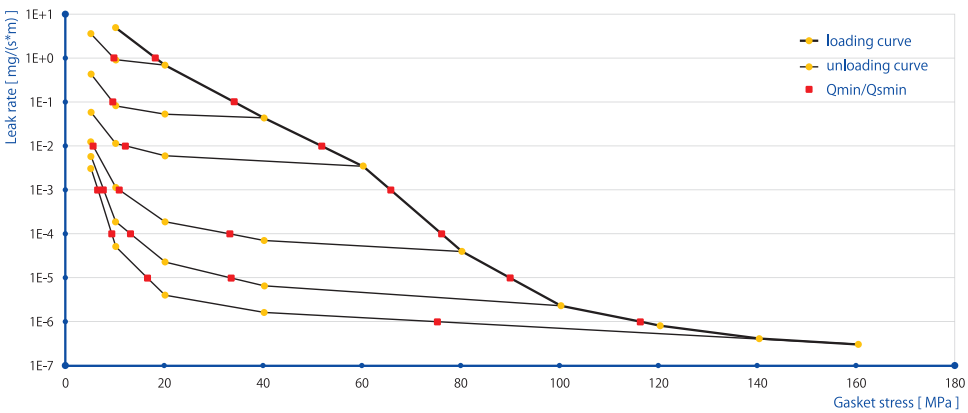
Minimum stress to seal $Q_{min(L)}$ (at assembly), $Q_{Smin(L)}$ (after off-loading) for inner pressure 10 bar										
Tightness class	$Q_{min(L)}$	$Q_{Smin(L)}$, MPa								
mg/(s x m)	MPa	Q_A 10MPa	Q_A 20 MPa	Q_A 40 MPa	Q_A 60 MPa	Q_A 80 MPa	Q_A 100 MPa	Q_A 120 MPa	Q_A 140 MPa	Q_A 160 MPa
10^0	5	5	5	5	5	5	5	-	-	5
10^{-1}	9	5	5	5	5	5	5	-	-	5
10^{-2}	28	-	-	5	5	5	5	-	-	5
10^{-3}	50	-	-	-	6	5	5	-	-	5
10^{-4}	67	-	-	-	-	7	5	-	-	5
10^{-5}	82	-	-	-	-	-	11	-	-	5
10^{-6}	96	-	-	-	-	-	56	-	-	12
10^{-7}	120	-	-	-	-	-	-	-	-	111

Minimum stress to seal $Q_{min(L)}$ (at assembly), $Q_{Smin(L)}$ (after off-loading) for inner pressure 40 bar										
Tightness class	$Q_{min(L)}$	$Q_{Smin(L)}$, MPa								
mg/(s x m)	MPa	Q_A 10MPa	Q_A 20 MPa	Q_A 40 MPa	Q_A 60 MPa	Q_A 80 MPa	Q_A 100 MPa	Q_A 120 MPa	Q_A 140 MPa	Q_A 160 MPa
10^0	18	-	10	5	5	5	5	-	-	5
10^{-1}	34	-	-	10	5	5	5	-	-	5
10^{-2}	52	-	-	-	12	6	5	-	-	5
10^{-3}	66	-	-	-	-	11	8	-	-	7
10^{-4}	76	-	-	-	-	33	13	-	-	9
10^{-5}	90	-	-	-	-	-	34	-	-	17
10^{-6}	116	-	-	-	-	-	-	-	-	75

Leakage - ambient temperature / inner pressure = 10 bar



Leakage - ambient temperature / inner pressure = 40 bar



GASKET SHEETS

TECHNICAL SPECIFICATION

Gasket sheet Gambit AF-202

Material

Gasket sheet **GAMBIT AF-202** is based on Kevlar® aramide fibres, mineral fibres, and fillers bound with NBR rubber-based binder.

Designation according to **DIN 28091-2: FA-AM1-O**

Kevlar® is a registered trademark of E. I. du Pont de Nemours and Company or its affiliates.

General properties and applications

Popular sheet designated for sealing in low temperature and low pressure applications. Particularly recommended for fuel oil installations.

Maximum working conditions

Peak temperature	**°C**	200
Temperature under continuous operation	**°C**	180
Temperature under continuous operation with steam	**°C**	150
Pressure	**MPa**	4

Dimensions

Standard thicknesses of sheets /thicknesses above 4.0 mm are produced by gluing/	**mm**	0,5; 0,8 1,0; 1,5; 2,0; 2,5 3,0; 4,0; 5,0; 6,0	± 0,1 ± 10% ± 10%
Standard dimensions of sheets /custom dimensions available within the total range of 1500x3000 mm/	**mm**	1500x1500	± 10,0

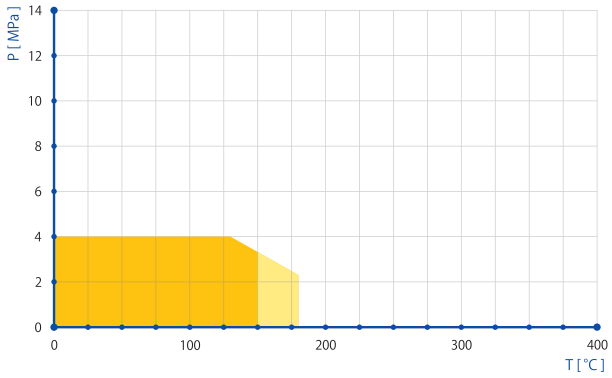
Non-standard thicknesses, graphiting of sheet surfaces, and reinforcement with metallic mesh available upon request.

GASKET SHEETS

Physical and chemical properties

Density	± 5%	**g/cm³**	2,0	DIN 28090-2
Transverse tensile strength	min.	**MPa**	6	DIN 52910
Compressibility	typical value	**%**	11	ASTM F36
Elastic recovery	min.	**%**	50	ASTM F36
Residual stresses 50 MPa/16 h/300 °C/	min.	**MPa**	20	DIN 52913
Residual stresses 50 MPa/16 h/175 °C/	min.	**MPa**	25	DIN 52913
INCREASE IN THICKNESS				
Oil IRM 903 150 °C/5 h	max.	**%**	12	ASTM F146
Colour		**khaki**		

(Values as detailed in table refer to 2.0 mm thick gasket sheets)



It is not recommended that maximum temperature and pressure are applied simultaneously. Pressure to temperature correlation for sheet thickness 2.0 mm is shown in the diagram.

- There is no requirement for trials.
- Trials should be run if the application involves steam.

GASKET SHEETS

TECHNICAL SPECIFICATION

Gasket sheet Gambit AF-300

Material

Gasket sheet **GAMBIT AF-300** is based on Kevlar® aramide fibres, mineral fibres, and fillers bound with NBR, NR and SBR rubber-based binder.

Designation according to DIN 28091-2: **FA-AM13-O**

Kevlar® is a registered trademark of E. I. du Pont de Nemours and Company or its affiliates.

General properties and applications

Elastic sheet easily following all the curves and irregularities of a flange. Particularly recommended for water and steam installations, in heating and power generation sector, as well as in municipal companies. The sheet is resistant to brake and cooling liquids, thus it is recommended for automotive applications.

Admissions / Certificates

INIG

Maximum working conditions

Peak temperature	**°C**	320
Temperature under continuous operation	**°C**	280
Temperature under continuous operation with steam	**°C**	220
Pressure	**MPa**	10

Dimensions

Standard thicknesses of sheets /thicknesses above 5.0 mm are produced by gluing/	**mm**	0,3; 0,5; 0,8 1,0; 1,5; 2,0; 2,5 3,0; 4,0; 5,0; 6,0	± 0,1 ± 10% ± 10%
Standard dimensions of sheets /custom dimensions available within the total range of 1500x3000 mm/	**mm**	1500x1500	± 10,0

Non-standard thicknesses, graphiting of sheet surfaces, and reinforcement with metallic mesh available upon request.

GASKET SHEETS

Physical and chemical properties

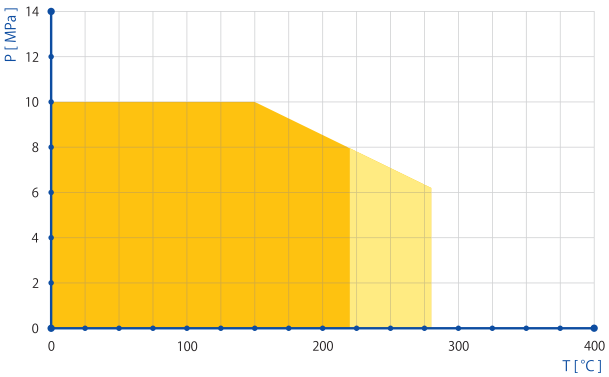
Density	± 5%	**g/cm³**	2,0	DIN 28090-2
Transverse tensile strength	min.	**MPa**	8	DIN 52910
Compressibility	typical value	**%**	11	ASTM F36
Elastic recovery	min.	**%**	50	ASTM F36
Residual stresses 50 MPa/16 h/300 °C/	min.	**MPa**	22	DIN 52913
Residual stresses 50 MPa/16 h/175 °C/	min.	**MPa**	28	DIN 52913
Colour		**yellow**		

(Values as detailed in table refer to 2.0 mm thick gasket sheets)

Calculation coefficients

Coefficients DT – UC – 90/WO-0/19								
σ_m			**σ_r**			**b**		
1 mm	2 mm	3 mm	1 mm	2 mm	3 mm	20 °C	200 °C	300 °C
40 MPa	21 MPa	12 MPa	6,4 p_0	5 p_0	4,1 p_0	1,1	1,8	3,0

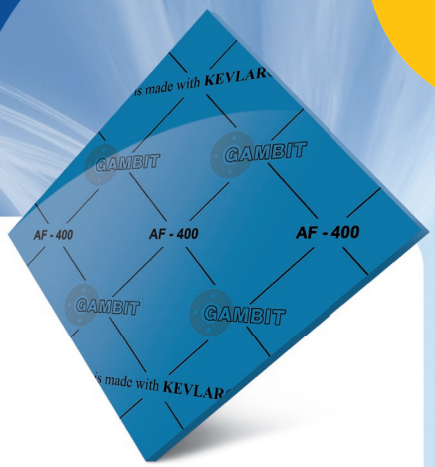
Coefficients ASME			
Tightness class	**Thickness**	**m**	**y**
L0,1	2 mm	3,2	4 MPa
L1,0	2 mm	1,6	2 MPa



It is not recommended that maximum temperature and pressure are applied simultaneously. Pressure to temperature correlation for sheet thickness 2.0 mm is shown in the diagram.

- There is no requirement for trials.
- Trials should be run if the application involves steam.

GASKET SHEETS



TECHNICAL SPECIFICATION

Gasket sheet Gambit AF-400

Material

Gasket sheet **GAMBIT AF-400** is based on Kevlar® aramide fibres, mineral fibres, and fillers bound with NBR rubber-based binder.

Designation according to DIN 28091-2: **FA-AM1-O**

Kevlar® is a registered trademark of E. I. du Pont de Nemours and Company or its affiliates.

General properties and applications

High parameter sheet, made of top quality materials. Highly reliable, with broad range of applications. Designated for use in supervised joints, and installations for transmission of natural gas. Resistant to water, steam, kerosene, fuel, oil, and solutions of salts, among others.

Admissions / Certificates

INIG

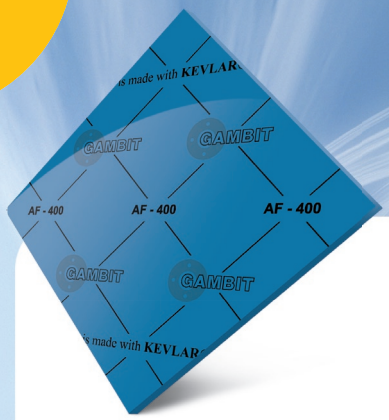
Maximum working conditions

Peak temperature	**°C**	400
Temperature under continuous operation	**°C**	350
Temperature under continuous operation with steam	**°C**	260
Pressure	**MPa**	12

Dimensions

Standard thicknesses of sheets /thicknesses above 5.0 mm are produced by gluing/	**mm**	0,3; 0,5; 0,8 1,0; 1,5; 2,0; 2,5 3,0; 4,0; 5,0; 6,0	± 0,1 ± 10% ± 10%
Standard dimensions of sheets /custom dimensions available within the total range of 1500x3000 mm/	**mm**	1500x1500	± 10,0

Non-standard thicknesses, graphiting of sheet surfaces, and reinforcement with metallic mesh available upon request.



GASKET SHEETS

Physical and chemical properties

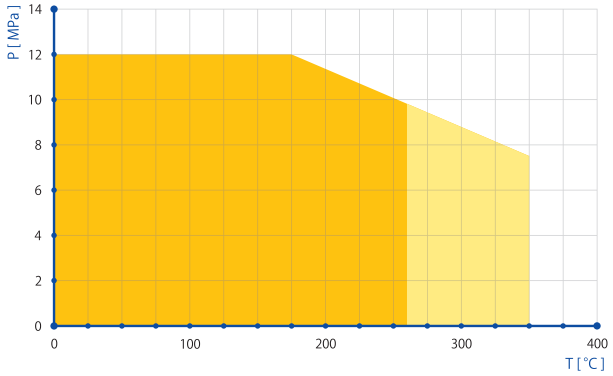
Density	± 5%	**g/cm³**	2,0	DIN 28090-2
Transverse tensile strength	min.	**MPa**	12	DIN 52910
Compressibility	typical value	**%**	10	ASTM F36
Elastic recovery	min.	**%**	55	ASTM F36
Residual stresses 50 MPa/16 h/300 °C/	min.	**MPa**	30	DIN 52913
Residual stresses 50 MPa/16 h/175 °C/	min.	**MPa**	35	DIN 52913
INCREASE IN THICKNESS				
Oil IRM 903 150 °C/5 h	max.	**%**	6	ASTM F146
Model fuel B 20 °C/5 h	max.	**%**	6	ASTM F146
Kerosene 20 °C/24 h	max.	**%**	5	ASTM F146
Colour		**blue**		

(Values as detailed in table refer to 2.0 mm thick gasket sheets)

Calculation coefficients

Coefficients DT – UC – 90/WO-0/19								
σ_m			σ_r			b		
1 mm	2 mm	3 mm	1 mm	2 mm	3 mm	20 °C	200 °C	300 °C
40 MPa	21 MPa	12 MPa	6,4 p_0	5 p_0	4,1 p_0	1,1	1,8	3,0

Coefficients ASME			
Tightness class	**Thickness**	**m**	**y**
L0,1	2 mm	5,5	2,5 MPa
L1,0	2 mm	2,4	1,0 MPa

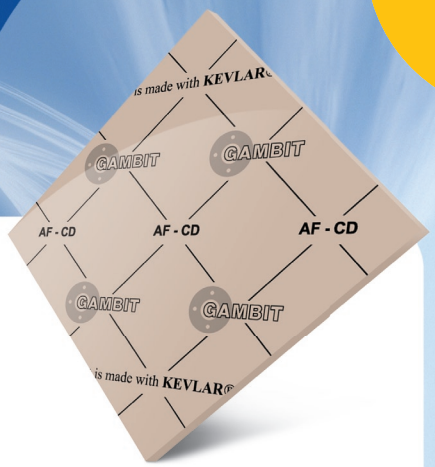


It is not recommended that maximum temperature and pressure are applied simultaneously. Pressure to temperature correlation for sheet thickness 2.0 mm is shown in the diagram.

- There is no requirement for trials.
- Trials should be run if the application involves steam.

All information in this catalogue is based on years of experience in manufacture and use of the discussed products. Since sealing performance in the joint is subject to multiple factors such as mounting method, system parameters, and sealed medium, technical parameters specified herein are of informative nature only and cannot be used as grounds for any claims; any special uses of products are subject to consulting with the manufacturer.

GASKET SHEETS



TECHNICAL SPECIFICATION

Gasket sheet Gambit AF-CD

Material

Gasket sheet **GAMBIT AF-CD** is based on natural fibres, mineral fibres, and fillers bound with NBR rubber-based binder.

Designation according to DIN 28091-2: **FA-N1-O**

General properties and applications

Based on natural fibres the sheet is recommended mostly for heating installations and water supply mains, with both hot and cold water. It is also dedicated to sewage mains and industrial water cycles.

Admissions / Certificates

PZH

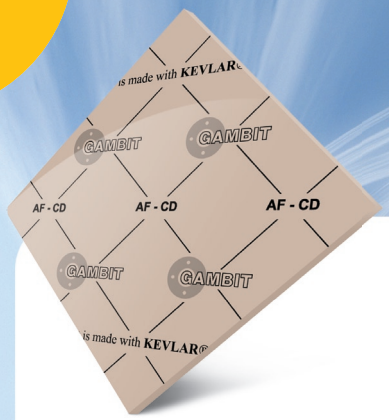
Maximum working conditions

Peak temperature	**°C**	200
Temperature under continuous operation	**°C**	160
Temperature under continuous operation with steam	**°C**	140
Pressure	**MPa**	8

Dimensions

Standard thicknesses of sheets /thicknesses above 4.0 mm are produced by gluing/	**mm**	0,5; 0,8 1,0; 1,5; 2,0; 2,5 3,0; 4,0; 5,0; 6,0	± 0,1 ± 10% ± 10%
Standard dimensions of sheets /custom dimensions available within the total range of 1500x3000 mm/	**mm**	1500x1500	± 10,0

Non-standard thicknesses, graphiting of sheet surfaces, and reinforcement with metallic mesh available upon request.

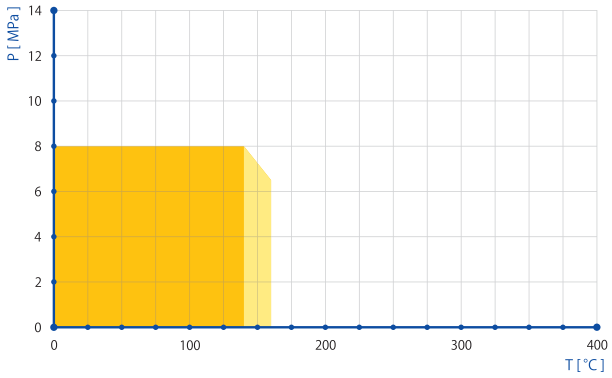


GASKET SHEETS

Physical and chemical properties

Density	±5 %	**g/cm³**	1,8	DIN 28090-2
Transverse tensile strength	min.	**MPa**	7	DIN 52910
Compressibility	typical value	**%**	11	ASTM F36
Elastic recovery	min.	**%**	55	ASTM F36
Residual stresses 50 MPa/16 h/175 °C/	min.	**MPa**	20	DIN 52913
INCREASE IN THICKNESS				
Oil IRM 903 150 °C/5 h	max.	**%**	5	ASTM F146
Colour		**beige**		

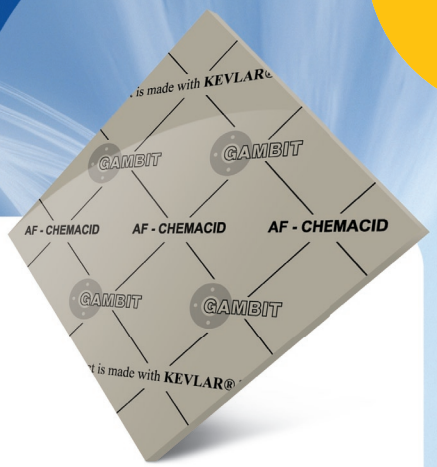
(Values as detailed in table refer to 2.0 mm thick gasket sheets)



It is not recommended that maximum temperature and pressure are applied simultaneously. Pressure to temperature correlation for sheet thickness 2.0 mm is shown in the diagram.

- There is no requirement for trials.
- Trials should be run if the application involves steam.

GASKET SHEETS



TECHNICAL SPECIFICATION

Gasket sheet Gambit AF-CHEMACID

Material

Gasket sheet GAMBIT **AF-CHEMACID** is based on Kevlar® aramide fibres, mineral fibres, and fillers bound with CSM rubber-based binder.

Designation according to DIN 28091-2: **FA-AMZ-O**

Kevlar® is a registered trademark of E. I. du Pont de Nemours and Company or its affiliates.

General properties and applications

Acid and base resistant. Recommended mostly for applications in chemical sector.

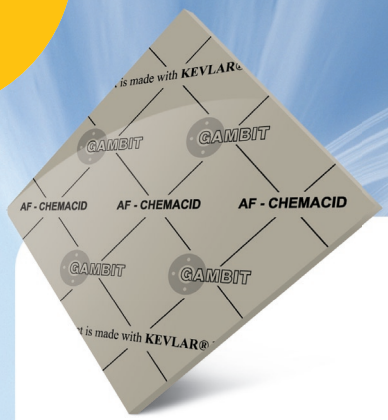
Maximum working conditions

Peak temperature	**°C**	200
Temperature under continuous operation	**°C**	150
Pressure	**MPa**	4

Dimensions

Standard thicknesses of sheets /thicknesses above 4.0 mm are produced by gluing/	**mm**	0,5; 0,8 1,0; 1,5; 2,0; 2,5 3,0; 4,0; 5,0; 6,0	± 0,1 ± 10% ± 10%
Standard dimensions of sheets /custom dimensions available within the total range of 1500x3000 mm/	**mm**	1500x1500	± 10,0

Non-standard thicknesses and graphiting of sheet surfaces available upon request.



GASKET SHEETS

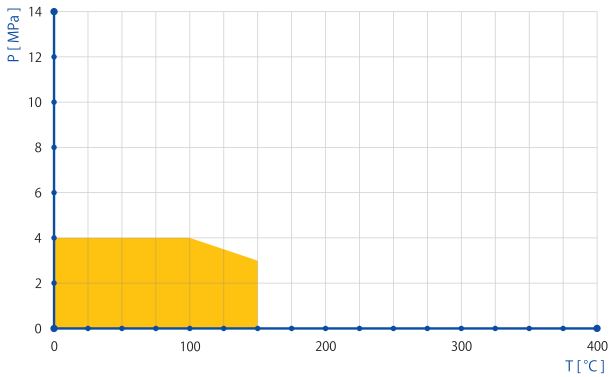
Physical and chemical properties

Density	± 5%	**g/cm³**	2,0	DIN 28090-2
Transverse tensile strength	min.	**MPa**	9	DIN 52910
Compressibility	typical value	**%**	9	ASTM F36
Elastic recovery	min.	**%**	50	ASTM F36
Residual stresses 50 MPa/16 h/175 °C/	min.	**MPa**	25	DIN 52913
INCREASE IN THICKNESS				
40% HNO_3 23 °C/18 h	max.	**%**	8	ASTM F146
65% H_2SO_4 23 °C/48 h	max.	**%**	10	ASTM F146
Colour		**light beige**		

(Values as detailed in table refer to 2.0 mm thick gasket sheets)

Calculation coefficients

Coefficients ASME			
Tightness class	**Thickness**	**m**	**y**
L0,1	2 mm	7,5	4,2 MPa
L1,0	2 mm	3,5	2,1 MPa



It is not recommended that maximum temperature and pressure are applied simultaneously. Pressure to temperature correlation for sheet thickness 2.0 mm is shown in the diagram.

● There is no requirement for trials.

CNC SERVICES

General information

CNC tool shop in Gambit Lubawka Sp. z o.o. offers:

- manufacturing moulds for rubber products;
- manufacturing injection moulds and blow moulds for plastics;
- manufacturing punching dies, press tools;
- manufacturing precision tools and machine parts, as per customer's specification;
- tools recovery;
- manufacturing tools for scientific research;
- CAD/CAM design and technical consulting.

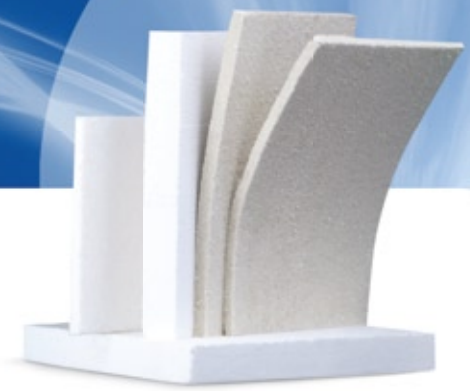
Based on 3D CAD/CAM technologies we provide comprehensive, integrated computer operation in a wide range of design-to-finished product services.

Products are manufactured based on a specification provided by a customer or developed by the experienced team of Gambit engineers using AutoCad and Inventor software.

Our machine stock includes the following:

- CNC turning lathe (HAAS), turning diameter 400 mm, length 760 mm;
- conventional turning lathe - turning diameter 560 mm, length 2000 mm;
- CNC vertical milling machine (HAAS) - x/y/z axis feed - 760/500/500;
- conventional milling machine - table 250x1200;
- conventional milling machine - table 400x1400;
- electro-erosion machine (Sodick) - table 750x550; max weight of an item 1000 kg;
- wire electrical discharge machine (Sodick) - table 606x396; max weight of an item 500 kg; cutting angle ±25° at the length 100 mm;
- Water Jet cutting machine - table size 2000x3000 mm;
- surface grinder - table 350x1000;
- cylinder and hole grinder - max outer diameter 280 mm; length 1000 mm.

CNC SERVICES



VACUUM FORMED THERMAL INSULATIONS CV

General information

Vacuum formed thermal insulation products type CV are made of ceramic fibres and specially selected binders. They feature high resistance to heat, low thermal conductivity, low density and high resistance to temperature changes. Due to their excellent thermal insulation properties, resistance to thermal shocks, heat resistance and ease of processing (also mechanical - milling) they are commonly used in power generation sector, metallurgy, founding, and ceramic sector as the lining of glass, ceramic and metallurgical furnaces.
CV thermal insulations are used as linings of furnace cars, fillings of expansion joints, protections of riser heads in foundries, protections of thermocouples, high temperature gaskets, foundry spouts, and others.

The advantages of using vacuum formed thermal insulation products type CV:

- reduction in furnace weight
- extension of lining lifecycle, especially in batch furnaces
- reduction in costs and time of repairs and overhauls

Standard CV panels are manufactured in hard and soft version in sizes 1000x1000 mm and 1000x500 mm; thickness 5.0 mm to 200 mm. Boards in size above 200 mm are produced by gluing.

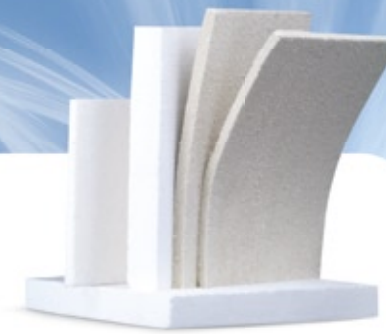
We also manufacture CV shapes: pipes, cylinders, cones, stops, arches, rings, and gutters. We offer milling of all kinds of shapes using the milling module of KIMLA plotter.

Properties of thermal insulation material CV

Type	T_{max}	Density kg/m³	Thermal conductivity at temp. °C	W/mK	Type	T_{max}	Density kg/m³	Thermal conductivity at temp. °C	W/mK
CV-800 (hard)	800	250	20	0,055	**CV-800 M** (elastic)	800	160-200	50	0,045
			200	0,072				300	0,078
			400	0,107				400	0,098
			600	0,162				500	0,125
			800	0,226				600	0,155
CV-1260 (hard)	1260	250	27	0,067	**CV-1260 M** (elastic)	1260	160-200	20	0,05
			200	0,065				200	0,08
			400	0,108				300	0,09
			600	0,166				500	0,14
			800	0,245				700	0,22
			1000	0,345				900	0,39
CV-1430 (hard)	1430	250	20	0,064	**CV-1430 M** (elastic)	1430	180-200	30	0,041
			200	0,066				200	0,063
			400	0,107				400	0,112
			600	0,161				600	0,186
			800	0,232				800	0,322
			900	0,274				1000	0,494
			1000	0,324					
			1200	0,425					
			1400	0,575					

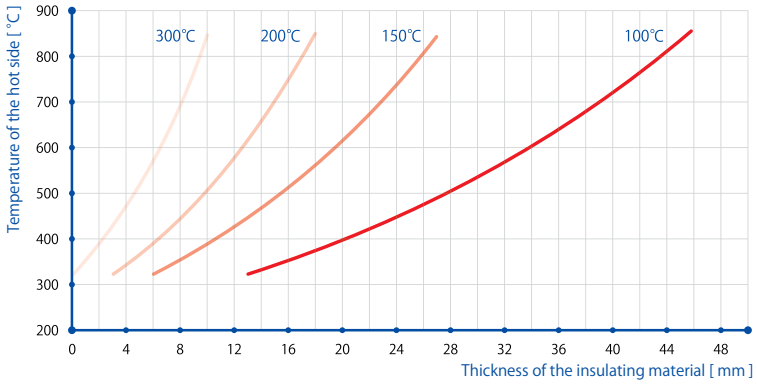
After 4 - hour test under maximum working temperature, the shrinkage of material amounts to:
max. 3 % in length, max. 4 % in thickness

THERMAL INSULATIONS

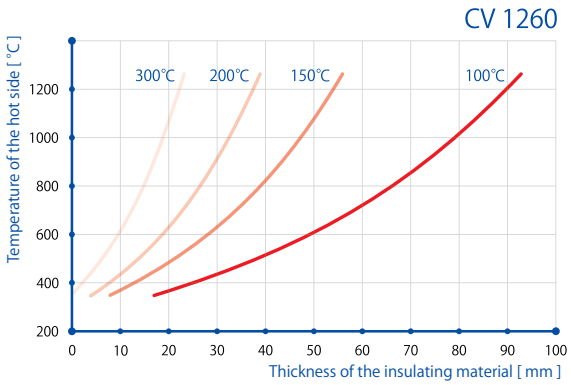


Reference diagrams for calculations of the thicknesses of insulating material CV

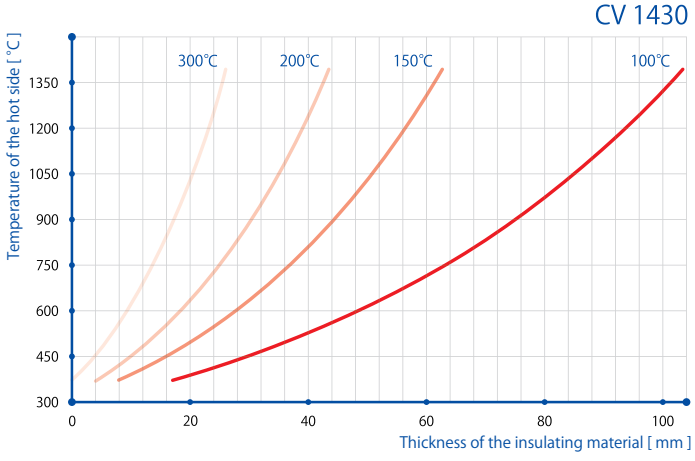
CV 800



CV 1260



CV 1430



CV 800

CV 800 M

CV 1260
CV 1430

CV 1260 M
CV 1430 M

Results and data used in preparation of the diagrams were taken from thermal conductivity tests of CV materials, and are a part of Technical Data Sheets for thermal insulation materials CV. Readings (i.e. diagrams of CV) are estimatations only. They can only be used for the preliminary calculation of the insulating material thicknesses.

Notes

RUBBER PRODUCTS, RUBBER AND METAL PRODUCTS

General information

Gambit Lubawka Sp. z o.o. is a manufacturer of a wide range of sealings and other rubber and rubber/metal products. They are all made of our own rubber mixtures, based on NR, NBR, SBR, EPDM rubbers and their combinations, and third party mixtures FKM and VMQ. Rubber mixtures with standard parameters, as well as with customer defined parameters, can be packed according to the agreed shape and weight.

Range of applications and physical and mechanical properties are detailed in the table:

Base rubber	IRHD hardness range [°Sh]	Temperature range [°C]	Physical and mechanical parameters		
			Tensile strength [MPa]	Unit elongation [%]	Resistance to media
Nitrile NBR	40÷95	-30÷120	5,0÷20,0	max. 700	Animal and vegetable oils, mineral oils, lubricants, aliphatic hydrocarbons, alcohols, water, solutions of salt and majority of acids and bases up to 60 °C.
Fluoride FKM	60÷95	-25÷220	8,0÷16,0	max. 300	Exceptional resistance to oils, fuels, hydraulic liquids, and other petroleum derivatives. Very high resistance to ozone and oxygen, alcohol, aromatic hydrocarbons, solutions of salts, acids and bases, including the oxidising ones.
Silicon VMQ	40÷90	-60÷220	2,0÷8,0	max. 500	Good resistance to water solutions of salts, acids and bases, as well as some oils. Exceptional electrical insulation properties.
Ethylene-propylene EPDM	45÷85	-55÷130	4,0÷14,0	max. 500	Excellent resistance to environmental conditions, including ozone. High resistance to water, steam, solutions of salts, majority of acids and bases, and many other substances, in particular polar ones. High elasticity at low temperatures. Good mechanical and dielectric properties.
Natural NR	45÷90	-60÷70	4,0÷21,0	max. 500	Excellent mechanical properties, good elasticity, resistance to abrasion and low temperature. Advantageous dynamic and fatigue properties.
Butadiene-styrene SBR+ butadiene BR	45÷90	-60÷120	6,0÷16,0	max. 400	Very good resistance to abrasion and cracking. Exceptional elasticity at the broad range of temperatures. Good ageing resistance.

RUBBER

Types of mixtures are defined in PN-82/C-94153 or in a customer's specification.
With years of experience in manufacturing and application of rubber mixtures and finished components we feel competent to select suitable mixture to a customer's specified needs.

We produce a wide range of vulcanized products using presses or injection moulding machines, namely:

- **Gaskets for piston rods of shock absorbers for motor industry.**
- **Gaskets for industrial fittings.**
- **Sealing rings of circular cross-section (O-ring type).**
- **Gaskets and rubber washers of rectangular cross-section.**
- **Rubber threads for hoisting machines.**
- **Rubber discs for belt conveyors.**
- **Membranes and diaphragms.**
- **Sleeves, bumpers, rubber and metal shock absorbers, silent blocks, etc.**
- **Mud flaps.**
- **Other products on the basis of drawings and agreements with customers.**

The antistatic and self-extinguishing rubber mixture, designed especially for mining applications, allowed launching the family of products dedicated to customers in that sector. Particularly interesting are rubber solids for circulation guides of hoisting machines, for which we are certified with "B" safety symbol, and admission to use in underground mining plants issued by the President of Central Mining Office (WYG).

RUBBER

We also manufacture the following rubber sheets from various rubber mixtures:

MATERIAL	Density in g/cm³	Sheet 1000x1000 Dimensions+tolerance in mm	Sheet 500x500 Dimensions+tolerance in mm	Thicknesses+tolerance in mm
NBR NR SBR SBR+BR /highly filled/ EPDM	1,20 - 1,40	995±5 x 995±5	490±5 x 490±5	2 - 5±0,3 6 - 10±0,4 11 - 18±0,5 19 - 30±0,8 31 - 50±1,2
VMQ	1,32	985±5 x 985±5	485±5 x 485±5	J/w
FKM	2,10	975±5 x 975±5	480±5 x 480±5	J/w

Sheets 1000x1000 are available in thickness 5 to 50 mm.
Sheets 500x500 are available in thickness 2 to 40 mm.
We do not reinforce sheets with fabric spacers.

In addition to standard products we are oriented on new launches. Our own design office and Tool-and-Die Facilities allow us to design and execute the equipment necessary for manufacturing product matching a customer's expectations, in cost-optimized technology with regard to the size of production lot ordered. As opposed to many rubber plants focused on large-scale production we are ready to meet your needs and expectations.

Notatki

COMPENSATORS AND COMPENSATOR FABRICS

General information

Industrial processes require a possibility of a flexible joint of two or more components that move against each other, in such a way as to maintain tightness of the connection. The solution of this problem are compensator fabrics produced by Gambit in accordance with individual needs of users or installation designers. They are used as flexible joints compensating thermal deformations, side shift, and vibrations, while muffling and reducing transfer of noise across the installation. Compensators are used in power plants, gas turbines, chemical industry, petrochemical industry, paper industry and cement industry. More and more compensators are used in exhaust gas treatment and desulphurisation. Our compensators are made of materials resistant to both high temperatures, up to 1000 °C, and aggressive chemical media. Working pressure of compensator fabric is -0.2 to 0.3 bar.
Application of compensator fabrics has a number of advantages. Thanks to high elasticity with minimum installation space required, small forces required during assembling and installation, and easy retrofitting, they can transfer and compensate displacements in all directions at the same time. Thanks to adoption of impenetrable materials (such as PTFE) they ensure high tightness of a joint at a wide range of temperatures and media.

Compensator fabrics are made in Gambit according to customer requirements, defined in drawings or specifications. The designs are very diversified; from the simplest single-layer compensators to designs of many layers. The layers can be made of PTFE with increased resistance to chemicals as well as quartz or ceramic layers with increased resistance to heat. Upon a customer's request we can fit them with additional thermal insulation. Thanks to implementation of the advancements in material engineering, today's fabrics, coated fabrics and films demonstrate not only thermal and chemical resistance, but also high mechanical and fatigue resistance to multiple deformations.

Also the assembling method depends on a customer's specification and considers local mounting conditions. Compensators can be finished with flanges, a sleeve design directly mounted to a conduit can be applied, or we can provide a customer with compensator fabrics for independent assembly to the conduit. We offer five standard designs of compensator fabrics.

Type of fabric	Temperature
TKCH 280	up to 280 °C + chemically aggressive media*
TK 450	up to 450 °C
TK 600	up to 600 °C
TKCH 600	up to 600 °C + chemically aggressive media*
TK 800	up to 800 °C

* with the exception of fluoride and hydrogen fluoride

COMPENSATORS

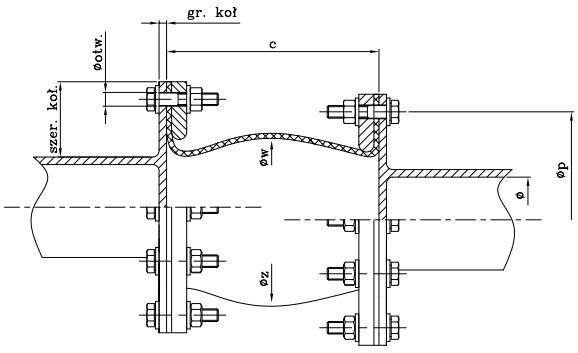
Due to diversity of tasks and local mounting and operating conditions, compensator fabrics are mostly designed according to customer's specifications. In order to design and manufacture efficient compensators operating for a long time, detailed information are necessary, with a special focus on:

- **sealed medium** - of essential meaning to selection of materials.
  Compensators are generally used in flue-gas installations. What should be taken into account in this case, is to specify the combustion process, being the source of flue-gas, and consequently, its chemical composition. Compounds of fluoride and sulphur are the most aggressive ones. At extremely high temperatures attention to possible reducing environment should be paid. As chemical agents usually are more aggressive in liquid phase than in gaseous phase, humidity content in the transferred medium, as well as the condensation preventing design should be considered. Also possible occurrence of soot or other particulates should be taken into account at the design stage. If solids occur, their concentration, shape and hardness, position of compensator, flow rate and direction should be taken into account. Sealed medium is another key criterion when it comes to compensator tightness. The solutions used when only dust-tightness is required differ from the situation when gas or toxic vapour tightness is required - in the latter case nearly absolute tightness is mandatory.

- **pressure and flow volume** - affects the compensator construction, materials used, quantity and thickness of layers and possible guards. Pressure pulses or sudden pressure jumps are of particular importance. Compensators manufactured by Gambit operate up to the maximum pressure of 0.3 bar. Longer compensators are definitely more susceptible to increased pressure and pressure jumps. High flow volume can cause abrasion of a compensator, and when the condition of laminar flow is exceeded, uncontrolled and unpredictable pulsation can occur.

- **displacements and mechanical interactions** - result in both considering possible dimensional changes and application of stronger materials. Large displacements sometimes require substituting a single compensator with a battery of compensators. The analysis should consider axial compression and expansion, lateral displacement, side shift and twisting. Amplitude of displacements, their interval, and their simultaneous occurrence are all important factors.

- **temperature** - one of the most difficult factors to be controlled when it comes to affecting a compensator. It is not only the problem of protecting against too high temperature, which can be solved by effective insulation. The problem is to apply insulation of compensator that prevents overheating of sealing layers, preventing condensation of humidity inside the compensator at the same time. In order to achieve such a balance, ambient temperature should be taken into account as well.



COMPENSATORS

Please consider the above information when placing your order for a compensator. In order to enhance completion of information, please fill in the questionnaire below.

I. Dimensions:

Channel clearance: A x B or ϕ .....

Inner dimensions of compensator: A_w x B_w or ϕ_w .....

Outer dimensions of compensator: A_z x B_z or ϕ_z .....

Distance between flanges: C .....

Effective dimensions for bolts: Ap x Bp or ϕp .....

Φ_{otw} bolt hole: .....

Distance between bolt holes or flange outline: .....

.....

Flange thickness: .....

Flange width: .....

II. Medium

Temperature of the medium .....

Type of the medium .....

Dust content (g/Nm^3): .....

Solvent content (in %): .....

Sulphur and sulphur compound content (in %): .....

Fluoride compound content (in %): .....

Humidity content (in % of relative humidity): .....

Positive pressure (mbar): .....

Negative pressure (mbar): .....

Pressure jumps .....

Value (mbar): .....

Frequency (Hz): .....

Medium flow rate (m/s): .....

III. Displacements

Axial

Amplitude (mm): ..... Frequency: .....

Transverse

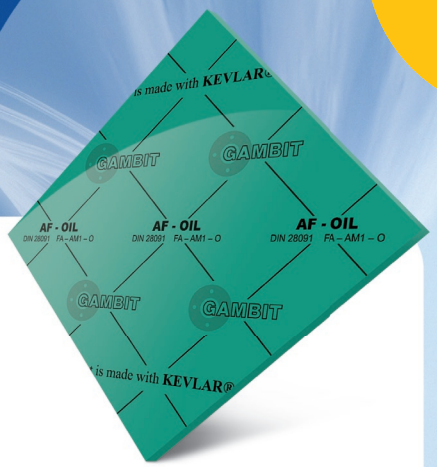
Amplitude (mm): ..... Frequency: .....

Torsional

Amplitude (°): ..... Frequency: .....

Notes

GASKET SHEETS



TECHNICAL SPECIFICATION

Gasket sheet Gambit AF-OIL

Material

Gasket sheet **GAMBIT AF-OIL** is based on Kevlar® aramide fibres, mineral fibres, and fillers bound with NBR rubber-based binder.

Designation according to DIN 28091-2: **FA-AM1-O**

Kevlar® is a registered trademark of E. I. du Pont de Nemours and Company or its affiliates.

General properties and applications

Oil-resistant gasket sheet, recommended for high temperatures and pressures. Designated for application in supervised joints. Suitable for natural gas and drinking water installations. Also recommended for applications with water, steam, kerosene, fuels, oils, brine, natural gas, propane-butane.

Admissions / Certificates

DVGW
Germanischer Lloyd
PZH

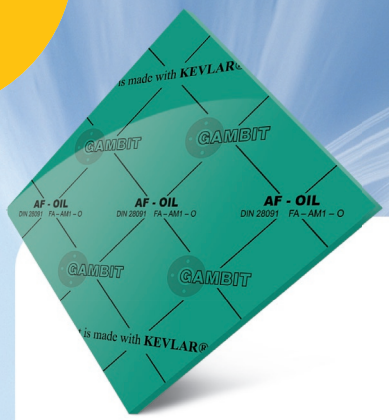
Maximum working conditions

Peak temperature	**°C**	350
Temperature under continuous operation	**°C**	300
Temperature under continuous operation with steam	**°C**	230
Temperatura minimalna	**°C**	-60
Pressure	**MPa**	10

Dimensions

Standard thicknesses of sheets /thicknesses above 5.0 mm are produced by gluing/	**mm**	0,3; 0,5; 0,8 1,0; 1,5; 2,0; 2,5 3,0; 4,0; 5,0; 6,0	± 0,1 ± 10% ± 10%
Standard dimensions of sheets /custom dimensions available within the total range of 1500x3000 mm/	**mm**	1500x1500	± 10,0

Non-standard thicknesses, graphiting of sheet surfaces, and reinforcement with metallic mesh available upon request.



GASKET SHEETS

Physical and chemical properties

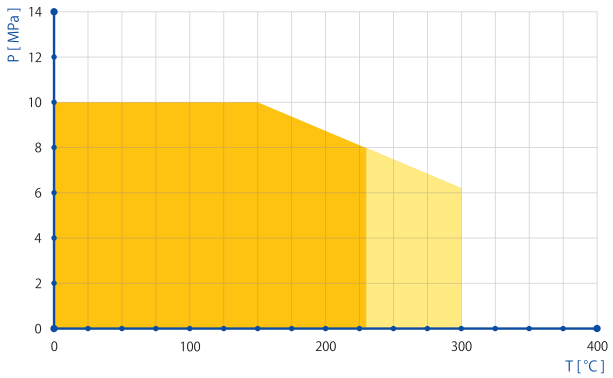
Density	± 5 %	**g/cm³**	2,0	DIN 28090-2
Transverse tensile strength	min.	**MPa**	9	DIN 52910
Compressibility	typical value	**%**	10	ASTM F36
Elastic recovery	min.	**%**	55	ASTM F36
Residual stresses 50 MPa/16 h/300 °C/	min.	**MPa**	29	DIN 52913
Residual stresses 50 MPa/16 h/175 °C/	min.	**MPa**	35	DIN 52913
INCREASE IN THICKNESS				
Oil IRM 903 150 °C/5 h	max.	**%**	6	ASTM F146
Model fuel B 20 °C/5 h	max.	**%**	6	ASTM F146
Kerosene 20 °C/24 h	max.	**%**	5	ASTM F146
Colour		**green**		

(Values as detailed in table refer to 2.0 mm thick gasket sheets)

Calculation coefficients

Coefficients DT – UC – 90/WO-0/19								
σ_m			σ_r			b		
1 mm	2 mm	3 mm	1 mm	2 mm	3 mm	20 °C	200 °C	300 °C
40 MPa	21 MPa	12 MPa	6,4 p_0	5 p_0	4,1 p_0	1,1	1,8	3,0

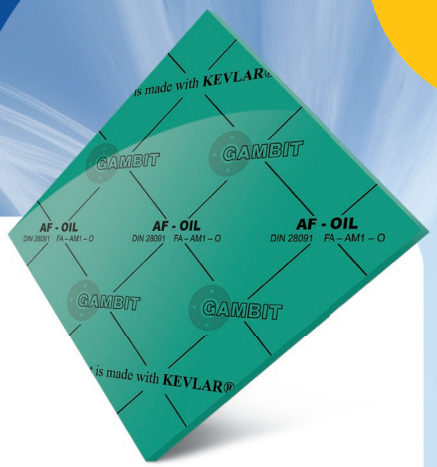
Coefficients ASME			
Tightness class	**Thickness**	**m**	**y**
L0,1	2 mm	4,1	2,7 MPa
L1,0	2 mm	1,8	1,2 MPa



It is not recommended that maximum temperature and pressure are applied simultaneously. Pressure to temperature correlation for sheet thickness 2.0 mm is shown in the diagram.

- There is no requirement for trials.
- Trials should be run if the application involves steam.

All information in this catalogue is based on years of experience in manufacture and use of the discussed products. Since sealing performance in the joint is subject to multiple factors such as mounting method, system parameters, and sealed medium, technical parameters specified herein are of informative nature only and cannot be used as grounds for any claims; any special uses of products are subject to consulting with the manufacturer.



Test Results of Gambit AF-OIL Published on Gasketdata.org

The below tests were run according to EN 13555, the most up-to-date norm in this domain. The results confirm the quality of our products and assist the design of flanges according to norm EN 1591-1+A1:2009/AC:2011.

The results have been approved by Center of Sealing Technologies (CST) at Münster University of Applied Sciences (MUAS) and published on www.gasketdata.org together with the datasheets of the world's leading manufacturers of sealing materials.

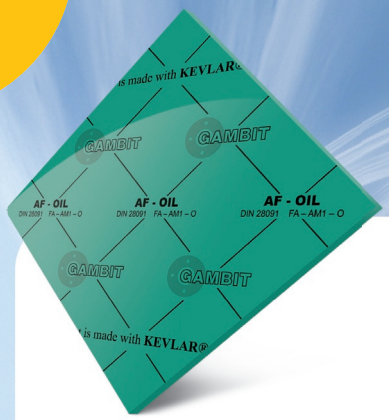
CST is an independent laboratory focused on the research and development in the field of sealing materials in order to assist both the producers and the users.

Gasket characteristics acc. EN 13555 (05/2005) required for design calculations acc. EN 1591-1+A1:2009/AC:2011
Sealing element dimensions [mm] 92 x 49 x 2

Relaxation ratio P_{QR} for stiffness C = 500 kN/mm			
Gasket stress, MPa	Ambient temperature	Temperature 1 (175 °C)	Temperature 2 (300 °C)
Stress level 1 (30 MPa)	0,94	0,82	0,61
Stress level 2 (50 MPa)	0,97	0,90	0,69
P_{QR} at Q_{Smax} (220/220/80 MPa)	0,99	0,86	0,67

Maximal applicable gasket stress Q_{Smax}, MPa		
Q_{Smax}, MPa – ambient temperature	Q_{Smax}, MPa – temperature 1 (175 °C)	Q_{Smax}, MPa – temperature 2 (300 °C)
220	220	80

Sekant unloading modulus of the gasket E_G, MPa and gasket thickness e_G, mm						
Gasket stress, MPa	Ambient temperature		Temperature 1 (175 °C)		Temperature 2 (300 °C)	
	E_G, MPa	e_G, mm	E_G, MPa	e_G, mm	E_G, MPa	e_G, mm
0	-	-	-	-	-	-
1	-	2,083	-	2,086	-	2,085
20	1133	1,955	1680	1,922	9216	1,89
30	1766	1,925	2311	1,909	5235	1,873
40	2457	1,903	2660	1,895	4853	1,859
50	3186	1,885	3369	1,883	5285	1,847
60	3982	1,871	3678	1,871	5453	1,834
80	5399	1,851	4440	1,845	6179	1,808
100	6535	1,835	4784	1,815	-	-
120	7345	1,821	5132	1,784	-	-
140	8098	1,808	5521	1,751	-	-
160	8523	1,796	5870	1,72	-	-
180	8926	1,785	6238	1,69	-	-
200	9383	1,774	6468	1,663	-	-
220	9739	1,763	6772	1,638	-	-

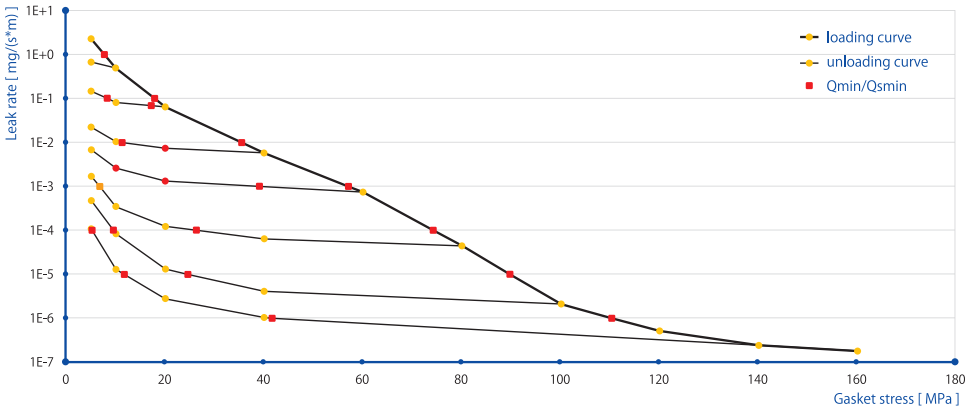


GASKET SHEETS

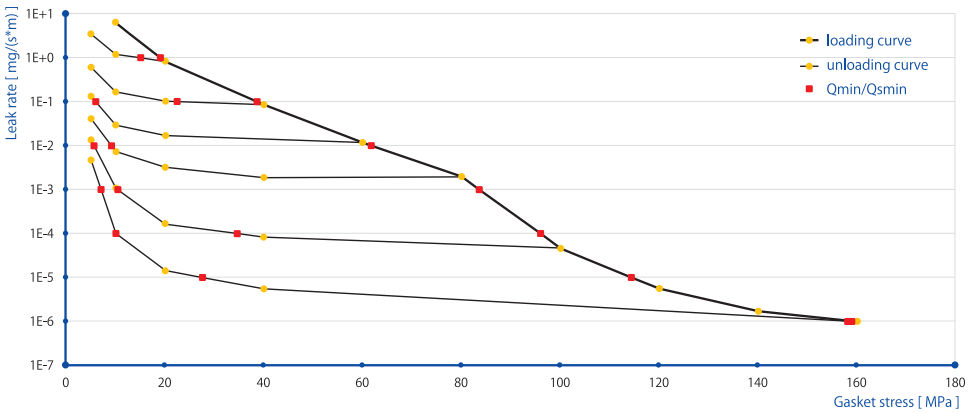
Minimum stress to seal $Q_{min(L)}$ (at assembly), $Q_{Smin(L)}$ (after off-loading) for inner pressure 10 bar										
Tightness class	$Q_{min(L)}$	$Q_{Smin(L)}$, MPa								
mg/(s x m)	MPa	Q_A 10MPa	Q_A 20 MPa	Q_A 40 MPa	Q_A 60 MPa	Q_A 80 MPa	Q_A 100 MPa	Q_A 120 MPa	Q_A 140 MPa	Q_A 160 MPa
10^{0}	8	5	5	5	5	5	5	-	-	5
10^{-1}	18	-	8	5	5	5	5	-	-	5
10^{-2}	36	-	-	11	5	5	5	-	-	5
10^{-3}	57	-	-	-	39	7	5	-	-	5
10^{-4}	74	-	-	-	-	27	10	-	-	5
10^{-5}	90	-	-	-	-	-	25	-	-	12
10^{-6}	111	-	-	-	-	-	-	-	-	42

Minimum stress to seal $Q_{min(L)}$ (at assembly), $Q_{Smin(L)}$ (after off-loading) for inner pressure 40 bar										
Tightness class	$Q_{min(L)}$	$Q_{Smin(L)}$, MPa								
mg/(s x m)	MPa	Q_A 10MPa	Q_A 20 MPa	Q_A 40 MPa	Q_A 60 MPa	Q_A 80 MPa	Q_A 100 MPa	Q_A 120 MPa	Q_A 140 MPa	Q_A 160 MPa
10^{0}	19	-	15	5	5	5	5	-	-	5
10^{-1}	39	-	-	23	6	5	5	-	-	5
10^{-2}	62	-	-	-	-	9	6	-	-	5
10^{-3}	84	-	-	-	-	-	11	-	-	7
10^{-4}	96	-	-	-	-	-	35	-	-	10
10^{-5}	115	-	-	-	-	-	-	-	-	28
10^{-6}	159	-	-	-	-	-	-	-	-	158

Leakage - ambient temperature / inner pressure = 10 bar



Leakage - ambient temperature / inner pressure = 40 bar



WOVEN BRAKE BANDS

General information

Woven brake bands are designed for all types of brakes and drum clutches in most critical applications. They feature high and stable friction coefficient and guarantee meeting the strictest safety requirements because their design assures resistance to rapid failures, even in worst case.
Such bands are based on highly durable and heat resistant yarns, featuring high friction coefficient. Special patent weave guarantees that the band does not delaminate, even in the most demanding working conditions. Special oil and synthetic impregnate ensure keeping stable braking conditions in the broad range of temperatures.
Thanks to their undeniable advantages the woven brake bands are used in most critical and demanding applications. BAC brake band is the only band with admission to use in hoisting machines for transport of humans in the mining sector, which is a safety critical application, issued by the President of Central Mining Office (WUG).

Application:
Woven friction linings are mostly used in drum brakes, in applications where high reliability and braking efficiency is necessary, e.g., in hoisting machines in mine shaft hoists, in stacking machines, stripping shovels and quarrying excavators, in harbour and shipborne cranes and elevators, steelwork overhead cranes or industrial eccentric presses.

Mounting:
We advise to assemble the brake bands using hollow rivets with mushroom heads on metal surfaces and dowels and glue on wooden surfaces. We recommend “RAKOL” glue for wooden surfaces and "Chester Molecular Super” for metal surfaces is recommended. Mounting instruction is included in Operational and Technical Manual provided upon request.

Placing orders:
The best way is to place an order for bands in sections, thickness and width as required, specified in conformity with the table on the reverse page. If required, specify the minimum length of the section. Manufacturing bands of the dimensions not specified in the table is also possible, after consultation.

FRICTION LININGS

Dimensions table for brake bands BAC and ATU-AE

Thickness in mm / Width in mm	5	6	8	10	12	15	20
30	•	•	•	-	-	-	-
35	•	•	•	-	-	-	-
40	•	•	•	•	•	•	•
45	•	•	•	•	•	•	•
50	•	•	•	•	•	•	•
55	•	•	•	•	•	•	•
60	•	•	•	•	•	•	•
65	•	•	•	•	•	•	•
70	•	•	•	•	•	•	•
75	•	•	•	•	•	•	•
80	•	•	•	•	•	•	•
85	•	•	•	•	•	•	•
90	•	•	•	•	•	•	•
95	•	•	•	•	•	•	•
100	•	•	•	•	•	•	•
105	•	•	•	•	•	•	•
110	•	•	•	•	•	•	•
115	•	•	•	•	•	•	•
120	•	•	•	•	•	•	•
130	•	•	•	•	•	•	•
140	•	•	•	•	•	•	•
150	•	•	•	•	•	•	•
160	•	•	•	•	•	•	•
170	•	•	•	•	•	•	•
180	•	•	•	•	•	•	•
190	•	•	•	•	•	•	•
200	•	•	•	•	•	•	•
210	•	•	•	•	•	•	•
220	•	•	•	•	•	•	•
230	•	•	•	•	•	•	•
240	•	•	•	•	•	•	•
250	•	•	•	•	•	•	•
260	•	•	•	•	•	•	•
270	•	•	•	•	•	•	•
280	•	•	•	•	•	•	•
290	•	•	•	•	•	•	•
300	•	•	•	•	•	•	•
320	•	•	•	•	•	•	•
350	•	•	•	-	-	-	-

FRICTION LININGS

Woven brake band BAC

Design of the brake band BAC:
Brake band BAC is a woven band of ceramic yarns with very thin monofilaments reinforced with brass wire. The wire acts as mechanical reinforcement and a medium carrying off heat from the working area. Special multi-layered weave prevents delamination of lining under high loads while braking. Such a woven band is soaked with top quality composition of natural and synthetic resins, which results in manufacturing a reliable and highly homogeneous friction material.

Application:
Woven asbestos-free brake band BAC is designed for application in drum brakes of heavy machinery, wherever large braking forces are essential, at high temperatures and at places where high reliability of friction material is required.

Technical characteristics:
Acceptable working parameters of woven brake band BAC:

- maximum unit pressure for lining adhesion to brake raceway - **1,2 MPa**
- maximum tangential velocity of braking raceway - **20 m/s**
- maximum temperature under continuous operation - **350 °C**
- minimum kinetic friction coefficient - **0,40**

Caution: in order to evaluate the temperature correctly, not only the ambient temperature in which the brake lining is assembled, but also the growth of temperature due to friction heat emission in working area should be taken into account. In case of intense braking, the temperature can increase by as much as 200 °C.

Approvals and admissions:
Brake lining BAC has an admission no. GM-15/12 issued by the President of Central Mining Office (WUG) for application in hoisting machines used in mine shaft hoists.

Woven brake band ATU-AE

Design of the brake band ATU-AE:
Brake band ATU-AE is a woven band of aramide yarns reinforced with brass wire. The wire acts as mechanical reinforcement and a medium carrying off heat from the working area. Special multi-layered weave prevents delamination of lining under high loads while braking. Such a woven band is soaked with top quality composition of natural and synthetic resins, which results in manufacturing a reliable and highly homogeneous friction material, featuring high working culture and low aggressiveness towards mated parts.

Application:
Woven asbestos-free brake band ATU-AE is designed for application in drum brakes of heavy machinery, wherever large braking forces are required, at high temepratures during operation and at places where high reliability of friction material and low wear of mated drum raceways is required. It is also recommended for use in equipment with high braking frequency.

Technical characteristics:
Permissible working parameters of woven brake band ATU-AE:

- maximum unit pressure for lining adhesion to brake raceway - **1,2 MPa**
- maximum tangential velocity of braking raceway - **20 m/s**
- maximum temperature under continuous operation - **280 °C**
- minimum kinetic friction coefficient - **0,40**

Caution: in order to evaluate the temperature correctly not only the ambient temperature in which the brake lining is assembled, but also the growth of temperature due to friction heat emission in working area should be taken into account. In case of intense braking the temperature can increase by as much as 200 °C.

PRESSED FRICTION LININGS

Structure of pressed friction lining:

The friction lining produced by Gambit is an asbestos-free material, mould-pressed to customer's order, or pressed into sheets and cut to a customer's specification. Composition of materials applied and special regimented mixing and pressing processes allow production of homogeneous and reliable material of high friction coefficient in broad range of temperatures, low and even wear, as well as good performance, including low wear of mating surfaces, as well as quiet and stable operation. Significant use of components with high thermal conductivity ensures effective lining braking, also in applications when a braking cycle is highly intensive. Use of aramide fibres in pressed friction lining ensures maintaining suitable elasticity and cracking resistance.

Application:

Pressed friction lining is designated for application in disc brakes, drum brakes, conical brakes and other types of brakes applied wherever large braking forces are required; at high temperature during operation; and when high reliability of friction material and low wear of mating drum raceways is necessary. It is also recommended for use in equipment with high braking frequency. Upon customer's request we can produce reinforced and cut pressed friction lining, designated for application in drum brakes.

Hardness categories and executions:

Pressed friction linings GC-E, GC-ES, GC-MK and GC-PZ are produced in two standard degrees of hardness and manufactured according to the version chosen by a customer. The versions are marked as follows:

+ Z - reinforced with a metal net
+ N - standard cut or in accordance with customer's drawing
+ 6 - hardness from 55° to 65° Sh D /standard/
+ 8 - hardness above 75° Sh D /very hard/

Pressed friction linings of GC-BO type are produced only above 75° Sh D and in manufacture versions depending on customer's needs.

Examples of symbols:

GC–E + ZN6 - a lining reinforced with a net, chased, hardness 55° to 65° Sh D /standard/
GC–ES + 8 - a lining with hardness above 75° Sh D /very hard/
GC–MK + Z - a net reinforced lining with standard hardness

By placing an order please specify a shape, dimensions and tolerances according to technical requirements for the needed type of lining and in correspondence to a customer's technical documentation.

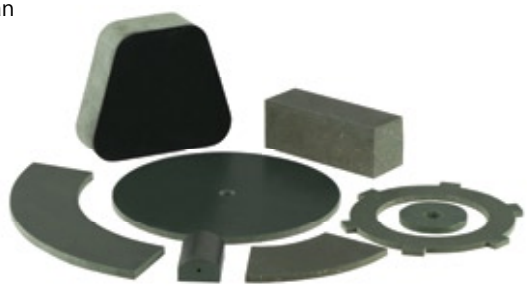
FRICTION LININGS

Types of manufactured friction linings

GC-E LINING

Permissible working parameters:

• maximum unit pressure for a lining adhesion to a brake raceway		- **3,0 N/mm²**
• maximum continuous temperature		- **200 °C**
• maximum peak temperature		- **300 °C**
• minimum kinetic friction coefficient (measured with a CEZAMET apparatus)		- **0,45**
• material wear	for +6 hardness	- **< 1,5 cm³/10⁷J**
	for +8 hardness	- **< 1 cm³/10⁷J**
• density not higher than		- **1,9 g/cm³**



Caution: in order to evaluate the temperature correctly not only the ambient temperature in which the brake lining is assembled, but also a growth of temperature due to friction heat emission in a working area should be considered. In case of intense braking the temperature can locally grow by as much as 200 °C.

GC-ES LINING

Permissible working parameters:

• maximum unit pressure for a lining adhesion to a brake raceway		- **3,0 N/mm²**
• maximum continuous temperature		- **200 °C**
• maximum peak temperature		- **300 °C**
• minimum kinetic friction coefficient (measured with a CEZAMET apparatus)		- **0,40**
• material wear	for +6 hardness	- **< 1,5 cm³/10⁷J**
	or 8+ hardness	- **< 1 cm³/10⁷J**
• density not higher than		- **2,1 g/cm³**

Caution: in order to evaluate the temperature correctly not only the ambient temperature in which the brake lining is assembled, but also a growth of temperature due to friction heat emission in a working area should be considered. In case of intense braking the temperature can locally grow by as much as 200 °C.

FRICTION LININGS

LINING GC-MK

Permissible working parameters:

• maximum unit pressure for a lining adhesion to a brake raceway		- **4,0 N/mm²**
• maximum continuous temperaturej		- **250 °C**
• maximum peak temperature		- **350 °C**
• minimum kinetic friction coefficient (measured with a CEZAMET apparatus)		- **0,45**
• material wear	for +6 hardness	- **< 1 cm³/10⁷J**
	for +8 hardness	- **< 0,5 cm³/10⁷J**
• density not higher than		- **2,1 g/cm³**

Caution: in order to evaluate the temperature correctly not only the ambient temperature in which the brake lining is assembled, but also a growth of temperature due to friction heat emission in a working area should be considered. In case of intense braking the temperature can locally grow by as much as 200 °C.

LINING GC-PZ

Permissible working parameters:

• surface resistance		- **< 1x10⁹ Ω**
• maximum unit pressure for a lining adhesion to a brake raceway		- **3,0 N/mm²**
• maximum continuous temperature		- **200 °C**
• maximum peak temperature		- **250 °C**
• minimum kinetic friction coefficient (measured with a CEZAMET apparatus)		- **0,45**
• material wear	for +6 hardness	- **< 1 cm³/10⁷J**
	for +8 hardness	- **< 0,5 cm³/10⁷J**
• density not higher than		- **2,0 g/cm³**

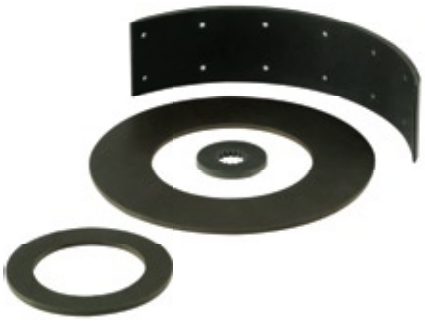
Caution: in order to evaluate the temperature correctly not only the ambient temperature in which the brake lining is assembled, but also a growth of temperature due to friction heat emission in a working area should be considered. In case of intense braking the temperature can locally grow by as much as 200 °C.

FRICTION LININGS

LINING GC-BO

Permissible working parameters:

- maximum unit pressure for a lining adhesion to a brake raceway - **3,5 N/mm^2**
- maximum continuous temperature - **250 °C**
- maximum peak temperature - **350 °C**
- minimum kinetic friction coefficient (measured with a CEZAMET apparatus) - **0,45**
- wear - **< 1 cm^3/10^{7}J**
- density not higher than - **2,2 g/cm^3**



Caution: in order to evaluate the temperature correctly not only the ambient temperature in which the brake lining is assembled, but also a growth of temperature due to friction heat emission in a working area should be considered. In case of intense braking the temperature can locally grow by as much as 200 °C.

Admissions and approvals:

Friction lining GC-E is certified with "B" safety symbol for applications in mining sector, in areas without an explosion hazard.

Friction lining GC-PZ is B sign certified for applications in mining sector, in areas with a methane and/or coal dust explosion hazard.

GASKET SHEETS

TECHNICAL SPECIFICATION

Gasket sheet Gambit PARO-GAMBIT

Material

Gasket sheet **PARO-GAMBIT** is based on carbon fibres, mineral fibres, and fillers bound with NBR rubber-based binder.

Designation according to DIN 28091-2: **FA-CM1-O**

General properties and applications

High performance sheet, recommended mostly for installations working with steam.

Maximum working conditions

Peak temperature	**°C**	450
Temperature under continuous operation	**°C**	350
Temperature under continuous operation with steam	**°C**	350
Pressure	**MPa**	10

Dimensions

Standard thicknesses of sheets /thicknesses above 4.0 mm are produced by gluing/	**mm**	0,5; 0,8 1,0; 1,5; 2,0; 2,5 3,0, 4,0; 5,0; 6,0	± 0,1 ± 10% ± 10%
Standard dimensions of sheets /custom dimensions available within the total range of 1500x3000 mm/	**mm**	1500x1500	± 10,0

Non-standard thicknesses, graphiting of sheet surfaces, and reinforcement with metallic mesh available upon request.

GASKET SHEETS

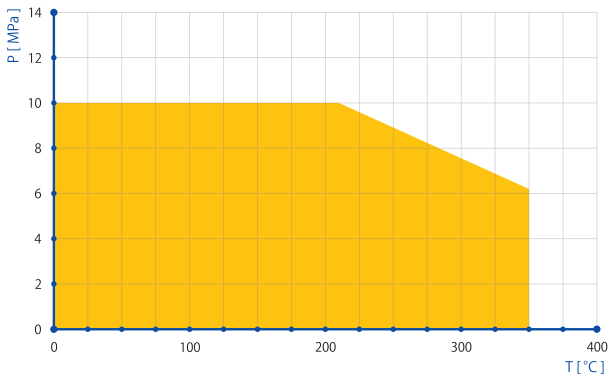
Physical and chemical properties

Density	± 5%	**g/cm³**	1,9	DIN 28090-2
Transverse tensile strength	min.	**MPa**	10	DIN 52910
Compressibility	typical value	**%**	11	ASTM F36
Elastic recovery	min.	**%**	55	ASTM F36
Residual stresses 50 MPa/16 h/300 °C/	min.	**MPa**	32	DIN 52913
Residual stresses 50 MPa/16 h/175 °C/	min.	**MPa**	35	DIN 52913
INCREASE IN THICKNESS				
Oil IRM 903 150 °C/5 h	max.	**%**	12	ASTM F146
Colour		**ginger**		

(Values as detailed in table refer to 2.0 mm thick gasket sheets)

Calculation coefficients

Coefficients DT – UC – 90/WO-0/19									
σ_m			**σ_r**			**b**			
1 mm	2 mm	3 mm	1 mm	2 mm	3 mm	20 °C	200 °C	300 °C	400 °C
30 MPa	15 MPa	10 MPa	6,4 p_0	5 p_0	4,1 p_0	1,0	1,7	2,5	3,6

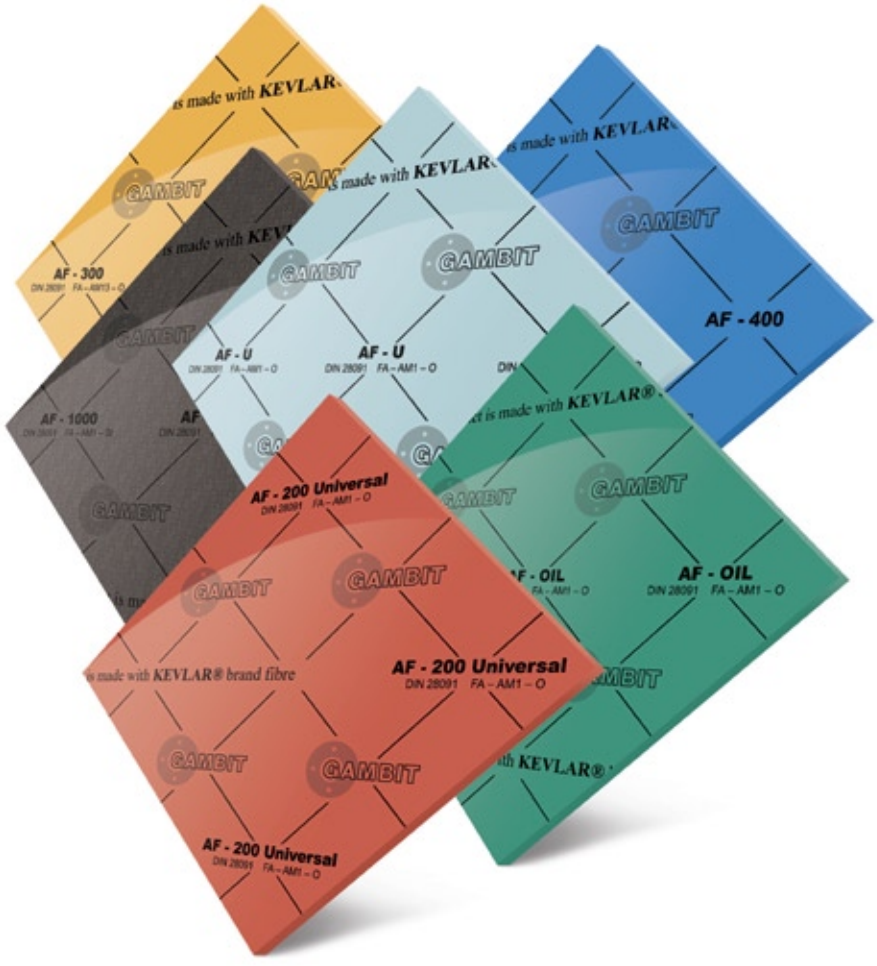


It is not recommended that maximum temperature and pressure are applied simultaneously. Pressure to temperature correlation for sheet thickness 2.0 mm is shown in the diagram.

● There is no requirement for trials.

GASKET SHEETS

GAMBIT AF series asbestos-free gasket sheets are state-of-the-art materials for technical sealing of various media, and for application in a broad range of temperatures and pressures. These products are composites of top quality aramide fibres, specially composed inorganic fibres, and fillers, as well as elastomers selected for specific working conditions. Highly specialised calendering process of sheets, meeting the requirements of ISO-9001, guarantees high and stable quality.
Technical parameters of GAMBIT AF sheets meet the requirements for the majority of applications. Wherever specific working conditions prevent using GAMBIT AF sheets we offer sheets based on expanded graphite, expanded vermiculite, or PTFE. All these products offer the highest level of quality and reliability.



Chemical resistance of gasket sheets GAMBIT

Item	Chemical medium	GAMBIT AF-1000	GAMBIT AF-400	GAMBIT AF-200G	GAMBIT AF-OIL	GAMBIT AF-300	GAMBIT AF-U	GAMBIT AF-200 UNIVERSAL	GAMBIT AF-CD	GAMBIT AF-202	GAMBIT AF-153	GAMBIT SOFT	GAMBIT AF-CHEMACID	PARO-GAMBIT
1	Acetone	■	▲	▲	▲	▲	▲	▲	■	■	■	■	▲	▲
2	Alcohol, ethyl	●	●	●	●	●	●	●	●	●	●	●	●	●
3	Alcohol, methyl	●	●	●	●	●	●	●	●	●	●	●	●	●
4	Ammonia	▲	●	●	●	▲	●	●	■	■	■	■	●	●
5	Aniline	■	■	■	■	▲	■	■	■	■	■	■	■	■
6	Benzene	▲	●	●	●	■	●	●	■	■	■	■	■	●
7	Gasoline	●	●	●	●	▲	●	●	●	●	▲	▲	▲	●
8	Chloride (wet)	■	▲	▲	▲	■	■	■	■	■	■	■	■	▲
9	Chloride (dry)	■	▲	▲	▲	▲	▲	▲	■	■	■	■	▲	▲
10	Chloroform	▲	▲	▲	▲	■	▲	▲	■	■	■	■	▲	▲
11	Cyclohexanone	▲	▲	▲	▲	■	▲	▲	■	■	■	■	▲	▲
12	Ethane	■	●	●	●	●	●	●	●	●	▲	▲	●	●
13	Phenol	■	▲	■	▲	■	▲	▲	■	■	■	■	▲	▲
14	Freon 11 and 12	■	●	●	●	▲	●	●	■	▲	■	■	●	●
15	Freon 22	■	▲	▲	▲	■	▲	▲	■	■	■	■	▲	▲
16	Ethylene glycol	●	●	●	●	●	●	●	●	●	●	●	●	●
17	Nitric acid 20%	■	▲	■	▲	▲	▲	▲	■	■	■	■	●	▲
18	Nitric acid 40%	■	▲	■	▲	▲	▲	▲	■	■	■	■	▲	▲
19	Phosphoric acid	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	●	▲
20	Formic acid	■	●	●	●	●	●	●	■	▲	■	■	●	●
21	Acetic acid	■	●	●	●	●	●	●	▲	▲	▲	▲	●	●
22	Sulfuric acid 20%	■	●	●	●	●	●	●	■	■	■	■	●	●
23	Fuming sulfuric acid	■	▲	■	▲	▲	▲	▲	■	■	■	■	▲	▲
24	Sulfuric acid 65%	■	▲	▲	■	■	■	■	■	■	■	■	●	▲
25	Hydrochloric acid 20%	■	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	●	▲
26	Hydrochloric acid 36%	■	▲	▲	■	■	■	■	■	■	■	■	●	■
27	Soap	●	●	●	●	●	●	●	●	●	●	●	●	●
28	Potassium permanganate	▲	●	▲	●	▲	●	●	▲	▲	▲	▲	●	●
29	Kerosene	▲	●	●	●	●	●	●	●	▲	▲	▲	▲	●
30	Ethyl acetate	■	▲	▲	▲	▲	▲	▲	■	■	■	■	▲	▲
31	Hydraulic oil (mineral)	▲	●	●	●	▲	●	●	●	▲	▲	▲	●	●
32	Hydraulic oil (phosphate ester type)	▲	▲	▲	▲	■	▲	▲	■	■	■	■	▲	▲
33	Silicone oil	●	●	●	●	●	●	●	●	●	●	●	●	●
34	Air	●	●	●	●	●	●	●	●	●	●	●	●	●
35	Trichloroethylene	▲	▲	▲	▲	■	▲	▲	■	■	■	■	▲	▲
36	Water	●	●	●	●	●	●	●	●	●	●	●	●	●
37	Sea water	■	●	●	●	●	●	●	●	●	●	●	●	●
38	Ammonium hydroxide	▲	●	●	●	●	●	●	▲	▲	▲	▲	●	●
39	Potassium hydroxide	▲	▲	▲	▲	▲	▲	▲	■	▲	■	■	▲	▲
40	Sodium hydroxide	▲	▲	▲	▲	▲	▲	▲	■	▲	■	■	▲	▲
41	Calcium hydroxide	▲	●	●	●	●	●	●	▲	●	▲	▲	●	●

● Suitable for use. ▲ Can be used only after successful trials under working conditions. ■ Not suitable for use.

All information in this catalogue is based on years of experience in manufacture and use of the discussed products. Since sealing performance in the joint is subject to multiple factors such as mounting method, system parameters, and sealed medium, technical parameters specified herein are of informative nature only and cannot be used as grounds for any claims; any special uses of products are subject to consulting with the manufacturer.

GASKET SHEETS

Notes on selection and mounting of gaskets made of gambit gasket sheets

When selecting the material for sealing of individual nodes, consider the following factors. The most important are working temperature and pressure, type of sealed medium, and joint design. There are also other factors affecting the performance of sealing, such as cyclical nature of operations, mechanical vibrations, precision of mounting, and technical condition of flanges.

Data and T-P diagrams referred to in this catalogue allow to select the material that best suits the requirements with regard to working conditions of a given joint. Consider also that the working parameters should be within the suitable area of the diagram. This does not mean that the sealing cannot, in some cases, be effective when working parameters fall outside of the diagram. However, such situations require consulting our technical support team, or running trials.

In order for the sealing to work long and stable, it is necessary that certain requirements are met concerning flanges, bolts and mounting. The key is to ensure parallel and flat arrangement of mating flanges. Only then the whole sealing surface is under mounting load exceeding that required by calculation procedures and, simultaneously, the stress does not exceed the value damaging the gasket under working conditions. In practice, however, there is a number of cases where torque spanners cannot be used during mounting. In such cases we recommend to exert such pressure between flanges that the gasket is compressed by 8-10% of its original thickness. Such pressure is sufficient, in most cases, to tighten the joint without causing damage to the gasket. To the same end we recommend using identical bolts for the whole joint. They should be in good technical condition and coated with a high-quality lubricant.

Gasket sheet material is a composite made of organic and inorganic components. It can work efficiently at temperatures preventing the use of some of its individual components. You should however be always aware of specificity of the material, its strengths and weaknesses.

All gaskets made of aramide and rubber sheets harden at temperatures above 200 °C. Good sheets, such as GAMBIT sheets, even then remain elastic enough to compensate for thermal movements of flanges within the temperature range as specified in this catalogue. This is the basic requirement for keeping the sealing tight, especially in the case of nodes subject to thermal cycles.

Another threat to aramide and rubber sheets at temperatures above 380 °C is oxidation. This process causes elastomer binding the sheet to burn out. In order to prevent it, the elastomer component is to be isolated from chemical effects of both sealed medium and ambient oxygen. This goal can be achieved in two ways. The first is a suitable flange design, e.g. tongue/groove. The second is jacketing (securing gasket edge with metal). Jacketing is to be so executed that it protects the composite material from ingress of the medium, but permits response to thermal movements and vibrations of a flange joint. Jacketing acts as a mechanical reinforcement of the gasket, protects against diffusion of sealed medium via the gasket material, and, most of all, protects the composite materials of the gasket against adverse chemical effects of the sealed medium and the environment.

Correctly assembled flange joint, with properly selected and mounted gasket, allows to maintain tightness for a long time. However, it is prohibited to reuse gaskets once removed.

Notes

All information in this catalogue is based on years of experience in manufacture and use of the discussed products.
Since sealing performance in the joint is subject to multiple factors such as mounting method, system parameters, and sealed medium,
technical parameters specified herein are of informative nature only and cannot be used as grounds for any claims;
any special uses of products are subject to consulting with the manufacturer.

GASKET SHEETS

TECHNICAL SPECIFICATION

Gasket sheet Gambit AF-153

Material

Gasket sheet **GAMBIT AF-153** is based on natural fibres, mineral fibres, and fillers bound with NBR, NR and SBR rubber-based binder.

Designation according to DIN 28091-2: **FA-MN13-O**

General properties and applications

Low-parameter sheet, recommended mostly for water supply and sewage mains.

Admissions / Certificates

WRAS*
PZH

Maximum working conditions

Peak temperature	**°C**	180
Temperature under continuous operation	**°C**	155
Temperature under continuous operation with steam	**°C**	130
Pressure	**MPa**	4

Dimensions

Standard thicknesses of sheets /thicknesses above 4.0 mm are produced by gluing/	**mm**	0,5; 0,8 1,0; 1,5; 2,0; 2,5 3,0; 4,0; 5,0; 6,0	± 0,1 ± 10% ± 10%
Standard dimensions of sheets /custom dimensions available within the total range of 1500x3000 mm/	**mm**	1500x1500	±10,0

Non-standard thicknesses, graphiting of sheet surfaces, and reinforcement with metallic mesh available upon request.

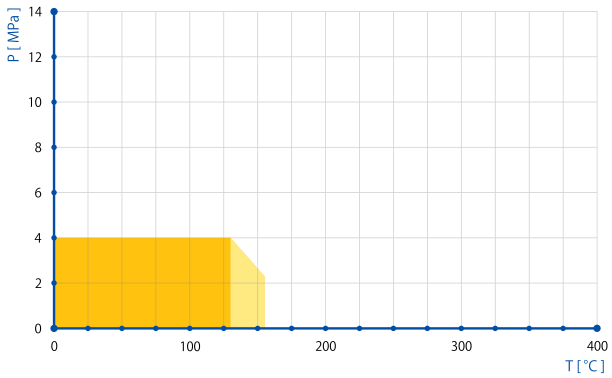
* Certified version available upon request.

GASKET SHEETS

Physical and chemical properties

Density	± 5%	**g/cm³**	1,9	DIN 28090-2
Transverse tensile strength	min.	**MPa**	5	DIN 52910
Compressibility	typical value	**%**	10	ASTM F36
Elastic recovery	min.	**%**	50	ASTM F36
Residual stresses 50 MPa/16 h/175 °C/	min.	**MPa**	20	DIN 52913
Colour		**light green**		

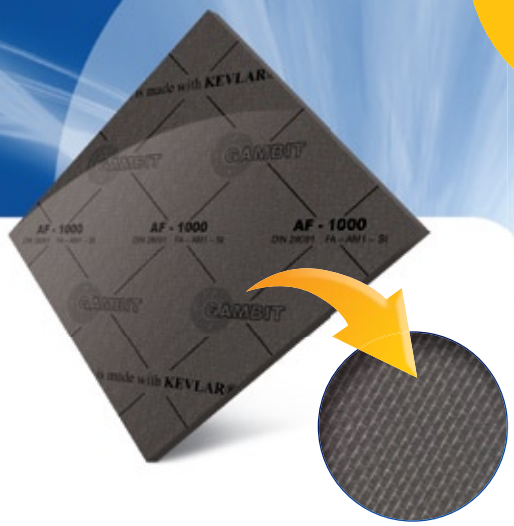
(Values as detailed in table refer to 2.0 mm thick gasket sheets)



It is not recommended that maximum temperature and pressure are applied simultaneously. Pressure to temperature correlation for sheet thickness 2.0 mm is shown in the diagram.

- There is no requirement for trials.
- Trials should be run if the application involves steam.

GASKET SHEETS



TECHNICAL SPECIFICATION

Gasket sheet Gambit AF-1000

Material

Gasket sheet **GAMBIT AF-1000** is based on Kevlar® aramide fibres, mineral fibres, and fillers bound with NBR rubber-based binder; reinforced with galvanized steel mesh.

Designation according to DIN 28091-2: **FA-AM1-ST**

Kevlar® is a registered trademark of E. I. du Pont de Nemours and Company or its affiliates.

General properties and applications

Used in high temperature flange joints, in systems with high fluctuations in pressure and medium flow rate. Features high mechanical resistance. Can be used in automotive industry. It is not recommended with acids and bases. When working with steam mind using suitable mounting clamps. Water, steam, kerosene, gasoline, fuel, and oil resistant.

Admissions / Certificates

Germanischer Lloyd

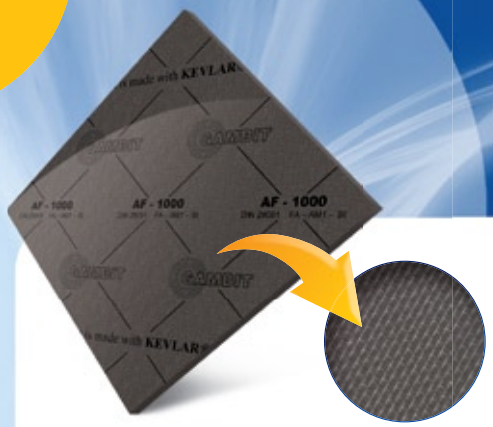
Maximum working conditions

Peak temperature	**°C**	420
Temperature under continuous operation	**°C**	350
Temperature under continuous operation with steam	**°C**	250
Pressure	**MPa**	12

Dimensions

Standard thicknesses of sheets /thicknesses above 5.0 mm are produced by gluing/	**mm**	0,8 1,0; 1,5; 2,0; 2,5 3,0; 4,0, 5,0; 6,0	± 0,1 ± 10% ± 10%
Standard dimensions of sheets /custom dimensions available within the total range of 1500x3000 mm/	**mm**	1500x1500	± 10,0

Non-standard thicknesses and graphiting of sheet surfaces available upon request.

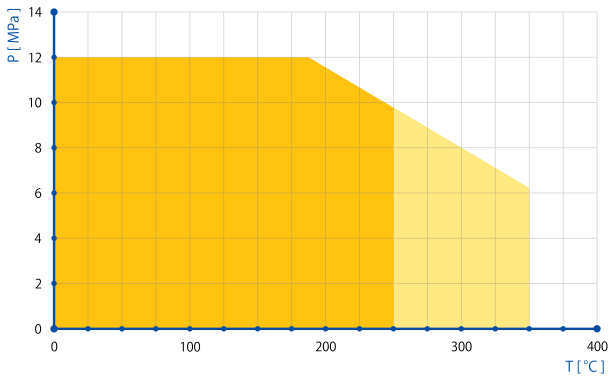


GASKET SHEETS

Physical and chemical properties

Density		**g/cm³**	2,2 - 2,45	DIN 28090-2
Compressibility	typical value	**%**	9	ASTM F36
Elastic recovery	min.	**%**	50	ASTM F36
Residual stresses 50 MPa/16 h/300 °C/	min.	**MPa**	32	DIN 52913
Residual stresses 50 MPa/16 h/175 °C/	min.	**MPa**	35	DIN 52913
INCREASE IN THICKNESS				
Oil IRM 903 150 °C/5h	max.	**%**	8	ASTM F146
Model fuel B 20 °C/5 h	max.	**%**	7	ASTM F146
Kerosene 20 °C/24 h	max.	**%**	6	ASTM F146
Colour		**graphite**		

(Values as detailed in table refer to 2.0 mm thick gasket sheets)



It is not recommended that maximum temperature and pressure are applied simultaneously. Pressure to temperature correlation for sheet thickness 2.0 mm is shown in the diagram.

- There is no requirement for trials.
- Trials should be run if the application involves steam.

GASKET SHEETS

TECHNICAL SPECIFICATION

Gasket sheet Gambit AF-200 UNIVERSAL

Material

Gasket sheet **GAMBIT AF-200** Universal is based on Kevlar® aramide fibres, mineral fibres, and fillers bound with NBR rubber-based binder.

Designation according to DIN 28091-2: **FA-AM1-O**

Kevlar® is a registered trademark of E. I. du Pont de Nemours and Company or its affiliates.

General properties and applications

Versatile, oil resistant sheet designed for applications with the majority of media under medium temperatures and pressures. Environmentally friendly sheet type, free from N-nitrosamines.

Admissions / Certificates

DVGW
Germanischer Lloyd
INIG
KTW

Maximum working conditions

Tetmperatura chwilowa	**°C**	300
Temperature under continuous operation	**°C**	220
Temperature under continuous operation with steam	**°C**	180
Pressure	**MPa**	6

Dimensions

Standard thicknesses of sheets /thicknesses above 5.0 mm are produced by gluing/	**mm**	0,3; 0,5; 0,8 1,0; 1,5; 2,0; 2,5 3,0; 4,0; 5,0; 6,0	± 0,1 ± 10% ± 10%
Standard dimensions of sheets /custom dimensions available within the total range of 1500x3000 mm/	**mm**	1500x1500	± 10,0

Non-standard thicknesses, graphiting of sheet surfaces, and reinforcement with metallic mesh available upon request.

GASKET SHEETS

Physical and chemical properties

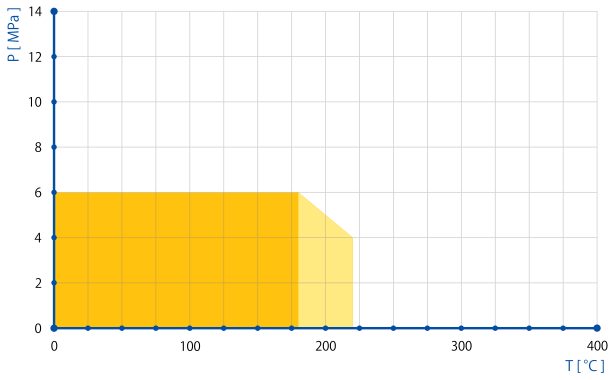
Density	± 5%	**g/cm³**	2,0	DIN 28090-2
Transverse tensile strength	min.	**MPa**	7	DIN 52910
Compressibility	typical value	**%**	10	ASTM F36
Elastic recovery	min.	**%**	55	ASTM F36
Residual stresses 50 MPa/16 h/300 °C/	min.	**MPa**	22	DIN 52913
Residual stresses 50 MPa/16 h/175 °C/	min.	**MPa**	28	DIN 52913
INCREASE IN THICKNESS				
Oil IRM 903 150 °C/5 h	max.	**%**	5	ASTM F146
Model fuel B 20 °C/5 h	max.	**%**	5	ASTM F146
Colour		**red**		

(Values as detailed in table refer to 2.0 mm thick gasket sheets)

Calculation coefficients

Coefficients DT – UC – 90/WO-0/19								
σ_m			σ_r			b		
1 mm	2 mm	3 mm	1 mm	2 mm	3 mm	20 °C	200 °C	300 °C
40 MPa	21 MPa	12 MPa	6,4 p_0	5 p_0	4,1 p_0	1,1	1,8	3,0

Coefficients ASME			
Tightness class	Thickness	m	y
L0,1	2 mm	4,0	3,5 MPa
L1,0	2 mm	1,7	1,1 MPa



It is not recommended that maximum temperature and pressure are applied simultaneously. Pressure to temperature correlation for sheet thickness 2.0 mm is shown in the diagram.

- There is no requirement for trials.
- Trials should be run if the application involves steam.

Test Results of Gambit AF–200 UNIVERSAL Published on Gasketdata.org

The below tests were run according to EN 13555, the most up-to-date norm in this domain. The results confirm the quality of our products and assist the design of flanges according to norm EN 1591-1+A1:2009/AC:2011.

The results have been approved by Center of Sealing Technologies (CST) at Münster University of Applied Sciences (MUAS) and published on www.gasketdata.org together with the datasheets of the world's leading manufacturers of sealing materials.

CST is an independent laboratory focused on the research and development in the field of sealing materials in order to assist both the producers and the users.

Gasket characteristics acc. EN 13555 (05/2005) required for design calculations acc. EN 1591-1+A1:2009/AC:2011
Sealing element dimensions [mm] 92 x 49 x 2

Relaxation ratio P_{QR} for stiffness C = 500 kN/mm			
Gasket stress, MPa	Ambient temperature	Temperature 1 (175 °C)	Temperature 2 (300 °C)
Stress level 1 (30 MPa)	0,96	0,84	0,54
Stress level 2 (50 MPa)	0,97	0,78	0,57
P_{QR} at Q_{Smax} (220/60/60 MPa)	0,98	0,76	0,53

Maximal applicable gasket stress Q_{Smax}, MPa		
Q_{Smax}, MPa – ambient temperature	Q_{Smax}, MPa – temperature 1 (175 °C)	Q_{Smax}, MPa – temperature 2 (300 °C)
220	60	60

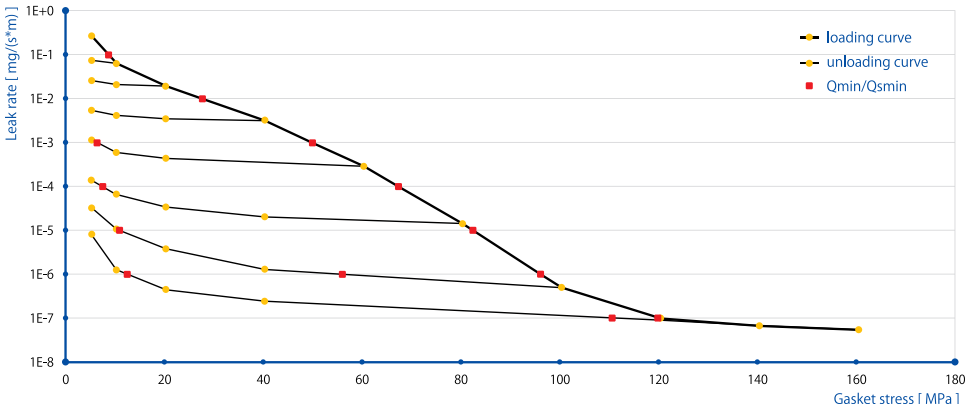
Sekant unloading modulus of the gasket E_G, MPa and gasket thickness e_G, mm						
Gasket stress, MPa	Ambient temperature		Temperature 1 (175 °C)		Temperature 2 (300 °C)	
	E_G, MPa	e_G, mm	E_G, MPa	e_G, mm	E_G, MPa	e_G, mm
0	-	-	-	-	-	-
1	-	2,134	-	2,027	-	2,036
20	1534	2,008	2314	1,880	5157	1,866
30	2547	1,982	2622	1,862	3929	1,848
40	3542	1,961	2839	1,836	3882	1,829
50	4325	1,942	3032	1,802	3981	1,806
60	4909	1,924	3252	1,761	4472	1,778
80	5837	1,891	-	-	-	-
100	6465	1,860	-	-	-	-
120	6887	1,832	-	-	-	-
140	7219	1,807	-	-	-	-
160	7401	1,783	-	-	-	-
180	7715	1,761	-	-	-	-
200	7989	1,741	-	-	-	-
220	8217	1,722	-	-	-	-

GASKET SHEETS

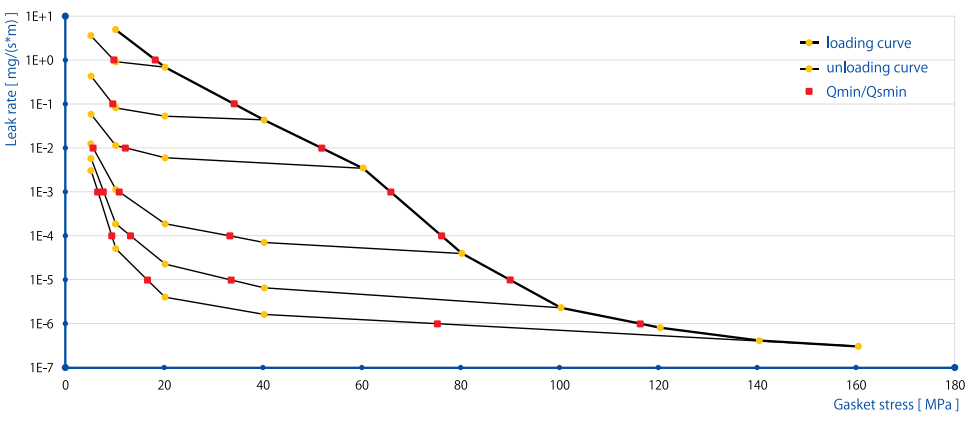
Minimum stress to seal $Q_{min(L)}$ (at assembly), $Q_{Smin(L)}$ (after off-loading) for inner pressure 10 bar										
Tightness class	$Q_{min(L)}$	$Q_{Smin(L)}$, MPa								
mg/(s x m)	MPa	Q_A 10MPa	Q_A 20 MPa	Q_A 40 MPa	Q_A 60 MPa	Q_A 80 MPa	Q_A 100 MPa	Q_A 120 MPa	Q_A 140 MPa	Q_A 160 MPa
10^0	5	5	5	5	5	5	5	-	-	5
10^{-1}	9	5	5	5	5	5	5	-	-	5
10^{-2}	28	-	-	5	5	5	5	-	-	5
10^{-3}	50	-	-	-	6	5	5	-	-	5
10^{-4}	67	-	-	-	-	7	5	-	-	5
10^{-5}	82	-	-	-	-	-	11	-	-	5
10^{-6}	96	-	-	-	-	-	56	-	-	12
10^{-7}	120	-	-	-	-	-	-	-	-	111

Minimum stress to seal $Q_{min(L)}$ (at assembly), $Q_{Smin(L)}$ (after off-loading) for inner pressure 40 bar										
Tightness class	$Q_{min(L)}$	$Q_{Smin(L)}$, MPa								
mg/(s x m)	MPa	Q_A 10MPa	Q_A 20 MPa	Q_A 40 MPa	Q_A 60 MPa	Q_A 80 MPa	Q_A 100 MPa	Q_A 120 MPa	Q_A 140 MPa	Q_A 160 MPa
10^0	18	-	10	5	5	5	5	-	-	5
10^{-1}	34	-	-	10	5	5	5	-	-	5
10^{-2}	52	-	-	-	12	6	5	-	-	5
10^{-3}	66	-	-	-	-	11	8	-	-	7
10^{-4}	76	-	-	-	-	33	13	-	-	9
10^{-5}	90	-	-	-	-	-	34	-	-	17
10^{-6}	116	-	-	-	-	-	-	-	-	75

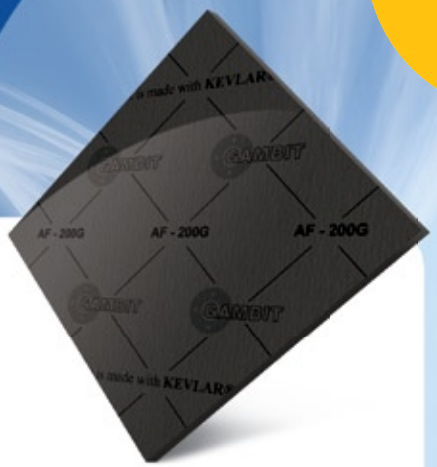
Leakage - ambient temperature / inner pressure = 10 bar



Leakage - ambient temperature / inner pressure = 40 bar



GASKET SHEETS



TECHNICAL SPECIFICATION

Gasket sheet Gambit AF-200G

Material

Gasket sheet **GAMBIT AF-200G** is based on Kevlar® aramide fibres, mineral fibres, and fillers bound with NBR rubber-based binder

Designation according to DIN 28091-2: **FA-AM1-O**

Kevlar® is a registered trademark of E. I. du Pont de Nemours and Company or its affiliates.

General properties and applications

High parameter sheet, containing special combination of aramide fibres and graphite. The sheet features high elasticity. Recommended for applications with steam. Water, fuel, and oil resistant, among others.

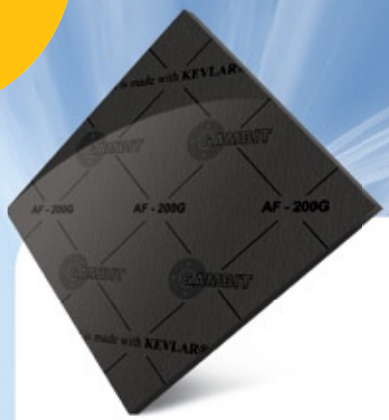
Maximum working conditions

Peak temperature	**°C**	380
Temperature under continuous operation	**°C**	320
Temperature under continuous operation with steam	**°C**	250
Pressure	**MPa**	8

Dimensions

Standard thicknesses of sheets /thicknesses above 5.0 mm are produced by gluing/	**mm**	0,3; 0,5; 0,8 1,0; 1,5; 2,0; 2,5 3,0; 4,0; 5,0; 6,0	± 0,1 ± 10% ± 10%
Standard dimensions of sheets /custom dimensions available within the total range of 1500x3000 mm/	**mm**	1500x1500	± 10,0

Non-standard thicknesses, graphiting of sheet surfaces, and reinforcement with metallic mesh available upon request.
Metallic mesh reinforcement increases the maximum working pressure by 2 MPa (other physical and chemical properties are also changed).

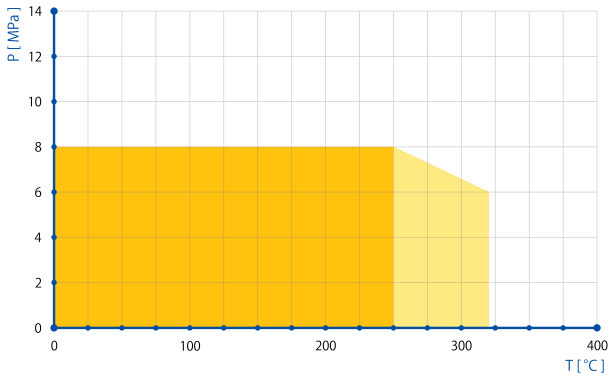


GASKET SHEETS

Physical and chemical properties

Density	± 5%	**g/cm³**	1,9	DIN 28090-2
Transverse tensile strength	min.	**MPa**	9	DIN 52910
Compressibility	typical value	**%**	10	ASTM F36
Elastic recovery	min.	**%**	50	ASTM F36
Residual stresses 50 MPa/16 h/300 °C/	min.	**MPa**	25	DIN 52913
Residual stresses 50 MPa/16 h/175 °C/	min.	**MPa**	30	DIN 52913
INCREASE IN THICKNESS				
Oil IRM 903 150 °C/5 h	max.	**%**	5	ASTM F146
Model fuel B 20 °C/5 h	max.	**%**	6	ASTM F146
Colour		**graphite**		

(Values as detailed in table refer to 2.0 mm thick gasket sheets)



It is not recommended that maximum temperature and pressure are applied simultaneously. Pressure to temperature correlation for sheet thickness 2.0 mm is shown in the diagram.

- There is no requirement for trials.
- Trials should be run if the application involves steam.

TECHNICAL SPECIFICATION

Gasket sheet Gambit AF-202

Material

Gasket sheet **GAMBIT AF-202** is based on Kevlar® aramide fibres, mineral fibres, and fillers bound with NBR rubber-based binder.

Designation according to **DIN 28091-2: FA-AM1-O**

Kevlar® is a registered trademark of E. I. du Pont de Nemours and Company or its affiliates.

General properties and applications

Popular sheet designated for sealing in low temperature and low pressure applications. Particularly recommended for fuel oil installations.

Maximum working conditions

Peak temperature	**°C**	200
Temperature under continuous operation	**°C**	180
Temperature under continuous operation with steam	**°C**	150
Pressure	**MPa**	4

Dimensions

Standard thicknesses of sheets /thicknesses above 4.0 mm are produced by gluing/	**mm**	0,5; 0,8 1,0; 1,5; 2,0; 2,5 3,0; 4,0; 5,0; 6,0	± 0,1 ± 10% ± 10%
Standard dimensions of sheets /custom dimensions available within the total range of 1500x3000 mm/	**mm**	1500x1500	± 10,0

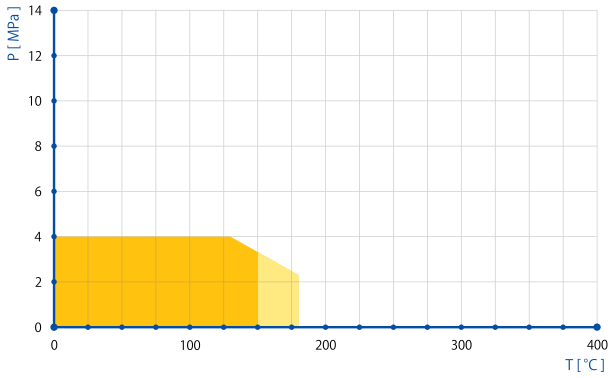
Non-standard thicknesses, graphiting of sheet surfaces, and reinforcement with metallic mesh available upon request.

GASKET SHEETS

Physical and chemical properties

Density	± 5%	**g/cm³**	2,0	DIN 28090-2
Transverse tensile strength	min.	**MPa**	6	DIN 52910
Compressibility	typical value	**%**	11	ASTM F36
Elastic recovery	min.	**%**	50	ASTM F36
Residual stresses 50 MPa/16 h/300 °C/	min.	**MPa**	20	DIN 52913
Residual stresses 50 MPa/16 h/175 °C/	min.	**MPa**	25	DIN 52913
INCREASE IN THICKNESS				
Oil IRM 903 150 °C/5 h	max.	**%**	12	ASTM F146
Colour		**khaki**		

(Values as detailed in table refer to 2.0 mm thick gasket sheets)



It is not recommended that maximum temperature and pressure are applied simultaneously. Pressure to temperature correlation for sheet thickness 2.0 mm is shown in the diagram.

- There is no requirement for trials.
- Trials should be run if the application involves steam.

GASKET SHEETS

TECHNICAL SPECIFICATION

Gasket sheet Gambit AF-300

Material

Gasket sheet **GAMBIT AF-300** is based on Kevlar® aramide fibres, mineral fibres, and fillers bound with NBR, NR and SBR rubber-based binder.

Designation according to DIN 28091-2: **FA-AM13-O**

Kevlar® is a registered trademark of E. I. du Pont de Nemours and Company or its affiliates.

General properties and applications

Elastic sheet easily following all the curves and irregularities of a flange. Particularly recommended for water and steam installations, in heating and power generation sector, as well as in municipal companies. The sheet is resistant to brake and cooling liquids, thus it is recommended for automotive applications.

Admissions / Certificates

INIG

Maximum working conditions

Peak temperature	**°C**	320
Temperature under continuous operation	**°C**	280
Temperature under continuous operation with steam	**°C**	220
Pressure	**MPa**	10

Dimensions

Standard thicknesses of sheets /thicknesses above 5.0 mm are produced by gluing/	**mm**	0,3; 0,5; 0,8 1,0; 1,5; 2,0; 2,5 3,0; 4,0; 5,0; 6,0	± 0,1 ± 10% ± 10%
Standard dimensions of sheets /custom dimensions available within the total range of 1500x3000 mm/	**mm**	1500x1500	± 10,0

Non-standard thicknesses, graphiting of sheet surfaces, and reinforcement with metallic mesh available upon request.

GASKET SHEETS

Physical and chemical properties

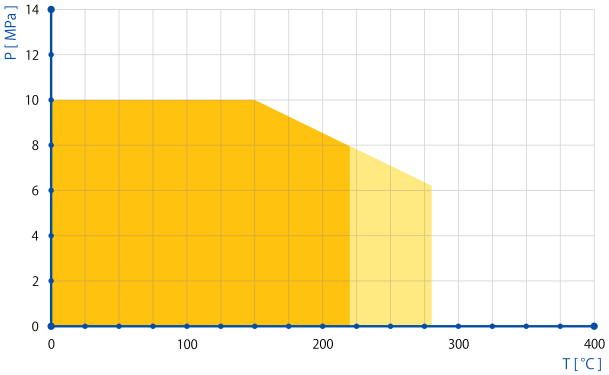
Density	± 5%	**g/cm³**	2,0	DIN 28090-2
Transverse tensile strength	min.	**MPa**	8	DIN 52910
Compressibility	typical value	**%**	11	ASTM F36
Elastic recovery	min.	**%**	50	ASTM F36
Residual stresses 50 MPa/16 h/300 °C/	min.	**MPa**	22	DIN 52913
Residual stresses 50 MPa/16 h/175 °C/	min.	**MPa**	28	DIN 52913
Colour		**yellow**		

(Values as detailed in table refer to 2.0 mm thick gasket sheets)

Calculation coefficients

Coefficients DT – UC – 90/WO-0/19								
σ_m			σ_r			**b**		
1 mm	2 mm	3 mm	1 mm	2 mm	3 mm	20 °C	200 °C	300 °C
40 MPa	21 MPa	12 MPa	6,4 p_0	5 p_0	4,1 p_0	1,1	1,8	3,0

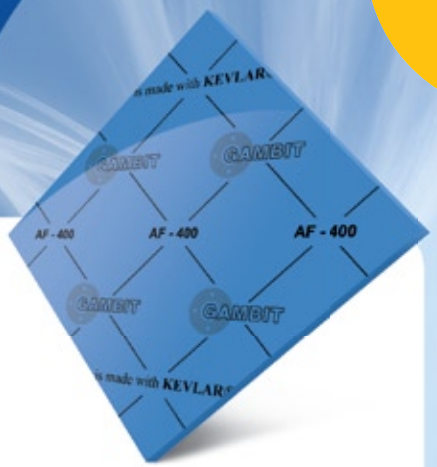
Coefficients ASME			
Tightness class	**Thickness**	**m**	**y**
L0,1	2 mm	3,2	4 MPa
L1,0	2 mm	1,6	2 MPa



It is not recommended that maximum temperature and pressure are applied simultaneously. Pressure to temperature correlation for sheet thickness 2.0 mm is shown in the diagram.

- There is no requirement for trials.
- Trials should be run if the application involves steam.

GASKET SHEETS



TECHNICAL SPECIFICATION

Gasket sheet Gambit AF-400

Material

Gasket sheet **GAMBIT AF-400** is based on Kevlar® aramide fibres, mineral fibres, and fillers bound with NBR rubber-based binder.

Designation according to DIN 28091-2: **FA-AM1-O**

Kevlar® is a registered trademark of E. I. du Pont de Nemours and Company or its affiliates.

General properties and applications

High parameter sheet, made of top quality materials. Highly reliable, with broad range of applications. Designated for use in supervised joints, and installations for transmission of natural gas. Resistant to water, steam, kerosene, fuel, oil, and solutions of salts, among others.

Admissions / Certificates

INIG

Maximum working conditions

Peak temperature	**°C**	400
Temperature under continuous operation	**°C**	350
Temperature under continuous operation with steam	**°C**	260
Pressure	**MPa**	12

Dimensions

Standard thicknesses of sheets /thicknesses above 5.0 mm are produced by gluing/	**mm**	0,3; 0,5; 0,8 1,0; 1,5; 2,0; 2,5 3,0; 4,0; 5,0; 6,0	± 0,1 ± 10% ± 10%
Standard dimensions of sheets /custom dimensions available within the total range of 1500x3000 mm/	**mm**	1500x1500	± 10,0

Non-standard thicknesses, graphiting of sheet surfaces, and reinforcement with metallic mesh available upon request.

GASKET SHEETS

Physical and chemical properties

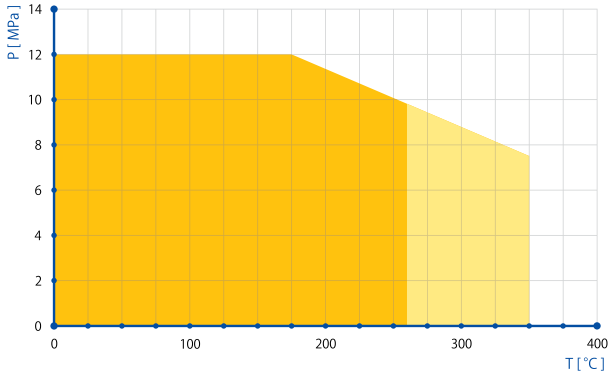
Density	± 5%	**g/cm³**	2,0	DIN 28090-2
Transverse tensile strength	min.	**MPa**	12	DIN 52910
Compressibility	typical value	**%**	10	ASTM F36
Elastic recovery	min.	**%**	55	ASTM F36
Residual stresses 50 MPa/16 h/300 °C/	min.	**MPa**	30	DIN 52913
Residual stresses 50 MPa/16 h/175 °C/	min.	**MPa**	35	DIN 52913
INCREASE IN THICKNESS				
Oil IRM 903 150 °C/5 h	max.	**%**	6	ASTM F146
Model fuel B 20 °C/5 h	max.	**%**	6	ASTM F146
Kerosene 20 °C/24 h	max.	**%**	5	ASTM F146
Colour		**blue**		

(Values as detailed in table refer to 2.0 mm thick gasket sheets)

Calculation coefficients

Coefficients DT – UC – 90/WO-0/19								
σ_m			**σ_r**			**b**		
1 mm	2 mm	3 mm	1 mm	2 mm	3 mm	20 °C	200 °C	300 °C
40 MPa	21 MPa	12 MPa	6,4 p_0	5 p_0	4,1 p_0	1,1	1,8	3,0

Coefficients ASME			
Tightness class	**Thickness**	**m**	**y**
L0,1	2 mm	5,5	2,5 MPa
L1,0	2 mm	2,4	1,0 MPa



It is not recommended that maximum temperature and pressure are applied simultaneously. Pressure to temperature correlation for sheet thickness 2.0 mm is shown in the diagram.

- There is no requirement for trials.
- Trials should be run if the application involves steam.

All information in this catalogue is based on years of experience in manufacture and use of the discussed products. Since sealing performance in the joint is subject to multiple factors such as mounting method, system parameters, and sealed medium, technical parameters specified herein are of informative nature only and cannot be used as grounds for any claims; any special uses of products are subject to consulting with the manufacturer.

GASKET SHEETS

TECHNICAL SPECIFICATION

Gasket sheet Gambit AF-CD

Material

Gasket sheet **GAMBIT AF-CD** is based on natural fibres, mineral fibres, and fillers bound with NBR rubber-based binder.

Designation according to DIN 28091-2: **FA-N1-O**

General properties and applications

Based on natural fibres the sheet is recommended mostly for heating installations and water supply mains, with both hot and cold water. It is also dedicated to sewage mains and industrial water cycles.

Admissions / Certificates

PZH

Maximum working conditions

Peak temperature	**°C**	200
Temperature under continuous operation	**°C**	160
Temperature under continuous operation with steam	**°C**	140
Pressure	**MPa**	8

Dimensions

Standard thicknesses of sheets /thicknesses above 4.0 mm are produced by gluing/	**mm**	0,5; 0,8 1,0; 1,5; 2,0; 2,5 3,0; 4,0; 5,0; 6,0	± 0,1 ± 10% ± 10%
Standard dimensions of sheets /custom dimensions available within the total range of 1500x3000 mm/	**mm**	1500x1500	± 10,0

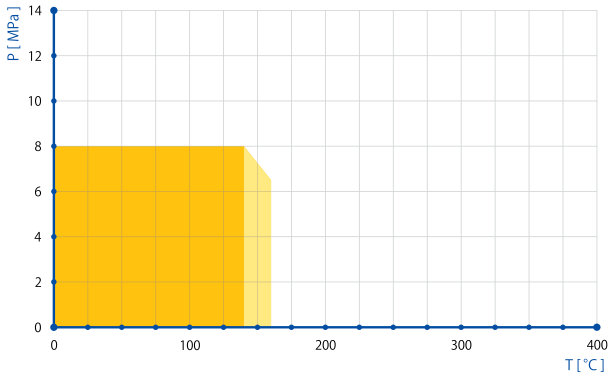
Non-standard thicknesses, graphiting of sheet surfaces, and reinforcement with metallic mesh available upon request.

GASKET SHEETS

Physical and chemical properties

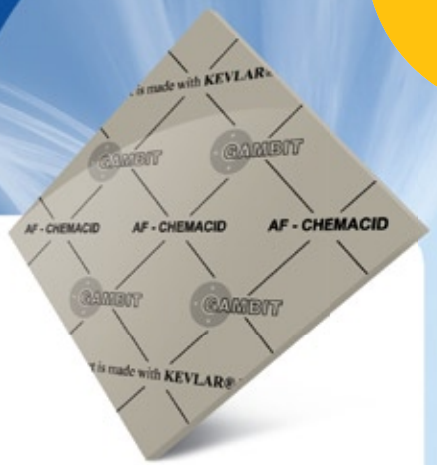
Density	±5 %	**g/cm³**	1,8	DIN 28090-2
Transverse tensile strength	min.	**MPa**	7	DIN 52910
Compressibility	typical value	**%**	11	ASTM F36
Elastic recovery	min.	**%**	55	ASTM F36
Residual stresses 50 MPa/16 h/175 °C/	min.	**MPa**	20	DIN 52913
INCREASE IN THICKNESS				
Oil IRM 903 150 °C/5 h	max.	**%**	5	ASTM F146
Colour		beige		

(Values as detailed in table refer to 2.0 mm thick gasket sheets)



It is not recommended that maximum temperature and pressure are applied simultaneously. Pressure to temperature correlation for sheet thickness 2.0 mm is shown in the diagram.

- There is no requirement for trials.
- Trials should be run if the application involves steam.



TECHNICAL SPECIFICATION

Gasket sheet Gambit AF-CHEMACID

Material

Gasket sheet GAMBIT **AF-CHEMACID** is based on Kevlar® aramide fibres, mineral fibres, and fillers bound with CSM rubber-based binder.

Designation according to DIN 28091-2: **FA-AMZ-O**

General properties and applications

Acid and base resistant. Recommended mostly for applications in chemical sector.

Maximum working conditions

Peak temperature	**°C**	200
Temperature under continuous operation	**°C**	150
Pressure	**MPa**	4

Dimensions

Standard thicknesses of sheets /thicknesses above 4.0 mm are produced by gluing/	**mm**	0,5; 0,8 1,0; 1,5; 2,0; 2,5 3,0; 4,0; 5,0; 6,0	± 0,1 ± 10% ± 10%
Standard dimensions of sheets /custom dimensions available within the total range of 1500x3000 mm/	**mm**	1500x1500	± 10,0

Non-standard thicknesses and graphiting of sheet surfaces available upon request.

GASKET SHEETS

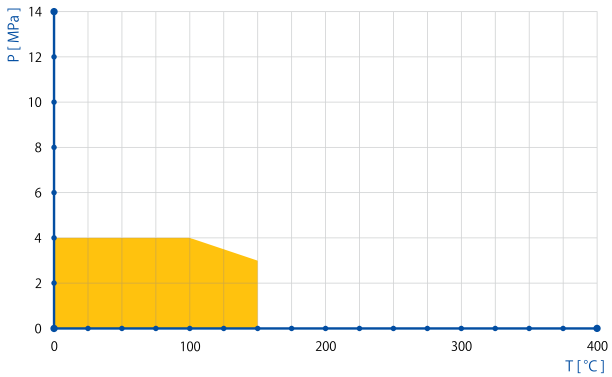
Physical and chemical properties

Density	± 5%	**g/cm³**	2,0	DIN 28090-2
Transverse tensile strength	min.	**MPa**	9	DIN 52910
Compressibility	typical value	**%**	9	ASTM F36
Elastic recovery	min.	**%**	50	ASTM F36
Residual stresses 50 MPa/16 h/175 °C/	min.	**MPa**	25	DIN 52913
INCREASE IN THICKNESS				
40% HNO_3 23 °C/18 h	max.	**%**	8	ASTM F146
65% H_2SO_4 23 °C/48 h	max.	**%**	10	ASTM F146
Colour		**light beige**		

(Values as detailed in table refer to 2.0 mm thick gasket sheets)

Calculation coefficients

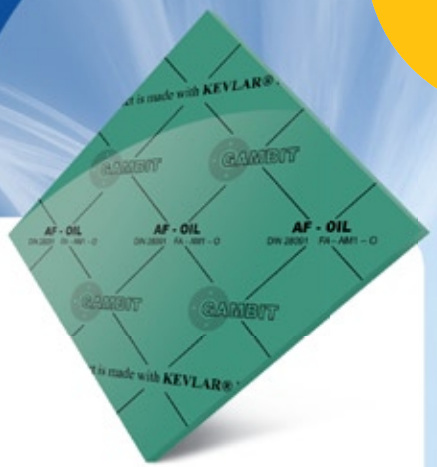
Coefficients ASME			
Tightness class	**Thickness**	**m**	**y**
L0,1	2 mm	7,5	4,2 MPa
L1,0	2 mm	3,5	2,1 MPa



It is not recommended that maximum temperature and pressure are applied simultaneously. Pressure to temperature correlation for sheet thickness 2.0 mm is shown in the diagram.

● There is no requirement for trials.

GASKET SHEETS



TECHNICAL SPECIFICATION

Gasket sheet Gambit AF-OIL

Material

Gasket sheet **GAMBIT AF-OIL** is based on Kevlar® aramide fibres, mineral fibres, and fillers bound with NBR rubber-based binder.

Designation according to DIN 28091-2: **FA-AM1-O**

General properties and applications

Oil-resistant gasket sheet, recommended for high temperatures and pressures. Designated for application in supervised joints. Suitable for natural gas and drinking water installations. Also recommended for applications with water, steam, kerosene, fuels, oils, brine, natural gas, propane-butane.

Admissions / Certificates

DVGW
Germanischer Lloyd
PZH

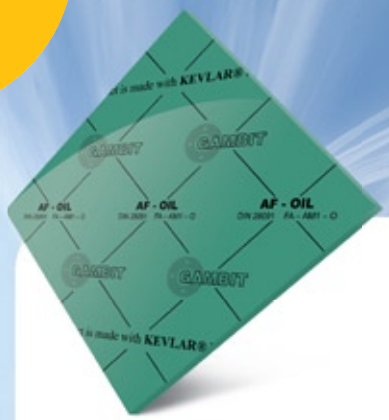
Maximum working conditions

Peak temperature	**°C**	350
Temperature under continuous operation	**°C**	300
Temperature under continuous operation with steam	**°C**	230
Temperatura minimalna	**°C**	-60
Pressure	**MPa**	10

Dimensions

Standard thicknesses of sheets /thicknesses above 5.0 mm are produced by gluing/	**mm**	0,3; 0,5; 0,8 1,0; 1,5; 2,0; 2,5 3,0; 4,0; 5,0; 6,0	± 0,1 ± 10% ± 10%
Standard dimensions of sheets /custom dimensions available within the total range of 1500x3000 mm/	**mm**	1500x1500	± 10,0

Non-standard thicknesses, graphiting of sheet surfaces, and reinforcement with metallic mesh available upon request.



GASKET SHEETS

Physical and chemical properties

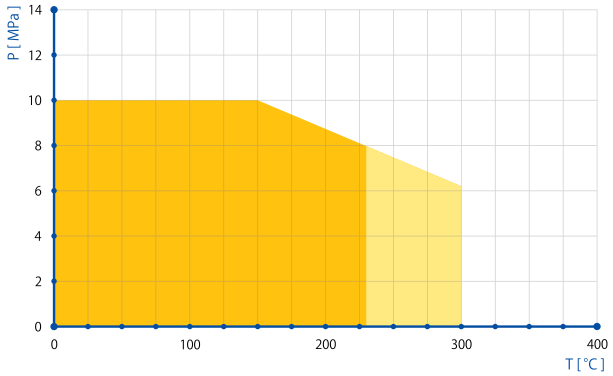
Density	± 5 %	**g/cm³**	2,0	DIN 28090-2
Transverse tensile strength	min.	**MPa**	9	DIN 52910
Compressibility	typical value	**%**	10	ASTM F36
Elastic recovery	min.	**%**	55	ASTM F36
Residual stresses 50 MPa/16 h/300 °C/	min.	**MPa**	29	DIN 52913
Residual stresses 50 MPa/16 h/175 °C/	min.	**MPa**	35	DIN 52913
INCREASE IN THICKNESS				
Oil IRM 903 150 °C/5 h	max.	**%**	6	ASTM F146
Model fuel B 20 °C/5 h	max.	**%**	6	ASTM F146
Kerosene 20 °C/24 h	max.	**%**	5	ASTM F146
Colour		**green**		

(Values as detailed in table refer to 2.0 mm thick gasket sheets)

Calculation coefficients

Coefficients DT – UC – 90/WO-0/19								
σ_m			σ_r			b		
1 mm	2 mm	3 mm	1 mm	2 mm	3 mm	20 °C	200 °C	300 °C
40 MPa	21 MPa	12 MPa	6,4 p_0	5 p_0	4,1 p_0	1,1	1,8	3,0

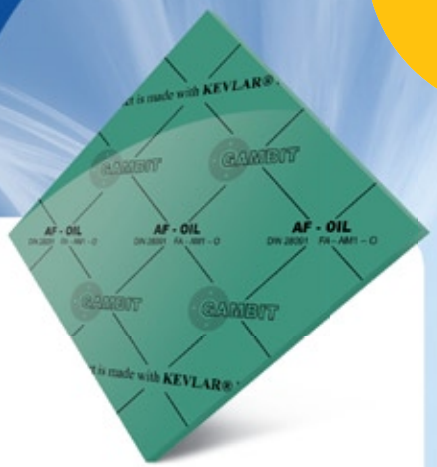
Coefficients ASME			
Tightness class	**Thickness**	**m**	**y**
L0,1	2 mm	4,1	2,7 MPa
L1,0	2 mm	1,8	1,2 MPa



It is not recommended that maximum temperature and pressure are applied simultaneously. Pressure to temperature correlation for sheet thickness 2.0 mm is shown in the diagram.

- There is no requirement for trials.
- Trials should be run if the application involves steam.

All information in this catalogue is based on years of experience in manufacture and use of the discussed products. Since sealing performance in the joint is subject to multiple factors such as mounting method, system parameters, and sealed medium, technical parameters specified herein are of informative nature only and cannot be used as grounds for any claims; any special uses of products are subject to consulting with the manufacturer.



Test Results of Gambit AF-OIL Published on Gasketdata.org

The below tests were run according to EN 13555, the most up-to-date norm in this domain. The results confirm the quality of our products and assist the design of flanges according to norm EN 1591-1+A1:2009/AC:2011.

The results have been approved by Center of Sealing Technologies (CST) at Münster University of Applied Sciences (MUAS) and published on www.gasketdata.org together with the datasheets of the world's leading manufacturers of sealing materials.

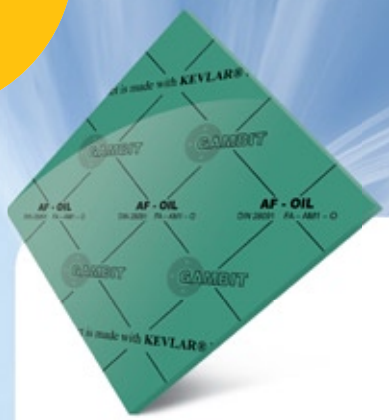
CST is an independent laboratory focused on the research and development in the field of sealing materials in order to assist both the producers and the users.

Gasket characteristics acc. EN 13555 (05/2005) required for design calculations acc. EN 1591-1+A1:2009/AC:2011
Sealing element dimensions [mm] 92 x 49 x 2

Relaxation ratio P_{QR} for stiffness C = 500 kN/mm			
Gasket stress, MPa	Ambient temperature	Temperature 1 (175 °C)	Temperature 2 (300 °C)
Stress level 1 (30 MPa)	0,94	0,82	0,61
Stress level 2 (50 MPa)	0,97	0,90	0,69
P_{QR} at Q_{Smax} (220/220/80 MPa)	0,99	0,86	0,67

Maximal applicable gasket stress Q_{Smax}, MPa		
Q_{Smax}, MPa – ambient temperature	Q_{Smax}, MPa – temperature 1 (175 °C)	Q_{Smax}, MPa – temperature 2 (300 °C)
220	220	80

Sekant unloading modulus of the gasket E_G, MPa and gasket thickness e_G, mm						
Gasket stress, MPa	Ambient temperature		Temperature 1 (175 °C)		Temperature 2 (300 °C)	
	E_G, MPa	e_G, mm	E_G, MPa	e_G, mm	E_G, MPa	e_G, mm
0	-	-	-	-	-	-
1	-	2,083	-	2,086	-	2,085
20	1133	1,955	1680	1,922	9216	1,89
30	1766	1,925	2311	1,909	5235	1,873
40	2457	1,903	2660	1,895	4853	1,859
50	3186	1,885	3369	1,883	5285	1,847
60	3982	1,871	3678	1,871	5453	1,834
80	5399	1,851	4440	1,845	6179	1,808
100	6535	1,835	4784	1,815	-	-
120	7345	1,821	5132	1,784	-	-
140	8098	1,808	5521	1,751	-	-
160	8523	1,796	5870	1,72	-	-
180	8926	1,785	6238	1,69	-	-
200	9383	1,774	6468	1,663	-	-
220	9739	1,763	6772	1,638	-	-

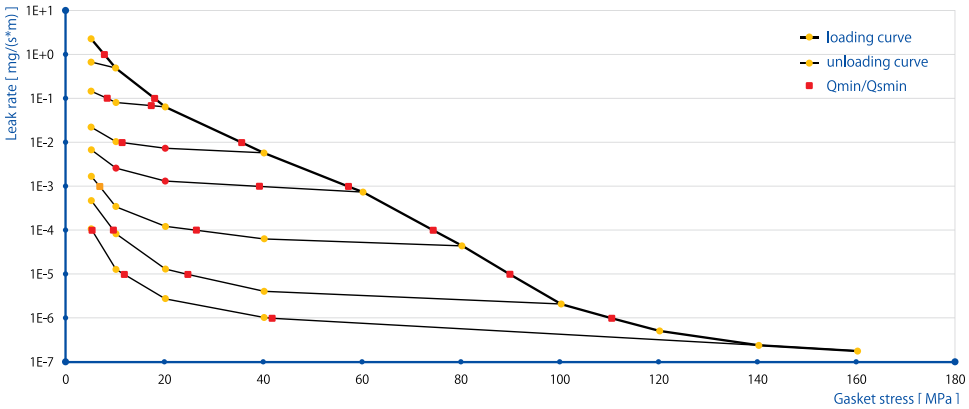


GASKET SHEETS

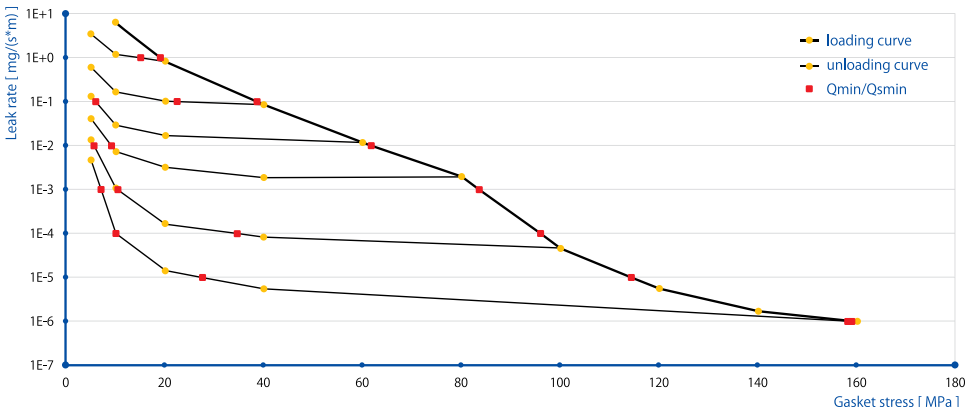
Minimum stress to seal $Q_{min(L)}$ (at assembly), $Q_{Smin(L)}$ (after off-loading) for inner pressure 10 bar										
Tightness class	$Q_{min(L)}$	$Q_{Smin(L)}$, MPa								
mg/(s x m)	MPa	Q_A 10MPa	Q_A 20 MPa	Q_A 40 MPa	Q_A 60 MPa	Q_A 80 MPa	Q_A 100 MPa	Q_A 120 MPa	Q_A 140 MPa	Q_A 160 MPa
10^0	8	5	5	5	5	5	5	-	-	5
10^{-1}	18	-	8	5	5	5	5	-	-	5
10^{-2}	36	-	-	11	5	5	5	-	-	5
10^{-3}	57	-	-	-	39	7	5	-	-	5
10^{-4}	74	-	-	-	-	27	10	-	-	5
10^{-5}	90	-	-	-	-	-	25	-	-	12
10^{-6}	111	-	-	-	-	-	-	-	-	42

Minimum stress to seal $Q_{min(L)}$ (at assembly), $Q_{Smin(L)}$ (after off-loading) for inner pressure 40 bar										
Tightness class	$Q_{min(L)}$	$Q_{Smin(L)}$, MPa								
mg/(s x m)	MPa	Q_A 10MPa	Q_A 20 MPa	Q_A 40 MPa	Q_A 60 MPa	Q_A 80 MPa	Q_A 100 MPa	Q_A 120 MPa	Q_A 140 MPa	Q_A 160 MPa
10^0	19	-	15	5	5	5	5	-	-	5
10^{-1}	39	-	-	23	6	5	5	-	-	5
10^{-2}	62	-	-	-	-	9	6	-	-	5
10^{-3}	84	-	-	-	-	-	11	-	-	7
10^{-4}	96	-	-	-	-	-	35	-	-	10
10^{-5}	115	-	-	-	-	-	-	-	-	28
10^{-6}	159	-	-	-	-	-	-	-	-	158

Leakage - ambient temperature / inner pressure = 10 bar



Leakage - ambient temperature / inner pressure = 40 bar



GASKET SHEETS

TECHNICAL SPECIFICATION

Gasket sheet Gambit AF-U

Material

Gasket sheet **GAMBIT AF-U** is based on Kevlar® aramide fibres, mineral fibres, and fillers bound with NBR rubber-based binder.

Designation according to DIN 28091-2: **FA-AM1-O**

Kevlar® is a registered trademark of E. I. du Pont de Nemours and Company or its affiliates.

General properties and applications

Sheet designated for sealing in medium temperature and medium pressure applications. Specially designed for drinking water installations. Water, steam, kerosene, fuel, and oil resistant, among other media.

Admissions / Certificates

PZH
TA Luft (VDI 2440)

Maximum working conditions

Peak temperature	**°C**	350
Temperature under continuous operation	**°C**	250
Temperature under continuous operation with steam	**°C**	200
Pressure	**MPa**	10

Dimensions

Standard thicknesses of sheets /thicknesses above 5.0 mm are produced by gluing/	**mm**	0,3; 0,5; 0,8 1,0; 1,5; 2,0; 2,5 3,0; 4,0; 5,0; 6,0	± 0,1 ± 10% ± 10%
Standard dimensions of sheets /custom dimensions available within the total range of 1500x3000 mm/	**mm**	1500x1500	± 10,0

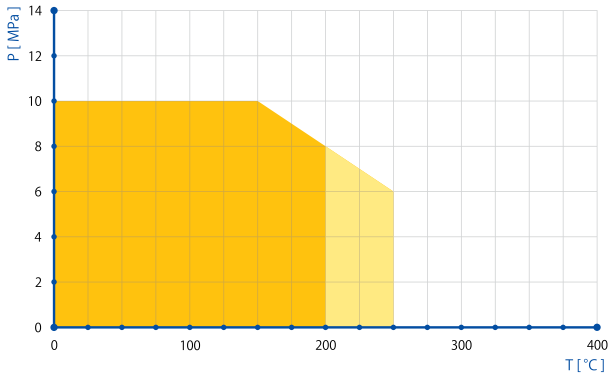
Non-standard thicknesses, graphiting of sheet surfaces, and reinforcement with metallic mesh available upon request.

GASKET SHEETS

Physical and chemical properties

Density	± 5%	**g/cm³**	2,0	DIN 28090-2
Transverse tensile strength	min.	**MPa**	8	DIN 52910
Compressibility	typical value	**%**	10	ASTM F36
Elastic recovery	min.	**%**	50	ASTM F36
Residual stresses 50 MPa/16 h/300 °C/	min.	**MPa**	22	DIN 52913
Residual stresses 50 MPa/16 h/175 °C/	min.	**MPa**	28	DIN 52913
INCREASE IN THICKNESS				
Oil IRM 903 150 °C/5 h	max.	**%**	8	ASTM F146
Model fuel B 20 °C/5 h	max.	**%**	8	ASTM F146
Colour		**light blue**		

(Values as detailed in table refer to 2.0 mm thick gasket sheets)



It is not recommended that maximum temperature and pressure are applied simultaneously. Pressure to temperature correlation for sheet thickness 2.0 mm is shown in the diagram.

- There is no requirement for trials.
- Trials should be run if the application involves steam.

GASKET SHEETS

TECHNICAL SPECIFICATION

Gasket sheet Gambit PARO-GAMBIT

Material

Gasket sheet **PARO-GAMBIT** is based on carbon fibres, mineral fibres, and fillers bound with NBR rubber-based binder.

Designation according to DIN 28091-2: **FA-CM1-O**

General properties and applications

High performance sheet, recommended mostly for installations working with steam.

Maximum working conditions

Peak temperature	**°C**	450
Temperature under continuous operation	**°C**	350
Temperature under continuous operation with steam	**°C**	350
Pressure	**MPa**	10

Dimensions

Standard thicknesses of sheets /thicknesses above 4.0 mm are produced by gluing/	**mm**	0,5; 0,8 1,0; 1,5; 2,0; 2,5 3,0, 4,0; 5,0; 6,0	± 0,1 ± 10% ± 10%
Standard dimensions of sheets /custom dimensions available within the total range of 1500x3000 mm/	**mm**	1500x1500	± 10,0

Non-standard thicknesses, graphiting of sheet surfaces, and reinforcement with metallic mesh available upon request.

GASKET SHEETS

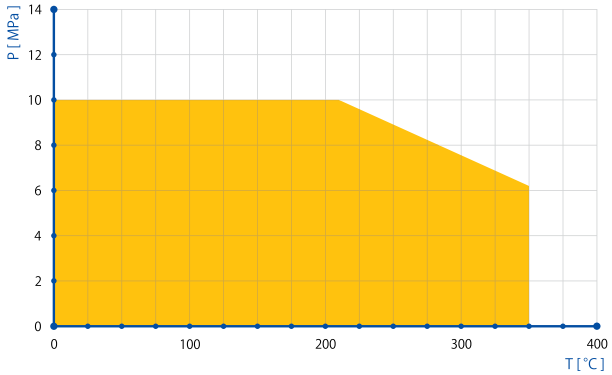
Physical and chemical properties

Density	± 5%	**g/cm³**	1,9	DIN 28090-2
Transverse tensile strength	min.	**MPa**	10	DIN 52910
Compressibility	typical value	**%**	11	ASTM F36
Elastic recovery	min.	**%**	55	ASTM F36
Residual stresses 50 MPa/16 h/300 °C/	min.	**MPa**	32	DIN 52913
Residual stresses 50 MPa/16 h/175 °C/	min.	**MPa**	35	DIN 52913
INCREASE IN THICKNESS				
Oil IRM 903 150 °C/5 h	max.	**%**	12	ASTM F146
Colour		**ginger**		

(Values as detailed in table refer to 2.0 mm thick gasket sheets)

Calculation coefficients

Coefficients DT – UC – 90/WO-0/19									
σ_m			**σ_r**			**b**			
1 mm	2 mm	3 mm	1 mm	2 mm	3 mm	20 °C	200 °C	300 °C	400 °C
30 MPa	15 MPa	10 MPa	6,4 p_0	5 p_0	4,1 p_0	1,0	1,7	2,5	3,6



It is not recommended that maximum temperature and pressure are applied simultaneously. Pressure to temperature correlation for sheet thickness 2.0 mm is shown in the diagram.

- There is no requirement for trials.

GASKET SHEETS

TECHNICAL SPECIFICATION

Gasket sheet Gambit SOFT

Material

Gasket sheet **GAMBIT SOFT** is based on natural fibres, mineral fibres, and fillers bound with NR rubber-based binder.

Designation according to DIN 28091-2: **FA-N1-O**

General properties and applications

Elastic sheet for application in low parameter installations. Particularly recommended for heating, water supply and sewage installations. Remains tight with low bolt load.

Maximum working conditions

Peak temperature	**°C**	180
Temperature under continuous operation	**°C**	150
Temperature under continuous operation with steam	**°C**	130
Pressure	**MPa**	3

Dimensions

Standard thicknesses of sheets /thicknesses above 4.0 mm are produced by gluing/	**mm**	0,5; 0,8 1,0; 1,5; 2,0; 2,5 3,0; 4,0; 5,0; 6,0	± 0,1 ± 10% ± 10%
Standard dimensions of sheets /custom dimensions available within the total range of 1500x3000 mm/	**mm**	1500x1500	± 10,0

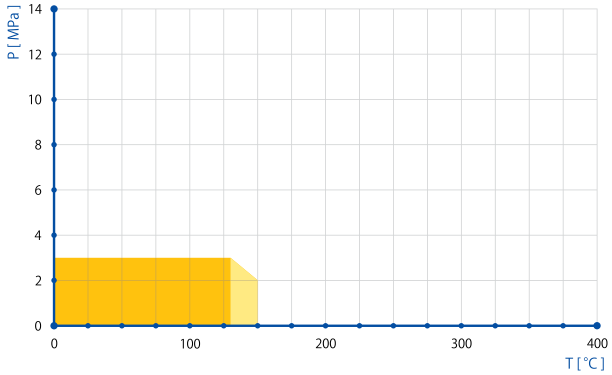
Non-standard thicknesses, graphiting of sheet surfaces, and reinforcement with metallic mesh available upon request.

GASKET SHEETS

Physical and chemical properties

Density	± 5%	**g/cm³**	1,8	DIN 28090-2
Transverse tensile strength	min.	**MPa**	4	DIN 52910
Compressibility	typical value	**%**	18	ASTM F36
Elastic recovery	min.	**%**	50	ASTM F36
Colour		**sky blue**		

(Values as detailed in table refer to 2.0 mm thick gasket sheets)



It is not recommended that maximum temperature and pressure are applied simultaneously. Pressure to temperature correlation for sheet thickness 2.0 mm is shown in the diagram.

- There is no requirement for trials.
- Trials should be run if the application involves steam.

GASKET SHEETS

TECHNICAL SPECIFICATION

Gasket sheet Gambit SOFT

Material

Gasket sheet **GAMBIT SOFT** is based on natural fibres, mineral fibres, and fillers bound with NR rubber-based binder.

Designation according to DIN 28091-2: **FA-N1-O**

General properties and applications

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Maximum working conditions

Peak temperature	**°C**	180
Temperature under continuous operation	**°C**	150
Temperature under continuous operation with steam	**°C**	130
Pressure	**MPa**	3

Dimensions

Standard thicknesses of sheets /thicknesses above 4.0 mm are produced by gluing/	**mm**	0,5; 0,8 1,0; 1,5; 2,0; 2,5 3,0; 4,0; 5,0; 6,0	± 0,1 ± 10% ± 10%
Standard dimensions of sheets /custom dimensions available within the total range of 1500x3000 mm/	**mm**	1500x1500	± 10,0

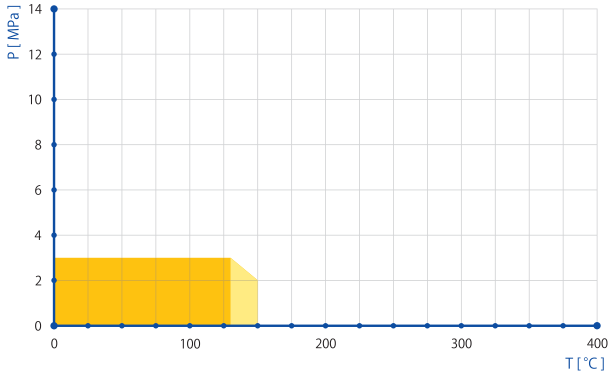
Non-standard thicknesses, graphiting of sheet surfaces, and reinforcement with metallic mesh available upon request.

GASKET SHEETS

Physical and chemical properties

Density	± 5%	**g/cm³**	1,8	DIN 28090-2
Transverse tensile strength	min.	**MPa**	4	DIN 52910
Compressibility	typical value	**%**	18	ASTM F36
Elastic recovery	min.	**%**	50	ASTM F36
Colour		**sky blue**		

(Values as detailed in table refer to 2.0 mm thick gasket sheets)



It is not recommended that maximum temperature and pressure are applied simultaneously. Pressure to temperature correlation for sheet thickness 2.0 mm is shown in the diagram.

- There is no requirement for trials.
- Trials should be run if the application involves steam.

BRAIDED PACKINGS

General information

Braided packings are the most common sealings used in stuffing boxes of pumps and fittings. Easy-to-apply, versatile, long-lasting and relatively cheap, they are continuously a subject of users' interest, although the number of alternative solutions is growing steadily. Implementation of advancements in material engineering, new materials and ever further specialised material and design compositions, allow obtaining better and more durable sealing solutions, provided correct mounting and operation is ensured.

Operating principle of braided packing.
Properly cut sections of braided packing placed in the stuffing box form a package (Fig.1).

The design of such a package, or each segment thereof, allows its pressing to a lateral surface of the stuffing box and to a shaft or a spindle. The pressing should be strong enough to cause compression of the sealing material and filling of all irregularities in surfaces of mated shaft and stuffing box. Since one of the mated surfaces is moving, good packing should flexibly follow the run-out or lack of alignment of a shaft or a spindle.
Majority of irregularities in operation of stuffing box sealing is a result of incorrect matching of packing to working conditions or incorrect mounting, so keeping predetermined mounting procedure is essential.

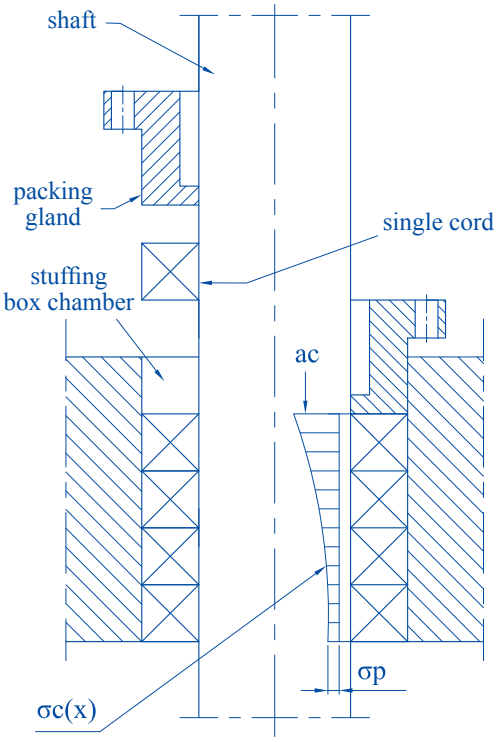


Fig. 1
Packed stuffing box with distribution of stresses.

BRAIDED PACKINGS

Sealing procedure for stuffing boxes in pumps.

In case of packing of stuffing boxes in rotodynamic pumps, considerably high speed of the rotating shaft towards packing occurs. As a result of friction, significant quantities of heat are emitted. Correct assembly and operation shall minimize occurrence of heat energy and drain it from the friction area. In order to achieve it, the following steps should be taken:

1. Remove old packing from the stuffing box, thoroughly clean the whole stuffing box and the shaft and check the condition of the shaft or a sleeve. In the event of excessive wear, regenerate or replace it with a new one.

2. Select suitable packing size. In order to do that, measure the diameter of the shaft or the sleeve and the outer diameter of stuffing box in sealing area. Target dimension of the packing equals half the difference in diameters.

3. When mounting in the stuffing box, use properly cut ring-shaped packing sections. Spiral winding of packing is not allowed. In practice, various methods of calculating the length of individual packing section are used. However, the most popular one is winding the packing on the pump shaft, previously removed from the stuffing box, or – and this is even better – winding it on a wooden shaft of diameter equal to diameter of the pump shaft in sealing area. For winding and cutting of packing, see figures.

   The packing should be slightly, but not fully, tense while cut.

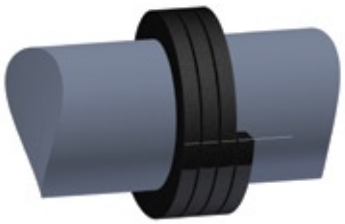


Fig . 2
The method of cutting the braided packing sections to a stuffing box of a pump.

4. It is best to apply packing rings that have been formed (pressed) outside of the stuffing box. In such a case, the inner diameter of press socket should be 0.05 mm larger than diameter of a roller and in the same size as the diameter of stuffing box.

5. Insert the pressed rings, or the properly cut packing sections, into the stuffing box one by one, making sure that they fill the sealed area without gaps at joints of ring ends and without the ends overlapping each other. Then slide the rings, using a divided sleeve, so that they rest at the bottom of the stuffing box. Insert the consecutive rings in the same way, with the joints of subsequent rings moved by 90°, at the same time pressing them slightly against previously inserted packings. If possible, rotate the shaft whilst inserting packings, in order to achieve better mounting of individual packings in the stuffing box.

6. After inserting the last ring in the stuffing box, replace a packing gland, tighten the bolts with your fingers or, very slightly, with a spanner.

7. In order to ensure correct guiding of the gland, adjust the height of the sealing package so that it is smaller than the length of stuffing box by at least 1/2 of packing thickness.

BRAIDED PACKINGS

8. After priming the pump with the sealed medium, start the pump. At the starting phase of operation the packing should leak – even if the leak is substantial. A significant leak in the beginning phase of operation results in considerable increase in packing durability. At this stage the volume of packing increases due to thermal expansion and absorption of sealed medium. In consequence condensed packing and increased pressure against the shaft is obtained. This is the initial complementary sealing of the stuffing box. If during that phase the leak is stopped loosen the gland so that the leak continues.

9. After one hour tighten the gland gradually and evenly. Generally nuts are tightened every 5 minutes by 1/6th of a turn. The tightening process should be continued until the leak is reduced to 1-2 drops per minute per each centimetre of shaft length.

   Controled leakage is necessary for correct operation of the packing of stuffing box in the pump.

   Excessive tightening of the gland, manifesting itself in the temperature increase and lack of leak, shall cause increased friction and reduced carrying off heat from the friction area. As a result, the impregnating substances get squeezed out quickly, the packing at the point of contact with the shaft gets overheated and hardened, and, consequently, loss of elasticity occurs. Such packing is deprived of sealing properties and its further tightening can only cause damages to the shaft or the sleeve.

10. During operation check for leaks at least once a day. If they are higher than desired, adjust leaks according to principle in Clause 9.

11. Overall tightening of the gland during operation cannot exceed 40% of the original height of the package. After that value is reached, the packing must be replaced. Adding new rings to extend the lifecycle of the package is not recommended, as packing causes the most serious damage in the last phase of operation, in the absence of lubricants, when it contains friction particles acquired from sealed medium and shaft wear products.

Sealing of fittings.

The moving part of the sealed node of fittings performs relatively slow rotating movement, sometimes accompanied with a limited movement along the axis. Due to relatively small quantities of friction energy released, low speed of rotation permits application of much higher pressure of the gland, which takes effect in operation of the packing practically without leaks. However, it should be kept in mind that extensively high pressure applied when substantial gaps between the spindle and stuffing box enclosure appear, can cause an adverse effect of packing material getting inside the gap; this is why packings used in fittings should be more compact in design and more resistant to pressing into pump gaps. In order to carry out the correct assembly of packing in fittings, the following steps should be taken:

1. Remove old packing from the stuffing box, thoroughly clean the whole stuffing box and the shaft and check the condition of the shaft or a sleeve. In the event of excessive wear, regenerate or replace it with a new one.

2. Select suitable packing size. In order to do that, measure the diameter of the shaft or the sleeve and the outer diameter of stuffing box in sealing area. Target dimension of the packing equals half the difference in diameters.

3. When mounting in the stuffing box, use properly cut ring-shaped packing sections. Spiral winding of packing is not allowed. In practice, various methods of calculating the length of individual packing section are used. However, the most popular one is winding the packing on the pump shaft removed from the stuffing box, or – and this is even better – winding it on a wooden shaft of diameter equal to diameter of the pump shaft in sealing area. For winding and cutting of packing, see figures.

The packing should be slightly, but not fully, tense while cut.

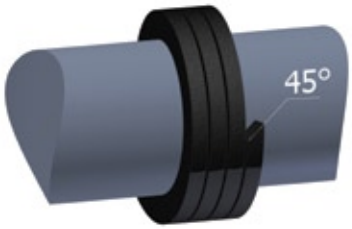


Fig . 3
The method of cutting the braided packing sections to a stuffing box of a fitting.

4. It is best to apply packing rings that have been formed (pressed) outside of the stuffing box. In such a case, the inner diameter of press socket should be 0.05 mm larger than diameter of a roller and in the same size as the diameter of stuffing box.

5. Insert the pressed rings, or the properly cut packing sections, into the stuffing box one by one, making sure that they fill the sealed area without gaps at joints of ring ends and without the ends overlapping each other. Then slide the rings, using a divided sleeve, so that they rest at the bottom of the stuffing box. Insert the consecutive rings in the same way, with the joints of subsequent rings moved by 90°, at the same time pressing them slightly against previously inserted packings. If possible, rotate the spindle whilst inserting packings, in order to achieve better mounting of individual packings in the stuffing box.

6. Press the gland until a significant resistance is felt. At the same time turn the valve spindle so as to determine the need for adjustment of each packing inside the stuffing box.

7. After mounting of valve in the process line check the leak, and after ca. 1 day of operation tighten the gland, even if there is no leak. Obviously each leak is to be promptly eliminated by tightening of the gland.

BRAIDED PACKINGS

Packing type	Material group	Design and materials	Operating conditions	
			pH	Temperature range, °C
605	Graphite	Diagonally braided packing of expanded graphite yarn on cotton carrier	0-14*	-200÷+450 for steam 550
6051		Diagonally braided packing of expanded graphite yarn on inconel carrier	0-14*	-200÷+450 for steam 600
6055		Diagonally braided packing of expanded graphite yarn with corrosion inhibitor, where each thread is over-braided with inconel mesh	0-14*	-200÷+450 for steam 600
645		Diagonally braided packing of expanded graphite yarn on cotton carrier impregnated with PTFE	0-14*	-200÷+280
608	PTFE	Diagonally braided packing of fibrous PTFE yarn with incorporated graphite and silicon oil	0-14	-200÷+280
6080		Diagonally braided packing of pure, fibrous PTFE yarn without added oils nor other lubricants	0-14	-150÷+280
6081		Diagonally braided packing of yarn of fibrous PTFE with silicon oil	0-14	-200÷+280
6084		Diagonally braided packing of fibrous PTFE yarn with incorporated graphite and large quantities of silicon oil	0-14	-200÷+280
6085N		Diagonally braided packing of GORE yarn of fibrous PTFE with incorporated graphite and silicon oil	0-14	-200÷+280
6088		Diagonally braided packing of GORE G4 yarn of fibrous PTFE with incorporated graphite	0-14	-200÷+280
6491	Synthetic	Diagonally braided packing of synthetic fibres yarn impregnated with PTFE	1-13	-200÷+280
6493		Diagonally braided packing of aramide fibres yarn impregnated with PTFE	2-13	-200÷+280
6086	Hybrid	Diagonally braided packing of fibrous PTFE yarn with incorporated graphite and silicon oil, and with an interweave of aramide yarn impregnated with PTFE	2-13	-200÷+280
6087		Diagonally braided packing of fibrous PTFE yarn with incorporated graphite and silicon oil, and with edges reinforced with aramide yarn impregnated with PTFE	2-13	-200÷+280
6089		Diagonally braided packing of fibrous PTFE yarn impregnated with silicon oil, and with edges reinforced with aramide yarn impregnated with PTFE	2-13	-200÷+280
611	Other, including cotton	Braided packing of cotton yarn soaked with oil impregnate with graphite	5-9	-30÷+120
621		Braided packing of cotton yarn soaked with oil impregnate with talc	5-9	-30÷+120
641		Braided packing of cotton yarn soaked with PTFE impregnate	5-9	-50÷+120

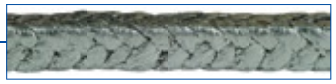
* except strong oxidants

BRAIDED PACKINGS

Graphite packings

Expanded graphite is one of the best materials for manufacturing dynamic sealings. Its heat resistance ranges from - 200 °C to + 2000 °C. Unfortunately its heat resistance decreases in the effect of air, steam and other oxidants. It is therefore assumed that good brands of expanded graphite can be used in the air up to 450 °C, in dynamic applications up to 550 °C, and in static applications, e.g. in valves, up to 600 °C.
Expanded graphite features very good chemical resistance to practically all media, with the exception of strong oxidants; good thermal conductivity and low friction coefficient for steel.

PACKING TYPE 605



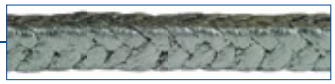
Characteristics:
Packing made of expanded pure graphite yarn with a cotton core. Due to its thermal and chemical resistance, self-lubricating properties and good thermal conductivity, the expanded graphite is perfect for high temperature braided packings used in both rotodynamic pumps and in fittings. Replacement of inconel reinforcement with cotton thread reduces mechanical parameters at high temperature but thanks to that the packing sets itself more softly inside the stuffing box and its friction coefficient is lower.

Application:
Recommended for use in stuffing boxes of pumps and fittings at temperatures up to 450 °C, with water, steam, oils, solvents, salts, acids and alkalis, with exception of strong oxidants. Not recommended for use with liquid metals and abrasive media.
Particularly recommended for use in rotodynamic pumps, where PTFE cannot be used due to temperature limitations.

pH	Max. temp.	Rotodynamic pumps	Piston pumps	Fittings	Dimension range
0-14	-200÷450 °C, in steam up to 550 °C, in oxygen-free atmosphere up to 2000 °C	p = 40 bar v = 40 m/s	not recommended	p = 200 bar v = 2 m/s	6-25 mm

BRAIDED PACKINGS

PACKING TYPE 6051



Characteristics:

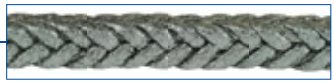
Packing of expanded pure graphite yarn reinforced with a thin inconel wire. Due to its thermal and chemical resistance, self-lubricating properties and good thermal conductivity, the expanded graphite is perfect for high temperature braided packings. Use of reinforcement a with thin inconel wire improves mechanical strength of the packing, while preventing it from entering into the gap between a shaft or a spindle and an enclosure of the stuffing box.

Application:

Recommended for use in stuffing boxes of pumps and fittings at extremely high temperatures, with water, steam, oils, solvents, salts, acids and alkalis, with exception of strong oxidants. Not recommended for use with liquid metals, e.g. iron, and abrasive media.
Particularly popular in professional power generation sector.

pH	Max. temp.	Rotodynamic pumps	Piston pumps	Fittings	Dimension range
0-14	-200÷+600 °C, in oxygen-free atmosphere up to 2000 °C	not recommended	not recommended	p = 320 bar v = 2 m/s	6-25 mm

PACKING TYPE 6055



Characteristics:

Packing of expanded pure graphite yarn reinforced with thin inconel wire, with each single thread over-braided with inconel mesh. Due to its thermal and chemical resistance, self-lubricating properties and good thermal conductivity, expanded graphite is perfect for high temperature braided packings used in both rotodynamic pumps and in fittings. Use of reinforcement with dense inconel plait improves mechanical strength of the packing, while preventing it from entering into the gap between the shaft or the spindle and the stuffing box enclosure. This permits using the packing at extremely high pressure conditions. This type contains inhibitors of corrosion.

Application:

Recommended for use in stuffing boxes of fittings at extremely high temperatures and pressures, with water, steam, oils, solvents, salts, acids and alkalis, with exception of strong oxidants. Not recommended for use with liquid metals, e.g. iron, and abrasive media.
Particularly popular in professional power generation sector.

pH	Max. temp.	Rotodynamic pumps	Piston pumps	Fittings	Dimension range
0-14	-200÷+600 °C, in oxygen-free atmosphere up to 2000 °C	not recommended	not recommended	p = 600 bar v = 1,5 m/s	6-25 mm

BRAIDED PACKINGS

PACKING TYPE 645

Characteristics:

Packing of expanded pure graphite yarn with cotton core, additionally impregnated with PTFE. Due to its thermal and chemical resistance, self-lubricating properties and good thermal conductivity, expanded graphite is perfect for high temperature braided packings used in both rotodynamic pumps and in fittings. Addition of PTFE reduces permissible working temperature but it improves friction coefficient and improves cohesion, which facilitates mounting in stuffing boxes of pumps.

Application:

Recommended for use in stuffing boxes of pumps and fittings at temperatures up to 280 °C, with water, steam, oils, solvents, salts, acids and alkalis, with exception of strong oxidants. Not recommended for use with abrasive media.

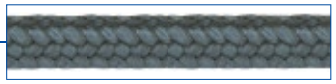
pH	Max. temp.	Rotodynamic pumps	Piston pumps	Fittings	Dimension range
0-14	-200÷+280 °C	p = 25 bar v = 25 m/s	not recommended	p = 100 bar v = 2 m/s	6-25 mm

BRAIDED PACKINGS

PTFE packings

PTFE (polytetrafluoroethylene), also known as Teflon, is a perfect sealant. Its good heat resistance up to 280°C, outstanding chemical resistance and low friction coefficient permit application of PTFE yarn both in stuffing boxes of pumps and fittings. Addition of incorporated graphite improves thermal conductivity and reduces tendency of PTFE to squeeze in gaps between the shaft or the spindle and stuffing box enclosure.

PACKING TYPE 608



Characteristics:
Packing of fibrous PTFE yarn with incorporated graphite and soaked with silicon oil. Thanks to this composition braided packing is only slightly prone to squeezing out of the stuffing box and softly adheres to the shape of the stuffing box. Low friction coefficient and high thermal conductivity protect the package against overheating caused by high revolutions of the pump shaft. Thanks to all these characteristics the packing similar to packings of GFO at significantly lower price is obtained.

Application:
Recommended for use in stuffing boxes of pumps and fittings, with water, steam, oils, solvents, salts, acids and alkalis, with exception of very strong oxidants.
The most popular of PTFE packings.

pH	Max. temp.	Rotodynamic pumps	Piston pumps	Fittings	Dimension range
0-14	-200÷+280 °C	p = 20 bar v = 10 m/s	p = 100 bar v = 2 m/s	p = 100 bar v = 2 m/s	4-25 mm

PACKING TYPE 6080

Characteristics:
Packing of pure, fibrous PTFE yarn without any additives nor lubricants. Lack of any additives remarkably improves chemical resistance of the packing, including resistance to strong oxidants.

Application:
Recommended for use in rotodynamic pumps, piston pumps and industrial fittings, in food, chemical and pharmaceutical sector, and in drinking water treatment plants. Can be used in installations containing oxygen. Resistant to water, steam, oils, liquid fuels, solvents, acids and alkalis.

pH	Max. temp.	Rotodynamic pumps	Piston pumps	Fittings	Dimension range
0-14	-150÷280 °C	p = 8 bar v = 8 m/s	p = 60 bar v = 2 m/s	p = 150 bar v = 2 m/s	4-25 mm

BRAIDED PACKINGS

PACKING TYPE 6081 PTFE, "WHITE"

Characteristics:

Braided packing of pure fibrous PTFE soaked in an impregnate based on silicon oil. Fibrous form of PTFE remarkably reduces a natural tendency of PTFE to "flow" and allows obtaining solid and effective sealing.

Application:

Recommended for use in rotodynamic pumps, piston pumps and industrial fittings, in food, chemical and pharmaceutical sector, and in drinking water treatment plants. Resistant to water, steam, oils, liquid fuels, solvents, acids and alkalis, except for strong oxidants.

pH	Max. temp.	Rotodynamic pumps	Piston pumps	Fittings	Dimension range
0-14	-200÷+280 °C	p = 20 bar v = 10 m/s	p = 80 bar v = 2m/s	p = 20 bar v = 1 m/s	4-25 mm

PACKING TYPE 6084

Characteristics:

Packing made of fibrous PTFE yarn with incorporated graphite and large quantities of silicon oil. Exceptionally soft and elastic packing, with low friction coefficient and high thermal conductivity.

Application:

Packing 6084 is a high quality packing for rotodynamic pumps used in all sectors of industry and economy. Due to its high resistance to media such as water, steam, oils, liquid fuels, acids and alkalis, it is particularly widely used in chemical and power generation sectors and in a municipal construction sector. Due to its softness it requires stuffing boxes with small gaps between the shaft and the stuffing box enclosure.

pH	Max. temp.	Rotodynamic pumps	Piston pumps	Fittings	Dimension range
0-14	-200÷+280 °C	p = 20 bar v = 15 m/s	p = 60 bar v = 1 m/s	p = 80 bar v = 1 m/s	4-25 mm

BRAIDED PACKINGS

PACKING TYPE 6085N

Characteristics:

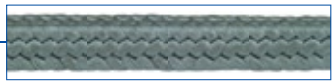
Braided packing of top quality GORE yarn. The yarn is a composition of perfectly pulped PTFE filled with graphite and soaked in silicons. Thanks to superfine technology and reliability of yarn, the obtained packing meets the strictest requirements and is used in stuffing boxes of high speed pumps, and wherever the quality of packing is a key to success.

Application:

Packing 6085N is a top quality packing for rotodynamic pumps used in all sectors of industry and economy. Due to its high resistance to such media as water, steam, oils, liquid fuels, acids and alkalis, it is particularly common in chemical sector, power generation sector and municipal construction sector.

pH	Max. temp.	Rotodynamic pumps	Piston pumps	Fittings	Dimension range
0-14	-200÷+280 °C	p = 20 bar v = 25 m/s	p = 150 bar v = 2 m/s	p = 200 bar v = 2 m/s	4-25 mm

PACKING TYPE 6088 GAMFLON G4



Characteristics:

This high-pressure packing is braided using top quality GORE G4 yarn, which is a composition of pulped PTFE and graphite. Absence of oil impregnates improves resistance of packing of GORE G4 yarn to pressure. High quality of plait paired with high quality of yarns produced reliable packing with unique properties.

Application:

Thanks to its properties, this packing is the most commonly used in fittings wherever high pressure and media require the best possible product. GAMFLON G4 can be used with water, steam, liquid fuels, oils, solvents, acids and bases, with exception of strong oxidants.

pH	Max. temp.	Rotodynamic pumps	Piston pumps	Fittings	Dimension range
0-14	-200÷+280 °C	p = 50 bar v = 8 m/s	p = 200 bar v = 2 m/s	p = 400 bar v = 1 m/s	4-25 mm

BRAIDED PACKINGS

Synthetic packings

Synthetic packings are braided of strong synthetic yarns, durable and resistant to heat and chemicals. Thanks to their fibrous structure they demonstrate very high elasticity and resistance to squeezing out of the stuffing box. Their heat resistance excels the heat resistance of PTFE which they are impregnated with.

PACKING TYPE 6491 GAMTEX

Characteristics:

State-of-the-art braided packing of synthetic yarn, highly resistant to heat and chemicals, soaked with PTFE-based impregnating composition. That impregnate, applied on each fibre, substantially reduces friction coefficient and fills the slightest spaces between monofilaments.
The packing features exceptional softness and elasticity. Perfectly adheres to the stuffing box.

Application:

Specially recommended for applications with steam, as well as in high pressure pumps and fittings, with water, solutions of salt and medium strength acids and bases, and with organic substances, such as liquid fuels, oils, greases or solvents. Used in all sectors of industry and municipal economy.

pH	Max. temp.	Rotodynamic pumps	Piston pumps	Fittings	Dimension range
1-13	-200÷+280 °C	p = 20 bar v = 20 m/s	p = 80 bar v = 2 m/s	p = 100 bar v = 2 m/s	4-25 mm

PACKING TYPE 6493

Characteristics:

Braided packing of aramide yarn, used in production of yarn guarantees exceptional resistance of packing both to mechanical and chemical factors, also at high temperatures. Soaking each thread separately with PTFE-based impregnate during the braiding process allows further significant reduction in friction coefficient of packing on the shaft, as well as seals the spaces between monofilaments, resulting in unrivalled packing for many applications.

Application:

Specially recommended fo ruse in pumps and fittings exposed to abrasives, such as suspensions of sand, sewage and other materials with abrasive effect. Packing designed for use in high pressure pumps and fittings, with water, steam, solutions of salt and medium strength acids and bases, and with organic substances, such as liquid fuels, oils, lubricants or solvents. Used in all sectors of industry and municipal economy and in mining.

pH	Max. temp.	Rotodynamic pumps	Piston pumps	Fittings	Dimension range
2-13	-200÷+280 °C	p = 25 bar v = 20 m/s	p = 100 bar v = 2 m/s	p = 100 bar v = 2 m/s	4-25 mm

BRAIDED PACKINGS

Hybrid packings

Bearing in mind specific properties of PTFE as a material with exceptional chemical resistance and low friction coefficient, but soft at the same time, and mechanical strength of aramide fibres, we produced the combination of both advantages using special weaves. Packings with uniformly interwoven aramide and PTFE yarns are designed for rotating movement, and packings in which aramide reinforces the edges, are designed for to-and-fro motion and for fittings.

PACKING TYPE 6086 ZEBRA

Characteristics:

Packing made of PTFE yarn filled with graphite, and aramide yarn impregnated with PTFE. Thanks to special weave, the aramide fibres evenly reinforce the packing. Thus developed packing is strong, softly fills the stuffing box and evenly works with rotating shaft or protecting sleeve.

Application:

The packing was developed for users of rotodynamic pumps and other equipment working with water, water solutions of salts, acids and bases, liquid fuels, oils and solvents, and suspensions of solids in such media.

pH	Max. temp.	Rotodynamic pumps	Piston pumps	Fittings	Dimension range
2-13	-200÷+280 °C	p = 20 bar v = 20 m/s	not recommended	p = 300 bar v = 2 m/s	6-25 mm

PACKING TYPE 6087 GAMFLON AR

Characteristics:

The packing makes good use of excellent properties of PTFE yarns filled with graphite and with silicon oil, adding generally known mechanical strength of aramide. Special weave, of packing GAMFLON AR, which allows reinforcement of edges with aramide, does not reduce movement properties of PTFE.

Application:

The packing was developed for users of pumps and fittings encountering problems with highly abrasive media. The packing is also perfect for piston pumps, where to-and-fro motion damages classical packings. Chemical resistance of GAMFLON AR permits the use of this packing with water, oils, liquid fuels, solvents, and medium strong acids and bases.

pH	Max. temp.	Rotodynamic pumps	Piston pumps	Fittings	Dimension range
2-13	-200÷+280 °C	not recommended	p = 200 bar v = 5 m/s	p = 300 bar v = 2 m/s	6-25 mm

BRAIDED PACKINGS

PACKING TYPE 6089

Characteristics:
Packing design is similar to packing type 6087, the only difference being the type of used Teflon yarn, without incorporated graphite.

Application:
The packing was developed for users of pumps and fittings encountering difficulties with highly abrasive media. The packing is also perfect for piston pumps, where to-and-fro motion damages classical packings. Using of white PTFE in the yarn allows its use wherever contamination of sealed medium with graphite is unacceptable.

pH	Max. temp.	Rotodynamic pumps	Piston pumps	Fittings	Dimension range
2-13	-200÷+280 °C	not recommended	p = 200 bar v = 5 m/s	p = 300 bar v = 2 m/s	6-25 mm

Other packings, including cotton type

Recent years have seen the advent of many modern materials and yarns. This does not mean, however, that classic materials are forgotten. For example cotton-based packings are still widely used.

PACKING TYPE 611

Characteristics:
Packing braided of cotton yarn with microfibrous structure, impregnated with composition of high quality lubricants enriched with high graphite content. The applied weave guarantees high softness and elasticity of packing. Lubricant used to soak the packing reduces friction and removes heat from the friction area.

Application:
Recommended for use in fittings and high-speed rotodynamic pumps working with water, steam, oils, solutions of salts and medium strength acids and bases.

pH	Max. temp.	Rotodynamic pumps	Piston pumps	Fittings	Dimension range
5-9	-30÷+120 °C	p = 10 bar v = 5 m/s	p = 20 bar v = 1,5 m/s	p = 60 bar v = 2 m/s	8-50 mm

BRAIDED PACKINGS

PACKING TYPE 621

Characteristics:

Similarly to packing type 611, it is braided of natural cotton yarn impregnated with composition of lubricants in which graphite was substituted with talc. Thus developed packing can be used wherever even minimum contamination with graphite is unacceptable.

Application:

Recommended for use in stuffing boxes of pumps and fittings in drinking water installations, in laundries, dyeing plants, in textile and chemical industry.

pH	Max. temp.	Rotodynamic pumps	Piston pumps	Fittings	Dimension range
5-9	120 °C	p = 10 bar v = 5 m/s	p = 20 bar v = 1,5 m/s	p = 60 bar v = 2 m/s	8-50 mm

PACKING TYPE 641

Characteristics:

Packing braided of natural cotton saturated with special PTFE-based impregnate, thread by thread, during braiding process. The impregnate has a double function: it reduces friction coefficient while increasing chemical resistance of the packing. At the same time delicate cotton fibres make the resulting packing exceptionally soft and fitting well in the stuffing box.

Application:

General purpose packing. Recommended for use in stuffing boxes of pumps and fittings, in all sectors of industry, and in municipal economy. Resistant to water, oils, liquid fuels, lubricants and solvents, as well as to water solutions of salts and medium strength acids and bases.

pH	Max. temp.	Rotodynamic pumps	Piston pumps	Fittings	Dimension range
5-9	-50÷120 °C	p = 10 bar v = 10 m/s	p = 60 bar v = 2 m/s	p = 150 bar v = 2 m/s	6-25 mm

We also manufacture braided packings from ceramic yarn, applied in sealings of fittings, of the following types:

- 616 - a packing made of bolus alba yarn, impregnated with a lubricant composition enriched with significant quantity of graphite
- 646 - a packing made of bolus alba yarn, soaked with a PTFE-based impregnate

Notes

THERMAL INSULATION CORDS AND PACKINGS

General information

Gambit Lubawka Sp. z o.o. is a manufacturer of braided packings for static and thermal insulation applications. Our offer features thermal insulation cords also. Braided packings are compositions of yarns braided diagonally, whereas the cords have soft, fibrous core and yarn overbraiding. Design, yarns, and materials vary depending on a working temperature and pressure. In multiple cases combinations of yarns are used to achieve the optimal functionality. Packings and cords detailed herein are mostly used for thermal insulation of both hot and cold media, e.g., in various types of water, steam, ventilation, and flue ducts. They are used to insulate boilers, tanks, furnace chambers, and drier chambers, as well as ball and jet mills.

When installing contemplated packings and cords consider local conditions of mounting and use in a given application. Such factors as vibrations from installations, frequent opening of chamber doors, local overheating, or occurrence of extraordinary, chemically aggressive substances, as well as significant wear of the insulated node can affect the lifecycle and efficiency of packings used. Over-braided cords produced by Gambit have dense braid, thanks to which they feature higher durability than twisted cords, and cords over-braided with just a thin mesh of yarns or wires. All packings are standardly executed in square version, however they can be executed in round version upon request. Hardness of packing and any custom designs are subject to arrangement.

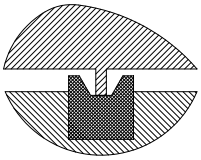
Materials used in production of thermal insulation cords:

1. Glass rovings – a bundle of parallel, continuous glass fibres of type E glass.
2. Textured glass yarn – a bunch of twisted, continuous glass fibres type E; subjected to a curling process which increases the elasticity and improves the efficiency of insulation.
3. Aluminosilicate yarn – yarn based on ceramic, aluminosilicate fibres featuring high chemical purity and increased heat resistance. It contains ca. 18% of organic fibres, which in the beginning of operation burn out without aggravating utility properties of a packing/cord.
4. Core made of aluminosilicate fibre – cut aluminosilicate fibre formed as soft and elastic core.
5. Bio-soluble ceramic yarn – thanks to the addition of calcium oxide and magnesia, fibres of this yarn type are biodegradable and, hence, considered safe to living organisms.

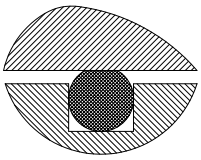
THERMAL INSULATIONS

CORD OR PACKING?

Depending on specific design of the sealed node we can use either fully braided packing or cord.



Blade closure – a metal sheet or a flat section pressing the packing – high surface pressures requires hard packing, preferably fully braided and relatively firm. The result is good tightness and sealing capability of media under elevated pressure.



Pressing with a flat surface allows to exert relatively small surface pressure on the sealing material. To achieve desired sealing effect the material should be relatively soft, hence the cord form.

Consider also possible vibrations of the cover against the body. In the event of vibrations it is of benefit that the sealing material is not too rigid and that it vibrates with the moving part. This helps to avoid ruptures of packings and cords by mated metal parts.

GLASS CORD EXECUTED WITH KEMAFIL BRAIDING 4642

Characteristics:
This cord is made by over-braiding a bunch of E glass yarns with glass silk mesh. The resulting product fits exceptionally well around insulated surfaces.

Application:
This cord can be used as thermal insulation of all types of transfer ducts, heating installations, machinery and equipment.

Minimum temperature [°C]	Maximum peak temperature [°C]	Maximum temperature under continuous operation [°C]	Dimension range [mm]
-100	700	650	3-25

Thermal insulation packings

PACKING TYPE 604

Characteristics:
Braided packing made of type E textured glass. Its nominal diameter of fibres is 6 to 11 micrometres. Thanks to suitable weave and texture the packing is elastic and has significant volume of air trapped between fibres. That phenomenon ensures excellent thermal insulation.

Application:
Used for sealing chambers, driers and furnaces at high temperatures. High chemical resistance of glass fibres allows to use this packing in chemical equipment, and exhaust systems for hot flue and post-reaction gases. This packing is resistant to majority of aggressive chemicals, except for fluoride, strong alkalis, and phosphoric and sulphuric acid. Also used as thermal insulation of hot components.

Minimum temperature [°C]	Maximum peak temperature [°C]	Maximum temperature under continuous operation [°C]	Permissible pressure [bar]	Dimension range [mm]
-100	700	650	1,0	6-50

PACKING TYPE 604HT

Characteristics:
Braided packing made of textured HT glass with heat resistance increased to 750°C, and nominal diameter of fibres 6 to 9 micrometres. Special composition of glass and surface treatment result in improved lifecycle at high temperatures. Thanks to texturing, this packing is similar to type 604 – it is elastic, with significant quantities of air trapped between fibres; hence excellent thermal insulation properties.

Application:
Used for sealing chambers, driers and furnaces at high temperatures. High chemical resistance of glass fibres allows to use this packing in chemical equipment, and exhaust systems for hot flue and post-reaction gases. This packing is resistant to majority of aggressive chemicals, except for fluoride, strong alkalis, and phosphoric and sulphuric acid. Also used as thermal insulation of hot components.

Minimum temperature [°C]	Maximum peak temperature [°C]	Maximum temperature under continuous operation [°C]	Permissible pressure [bar]	Dimension range [mm]
-100	800	750	1,0	6-50

THERMAL INSULATIONS

PACKING TYPE 606

Characteristics:
Stainless steel reinforced aluminosilicate yarn used in this packing provides excellent heat resistance combined with excellent thermal insulation property. Additionally, the style of braid enhances the characteristics with high elasticity. This packing contains up to 18% of organic fibres which may burn out in the beginning of operation period without adverse effects to operational parameters of the packing.

Application:
Used for sealing chambers, driers and furnaces at extremely high temperatures. High chemical resistance of aluminosilicate fibres allows to adopt this packing in chemical equipment, and exhaust systems for hot flue and post-reaction gases. Also used as thermal insulation of hot components. This packing can be used for continuous operation in static applications at temperatures up to 1100 °C, and in dynamic applications up to 650 °C.

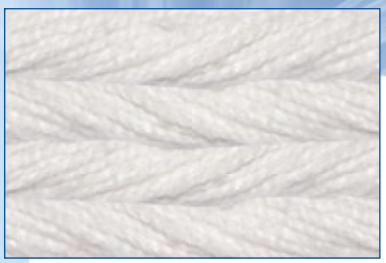
Minimum temperature [°C]	Maximum peak temperature [°C]	Maximum temperature under continuous operation [°C]		Dimension range [mm]
		static	dynamic	
-100	1200	1100	650	8-50

PACKING TYPE 606BIO

Characteristics:
Stainless steel reinforced bio-soluble ceramic yarn used in this packing provides excellent heat resistance combined with excellent thermal insulation property. Additionally, the style of braiding enhances the characteristics with high elasticity. This packing contains up to 18% of organic fibres which may burn out in the beginning of operation period without adverse effects to operational parameters of the packing. Modification of chemical composition allows to obtain a product that even when inhaled promptly exits the lungs, not causing any health risks.

Application:
Used for sealing chambers, driers and furnaces at extremely high temperatures. High chemical resistance of aluminosilicate fibres allows to adopt this packing in chemical equipment, and exhaust systems for hot flue and post-reaction gases. Also used as thermal insulation of hot components. This packing can be used for continuous operation in static applications at temperatures up to 1100 °C, and in dynamic applications up to 650 °C.

Minimum temperature [°C]	Maximum peak temperature [°C]	Maximum temperature under continuous operation [°C]		Dimension range [mm]
		static	dynamic	
-100	1100	1100	650	8-50



Thermal insulation cords

TWISTED GLASS CORD TYPE 454

Characteristics:
This cord is produced by twisting a few to a dozen or more textured glass yarns type E around one axis. This twisted cord fits exceptionally well over isolated surfaces that it is wound around.

Application:
This cord can be used as thermal insulation with all types of transfer ducts, heating installations, machinery and equipment. It is also used as static sealing in all types of chambers, driers and furnaces.

Minimum temperature [°C]	Maximum peak temperature [°C]	Maximum temperature under continuous operation [°C]	Dimension range [mm]
-100	700	650	3-12

TWISTED ALUMINOSILICATE CORDS TYPE 455 AND 456

Characteristics:
These cords are made of coaxially twisted aluminosilicate yarns. Such a design provides high tensile strength and allows for simple, on-site adjustment of the diameter by untwisting. As with the previous cord, these two types fit exceptionally well over isolated surfaces that they are wound around.
Type 455 is made of aluminosilicate yarn on glass carrier.
Type 456 is made of aluminosilicate yarn reinforced with stainless steel wire.

Application:
These two types can be used as thermal insulation with all types of transfer ducts, heating installations, machinery and equipment. They are also used as static sealing in all types of chambers, driers and furnaces.
We generally recommend to use type 456, however, where the use of metal is not desirable, we recommend type 455.

Minimum temperature [°C]	Maximum peak temperature [°C]	Maximum temperature under continuous operation [°C]		Dimension range [mm]
		static	dynamic	
-100	1200	1100	650	3-12

THERMAL INSULATIONS

OVER-BRAIDED ALUMINOSILICATE CORDS TYPE 475 AND 476

Characteristics:

These types are produced by over-braiding a core with aluminosilicate yarn. The core consists of either a bunch of aluminosilicate yarns, or soft aluminosilicate fibres. In result, these cords are both soft and mechanically durable.
Type 475 is made of aluminosilicate yarn on glass carrier.
Type 476 is made of aluminosilicate yarn reinforced with stainless steel wire.

Application:

These cords can be used as thermal insulation with all types of transfer ducts, heating installations, machinery and equipment. Thanks to their softness and elasticity they are also used as static sealing in all types of chambers, driers and furnaces.
We generally recommend to use type 476, however, where the use of metal is not desirable, we recommend type 475.

Minimum temperature [°C]	Maximum peak temperature [°C]	Maximum temperature under continuous operation [°C]		Dimension range [mm]
		static	dynamic	
-100	1200	1100	650	6-60

OVER-BRAIDED GLASS CORD TYPE 494

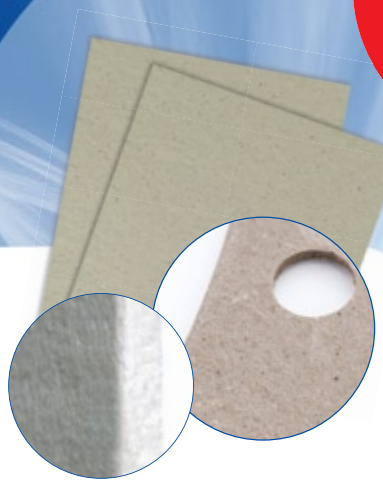
Characteristics:

This type consists of a glass core over-braided with textured glass yarn. In result, this product is both soft and mechanically durable.

Application:

Type 494 can be used as thermal insulation with all kinds of transfer ducts, heating installations, machinery and equipment. Thanks to its softness and elasticity it is used as static sealing in all types of chambers, driers and furnaces. This type is recommended for use in systems for treatment and removal of flue and post-reaction gases. It is also popular as insulation of furnace and fireplace doors.

Minimum temperature [°C]	Maximum peak temperature [°C]	Maximum temperature under continuous operation [°C]		Dimension range [mm]
		static	dynamic	
-100	700	650	650	6-60



MILLBOARD BA

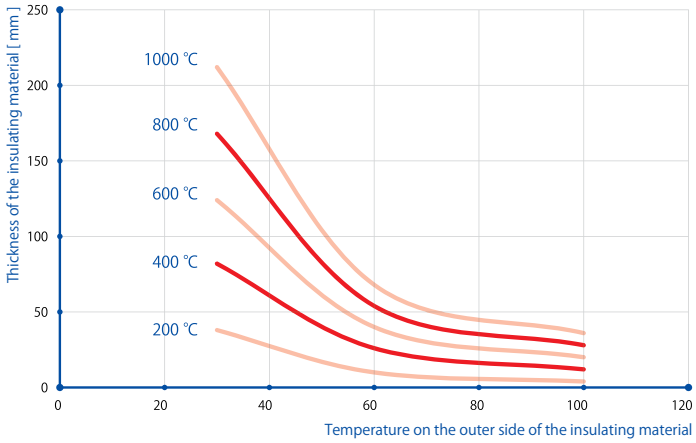
General information

Thermal insulation millboards BA are produced on the basis of ceramic and mineral fibres with wide-ranging resistance to heat, and heat-resistant fillers and binders, with the use of paper technology.
Thanks to the benefits offered, i.e. low density, excellent thermal insulation properties, immunity to thermal shocks, heat resistance, and ease of processing, Gambit BA products are widely used in power generation, metallurgy, and ceramics sector. Paper technology adopted in the production process of millboards, consisting in ordered arrangement of fibres, facilitates resistance to substantial mechanical loads and, thus, enables the use as a sealing material for flange joints.
Characteristics and working parameters are detailed in tables below.

Board symbol Parameter Thermal conductivity, W/mK	Millboard BA-700	Millboard BA-1050	Millboard BA-1200	Millboard BA-1400
w 20 °C	0,117	0,090	0,121	0,106
w 300 °C	0,136	0,111	0,144	0,138
w 400 °C	0,149	-	-	-
w 600 °C	0,174	0,165	0,189	0,182
w 800 °C	-	0,202	0,226	0,215
w 1000 °C	-	0,259	0,282	0,266
w 1100 °C	-	-	0,319	-
w 1200 °C	-	-	-	0,403

The most troublesome issue when selecting thermal insulation is estimation of thickness of layer required to achieve the desired insulation capacity. Above coefficients help calculating the thickness of thermal insulation layer required to reduce heat transfer via insulation. Calculation of actual heat loss or reduction in external temperature requires the knowledge of heat transfer and heat emission coefficients. These coefficients vary depending on local working conditions and the environment. Thus, as manufacturers of thermal insulation, we cannot guarantee achievement of the assumed insulating effect in the form of, e.g., external temperature of insulation.
The thickness of insulation required to achieve the desired external temperature can be estimated using the nomogram below. It represents the thickness of insulation as a function of the cool-side temperature, with temperatures of the hot side given as curves.

THERMAL INSULATIONS



Temperatures of the hot side of insulating material: 200 °C, 400 °C, 600 °C, 800 °C, and 1000 °C.

The nomogram is determined following the assumption of external temperature of 15 °C.

Board symbol Parameter	Millboard BA-700	Millboard BA-1050	Millboard BA-1200	Millboard BA -1400
Maximum temperature	700 °C	1050 °C	1250 °C	1400 °C
Application	general purpose thermal insulation millboard	soft millboard; after wetting, suitable for bending	hard millboard, mostly used for cutting	millboard with unique thermal resistance
Transverse tensile strength (min.)	1,10 MPa	1,20 MPa	1,30 MP	1,20 MPa
Transverse tensile strength (min.)	1,50 MPa	1,50 MPa	1,50 MPa	1,50 MPa
Shrinkage after 2 h at 600 °C (max.)	15%	15%	15%	15%
Humidity (max.)	3,0%	3,0%	3,0%	3,0%
Dimensions of sheets in mm	1000x1000	1000x1000	1000x1000	1000x1000
Weight of sheet with thickness				
2,0±0,24 mm	-	1400 g	1400 g	1400 g
2,5±0,40 mm	-	1800 g	-	-
3,0±0,40 mm	2250 g	2100 g	2100 g	2100 g
4,0±0,40 mm	3000 g	2800 g	2800 g	2800 g
5,0±0,49 mm	3700 g	3400 g	3400 g	3400 g
6,0±0,49 mm	4400 g	4000 g	4000 g	4000 g
7,0±0,49 mm	5050 g	-	-	-
8, 0±0,49 mm	5600 g	5200 g	5200 g	5200 g

THERMAL INSULATION FABRICS AND TAPES

General information

We offer thermal insulation fabrics and multilayer tapes made of top quality materials. Our products include thermal insulations, conveyor belts, and manhole tapes.

They are made using heat resistant glass, kaolin, aluminosilicate, quartz, and aramid yarns.

Thanks to specific structure and interweaving of yarns of various layers, the product is dense and resistant to delamination even under most demanding working conditions.
Thermal insulation tapes and fabrics are used as thermal insulation in all types of machinery, equipment and installations exposed to high temperatures, and wherever reduction in heat transfer is an aim.
They are frequently used as heat screens, insulations for annealing of welded structures, and as a protection of hoses and cables laid near heat sources.
They are also used as static insulation wherever high temperatures are accompanied by relatively low pressure of sealed medium, and/or large wear of flanges. To that end we can weave the tape with central section perforated in order to set the tape over the bolts of the sealed joint. Our tapes are also used in belt conveyors to transport hot objects and materials.
Upon request we can produce self-adhesive glass and aramid tapes. However, please mind that the adhesive layer only facilitates mounting and shall burn out under working conditions.

Other yarns for tapes and fabrics are available subject to arrangement between the customer and the manufacturer.

THERMAL INSULATIONS

Dimensions and dimensional tolerances

Width [mm]	Thickness [mm] ± 10%								
	2±0,3	3±0,4	5±0,7	6±0,8	8±0,8	10±1,0	12±1,2	15±1,5	20±2,0
30±2	A, S ,G	A, S ,G	A, S ,G	A, S ,G	A, S ,G	A, S ,G	A, S ,G	-	-
40±2	A, S ,G	A, S ,G	A, S ,G	A, S ,G	A, S ,G	A, S ,G	A, S ,G	A, S ,G	-
50±2	A, S ,G	A, S ,G	A, S ,G	A, S ,G	A, S ,G	A, S ,G	A, S ,G	A, S ,G	-
60±2	A, S ,G	A, S ,G	A, S ,G	A, S ,G	A, S ,G	A, S ,G	A, S ,G	A, S ,G	A, S ,G
80±2	A, S ,G	A, S ,G	A, S ,G	A, S ,G	A, S ,G	A, S ,G	A, S ,G	A, S ,G	A, S ,G
100±2	A, S ,G	A, S ,G	A, S ,G	A, S ,G	A, S ,G	A, S ,G	A, S ,G	A, S ,G	A, S ,G
120±2	A, S ,G	A, S ,G	A, S ,G	A, S ,G	A, S ,G	A, S ,G	A, S ,G	A, S ,G	A, S ,G
140±2	A, S ,G	A, S ,G	A, S ,G	A, S ,G	A, S ,G	A, S ,G	A, S ,G	A, S ,G	A, S ,G
160±2	A, S ,G	A, S ,G	A, S ,G	A, S ,G	A, S ,G	A, S ,G	A, S ,G	A, S ,G	A, S ,G
180±3	A, S ,G	A, S ,G	A, S ,G	A, S ,G	A, S ,G	A, S ,G	A, S ,G	A, S ,G	A, S ,G
200±3	A, S ,G	A, S ,G	A, S ,G	A, S ,G	A, S ,G	A, S ,G	A, S ,G	A, S ,G	A, S ,G
220±3	A, S ,G	A, S ,G	A, S ,G	A, S ,G	A, S ,G	A, S ,G	A, S ,G	A, S ,G	A, S ,G
250±3	A, S ,G	A, S ,G	A, S ,G	A, S ,G	A, S ,G	A, S ,G	A, S ,G	A, S ,G	-
300±4	A, S ,G	A, S ,G	A, S ,G	A, S ,G	A, S ,G	A, S ,G	A, S ,G	A, S ,G	-
400±4	A, S ,G	A, S ,G	A, S ,G	A, S ,G	-	-	-	-	-
500±5	A, S ,G	A, S ,G	-	-	-	-	-	-	-
600±6	A, S ,G	A, S ,G	-	-	-	-	-	-	-
800±8	A, S ,G	A, S ,G	-	-	-	-	-	-	-
1000±10	A, S ,G	A, S ,G	-	-	-	-	-	-	-
1200±10	A, S ,G	A, S ,G	-	-	-	-	-	-	-

A - aramid tape or fabric S - glass tape or fabric G - ceramic tape or fabric

THERMAL INSULATIONS

Glass tapes and fabrics

Glass tapes and fabrics are made of type E boroaluminosilicate glass, or type HT high temperature glass. Textured glass yarn consists of a bunch of continuous glass fibres of type E glass, subjected to curling process in order to increase its elasticity and improve the efficiency of insulation. We produce fabrics and tapes of type E glass - heat resistance up to 650 °C, and of HT glass - working at temperatures up to 750 °C.

Technical parameters

Type of tape or fabric	Glass E	Glass HT
Type of tape or fabric, °C	650	750
Temp. under dynamic operation, °C	650	750
Weft density in one layer	19-23* 17-21**	
Warp density in one layer	19-23* 17-21**	
Shrinkage after 2h at 800 °C, % of weight	max. 1,5	

* for thicknesses 2-10 mm ** for thicknesses 12-20 mm

Aramid tapes and fabrics

Aramid tapes and fabrics can be made from cut fibres of aromatic polyamide braided around glass carrier, or from continuous aramid fibre. Thanks to their excellent mechanical strength, tapes made of continuous aramid fibre are used as conveyor belts. Aramid yarn is obtained by braiding bunches of aromatic polyamide fibres around the glass core.

Technical parameters

Type of tape or fabric	Aramid
Temp. under static operation, °C	400
Temp. under dynamic operation, °C	300
Weft density in one layer	19-23* 17-21**
Warp density in one layer	19-23* 17-21**
Shrinkage after 2h at 400 °C, % of weight	max. 1,5

* for thicknesses 2-10 mm ** for thicknesses 12-20 mm

Ceramic tapes and fabrics

Ceramic tapes and fabrics can be made of kaolin, aluminosilicate, and BIO aluminosilicate yarn. Ceramic yarn is made of ceramic fibres braided on glass carrier. Up to 18% of cotton fibres are added as process additive. During operation cotton fibres burn out without aggravating the parameters of ceramic tapes and fabrics. In addition, the yarn can be reinforced with stainless steel or brass wire. Ceramic yarns include, among others, the following:

a. kaolin yarn – spun of fibres which are extracted through melting and defibering of natural kaolin. Since natural kaolin can include admixtures of various metals, resulting fibres can be tinted and feature lower application temperature than that of aluminosilicate fibres.

b. aluminosilicate yarn – based on aluminosilicate fibres featuring high chemical purity and increased heat resistance. Thanks to high chemical purity, it can be used at temperatures higher than kaolin yarn.

c. Bio-soluble ceramic yarn – thanks to the addition of calcium oxide and magnesia, fibres of this yarn type are biodegradable and, hence, considered safe to living organisms.

Technical parameters

Type of tape or fabric	Kaolin	Aluminosilicate	Bio-soluble ceramic
Temp. under static operation, °C	800	1200	1100
Temp. under dynamic operation, °C	650	650	650
Weft density in one layer	19-23* 17-21**		
Warp density in one layer	19-23* 17-21**		
Shrinkage after 2h at 800 °C, % of weight	max. 20		

* for thicknesses 2-10 mm ** for thicknesses 12-20 mm

GASKET SHEETS

TECHNICAL SPECIFICATION

Gasket sheet Gambit AF-U

Material

Gasket sheet **GAMBIT AF-U** is based on Kevlar® aramide fibres, mineral fibres, and fillers bound with NBR rubber-based binder.

Designation according to DIN 28091-2: **FA-AM1-O**

Kevlar® is a registered trademark of E. I. du Pont de Nemours and Company or its affiliates.

General properties and applications

Sheet designated for sealing in medium temperature and medium pressure applications. Specially designed for drinking water installations. Water, steam, kerosene, fuel, and oil resistant, among other media.

Admissions / Certificates

PZH
TA Luft (VDI 2440)

Maximum working conditions

Peak temperature	**°C**	350
Temperature under continuous operation	**°C**	250
Temperature under continuous operation with steam	**°C**	200
Pressure	**MPa**	10

Dimensions

Standard thicknesses of sheets /thicknesses above 5.0 mm are produced by gluing/	**mm**	0,3; 0,5; 0,8 1,0; 1,5; 2,0; 2,5 3,0; 4,0; 5,0; 6,0	± 0,1 ± 10% ± 10%
Standard dimensions of sheets /custom dimensions available within the total range of 1500x3000 mm/	**mm**	1500x1500	± 10,0

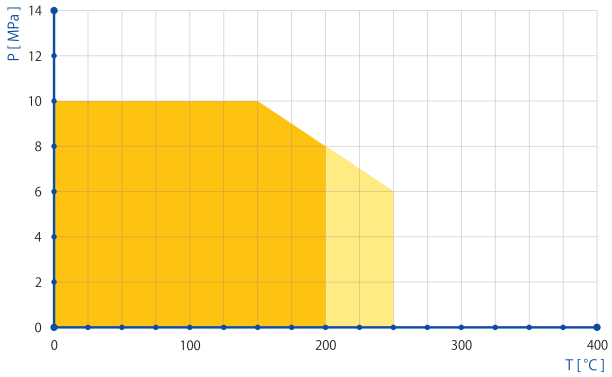
Non-standard thicknesses, graphiting of sheet surfaces, and reinforcement with metallic mesh available upon request.

GASKET SHEETS

Physical and chemical properties

Density	± 5%	**g/cm³**	2,0	DIN 28090-2
Transverse tensile strength	min.	**MPa**	8	DIN 52910
Compressibility	typical value	**%**	10	ASTM F36
Elastic recovery	min.	**%**	50	ASTM F36
Residual stresses 50 MPa/16 h/300 °C/	min.	**MPa**	22	DIN 52913
Residual stresses 50 MPa/16 h/175 °C/	min.	**MPa**	28	DIN 52913
INCREASE IN THICKNESS				
Oil IRM 903 150 °C/5 h	max.	**%**	8	ASTM F146
Model fuel B 20 °C/5 h	max.	**%**	8	ASTM F146
Colour		**light blue**		

(Values as detailed in table refer to 2.0 mm thick gasket sheets)



It is not recommended that maximum temperature and pressure are applied simultaneously. Pressure to temperature correlation for sheet thickness 2.0 mm is shown in the diagram.

- There is no requirement for trials.
- Trials should be run if the application involves steam.

GASKETS FOR STATIC APPLICATIONS IN FLANGE JOINTS

General Information

Flange joints are the most common industrial joints used in pipelines, machineries and installations. The most popular materials that ensure their tightness are static gaskets. Gambit Lubawka Sp. z o.o. offers a wide range of gasket types meeting various needs of customers.
We manufacture gaskets for various flange types and sizes. The most popular norms whose requirements give basis for our products are the following:

EN 1759 – flanges defined in the metric system with the indication of classes
EN 1092 – flanges defined in the metric system with the indication of PN
EN-ISO 7005 – flanges defined in the metric system with the indication of PN
ASME B 16.5 – flanges defined in the imperial system with the indication of classes

After having flanges defined by the customer, we offer gaskets according to relevant standards, and provide their design and dimensions. These standards are also quoted in the descriptions of individual gasket types. We also produce gaskets outside standard size ranges, based on specifications from our customers.

In order to meet the requirements of the customers who use various types of flanges, we produce the following types of gaskets:

1. Cut gasket, also with clad edges.

2. Spiral wound gaskets: Gamspir and Azmes types.

3. Kammprofile gaskets.

4. Metal jacketed gaskets.

Due to the diversity of designs and size ranges, when placing order, please specify:

1. Gasket geometry:

a. Type and size of the gasket.

b. Standard, nominal pressure and nominal diameter.

c. Drawings.

2. Gasket material.

3. Type of the sealed medium.

4. Temperature and pressure of the sealed medium.

5. Any other important requirements.

Cut gaskets

Gambit cut gaskets comprise a family of products which are made of a broad range of materials. In addition to Gambit gasket sheets, they can be cut out of high-temperature thermal insulation millboards, PTFE gasket sheets, expanded graphite, or expanded vermiculite. Among the cut gaskets offered by Gambit, there are also gaskets cut from rubber, aluminium, and copper sheets, as well as fibre washers.

Main working parameters of gaskets made of individual materials are detailed in the table:

Material	Temperature °C	Pressure MPa	Applications
GAMBIT AF-200 Universal	220	6	Water, steam, fuels, oils, solvents, solutions of salts, solutions of weak acids and bases.
GAMBIT AF-202	180	4	Water, steam, fuels, oils, solvents, solutions of salts, solutions of weak acids and bases.
GAMBIT AF-300	280	10	Water, steam, solutions of salts, solutions of weak acids and bases.
GAMBIT AF-200 G	320	8	Water, steam, kerosene, solvents, fuels, oils, gasoline, solutions of salts, solutions of weak acids and bases.
GAMBIT AF-OIL	300	10	Water, steam, fuels, oils, solvents, solutions of salts, solutions of weak acids and bases.
GAMBIT AF-400	350	12	Water, steam, fuels, oils, solvents, solutions of salts, solutions of weak acids and bases.
GAMBIT AF-1000	350	12	Water, fuels, oils, solvents, flue gases.
GAMBIT AF-153	155	4	Water, steam, fuels, oils, solvents.
GAMBIT AF-CD	160	8	Water, steam, fuels, oils, solvents.
GAMBIT AF-U	250	10	Water, steam, fuels, oils, solvents.
GAMBIT AF-CHEMACID	150	4	Water, solutions of strong acids (including oxidizers), alkalis.
GAMBIT SOFT	150	3	Water, solutions of weak acids and bases.
PARO-GAMBIT	350	10	Fuels, oils, solvents, solutions of weak acids and bases. Particularly recommended for steam installations.
GAMBIT PTFE	250	6	All media - including strong acids and bases, but excluding molten alkali metals, gaseous fluorine, and hydrogen fluoride.
GAMBIT GRZ	550	12	Most chemicals, excluding strong oxidants, such as nitric acid, chromic acid, and concentrated sulphuric acid.
THERMOGAMBIT	800	20	Water, steam, fuels, oils, solvents, solutions of salts, solutions of weak acids and bases. Particularly recommended for flue-gas removal systems.
BA-700	700	0,1	For power generation, metallurgy, and other high temperature applications.
BA-1050	1050	0,1	For power generation, metallurgy, and other high temperature applications.
BA-1200	1200	0,1	For power generation, metallurgy, and other high temperature applications.
BA-1400	1400	0,1	For power generation, metallurgy, and other high temperature applications.

GASKETS

Working parameters referred to in the above table should be reduced if standardization documents for flanges or gasket geometry so require.

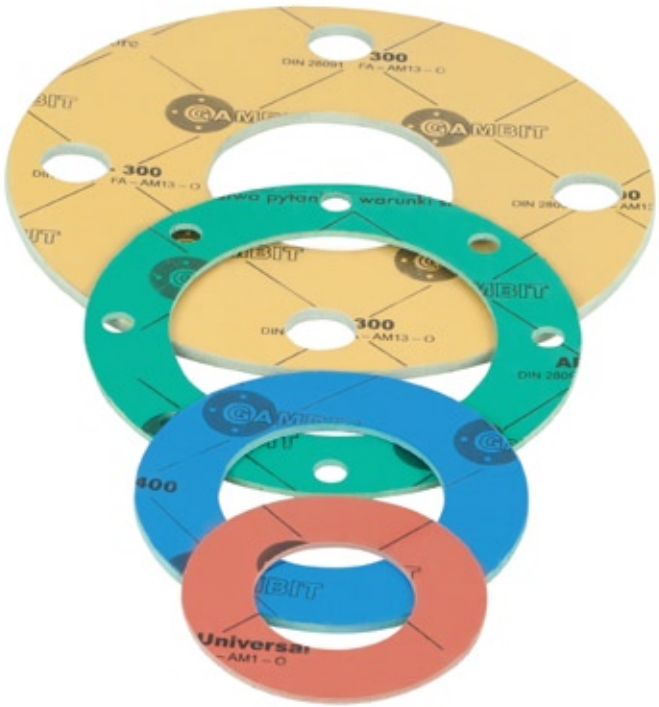
Working parameters of gaskets made of various materials result from the parameters of such materials, as well as standardization documents according to which these gaskets are manufactured.

Gambit offers gaskets with internal, or external edges reinforced with copper, or stainless steel. In addition to improving the tear strength of the gasket, such reinforcement improves also gasket tightness and protects the gasket material from chemical effects of the sealed medium.

We produce gaskets according to the following standards:

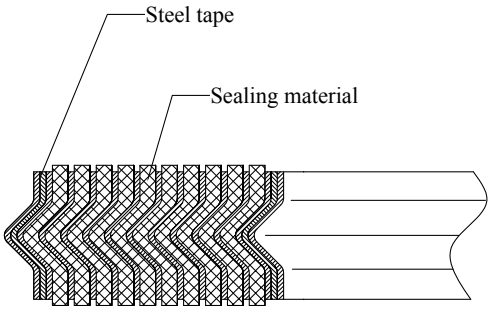
EN 1514-1
EN 12560-1
ISO 7483
ASME B 16.5, B 16.21, B 16.47
DIN 2690, 2691, 2692
DIN 7168
PN 86/H74374/2÷4

Additionally, we are ready to supply non-standardized sizes, as well as custom gaskets, in line with customer's drawings, or samples.



Spiral wound gaskets Gamspir and Azmes

Spiral wound gaskets are recommended for applications in petrochemical plants, refineries, chemical and power systems, etc., i.e. wherever high working parameters must be accompanied with high reliability.



Thanks to their design, spiral wound gaskets combine high heat resistance and elasticity of steel with sealing properties of soft gasket materials, such as expanded graphite and PTFE. Such gaskets are effective even with small mounting loads. They are non-flammable and blow-out resistant. Thanks to undeniable advantages, spiral wound gaskets are becoming more and more popular in industrial applications.

At Gambit, we produce spiral wound gaskets using a semi-automatic winding and welding machine, providing consistency of winding and welding parameters, and ensuring stable quality.

Our gaskets are manufactured according to the most popular standards:

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

According to these standards we manufacture the following types:

- GAMSPIR - without centering rings
- GAMSPIR I - with the inner centering ring
- GAMSPIR O - with the outer centering ring
- GAMSPIR IO - with inner and outer centering rings

Our standard design comprises steel type SS316L (inner centering ring and metallic spiral), galvanised carbon steel (outer centering ring), and expanded graphite or PTFE (filler). Such execution makes the gasket useful in the range of pressures as defined in the standards, and at temperatures up to 550 °C.

We offer spiral wound gaskets in the following size range:

- without the inner ring - up to 24'' (610 mm)
- with the inner ring - up to 14'' (356 mm)
- thickness 4.5 mm (3.2 mm when assembled)

Non-standard sizes and material versions for specific working conditions are available upon request.

Oval gaskets AZMES, designed for sealing manholes and handholes in pressure vessels and boilers, are of similar design. This type is executed without centering rings. Our standard materials are steel tape made of SS316L, and expanded graphite tape as the filler. Other material versions are available upon request.

GASKETS

Jacketed gaskets with BA filler

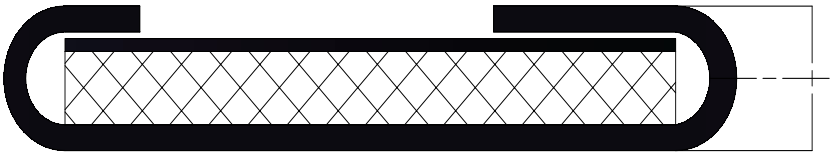
Wherever classic gaskets, cut out of gasket sheets, cannot be used due to temperature, pressure, or chemical effect of the sealed medium, we recommend jacketed gaskets with BA filler.

Gambit Lubawka Sp. z o.o. manufactures this type of gaskets from copper sheets, with filler material made of thermal insulation millboard. Thanks to soft annealed copper material they fit well the sealed surface, preventing the leakage of medium across the gasket and isolating the filling material from its chemical effects. The filler is usually made of thermal insulation millboard based on mineral or ceramic fibres resistant to high temperatures. Thanks to its laminar structure, millboard material provides appropriate elasticity to ensure tightness of joints across a wide temperature range.

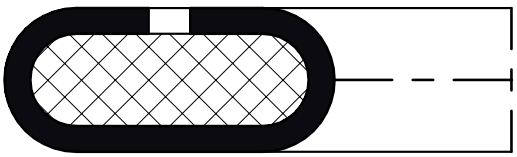
Jacketed gaskets are mostly used in the construction and repair of machinery and equipment for such domains as transportation, power generation, chemical and petrochemical sector, i.e. in applications with sudden and substantial changes in the pressure of sealed medium. These gaskets can be used within temperature range -200÷+600 °C, and at pressures up to 12 MPa. Depending on the design of a joint, it is permitted to exceed the above-mentioned working parameters after completion of trial operation.

Jacketed gaskets cannot be used with compressed oxygen or media aggressive to the metal used.

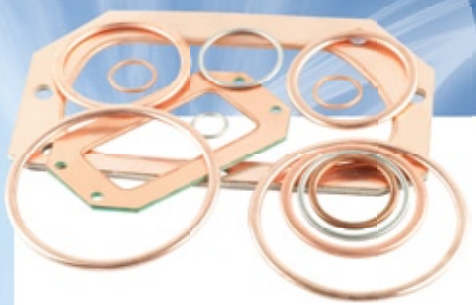
Jacketed gaskets are executed according to our technical documentation WT 296/2010. They are manufactured in two types:



• double jacketed gasket



• single jacketed gasket



GASKETS

Manufactured sizes of gaskets

Thickness [mm]	Dimensions [mm]					
1,65	19,4x26,7x1,65					
2,0	6x10x2,0	6x12x2,0	8x12x2,0	8x14x2,0	9,5x13,5x2,0	10x14x2,0
	10x16x2,0	10,5x16,5x2,0	11x17x2,0	12x16x2,0	17x23x2,0	18x24x2,0
	20x51x2,0	22,5x28,5x2,0	25x56x2,0	25x75x2,0	30x65x2,0	30x71x2,0
	60x90x2,0	60x100x2,0	61x69x2,0	62x74x2,0	80x145x2,0	
2,5	8x15x2,5	12x16x2,5	12x19x2,5	14x18x2,5	14x19x2,5	14x20x2,5
	15x22x2,5	16x20x2,5	16x22x2,5	18x22x2,5	20x24x2,5	20x26x2,5
	20x28x2,5	21x26x2,5	22x27x2,5	22x28x2,5	22,3x28,3x2,5	22x30x2,5
	28x36x2,5	33x39,5x2,5	34x40x2,5	34x43x2,5	35x44x2,5	38x44x2,5
	38,5x44x2,5	45x50x2,5				
3,0	10x18x3,0	12x19x3,0	12x22x3,0	14x20x3,0	15x22x3,0	16x22x3,0
	16x24x3,0	17x25x3,0	18x24x3,0	18x28x3,0	19x27x3,0	20x26x3,0
	20x30x3,0	21x28x3,0	22x29x3,0	22x30x3,0	22,5x28x3,0	23x32x3,0
	24x30x3,0	24x32x3,0	26x32x3,0	26x34x3,0	26x34x3,0	27x33x3,0
	27x34x3,0	27x35x3,0	27x36x3,0	30x36x3,0	30x38x3,0	30x42x3,0
	32x43x3,0	33x39x3,0	33x42x3,0	33x43x3,0	33x45x3,0	35x45x3,0
	36x42x3,0	36x65x3,0	38x48x3,0	39x49x3,0	40x46x3,0	40x50x3,0
	42x49x3,0	42x54x3,0	43x56x3,0	43x65x3,0	44x51x3,0	45x52x3,0
	44x54x3,0	46x58x3,0	48x56x3,0	49x64x3,0	50x60x3, 0	54x63x3,0
	61x68xx3,0	70x80x3,0	78x86x3,0	81x88x3,0	81x90x3,0	70x80x3,0
3,5	25x38x3,5	26x36x3,5	32x49x3,5	36x46x3,5	37x48x3,5	40x47x3,5
	40x50x3,5	42x52x3,5	43x53x3,5	52x60x3,5	53x65x3,5	54x62x3,5
	54x64x3,5	56x65x3,5	63x73x3,5	66,5x78,5x3,5	77x87,5x3,5	95x108x3,5
	98x123x3,6	99x153x3,6	100x110x3,5	111x153x3,6		
4,0	10,5x22x4,0	17x28x4,0	39x53x4,0	39x53x4,0	40x52x4,0	40x52x4,0
	43x54x4,0	43x55x4,0	48x60x4,0	50x68x4,0	58x72x4,0	59x71x4,0
	60x74x4,0	60x75x4,0	65x80x4,0	70x85x4,0	74x88x4,0	75x85x4,0
	75x90x4,0	80x95x4,0	85x100x4,0	89x103x4,0	90x105x4,0	93x103x4,0
	100x115x4,0	105x120x4,0	110x125x4,0	112x124x4,0	115x130x4,0	
4,5	38x46x4,5	43x64x4,5	60x70x4,5	65x85x4,5		
5,0	38x54x5,0	40x56x5,0	42x58x5,0	84x109x5,0	120x140x5,0	125x140x5,0
	130x150x5,0	140x160x5,0	142x168x5,0	150x170x5,0	165x185x5,0	185x205x5,0
6,0	30x47x6,0	36x52x6,0	47x64x6,0	51x66x6,0	192x218x6,0	
6,4	64x79x6,4					
9,5	63,3x82,3x9,5					

Gaskets made in other sizes, and of other materials, are available subject to agreement.