

TEMAC

GASKET & SEALING TECHNOLOGY



Introduction

Temac is a leading Central European manufacturer and distributor of industrial gaskets and sealings, which are used in power engineering, chemical, gas, oil, petrochemical and general machine-building industries.

Due to deployment of new technologies and a range of international quality certifications, Temac's list of customers includes companies such as Slovnaft (MOL), Shell, the Unipetrol Group, PKN Orlen, Gazprom and numerous subsidiaries of the Eriks (Royal Econosto Group, the Netherlands), to which Temac belonged from 1997 until 2006.

History of Temac, a.s.

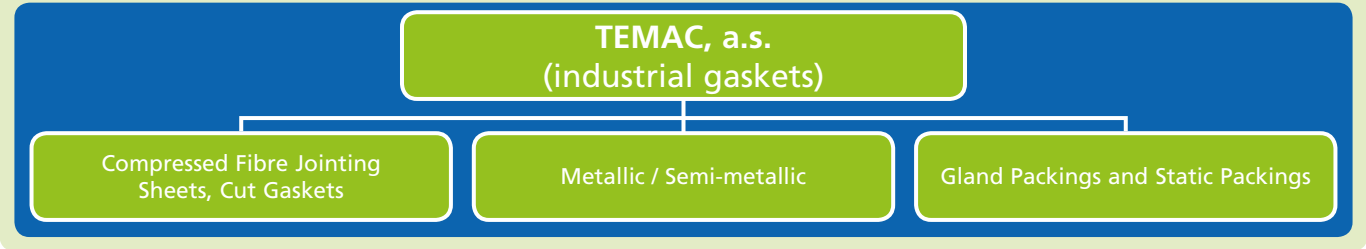
The company was established in 1917 in the village of Zverinek, which is situated 40 km east of Prague. The beginning of gasket and sealing production dates back to 1919. During the period of national changes in 1993, the company was privatised by a Dutch company DNI B.V.

In 1994, the company started production of sealing materials based on synthetic aramide fibres. From 1997, the company was incorporated into Dutch Royal Econosto Group listed on Amsterdam stock-exchange and took over production facilities and technologies from the Netherlands and the UK. Since December 2012 TEMAC has become the member of VATI Group, Russia.



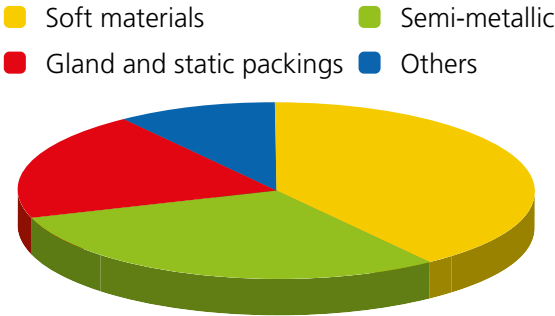
Sealing Solutions, New Technologies

Temac develops, manufactures and distributes a broad range of sealing solutions on basis of own Research and Development and co-operations with leading international material suppliers. We are working long-term on basis of an ISO 9001 system awarded by TÜV certification auditor and ISO 14001. Our logo emphasizes our almost hundred-years history, as well as our positive attitude to environmental protection.

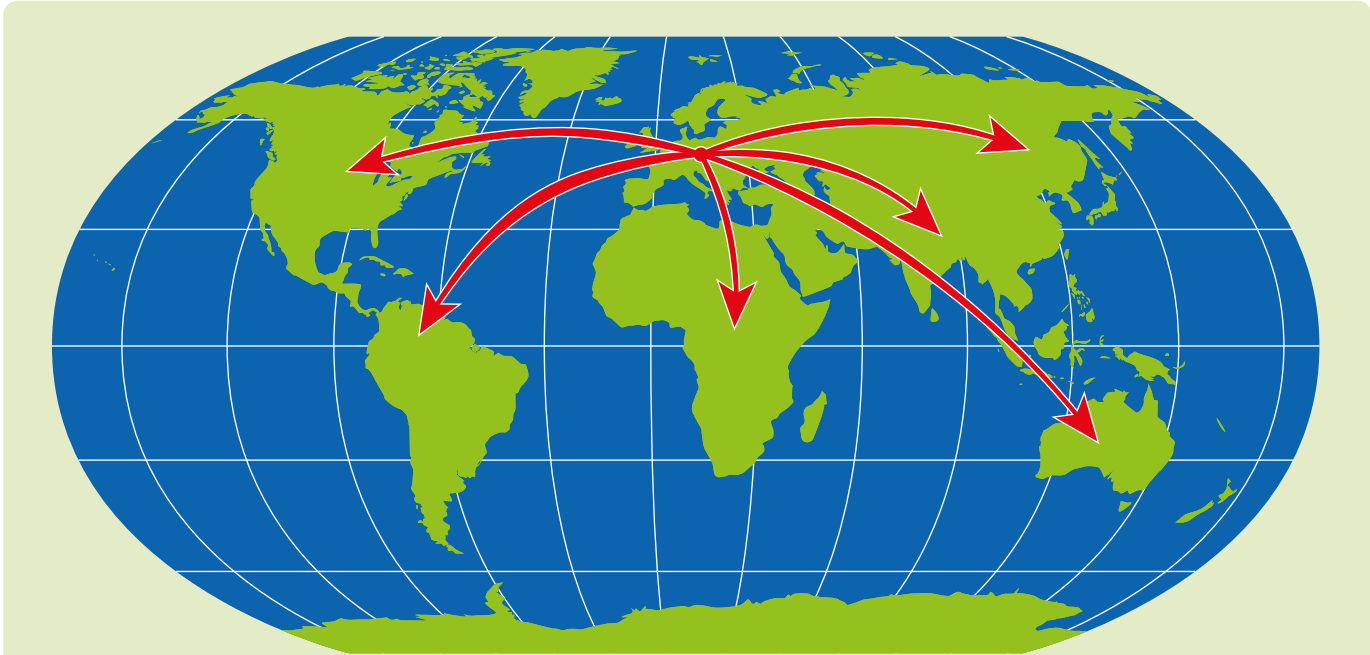


Our objective is the satisfaction of our customers and fulfilment of their requirements at the shortest possible time. Our company is proud of a growing reference list of end customers. Our goal is to further shorten our delivery times for our customers and to make our position even stronger as a qualified and preferred supplier of sealing solutions.

Temac is a manufacturer and supplier of full range of sealing elements: compressed synthetic fibre jointing sheets, expanded graphite and PTFE sheets, a wide range of combined gaskets (e.g. spiral wound gaskets, camprofiles, jacketed gaskets, ring type joints), and other (gland packings, graphite rings, flexible lip seals, PTFE products, static packings and textiles, thermoinsulating sheets, cut gaskets and geotextile materials.. Temac has its own research and development department, as well as testing equipment for industrial gaskets.



GASKETS		
Soft material	Metallic / Semi-metallic	Textil and other products
CSF - Compressed synthetic fibre	Spiral wound gaskets	Packings (pumps and valves)
Expanded graphite sheets	Camprofiles	Static packings and laggings
PTFE products - Uniflon	Double jacketed gaskets	Industrial textiles
Millboards	RTJ - ring type jointings	Geotextiles
Rubber sheets	Corrugated gaskets, Solid gaskets	Flexible lip seals
Ceramic paper, felt	Lens rings	PTFE (rods, sheets, hollows)
Cork-rubber sheets	Special products	PTFE components
Cut, blank, cut-out		PTFE envelope
Soft cut with inner eyelet		Manhole gaskets
AGM Geosynthetic Products		
Geogrids for asphalt- concrete layer reinforcement		Composite hoses
Geogrids AGM-Grunt		Gauge glass
Geocomposites		Technical support
		Special products



Our distribution network ensures that customers throughout the world receive our product and service quality, regardless of location. TEMAC has been exporting its products to more than 60 countries worldwide. Our exports represent more than 80% of our overall production.

Much of the success in TEMAC can be attributed to the hard work of our geographically organised sales teams which have not only focused their efforts on developing existing markets, but actively sought new areas for TEMAC product. But perhaps the most important factor in our growth is that we supply products which are of high quality, attractively priced and supported by friendly and efficient customer service.

Quality control and its assurances during the manufacturing process



The function of sealed connections is significantly influenced by the properties of the gasket. These properties take the form of characteristics which are of central significance for both, the selection of the suitable gasket as well as the required proof of tightness and strength. The technical support is the part of the sales and enables our team to provide the necessary data required by both, end customers and distributors, more and more often. Furthermore, these characteristics are essential for our production and our quality assurances.

Based on these requirements, TEMAC is proud to have TEMES testing machine supplied by the company Amtec in Germany, which provides a series of test rigs with which the gasket properties can be determined – accurately and cost-effectively.

The most important standards for gasket production and inspection technologies are DIN 28090 and EN 13555. These define the characteristics, and also define the test procedures to get the required characteristics. Furthermore, DIN 28091 describes procedures for quality control and its assurance during the entire production process of gasketing materials.

The test procedures according to DIN 52913 and DIN 3535 are also well established standards in the market and are one of the keys that may lead to the success in the current world of gaskets and seals. Many of the values, factors and the testing results are demanded by the customers all over the world regularly now. These are the simple parts of our support and the range of services to meet high and growing expectations of the global market.

TEMES is used in order to determine lots of different characteristics in accordance with many international standards such as residual stress as per DIN52913, BS7531 and ASTM F38 (Relaxation) and/or gas permeability prescribed by DIN3535-6, BS7531 and ASTM F37 as well as specific leakage rate (λ), etc. Other required characteristics could be hot and cold creep (deformation) as well as the recovery. It is also possible to measure the tightness class (L) upon the customer requirements or according to DIN28090-1 standard.

Testing according to EN 13555 standard can measure several values – e.g. tightness max. torque moment in service (Q_{smax}), modulus of elasticity (E_G, E_D), relaxation ratios, (P_{QR}), min. gasket assembly stress ($Q_{min(L)}$) and min. gasket stress in operation ($Q_{smin(L)}$) within the differential measuring method.

All the measurements made in accordance with EN 13555 do comply with DIN 28090-1. The determinations of σ_{VO} , σ_{BO} values are still frequent yet.



The company also provides "24 / 48 hours Service" covering technical questions and specifications, including active technical surveillance.



Compressed synthetic fibre jointing sheets

The Temac range of synthetic fibre jointing sheets is designed for a wide range of industrial and original equipment applications where sealing performance and specification are essential.

A comprehensive range of grades is available, covering a wide spectrum of applications. In addition, the materials can be supplied under private brand, colours various and formats according to customer's specifications. The jointing can be supplied as a sheet or as cut gaskets either to standard or non-standard dimensions. Most of the types can be supplied with a wire insertion.



Expanded graphite sheets

Our range of graphite products is designed for demanding, higher temperature applications typical for the chemical and petrochemical industry. Manufactured from high purity exfoliated graphite, the product is available with a variety of metallic inserts.

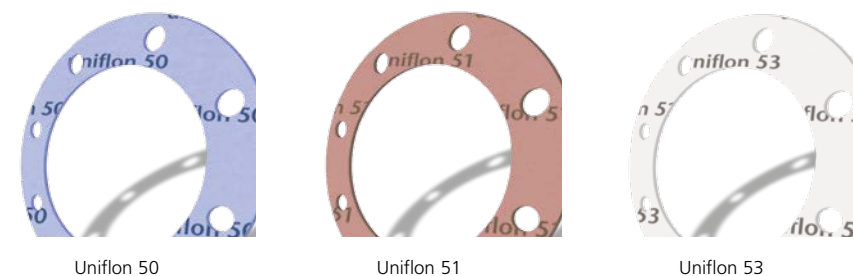
Ultra high purity for the nuclear industry and high pressure grades are also available.



PTFE products - Uniflon

Uniflon is a comprehensive range of modified and expanded PTFE sealing products designed for applications where chemical resistance is paramount or where food safety is a requirement.

The Uniflon 50 series is the latest generation of filled biaxially orientated PTFE sealing material combining outstanding chemical resistance with excellent sealing performance.



Millboards

Millboard is a relatively thin and dense sheet that is ideal for high-temperature gasketing, refractory back-up and general applications requiring a durable thermal barrier. The density of millboard is several times higher than the density of ceramic fibre papers, felts and vacuum-formed boards, resulting in a stronger choice of your application. The sheets can be die-cut or saw-cut.

	Temperature	Nefalit 5	Nefalit 7	Nefalit 11	Nefalit Al	Nefalit 1500
Nefalit 5	750 °C					
Nefalit 7	850 °C					
Nefalit 11	1100 °C					
Nefalit Al	1000 °C					
Nefalit 1500	1500 °C					
Nefinox	1350 °C					
Nefaver	1000 °C					
Nefalit Bio	1200 °C					
Tematherm 850	850 °C					
Tematherm 1100	1100 °C					

PTFE tape

Starflon is an inorganic sealant for static applications made of 100 % pure PTFE. Starflon is especially suited for sealing flange connections, pipe systems, hydraulic and pneumatic systems, etc. In addition, Starflow is ideal for seals in glass, enamel and plastic flanges and vessels. This product may also be installed on covers and doors. The applications can be found in petrochemical plants, the food industry, machine construction, laboratories, the pharmaceutical industry and gas processing companies.

Media: acids, hydroxides (alkalis), solvents, gases, etc.



Ceramic paper

The ceramic paper is made of refractory fibrous materials, normally in the forms of 1 and 2 mm thick sheet. The primary applications are thermal insulation and heat barrier creation. The flexible fabric structure can be coated with high temperature paints to provide further guard against corrosion and erosion by hot gases or the other heated materials. The paper can also be laminated with a high temperature adhesive to provide a more solid, but retaining composite feature of such heat resistance material.



Felt

Felt is a traditional material in the sealing industry and is generally used to provide dust seals in industrial applications. Felt is frequently used in applications where it has a dual function: the oil-permeated felt ring provides lasting lubrication of the underlying bearing and simultaneously acts as a dust seal.

Cork rubber sheets

Cork rubber is a mixture of cork with NBR as a binder. Its fine structure makes for an extreme dense gasket material. Because of its compressibility it is suitable for use as a seal at relatively low bolt loads. Moreover cork rubber has the ability to accommodate irregular flange surfaces and to prove a proper seal.

Rubber sheets

Rubber is a collective name for a wide range of interesting materials. The area of application for rubber is almost unlimited. Also in sealing technology, rubber is dominant in many shapes and forms, as it is easily processed from sheets into gaskets. The sheeting is available in different thicknesses, hardnesses and colours in several qualities and is available in rolls up to a standard width of 1400 mm and a roll length of up to 10 meters.

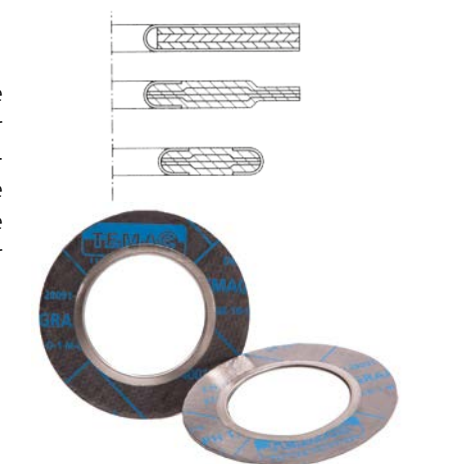


Cut gaskets

Our own cutting operation produces gaskets for pipe-flanges, machinery, heat exchangers, engines, etc. and can produce at a very short notice in case of emergency. Cutting tools, also in accordance with customer drawings or templates, are produced in our own tool shop. Cut gaskets can be produced from the sheets in Temac's production program, such as jointing sheets, expanded reinforced graphite and rubber.

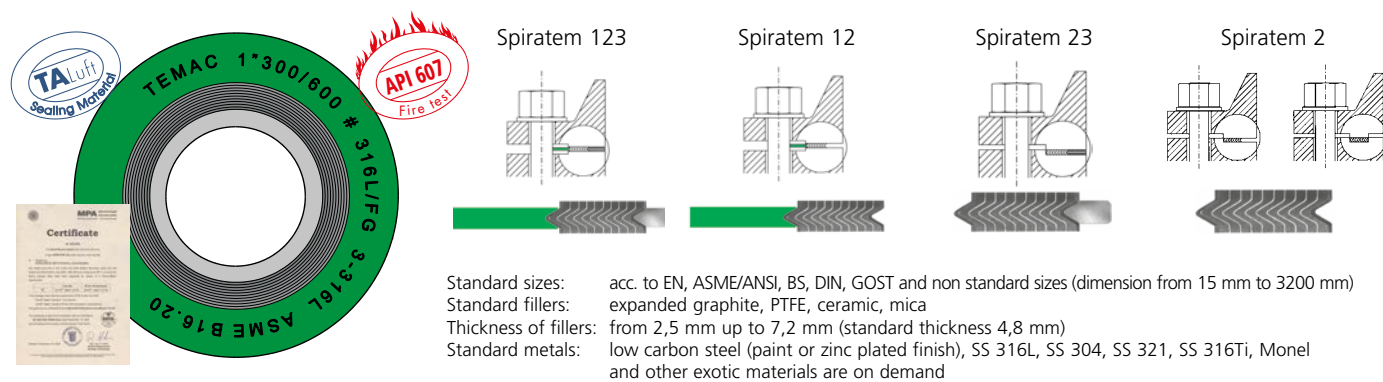
Cut gaskets with inner eyelet

Both compressed fibre and expanded graphite gaskets are available fitted with metal inner eyelets, to be used in applications where leak-free sealing is of greatest importance. The major advantages of this type of gasket are the resistance to blow-out and its higher temperature and pressure range.



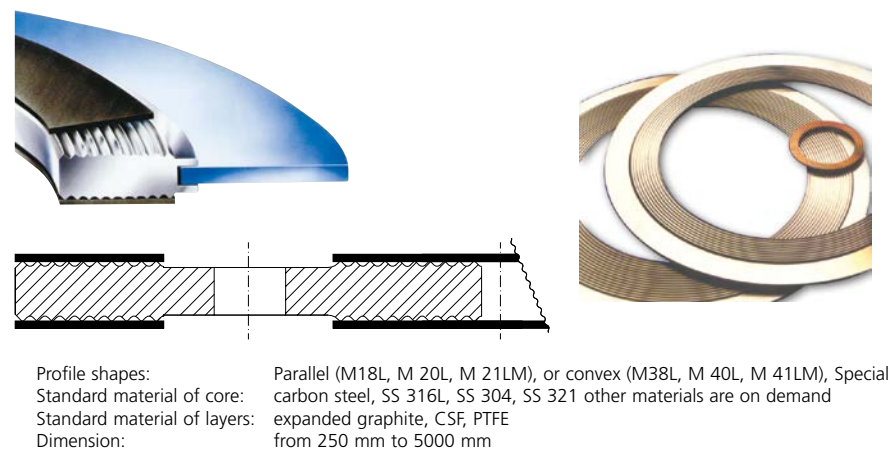
Spiral wound gaskets – SPIRATEM

Spiral wound gaskets - SPIRATEM of Temac are semi-metallic products designed for high pressure and temperature applications. A variety of forms of the gasket is available and these can be manufactured in a variety of materials or sizes to suit requirements.



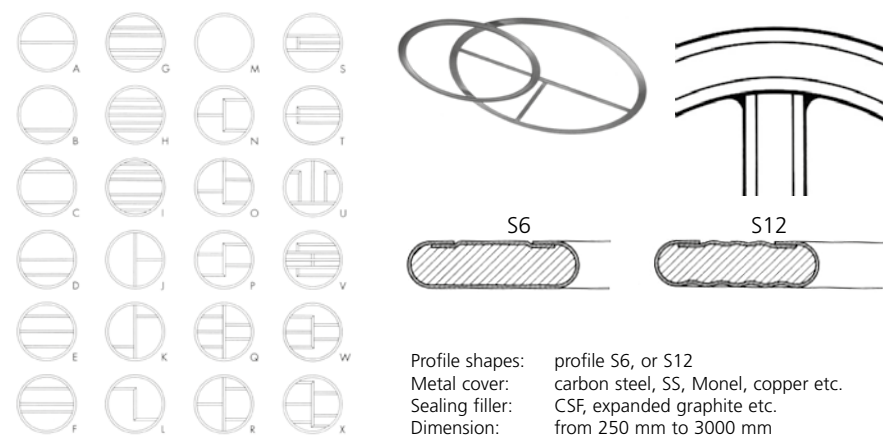
Camprofile gaskets

Camprofiles of Temac are the ideal product choice for standard pipeline and heat exchanger applications. They provide the highest levels of sealing integrity but with the ability to seal at sealing stresses normally associated with sheet materials. Camprofiles are able to cope with fluctuating temperatures and pressures making them the gasket of choice for heat exchanger service. The product can also be used invariably and again when refurbished.



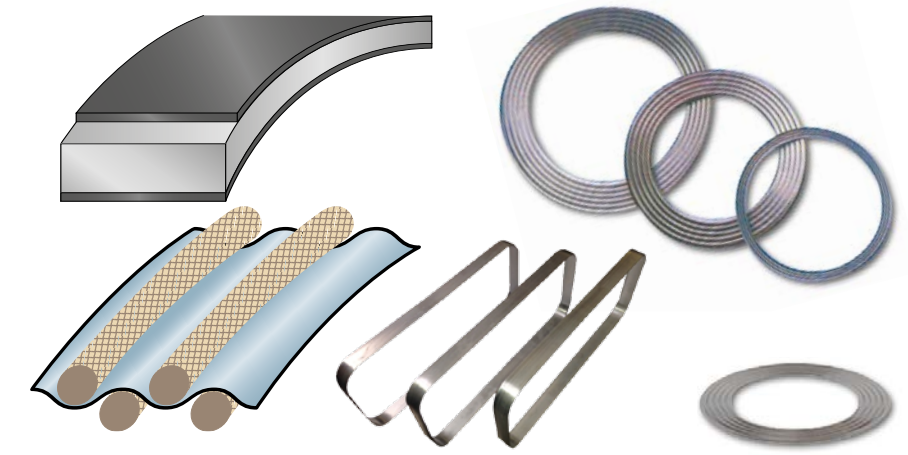
Double jacketed gaskets

Metal jacketed gaskets consist of a soft filler encapsulated in a metallic material. The filler material provides a gasket with compressibility and resilience while the jacket confers compressive strength and blow out resistance. Jacketed gaskets can be produced in a variety of configurations making them ideal for heat exchanger applications. A wide range of jacket and filler materials is available to suit every service condition.



Corrugated gaskets, Ribbon gaskets

Corrugated gaskets are universally usable sealing elements. Due to the different possibilities of manufacture in the form of rings, ovals, long ovals or frames, which can be with or without ribs, holes, and fixing loops, the field of application for these gaskets continuously expands. The gaskets can be completely or partly covered. Even in case of unmachined flanges, a satisfactory tightness could be achieved with adequate flexible soft layers.

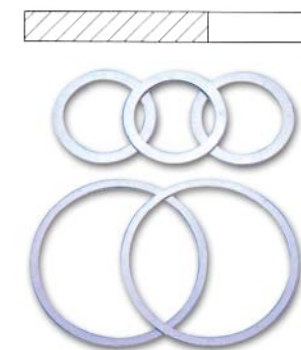


Solid metal gaskets

Solid metal gaskets can be delivered according to an international standard or customer specification. The most common types of metal gaskets are

Flat sealing ring

Used, among others, in valve seats, heat exchangers and in threaded connections.



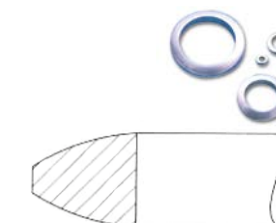
Insert ring

A machined sealing ring, available with or without sealing layer. These rings are used in groove/groove flange connections in accordance with DIN 2512 and WS 100 standards.



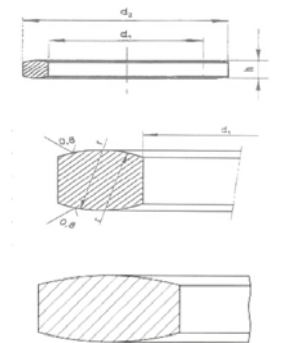
Lens ring

A machined sealing ring where the sealing action is based on line contact sealing. Effective sealing is obtained at relative limited bolt loads. This technique is widely used in high-pressure pipe systems (from PN 64 to PN 400).



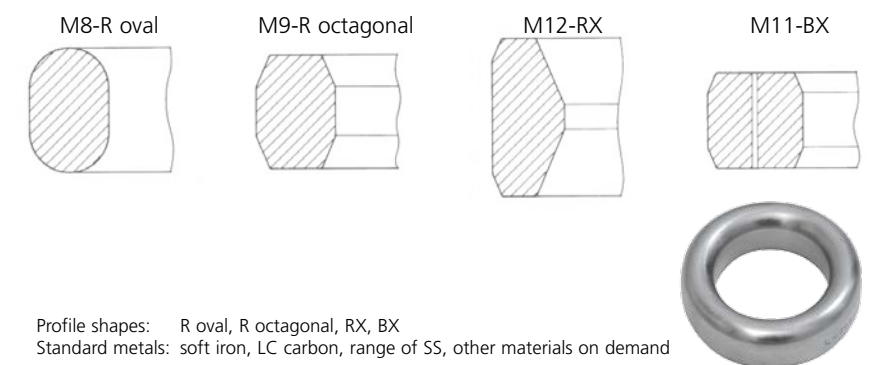
Convex ring

A machined sealing ring with dimensions in accordance with DIN 7603D or customer specifications.



RTJ - Ring joint gaskets

Metallic ring joints are designed for high pressure applications. They are available in a variety of forms to suit differing flange formats. RTJs can be used for very high and / or fluctuating pressures (up to 1500 bar) depending on the profile selected. Material selection determines its use at high temperatures (up to 1000 °C) and in aggressive media. RTJs are used above all in the chemical and petrochemical industry.



Temapack gland packings (pumps and valves)

In accordance with the programme of sealing materials, TEMAC produces very different kind of packings, which are used in devices such as rotary and reciprocating pumps and in valves. Our products for this range of application have a high quality and are made in many material combinations and impregnations. For braided packings we use natural materials (as cotton) and common synthetic materials (such as glass, Aramid, Acrylic, PTFE, PTFE/Graphite, expanded graphite etc).

Carbon	Expanded Graphite						PTFE			
7000	6500	6400	6300	6210	6200	6100	5410	5400	5300	5200
PTFE		PTFE + Aramid		Aramid		Acrylic		Ramie	Cotton	Glass
5110	5100	4200	4110	4100	3100	2230	2210	1180-1160	1140-1110	0021/0011



Isotem static packings and laggings

Temac produces static packings, which are mostly used for sealing of oven doors, boilers, autoclaves, stoves, pipes and cable laggings. These materials are used as a low pressure dry sealing. For temperatures up to 500 °C glass yarn is used, up to 1100 °C ceramic yarn with Inconel, we use also basalt yarn for a temperature of 750 °C. These sealings are made in square, rectangular-cross and round shapes and dimensions. Other dimensions as well as material data are available upon request.

Glass				Ceramic - with glass reinforcement Ceramic - with stainless wire reinforcement			Basalt
10	20	30	40	50	60	70	80

AGM Geosynthetic Products

Geogrids AGM-Grunt

Using of **AGM-Grunts**, PET geogrids with coating, is one of the most efficient method to increase the ground construction load capacity. Due to their structure they are suitable for reinforcement of coarse-grained materials, the grains of which are wedged into the geogrid meshes. Their main functions are capture, transfer and

distribution of the tensile stress arising in the loaded structure. At the same time they prevent mixing two layers (fine-grain, less load bearing subsoil with coarse-grain embankment).



Advantages of using AGM-Grunt geogrids:

- Creation of load bearing layer on top of less load bearing subsoil
- Cost savings for excavation and relocation of less load bearing subsoil
- Lower thickness of embankments
- Reduction of uneven subsidence
- Increase of the service life of whole construction

Geocomposites

AGM-Composite combines properties of non-woven (PP) geotextile and knitted (PET) geogrid. Due to these raw materials geocomposite gains excellent properties such as high tensile strength and resistance to forcing through. Functions in construction are reinforcement, separation and filtration.

Using of AGM-Composite is possible to decrease costs for excavation and relocation of low bearing subsoil with possibility to use local soil



Advantages of using AGM-Composite:

1. In ground construction

- Reduction of uneven subsidence
- Creation of load bearing layer on less load bearing subsoil

2. In retaining walls and slopes

- Enlargement of the surface above and below the wall or slope construction
- Quick and cost-effective building
- Prevention of vertical walls and steep slopes in collapsing

Geogrids for asphalt-concrete layer reinforcement

Asphalt-concrete layers have low tensile strength. Traffic load, climatic influence and unstable subsoil cause initiation of cracks and their further disruption. Geogrids **AGM-Dor** made of polyester and **AGM-Dor(C)** made of glass fiber can be used both for reinforcing new roads and repairing already

cracked ones. Due to bituminous impregnation dispersion both products are characterized by high adhesiveness to asphalt layers.



Advantages of using AGM – Dor and AGM – Dor(C):

- Reduction of cracks and rutting
- Simple a quick installation
- Lower thickness of bituminous layers
- Improvement of the road traffic-technical parameters

Manhole gaskets

Manholes - textile / rubber static gaskets are used for light duty conditions (max. temperature 250° C, max. pressure 25 bar) for the sealing of kettles, covers, boilers and furnaces.



Industrial textiles

Temac's fabrics are made as spunbonded form and used in many applications involving fire safety, high temperature insulation, air conditioning and refrigeration equipment, protective clothing and pipe/cable wrapping. It is also a very good material for electrical insulation. The fabrics are manufactured from glass or ceramic yarn. Most fabrics can be supplied with an aluminium foil (the maximum temperature is up to 120 °C).

Netes	Econet	Ceratem	Tape	Ladder

Flexible lip seals

A wide range of Flexible lip seals is used to seal hydraulic media on reciprocating shafts.

Temac range of seals is manufactured from NBR (nitrile) and CR (neoprene) rubbers reinforced with fabric (cotton, glass, or aramid). The resultant construction affords excellent fluid resistance, strength, flexibility and durability. The seals can also be supplied with a graphite or molybdenum disulphide finish to assist during the initial running-in period.

Temac manufactures its own tooling to provide its customers flexible services.



#1 C RINGS		#11 V RINGS	
#3 DISH RINGS		#12 SINGLE LIP	
#7 U RINGS		CHEVRON RINGS	

PTFE (rods, sheets, hollows)

PTFE components PTFE envelopes

Temac offers various components of high quality PTFE.

PTFE is a high quality synthetic material with the following characteristics: excellent chemical resistance within pH range 0-14, resistance to 250° C, ageing resistance, excellent gas tightness.

We offer PTFE products for high aggressive chemical applications. PTFE is available as extruded or moulded. Materials, which we offer are rods, sheets and hollows. This material can be used for perfect chemical resistance in a wide range of industrial applications.

PTFE Envelopes		
Slit type	Machined Square Edge Type	Machined Round Edge Type



Technical support • Consultancy • Service

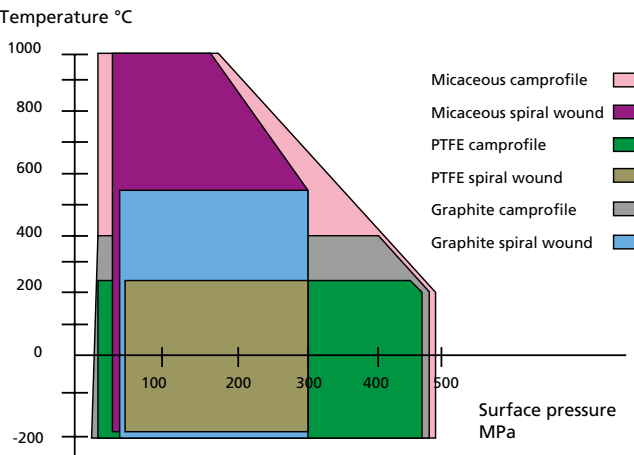
Our company provides full technical support in the field of flange joints, technical design as well as active participation of „Temac Technical Team“ directly at customer’s facilities. We are ready to professionally discuss the requirements of our customers and in co-operation with the managers of individual production departments of Temac we will propose comprehensive sealing solutions, produce seals in required quality, deliver them to the customer and install them at customer’s facilities. We closely co-operate with leading specialists in the field of tightening and installation of flange joints.



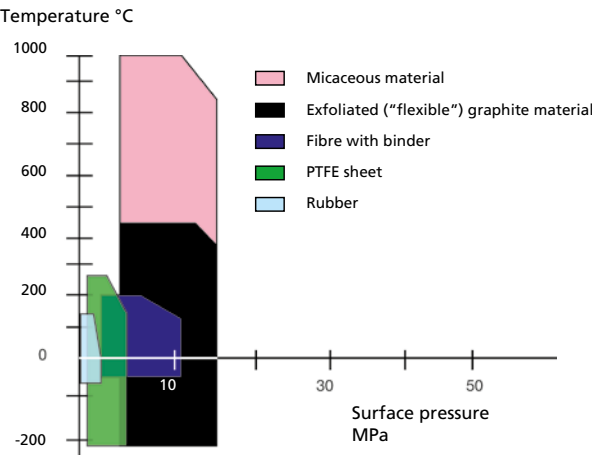
SEALING TECHNOLOGIES PROTECTING THE ENVIRONMENT



Application Guide – Semi-metallic Materials



Application Guide – “Soft” Sheet Materials



Temac Select Software: An easy way for gasket selection

Based on your input data entered into the „Temac Select“ commercial software application, suitable Temac sealing materials for various types of flange joints including resultant torque will be selected.





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