

FABRIC COMPENSATORS



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About Us

The company BIPAS - SISTEM d.o.o. was founded in Metković, in the south of Croatia, in 1998. The knowledge acquired in great conglomerates and companies was transferred by a group of enthusiasts into a new company which quickly gained a reputation of a reliable partner.

Due to owning and constantly expanding our expertise in sealing and isolation products, and by investing into education of our employees, our company very quickly positioned itself into the market with the business tradition of almost 25 years.

Main activities

■ Sealing

By long-standing collaboration and creation of partnership with our regular clients, we gained knowledge necessary for solving the most challenging sealing problems.

We specialize in creating the most complex forms of seals for static or dynamic setting in addition to adaptation to individual specific situations. We create all types of flange sealings in a modern way, quickly and with precision. We possess the knowledge and technology needed to create sealings for pipeline reinforcement, valves and both centrifugal and piston pumps.

Due to constant investing into modern machines, we are able to create thermal insulation gland packings for sealing furnace doors, fireboxes and boilers of different cross sections and types of packing.

■ Thermal insulation

The protection of machine components or parts of industrial plants from high temperatures or direct flame are a sub-specialty of the BIPAS - SISTEM company from its beginnings. We offer a variety of products made of glass and ceramic fibres intended for protection and isolation of up to 550°C or 650°C.

By offering Silontex products made of special glass fibres which can endure temperatures up to 750°C, we are able to solve even the most challenging problems of our clients.

Due to investing into modern machines, we offer wiring of different products with Inconel wire in order to provide additional or complete protection of our products, be it a thermal insulation gland packing or a hydraulic hose.

■ Fabric compensators

The experience and knowledge of our experts which has been acquired for decades in the areas of construction and production of industrial compensators are only some of the reasons why clients approach us with complete confidence.

Offering advice, providing professional assistance in installation and adapting to specific situations make BIPAS - SISTEM one of the most recognised companies in Croatia and other countries regarding this particular field of machine industry.

■ Slide bearings of marine shafts - METAFILON bearings

Expansion of product range and knowledge acquisition for the purposes of readily facing everyday challenges of the market brought us to the production of slide bearings of marine shafts. These products were formerly known as METAFILON on the Croatian market since they were produced by METAFILON d.o.o. company from Ploče. BIPAS - SISTEM company as the successor of the formerly mentioned company has been active on the market since 2010.

■ Products made of Teflon and other types of engineering plastics

Rich supplies of semi-manufactured goods made from different types of engineering plastics, among which we emphasize Teflon, provided our company with necessary range of products in areas of sealing and general industry.

An extrusion machine, a press, a particle removal device and a sintering furnace make us fully equipped and ready to answer numerous requests in case we need to create semi-manufactured or final products with presentation of technical documentation.

General information



Not so long ago, most compensators in power plants, oil production and petrochemical plants were made of metal. With the advancement of technology and the acquisition of knowledge, the so called soft-material compensators or fabric compensators were invented. They are named so because of their composition of multiple layers of fabric made of different materials. Today, there are almost no modern industrial plants without units designed this way.

Owing to the ability of multiple application of soft-material compensators and their resistance to chemicals and high temperatures, the price of work and maintenance of various industrial plants is significantly reduced. The flexibility of motion and movement absorption of any kind are the main reasons why this type of compensator was as quickly accepted in the industry.

The use of compensators is wide. Some of the main industry branches which are the leaders in utilization of compensators are:

- Shipbuilding
- Chemical industry
- Thermal power stations
- Gas turbine power plants
- Metallurgy
- Incineration plants

A compensator as a unit can be divided into three separate sub-units which are further divided into smaller units and individual parts:

Soft-material compensators

- Insulation layers
- Insulation packs
- Sealing layers
- Supporting layers
- Protective layers
- Reinforced edges

Compensator protection components:

- Internal pass tube
- Pre-insulation
- External protective grating
- Outlet nozzle

Connection components:

- Bolted counter flanges
- Clamping flanges
- Band clamps

BIPAS - SISTEM company specializes in the manufacture of soft-material compensators, while regarding protection and connection components, we can always help you with consultation and professional advice.

Compensator models

The temperatures that fabric compensators can withstand are 700 °C and higher.

The pressure they can withstand is up to 500 mbar.

Fabric compensators can absorb movement of any kind and for that reason they are not differentiated by that criterion as is the case with metal or rubber compensators. They are differentiated by the amount of movement absorption and by the kind and type of connection with a pipeline and other related parts.

Model BS 1911

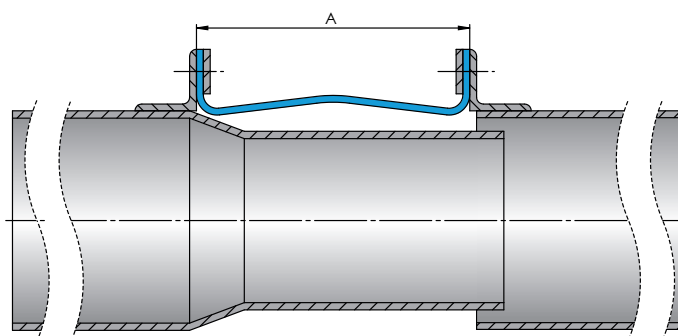
U-shaped cross-section.

Axial movement Δa is between 0,1 to 0,3 of dimension A.

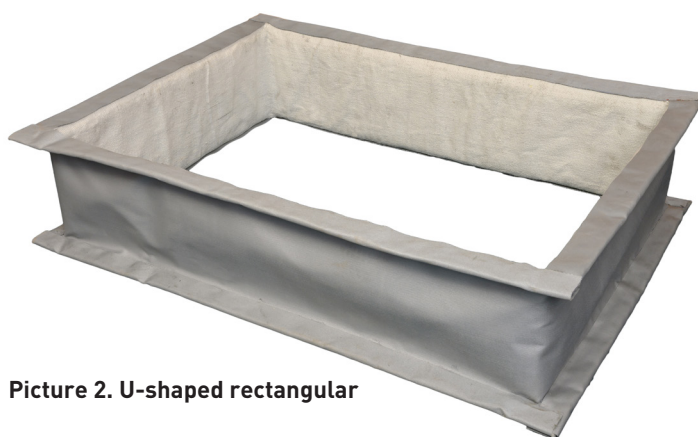
Lateral movement Δb is between 0,005 and 0,2 of dimension A.

Height A of this type of compensators is usually made from 150 to 400 mm.

The usage of this type of compensators is usually found in pipelines and circular or rectangular ducts.



Picture 1. Soft-material compensator of a U-shaped cross section



Picture 2. U-shaped rectangular



Picture 3. U-shaped circular



Compensator models

Model BS 1919

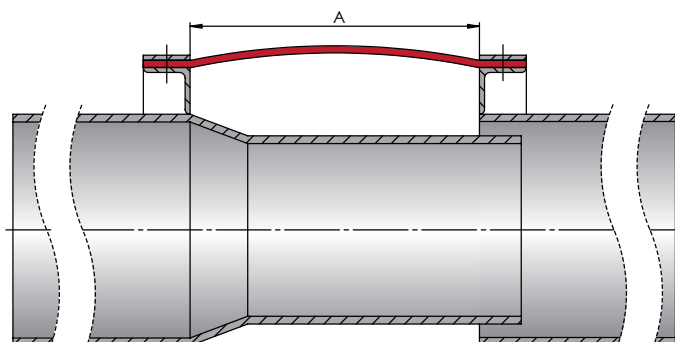
Soft-material compensator strips.

Axial movement Δa is between 0,1 to 0,3 of dimension A.

Lateral movement Δb is between 0,005 and 0,2 of dimension A.

Height A of this type of compensators is usually made from 100 to 400 mm.

The usage of this type of compensators is usually found in pipelines and circular or rectangular ducts.



Picture 4. Soft-material compensator strips



Picture 5. Soft-material compensator strips - example 1



Picture 6. Soft-material compensator strips - example 2

Compensator models

Model BS 1963

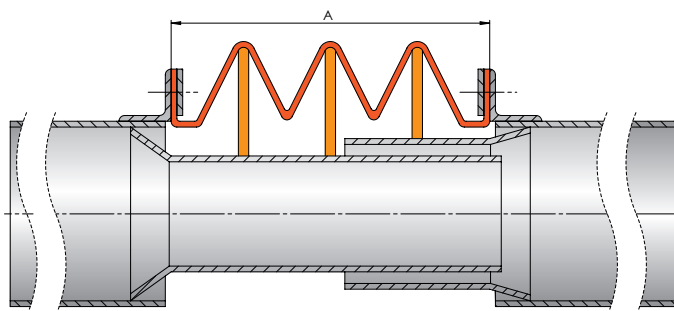
Pleat compensator with flange connection.

Axial movement Δa is between 0,4 to 0,7 of dimension A.

Lateral movement Δb is between 0,1 and 0,2 of dimension A.

Height A of this type of compensators is usually made from 200 to 800 mm.

The usage of this type of compensators is usually found in pipelines and circular or rectangular ducts of width up to 2000 mm. For greater width, there is a possibility of fabrication and installation with the condition that the compensator is under lower pressure.



Picture 7. Pleat compensator with flange connection

Model BS 1980

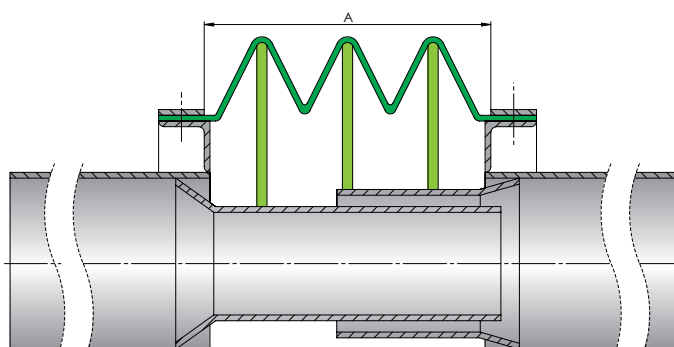
Pleat compensator with band ends.

Axial movement Δa is between 0,4 to 0,7 of dimension A.

Lateral movement Δb is between 0,1 and 0,2 of dimension A.

Height A of this type of compensators is usually made from 200 to 800 mm.

The usage of this type of compensators is usually found in pipelines and circular or rectangular ducts of width up to 2000 mm. For greater width, there is a possibility of fabrication and installation with the condition that the compensator is under lower pressure.



Picture 8. Pleat compensator with band ends

Compensator models

Model BS 1990

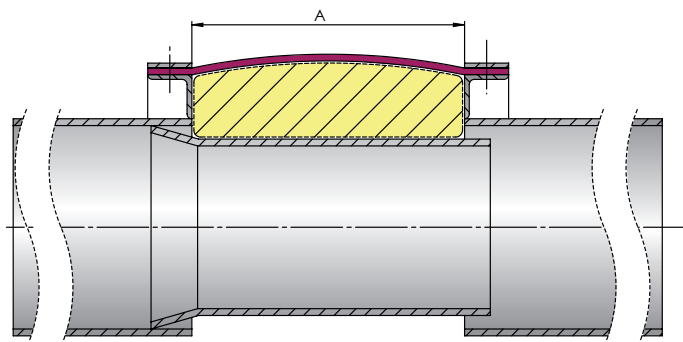
Pre-insulation of a soft-material compensator.

The main purpose of pre-insulation is lowering of excessive temperatures which sealing layers of compensators would not be able to withstand or physical protection of the media passing through a pipeline.

It is made in every dimension of various cross-sections.

Glass or ceramic felts can be used as pre-insulation materials, and exceptionally, rock wool.

Pre-insulation material can be wrapped in glass or ceramic fibre weave of different thickness. Stainless steel wire mesh can also be used as protection



Picture 9. Example of combination of compensator strips and pre-insulation



Picture 10. Compensator strips with pre-insulation



Picture 11. Examples of pre-insulation

Materials

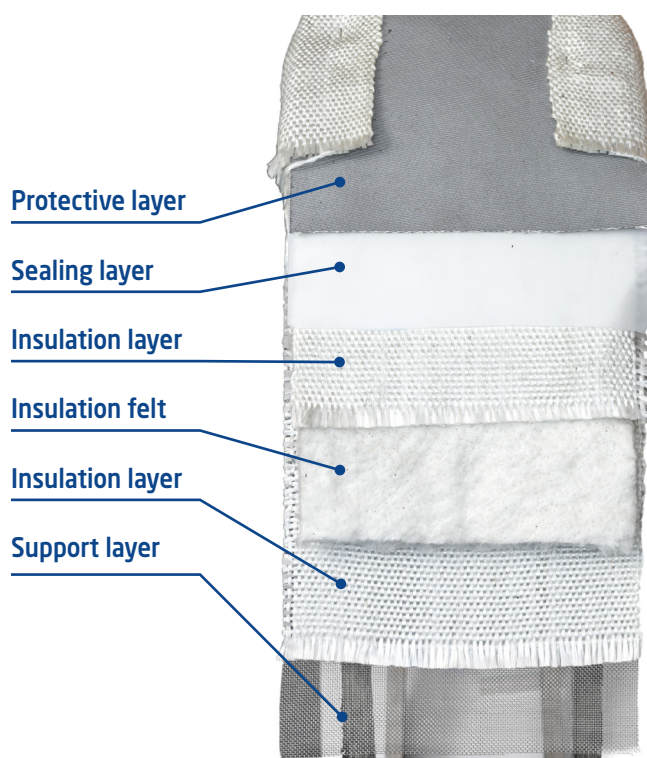
Soft-material compensators are made of several different layers. These layers are usually not glued or sewn together. However, in the flange area, all layers are mostly sewn together with solid thread for transport reasons.

Every soft-material compensator, depending on conditions of use, consists of the following layers:

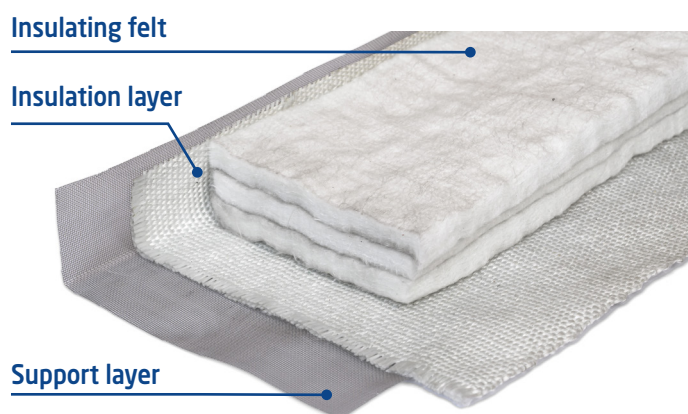
- Insulation layer
- Insulation felt
- Sealing layer
- Supporting layer
- Protective layer

In front of every soft-material compensator, depending on condition of use, pre-insulation can be installed consisting of the following layers:

- Supporting layer
- Insulation layer
- Insulation felt



Picture 12. Section of layers



Picture 13. Section of pre-insulation layers



Insulation layers and felts

Insulation layers are needed in case the temperature of the medium in a pipeline exceeds permitted temperature which can be tolerated by the sealing layer inside a soft-material compensator.

Depending on conditions of use and the type of medium affecting the compensator unit, different kinds of insulation layers and felts can be installed. It needs to be emphasized that insulation felts, regardless of type, have weak resistance, i.e. breakage, and in order to protect them, they are usually fronted by insulation fabric.

In addition, felt can be completely wrapped in an insulation layer (fabric) for full protection.

Materials – characteristics

Table 1. Different media and temperatures resistance

Conditions of use	Temperature resistance	Short-term peak temperature resistance	Acid-proof	Base-proof	Solvent-proof
Fabrics and felts	°C	°C			
Aramid	180	250	Conditional	Conditional	+
Glass fibre weave	550	650	+	Conditional	+
Glass felt	550	650	+	Conditional	+
Rock wool	700	750	Conditional	Conditional	+
Ceramic fibre weave	650	750	+	Conditional	+
Ceramic felt	1000	1100	+	Conditional	+
Ceramic fibre weave with wire	1000	1100	+	Conditional	+

Sealing layers

Sealing layer is the most important layer of every soft-material compensator.

Depending on the temperature and the type of medium passing through a pipeline, there are different kinds of foils made of synthetic rubber, metal or plastics.

When choosing a sealing layer, there are some things that should be considered:

- Pressure - depending on the direction of its increase, supporting layers can be placed in front of or behind the sealing layer.
- Condensate - its accumulation inside a soft-material compensator can corrode every layer which can cause damage to a compensator and ultimately leakage of the medium.
- Gas permeability - both rubber and plastic foils have it to some extent. Only metal foils are completely gas-tight, however they have some other disadvantages.

We offer the following sealing foils:

Table 2. Sealing foils resistance

Conditions of use	Temperature resistance	Short-term peak temperature resistance	Acid-proof	Base-proof	Solvent-proof
Sealing foils	°C	°C			
PTFE	260	280	+	+	+
Aluminium	500	550	-	-	+

Materials – characteristics

Supporting layers

Supporting layers are usually installed behind a sealing layer from the pressure increase direction.

The choice of an adequate supporting layer depends on permanent and short-term temperature resistance owned by a potential material.

Table 3. Supporting layers temperature resistance

Supporting layer	Temperature resistance [°C]	Short-term peak temperature resistance [°C]
Aramid	180	250
Glass fibre weave	550	650
Stainless steel wire mesh	600	850

Protective layers

Protective layer protects a compensator from environmental impact factors such as rain, sun, dust etc. It is important that a protective layer has a certain solidity and satisfactory resistance to potential mechanical influence on the soft-material compensator area.

In case that the supporting layer can withstand higher temperatures, there is less need for insulation inside a soft-material compensator which ultimately results in smaller amounts of condensate.

When creating soft-material compensators, BIPAS - SISTEM usually uses silicon-coated glass fibre weave with the following characteristics:

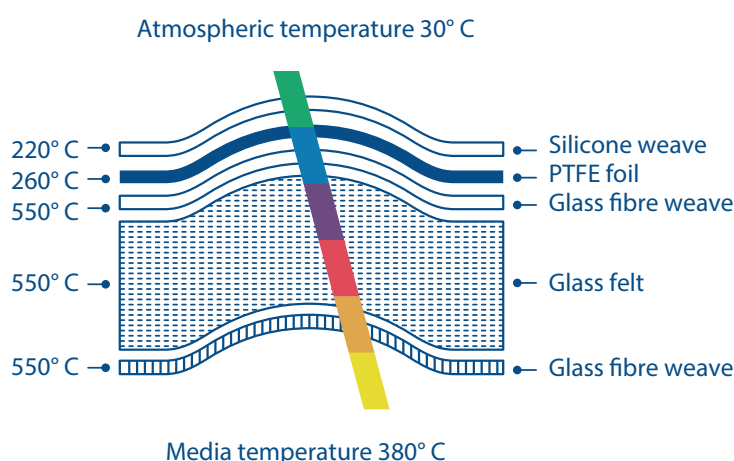
Table 4. Silicon-coated glass fibre weave resistance to different media and temperatures

Type of fabric	Temperature resistance [°C]	Short-term peak temperature resistance [°C]	Acid-proof	Base-proof	Solvent-proof
Silicon-coated glass fibre weave	220	230	-	-	Conditional

Temperature decrease

When constructing a soft-material compensator, it is necessary to be acquainted with three key details which are the maximum temperature of the medium passing through a pipeline and the temperature tolerated by both sealing and external protective layer.

Temperature resistance of a sealing layer and of an external protective layer represent the critical points in compensator construction. In other words, by using other layers with more suitable thickness, it is necessary to gradually decrease the temperature inside a compensator so its value would not exceed critical values of sealing and external protective layers.

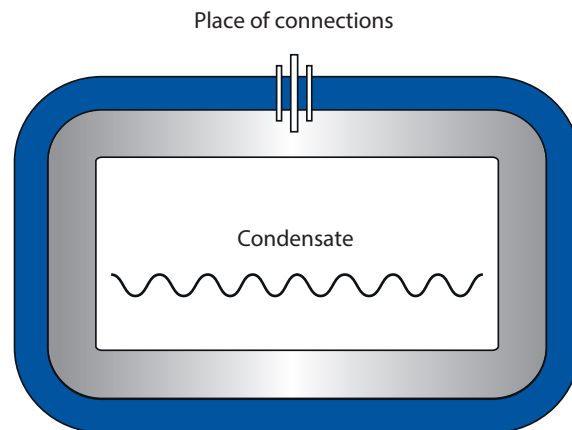


Picture 14. Temperature decrease diagram

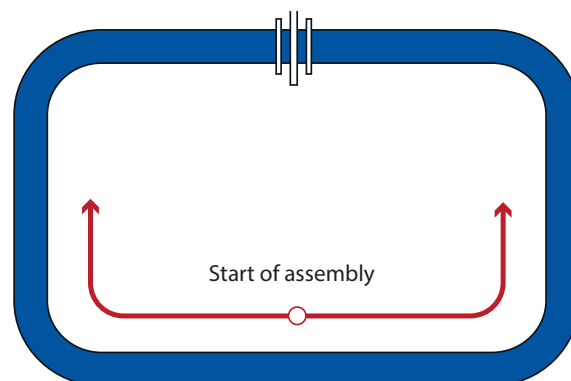
Installation instructions



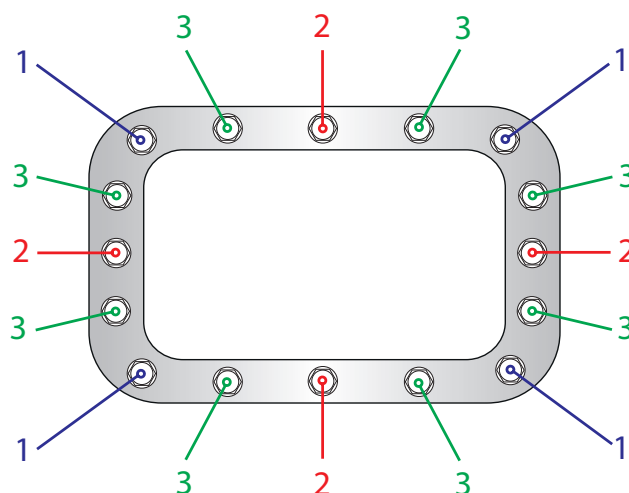
1. Check which side is the inner and which is the outer side of a compensator.
2. Treat all potentially sharp edges of ducts or pipelines so as not to cause damage during the installation.
3. The flange area of all layers of the compensator is the weakest spot of the unit. Place the compensator in such a way that the flange area of layers is at the lowest temperature and mechanical strain point.
4. In horizontal pipelines, the flange area of layers should face up due to condensate accumulation.
5. The installation starts in the middle of the compensator, i.e. from the opposite side of the flange area of layers towards the open edges (Picture 16.).
6. The order of screws tightening should follow the draft below (Picture 17.).



Picture 15. Installation with regard to condensate



Picture 16. Start of assembly



Picture 17. Order of tightening the screws

References

Our current markets

Considering all the measurable business parameters, BIPAS - SISTEM company has since its beginning left the greatest mark within the Republic of Croatia. Since all the surrounding countries have been developing their industries in the last 20 years, there was a call for finding business partners outside the home country. In 2005, a partner company BIPAS - SISTEM is founded in Sarajevo which serves a purpose of meeting the needs of the neighbouring market of Bosnia and Herzegovina. In 2022, a branch office is opened in Zagreb with the clear purpose of business expansion in the north-western part of Croatia. By gaining new and satisfied clients and with the absolute confidence in the quality and reliability of our products, it is our great wish to step into the markets of Western Europe in the future to represent our country as faithfully as possible in this area of industry.

Our regular clients

We are proud to state that for the last two decades we have been cooperating with every major Croatian shipyard and dry dock. Even though previous years were challenging for everybody, every project was completed to mutual satisfaction. Brodosplit, Uljanik and 3. Maj regularly use our products and services. Dry docks Viktor Lenac from Rijeka or Iskra Shipyard from Šibenik are some of the companies with which we have a long-standing partnership. To all of them, we are a reliable supplier and manufacturer of essential parts and components. In some cases, it was our ability of urgent production and fast delivery for the vessels in the repair stage which made us one of the indispensable partners of the above-mentioned companies. We also cooperate with the companies which represent more than just industry for Croatian society. Croatian

brands such as KONČAR, Franck and Saponia Osijek are companies which employ more than one generation of families and it is our greatest pleasure to be a part of their story, however small that part is.

Cemex, a cement factory from Split and one of the biggest industrial plants in Dalmatia is also our regular client. We receive regular orders from boiler and furnace factories such as Centrometal from Macinec in the north of Croatia and ThermoFLUX from the neighbouring Bosnia and Herzegovina. Another recognition of our reliability comes from the factory of construction material KNAUF from Novi Marof, as well as from the paper factory Natron Hayat from Maglaj, Bosnia and Herzegovina. The number of our associates is great and it will certainly become even greater!



3. MAJ
Brodogradilište d.d.



BRODOGRADILIŠTE
VIKTOR LENAC

Iskra shipyard

KONČAR
Končar - Aparati i postrojenja d.d.



SAPONIA

Jamnica

CEMEX



Holcim

nexe

CALUCEM

natron-hayat d.o.o.
MAGLAJ

Centrometal

ThermoFLUX

KNAUF INSULATION



PETROKEMIJA
KUTINA

SSL
SISECAM SODA LUKAVAC d.o.o.

ArcelorMittal

Fabric compensators

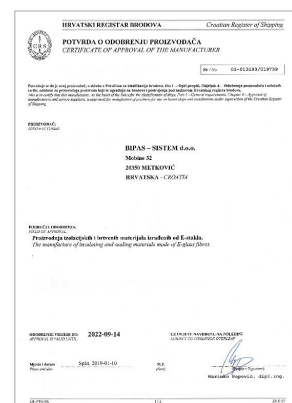
Certificate holders and acknowledgements

Based on the evaluation of authorities, BIPAS - SISTEM company meets the standard ISO 9001:2015 and as such has all the necessary basis for manufacturing and sale of sealing and insulation materials. In addition, Croatian Register of Shipping acknowledged us as the manufacturer of components built into ships and facilities under their supervision. Besides providing us with legal framework and work permits, these certificates also give us the responsibility of maintaining the level of all our production and work in such a way that nobody's safety is endangered.

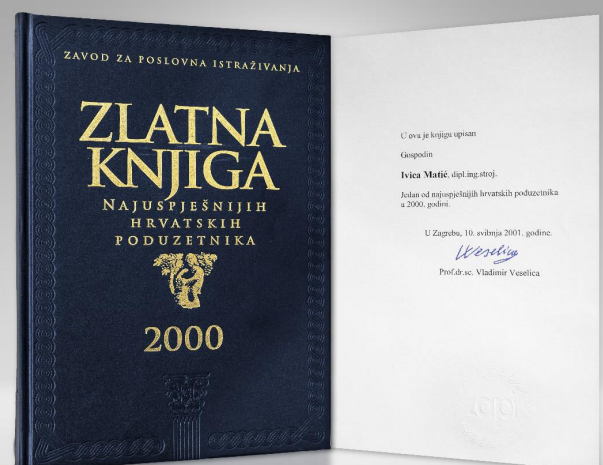
In order to manufacture components for thermal power plants, heat plants, petrochemical industry and various shipyards and dry docks in Metković, in the south of Croatia, far away from all industrial ongoing, it is essential to have knowledge, ability and courage.

To start, maintain and expand this narrative in the Neretva Valley, an area industrially oriented to completely different content, means that we stand out as different from everybody else.

We are very happy to be recognized by other people, entrepreneurs and institutions. It motivates us to continue what we know best - the world of sealing and insulating products and materials.



Croatian Chamber of Economy award of recognition from 2019.



Croatian Chamber of Economy award of recognition from 2001.





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