



GASKETS



Gasket Division

EUROGUARCO SpA
Italy

La Spezia, Plant 1


The Company

Established since 1958 in La Spezia by Luciano Ghirlanda, the company has gradually developed to become a trustworthy reference point in the global market, where it operates directly and through distributors and agents.


La Spezia, Plant 2

Cremona, Plant 2


The activity is mainly focused on the production of products for various industrial fields such as Oil & Gas, Marine, Rail, Mechanical and Chemical.

Besides the company distributes semi-finished products to various processing and installation industries.



Quality System

Euroguarco work in Quality Assurance System Certificate:

- ISO 9001
- ISO/TS 29001
- API 6D license
- EN 9100 (Aeronautical Industry)
- 97/23/CE (PED)
- ATEX



Certification

Euroguarco products have Certifications & Approvals required for use in various Industrial Sectors, among which:

- Oil & Gas (DIN-DVGW)
- Marine Industry (MED/IMO)
- Railway Industry (EN 45545)
- Navy


Cremona, Plant 1




Products

Industrial gaskets can be products in accordance with standards which cover types, sizes, materials, dimensions, tolerances, and markings. ASME B16.20 and B16.21, respectively for metallic and non-metallic gaskets, and EN 1514, are the most commonly used gasket standards.

Gaskets of special design can be engineered and fabricated to cover a wide range of applications for which there are no industry-wide standards. Custom-designed gaskets are manufactured for valves, pumps, compressors, turbines, boilers, heat exchangers, etc. Consult with Euroguarco engineers as early in the design stage as possible.

Materials

Sealing Materials:

Compressed Fibre, Flexible Graphite, PTFE, Thermiculite®, Beater Addition, Cellular and Plain Rubber, Mineral Fibre Felt and Millboard, Gelatine-Glycerine, Mica-Silicone Compound.

Metal Materials:

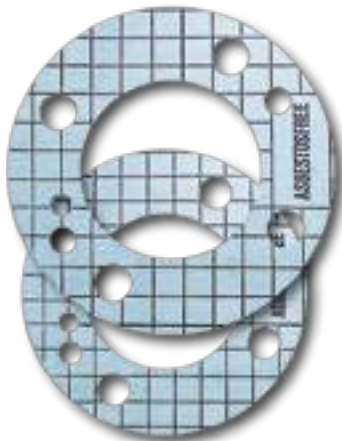
Carbon Steel, Stainless Steel 304, 304L, 309, 310, 316L, 316Ti, 317L, 321, 347, 430 Monel®, Titanium, Inconel® 600, 625, X-750, Hastelloy® B2, C276, Incoloy® 800, 825, Duplex, Zirconium, Tantalum, Copper.



Non-Metallic

Also known as Soft Gaskets, they are used for low to medium pressure service conditions.

Their fabrication is by either die-cutting or CAM cutting from sealing sheet materials.



Metallic

Full metal gaskets are the optimal solution for difficult sealing problems with large-scale forces and moments, high pressures, vacuum and/or high temperatures.

Product range:

- Metal Flat
- Ring-joint
- Lens
- Weld / Delta / Norsok ring



Semi-Metallic

Semi-metallic gaskets are combinations of metals and soft sealing materials (fillers). They provide the essential advantage of a separation between the "supporting" and the "sealing" functions.

Product range:

- Spiral-wound
- Metal jacketed
- Cam-profile

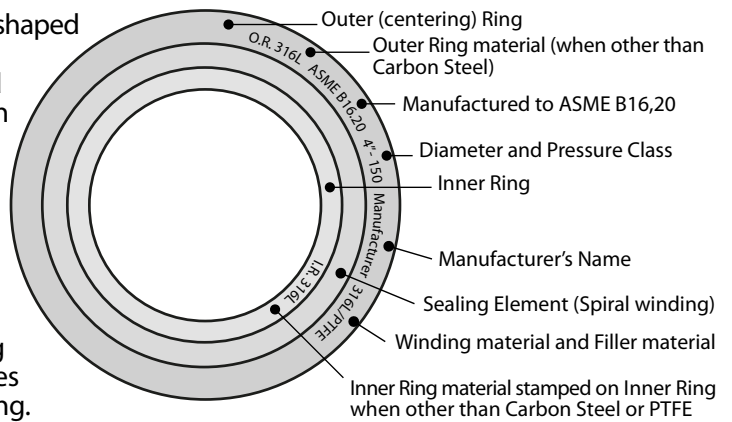


Spiral-Wound

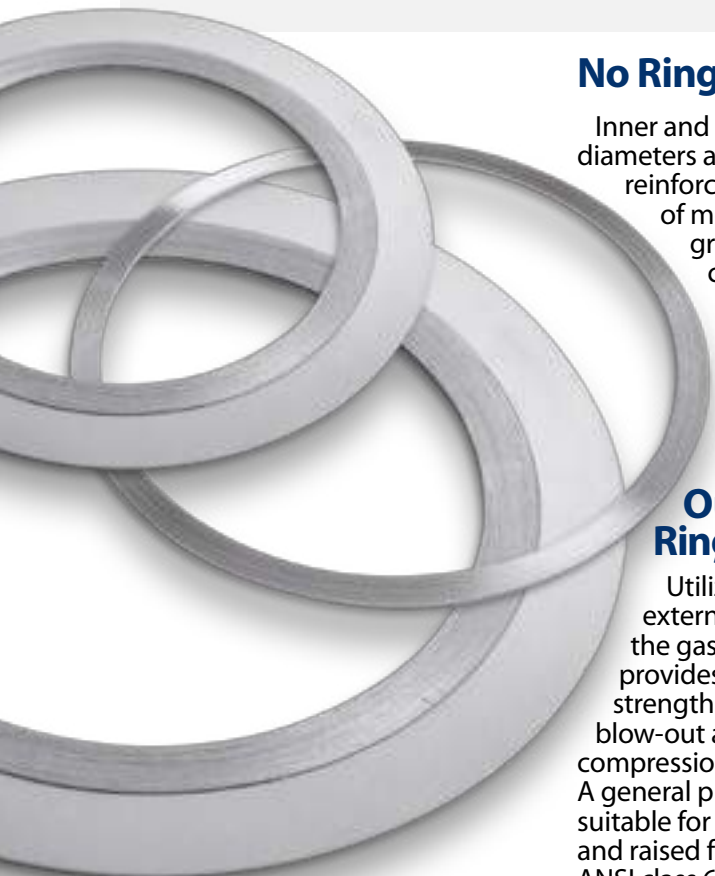
Characteristics

The concept of spiral wound gasket construction was originated by Flexitallic in 1912, inaugurating a new era in safe, effective sealing. SPW gaskets are suitable across a wide range of fluctuating service pressure - up to 250 bar - and temperature - from -200°C to 1000°C - depending on their construction. The sealing element

consists of a V-shaped metal strip spirally wound in combination with a sealing material filler. The metal strip provides outstanding resilience, while the flexible sealing filler guarantees excellent sealing.

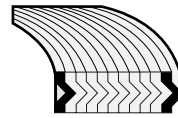


Common Constructions:



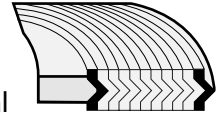
No Ring

Inner and outer diameters are reinforced with several plies of metal without filler to give greater stability and better compression and sealing characteristics. Suitable for tongue and groove or male and female or grooved to flat face flange assemblies.



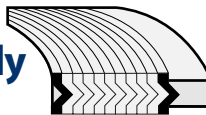
Inner Ring only

Solid inner metal ring acts as a compression stop and fills the annular space between flange bore and the inside diameter of the gasket. Designed to protect gasket windings from heat and corrosion, prevent accumulation of solids, reduce turbulent flow of process fluids, and minimize erosion at flange faces.



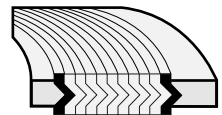
Outer Ring only

Utilizes an external ring which centers the gasket on flange face, provides additional radial strength to prevent gasket blow-out and acts as a compression stop. A general purpose gasket suitable for use with flat face and raised face flanges up to ANSI class 600.



Outer and Inner Ring

Suitable for flat face and raised face flanges and specified for high pressure/temperature service, this gasket features increased compressive force for blow-out prevention - up to ANSI class 2500 or where corrosive or toxic media are present.



Applications

Spiral-wound standard gaskets are suited for use on standard pipe flanges; while special design can be engineered and fabricated to cover a wide range of applications in pressure vessels such as valves, pumps, compressors, turbines, boilers, heat exchangers, etc.

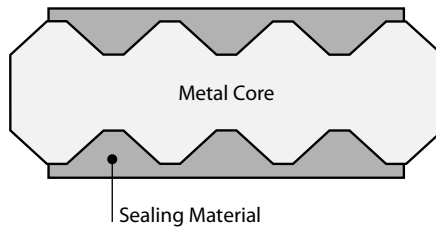
By operating on the tension of the winding, and on the protruding of the filler, spiral wound gaskets can be constructed to require lower gasket stress, in order to be used on light flanges, where bolt load is limited. Conversely, provided that the bolt load is sufficient, SPW can be manufactured to provide extra resiliency, for extreme pressure applications.

Spiral-wound gaskets are color coded to help expedite the selection and identity of the gaskets you need. The color on the outside edge of the centering ring identifies both the winding and filler materials. The metallic winding material is designated by a solid color. The filler materials are designated by color stripes at equal intervals on the outside edge of the centering ring.

Cam-Profile

Characteristics

Cam-profile gaskets consist of a metal core with concentric grooves on either side, topped by sealing materials tightly pressed into the grooves. The soft sealing material is thus confined and optimally densified in the valleys of the profile, allowing for only a slim layer between its tips and the flange surface, where a series of concentric seals is created.



This construction enhances sealing performance by inducing stress concentrations on the sealing surfaces, while the metal core provides rigidity and blowout resistance.



Common Constructions:

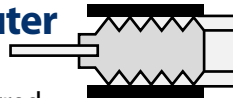
No Ring

Ideal for use in confined locations, including male and female tongue and groove and recessed flange type arrangements. These gaskets easily replace jacketed gaskets on heat exchangers, as they offer better sealing and seating performance. Suggested for complex shapes.



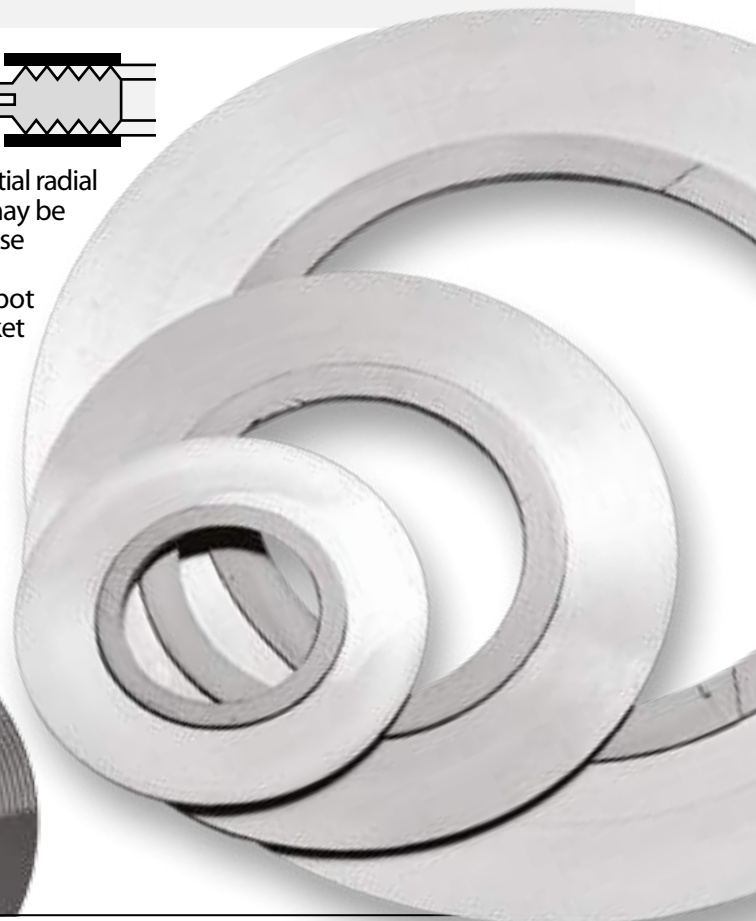
Loose Outer ring

Often preferred where flange differential radial thermal expansion may be encountered. The loose outer locating ring, which may also be spot welded, reduces gasket cost, as it can be obtained from less expensive material (i.e. carbon steel).



Integral Outer ring

The outer locating ring allows for correct gasket positioning within the mating flange bolt circle. Recommended for use on standard raised face and flat faced flanges.



Applications

Cam-profiles are said to be the best of three worlds:

- they require low seating stress like sheet gaskets;
- provide excellent tightness, due to the minimum thickness of the sealing layers, like spiral wound gaskets;
- have the handleability of a solid

metal gasket (no springing apart during installation, no buckling in service).

As a consequence Cam-profiles are highly suitable for varying temperature and pressure services, for light as well as heavily constructed flanges. Other benefits are low sensitivity to assembly faults, and the possibility to re-use the metal cores after being cleaned.

Cam-profiles gaskets can be made according to standards, as well as to customers' specifications in various designs. Use of cam-profile gasket in heat exchanger applications will ensure a reliable seal, from initial hydrotest through difficult operating conditions. They are suitable for TEMA flanges. When required, pass partition ribs can be supplied in any configuration.

Ring Type Joint

Characteristics

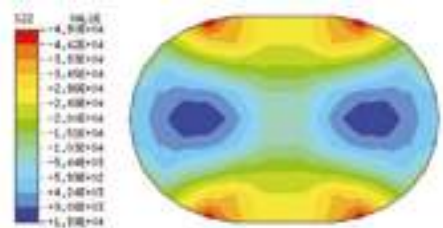
Ring type joint (RTJ) was initially developed for use in the petroleum industry, where high pressure/temperature applications necessitated a high integrity seal. They are mainly used in the oil field on drilling and completion equipment. Ring type joints are also commonly used on valves and pipework assemblies, along with some high integrity pressure vessel joints.

The material hardness of the RTJ must be less than the hardness of the flanges to ensure that the RTJ is deformed and not the flanges when assembled.

How They Work

Under axial compressive load, RTJ plastically deform and flow into the irregularities of the flange groove. Since the load bearing area of the RTJ is relatively small, very high surface stresses result between the sealing faces of the ring type joint

and the groove. These stresses are further increased on the Style RX and BX rings which allow very high internal pressures to be sealed. Since ring type joints are solid metal, their recovery characteristics are poor.



Common Constructions:

Style R

Standard Style R Ring Type Joints are manufactured in accordance with both API 6A and ASME B16.20 size/ratings. Available in both oval and octagonal configurations, both types are interchangeable on the modern octagonal type grooved flanges.

Style RX

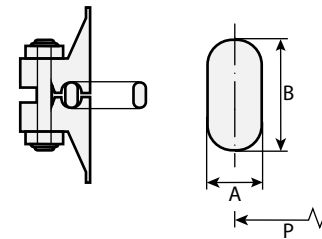
RX is an adaptation of the standard Style R and is designed to fit the same groove design as a Style R, making the gasket interchangeable.

Consideration should be given to the difference in finished make-up distance. The modified design uses an energizing on assembly effect, which improves the efficiency of the seal. Designs are also available for Subsea applications.

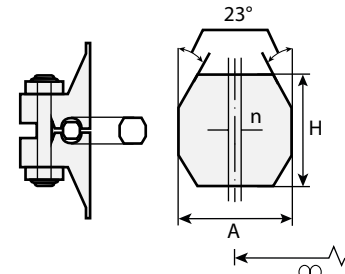
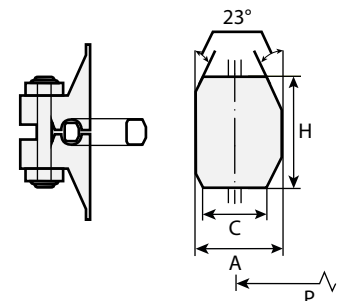
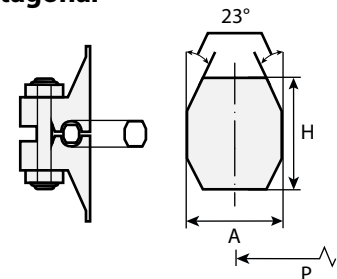
Style BX

The Style BX Ring Type Joints, manufactured in accordance with API 6A, are designed for use on pressurized systems up to 20,000 psi. When correctly fitted, the style BX gasket allows virtual face to face contact of the flange faces which means that the gasket is fully trapped on both the inner and outer diameters. All BX gaskets incorporate a pressure balance hole to ensure equalization of pressure which may be trapped in the grooves. Designs are also available for Subsea applications.

Oval



Octagonal



Characteristics

For high pressure applications, where seal integrity is crucial, less common metal gaskets can be specified.

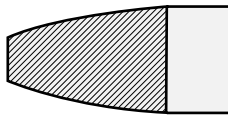
Euroguarco's production facilities can manufacture special metal gaskets of diameter beyond 4 m., ensuring the full traceability of raw materials and providing test reports of gasket physical and mechanical properties.



Common Constructions:

Lens Ring

Are usually produced according to DIN 2696 standard, although customer design is also possible.



Lens Rings have a spherical surface and are suitable for use with conical flange faces.

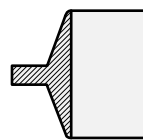
However, ASME B16.5 and other flange types can be modified to accept the Lens Ring.



Delta Ring

Are similar to Lens, but in this case the internal pressure of the vessel acts on gaskets to further improve the sealing.

This particular gasket always needs to be specifically designed by engineers.



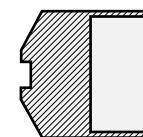
Weld Ring

Consist of two similar rings of special shape, which are welded to each other and to their mating flange.



All welding is conducted upon flange assembly on the outside of the gasket and flange, thus ensuring ease of location, especially in restricted applications where space is limited. An auxiliary gasket (SPW, cam-profile) is often used during hydro-test.

For chemical compatibility and in order to ensure controlled thermal conductivity and weld compatibility, the gasket



material must always be the same as the flange material.



Norsok Ring

Have been developed by the Norwegian Petroleum Industry, and are quite similar to style RX RTJ gasket.

Fabricated in accordance to Norsok L-005 specification, they often have a PTFE coating to avoid surface corrosion.

Metal Jacketed

Characteristics

Metal Jacketed gaskets, as the name suggests, consist of a metallic outer shell with non-metallic filler. The filler material gives the gasket resilience, while the metal jacket protects the filler and resists pressures, temperatures and corrosion. Metal Jacketed gaskets are available in a wide range of sizes and configurations. They are traditionally used for heat exchanger applications,

pumps and valves; although the resilience and recovery properties of these gaskets are limited.

In order to seal effectively, Metal Jacketed gaskets require smooth flange surface finishes, high bolt loads and flange flatness.



Common Constructions:

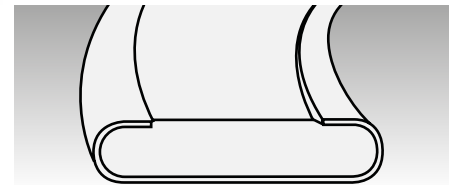
Single Jacketed Gaskets

The filler material is enclosed in a metal jacket which covers the inside and outside diameter of the gasket. Typically used on low pressure applications, including boilers, compressors, pumps, and diesel and gasoline engines. Minimum gasket width: 6.4 mm (1/4"). Standard gasket thickness: 3.2 mm (1/8").



Style 120

Style 120 has one of its contact surfaces covered and is ideally suited for comparatively narrow flange widths in circular and non-circular configurations. Not recommended for standard pipe flanges.



Style 124

Style 124 is an overlapped Single Jacketed Gasket, where the filler is completely enclosed on the inside and outside diameters and on both contact surfaces. It is suited for high temperature applications of narrow flange widths.

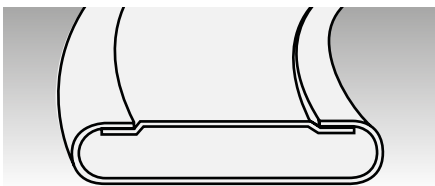
Double Jacketed Gaskets

Double Jacketed Gaskets are used on boiler and heat exchanger applications when ample bolting is available to correctly seat the gasket.

They are designed for high pressure and temperature applications up to ANSI class 900. Gasket widths as narrow as 8 mm. (5/16") can be manufactured depending on diameter. Very large gasket diameters can also be produced.

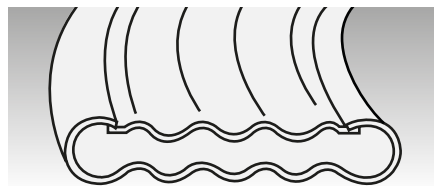
Standard gasket thickness is 3.2 mm (1/8").

Gaskets can be manufactured with either integral or welded pass partition bars, in a variety of complex configurations.



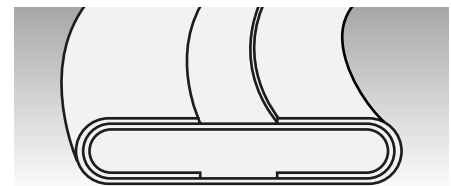
Style 123

The filler material is completely enclosed by a two piece metal jacket, which covers both the inside and outside diameters and both contact surfaces.



Style 126

Style 126 is similar to style Style 123 with the exception that the metal jacket is formed from a corrugated jacket providing better resilience than the Style 123, since the corrugations form multi-seals across the flange sealing face.



Style 127

Style 127 is a double shell gasket constructed of two reversed wrap-around shells. This provides superior flange support and handleability and provides better resistance to high pressures.

Other Sealing Materials



Flange Insulation Sets

Characteristics

Insulating sets comprise of a gasket, located between the flange sealing faces, one insulating sleeve per bolt, two insulating washers per bolt for maximum protection, and two plated mild steel or stainless steel washers per bolt. Insulating sets are essentially used for flange corrosion protection, where a seal is required

between dissimilar flange materials in contact with an electrolyte, in order to prevent the set up of a galvanic cell

which would corrode the anodic metal.

Insulating sets are also used to electrically isolate flange joints, preventing the flow of electrostatic charge along pipelines.

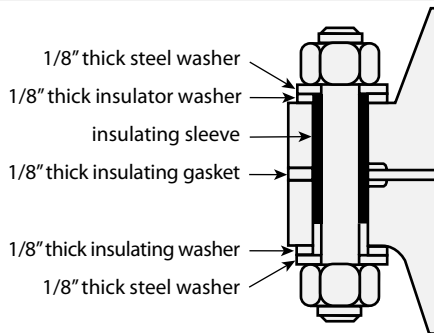


Common Constructions:

Style NCA

Full Face Gasket Insulating Set Assembly

Suitable for flat face and raised face flanges. The style minimizes the ingress of conductive foreign matter between the portion of the flanges outside the raised faces and reduces the risk of bridging.



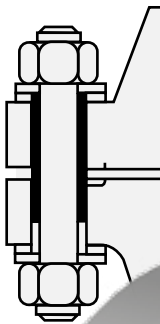
With style NCA and NCB insulating sets it is imperative that the bore of the gasket is equal to that of the pipe. This will prevent any foreign matter from accumulating in the annular space between the bore of the gasket and the bore of the pipe, thus preventing bridging.

The gasket material is typically neoprene-coated grade G-10 Glass-Reinforced Epoxy for service temperature up to 110°C. Phenolic laminate provides excellent insulating properties as well as corrosion resistance, and it is also used for the bolt sleeves and washers.

Style NCB

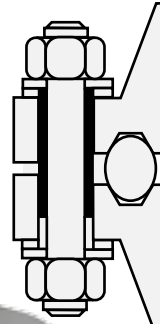
Inside Bolt Location Gasket Insulating Set Assembly

Utilizes a central gasket which locates within the bolts.



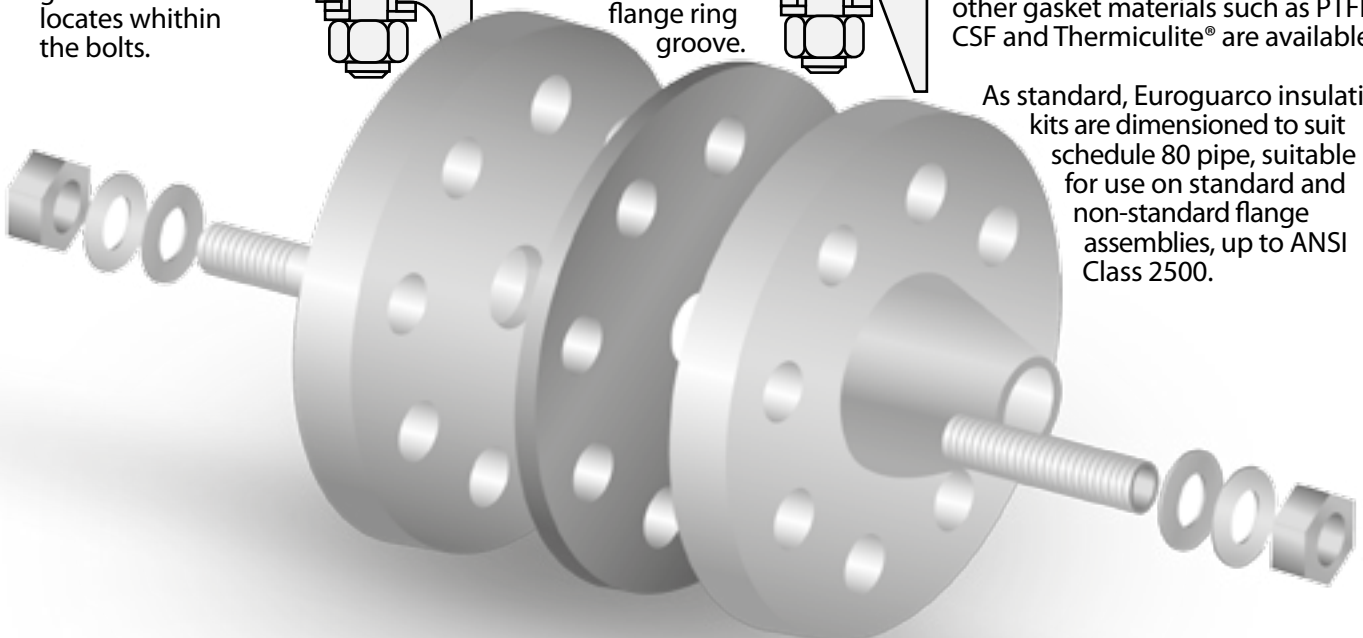
Style NCB Ring Joint Gasket Insulating Set Assembly

Insulating oval section ring joint will fit into a standard RTJ flange ring groove.



For higher service temperature, other gasket materials such as PTFE, CSF and Thermiculite® are available.

As standard, Euroguarco insulating kits are dimensioned to suit schedule 80 pipe, suitable for use on standard and non-standard flange assemblies, up to ANSI Class 2500.

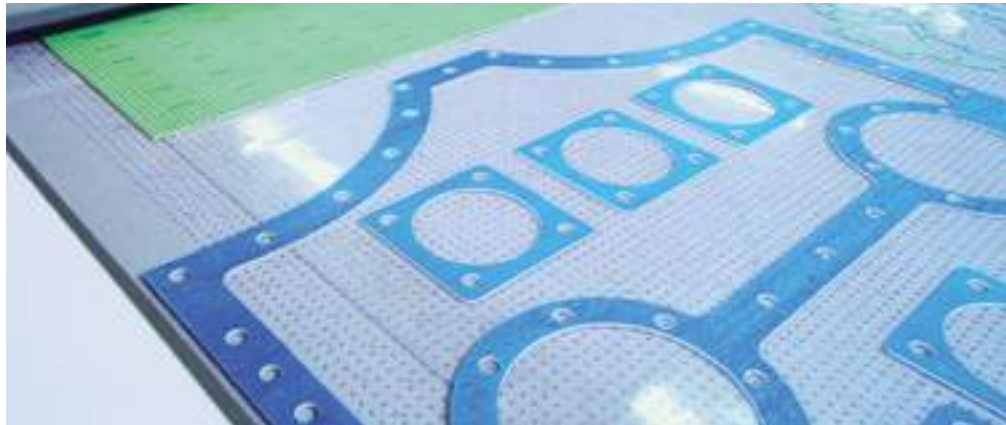


Soft Gaskets & Sealing Materials

Characteristics

Soft Gaskets are used with flat-face and raised-face flanges in low and medium Pressure Class applications. Based on the inertness of the materials used, they can fill many chemical requirements, and be used up to very high service temperature.

Their fabrication is usually by either die-cutting or CAM cutting, from several types of sealing sheet materials.



Gasket Types:

Compressed Synthetic Fibre FASIT®

Manufactured from a viscous granular mixture of high-strength short fibers, heat-resistant fillers and elastomeric binders, FASIT® sheets are highly reliable gasket materials, used worldwide with pipes, equipment and pressure vessels.

Common components:

- fibers: aramid, mineral, glass, cellulose and carbon
- fillers: clay, ceramic sulfates & oxides, active silica, graphite flakes, etc.
- binders: NR, SBR, NBR, CR, EPDM, CS



Service temperature:
from 150 to 300°C.

Pressure: from 60 to 100 bar depending on styles.

Flexible Graphite GRA-FLEX®

GRA-FLEX sheets are available with a variety of inserts or surface finishes:

- perforated tanged stainless steel sheet
- single or multiple flat stainless steel sheet
- fiberglass fabric
- steel mesh, polyethylene or PTFE film



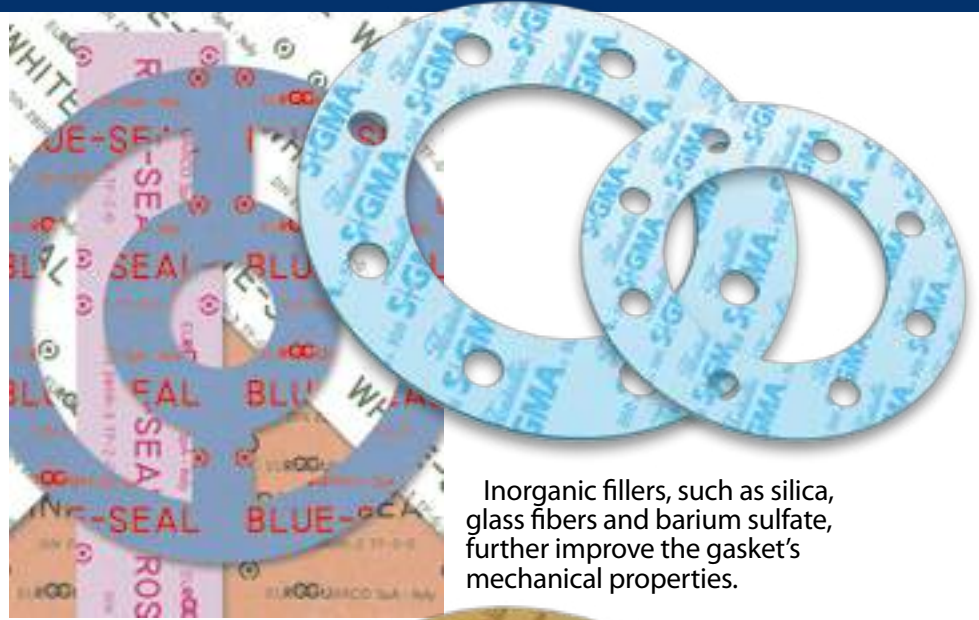
Service temperature:
from 450°C to 800°C

Pressure: from 40 to 120 bar depending on styles GRA-FLEX is also available in form of rolls, tape, rings and textiles.



Filled & modified PTFE **GUAFLON®** and **SIGMA®** by Flexitallic

GUAFLON® White Seal, Blue Seal, Pink Seal and Soft Seal are cost effective skived filled modified PTFE gasket sheets suitable for a wide range of chemically aggressive operating conditions. Most PTFE-based gasket sheet styles are obtained from a “modified” form of PTFE, which provides greater creep strength, higher elasticity, lower permeability.



Inorganic fillers, such as silica, glass fibers and barium sulfate, further improve the gasket’s mechanical properties.

Flexitallic **THERMICULITE®**

THERMICULITE is a “universal” gasket material that combines the load bearing and gas tight structure of flexible graphite, with the thermal and chemical resistance of mica.

Ideal choice for use in turbochargers and superchargers, diesel engine exhaust manifolds, oxidizing services in the nitrogen fertilizer manufacturing process, steam service, and many more.



Thermiculite 815® - up to 900°C, even with oxidizing media.
Thermiculite 715® - up to 500°C.



Other Sealing Materials:

Beater Addition, Cellular and Plain Rubber, Mineral Fibre Felt and Millboard, Gelatine-Glycerine, Mica Compound.



Textiles Gaskets:

Tapes, Ropes, Braids, Tad-Pole Gaskets, manufactured from various types of fibres, such as Glass, Silica, Ceramic, Aramid.



Compression Packings:

for pumps, valves, compressors, agitators, fans, and similar equipment.



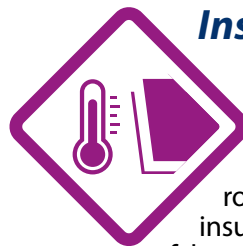
Euroguarco Divisions



Piping

Conforming to ANSI, BWG, AWG, BS and other international standards:

line pipe, boiler pipe, heat-exchanger tube, tube expanders, torque wrenches, condenser tube, boiler and heater tubes, U-tubes, assembly bundle tubes, finned tube for air-cooling systems; Carbon steel, stainless steel, Cu-Ni, admiralty brass, cast iron, special alloys.



Insulation

High temperature textiles (fabrics, tapes, ropes, sleeves), insulating blankets, felts, millboards, papers and mouldables, pre-formed insulating jackets, welding blankets, polymeric foam insulating boards, acoustic boards and sound barriers, fire-resistant textiles, compensation joints.

Speciality items for marine, oil & gas, steel, glass industries.



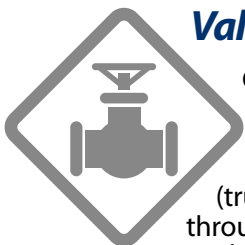
Engineering

Often in cooperation with partners, Euroguarco has performed several turn-key and sub-contract works

for the engineering, supply and construction of industrial and civil projects. Based on the project, Euroguarco can offer his customers with advantageous solution by reducing the cost impact of many services that normally EPCs give in outsource. Some cases:

- Piping system engineering, fabrication and testing
- Pig Launcher & Receiver (Iraq, Libya)
- Gas/Oil Tanker Jetty (Iran)
- Gas, oil or finished products Pipeline project (Turkey, Iran, Iraq)
- Slug Catcher (Iran)
- Steel & alloy piping structure (Mexico)
- Air and water cooling systems (Iraq)
- Insulation cut-on-design and supply for piping and pressure vessels (Kazakhstan, Italy)
- Flares and burners (Iraq)
- LPG storage and distribution system (Ghana, Tanzania)
- LPG filling station (Tanzania)
- Railway project (Ghana)
- Pumping station (Russia)
- Stations on skid (Iraq)

Euroguarco is also active in environment friendly projects, in cooperation or in consortium with specialized partner companies.



Valve

Gate, Swing-Check, Globe valves. Ball valves (trunnion, floating, through conduit), wrench and gear

operator. Forged and cast steel types. Butterfly, Wafer-type, Diaphragm and Knife-Gate valves.

Valve in bronze and brass: gate, globe, swing check and ball type. Conforming to dimensional standards ASME, ANSI, API, BS. Materials: carbon steel, stainless steel, cast iron, ductile iron and alloys. Sizes from 1/4" to 60", depending on the type of valve. Rating from 150 to 2500 Lbs.



Gasket

Conforming to ASME, DIN, EN and BS standards: compressed jointing sheets FASIT®, flexible graphite

GRAFLEX®, PTFE based sheets GUAFILON®, mica compound sheets GUARMICA®, gland packings, o-rings, die-cut gaskets, Weaveline gaskets, spiral-wound gaskets, metal-jacketed gaskets, ring-joint gaskets, flat metal gaskets, laminated gaskets, rubber gaskets, cam-profile gaskets, textile gaskets, manhole gaskets, etc.



Selected References

- ABB (Italy)
- ADOC Japan (EAU)
- Agip (Italy)
- Agip KCO (Kazakhstan)
- AGOCO (Libya)
- Alenia Aeronavale (Italy)
- Ameira Petroleum (Egypt)
- Ansaldo Energia (Italy)
- ASRY Shipyards (Bahrain)
- Attok Refinery (Pakistan)
- Bangladesh Gas Field Co. (Bangladesh)
- Banias Power Co. (Syria)
- Banias Refinery (Syria)
- Bateman-Litwin (France)
- Belleli (Italy)
- BP (Iraq)
- Brega (Libya)
- Brembana (Italy)
- Cairo Refining (Egypt)
- CERN (Switzerland)
- Daura Refinery (Iraq)
- Dongang Boiler Group (China)
- Eastern Refinery (Bangladesh)
- Eco Petrol (Colombia)
- Edipower (Italy)
- ENEL (Italy)
- ENI (Italy)
- Enppi (Egypt)
- Fincantieri (Italy)
- Finmeccanica (Italy)
- Fondital (Italy)
- Foster Wheeler (Italy)
- Gas Transmission Co. Ltd (Bangladesh)
- GAZPROM (Russia)
- GE Nuovo Pignone (USA, Italy)
- Homs Refinery (Syria)
- Jordan Petroleum Refinery (Jordan)
- LukOil (Russia)
- MAERSKOIL (Kazakhstan)
- Magotteaux (Belgium)
- Mangiarotti (Italy)
- Mari Gas Co. (Pakistan)
- McDermott (USA)
- Mellitah (Libya)
- Midland Refinery (Iraq)
- Ministry of Defense (Italy)
- National Refinery (Pakistan)
- NIGC (Iran)
- North Oil Company (Iraq)
- NPCC (EAU)
- Nuovo Pignone - GE (Italy)
- Officine Resta (Italy)
- Olmi - Alfa Laval (Italy)
- OPET Petrol (Turkey)
- ORYXGAS (Switzerland)
- Oto Melara (Italy)
- PDI-Pemex (Mexico)
- Petrojet (Egypt)
- Qatar Gas (Qatar)
- Ras Gas (Qatar)
- Saipem (Italy)
- Saras (Italy)
- SCOP (Iraq)
- Sirte Oil Co. (Libya)
- Snam (Italy)
- Solvay (Italy)
- South Oil Company (Iraq)
- SGS Oil & Gas (Czech Republic)
- SSGC (Pakistan)
- Kala Naft (Iran)
- Kordestan Petrochemical (Iran)
- MAPNA (Iran)
- Metec (Ethiopia)
- Nargan (Iran)
- NIOC (Iran)
- PDO (Oman)
- Pentair (USA)
- POGC (Iran)
- Yara (Italy)
- Sung Kyong (South Korea)
- Tecnimont (Italy)
- Tehran Refinery (Iran)
- Termomeccanica Italiana
- Trenitalia (Italy)
- Waha Oil Company (Libya)
- Warri Refinery (Nigeria)



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