KLINGER Thermoseal

# LEADER IN FLUID SEALING SOLUTIONS

## Products and Solutions

www.klinger-thermoseal.com

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# INTRODUCTION

With heightened awareness of safety and environmental issues, reducing leaks from flanged assemblies is of the utmost priority. It is important to understand how to select the correct gasket and how to install and maintain it to give optimum performance. If you have any doubt with regard to selecting the correct product or require advice on proper gasket installation, please contact our Technical Service Team.

# OUR COMPANY


## Customer Focus With Industry Expertise

KLINGER Thermoseal is a leading manufacturer and distributor of sealing products for industrial and OEM applications. The KLINGER Group is a world-leading developer and manufacturer of sealing, fluid control and fluid monitoring systems founded in 1886 by Austrian engineer, Richard Klinger. Today, the global KLINGER network operates 40+ manufacturing and distribution facilities and sales and service hubs in over 60 countries.

KLINGER Thermoseal's focus has always been on technical excellence, innovation, and dedication to the customer and their needs. KLINGER Thermoseal's Engineering Services are ready to examine and evaluate the application environment in which a gasket will be used, and our fully equipped testing lab can provide insight into the performance of a joint.

We deliver top quality performance combined with passion for excellence – then, now and tomorrow.

## Quality Sealing With Service And Innovation

KLINGER Thermoseal's efforts to provide excellence in products and services is continuous in order to assure customer requirements are determined and met. This is achieved through compliance with the requirements and continuous improvement of the Quality Management System. Customer satisfaction is first and foremost in our business objectives as we strive to exceed expectations.

Certification to the International Organization for Standardization assures customers that KLINGER Thermoseal is engaged in continuous improvement and that consistent and correct quality levels are maintained throughout all processes.

Our commitment to quality products is also backed by tens of thousands of hours of scientific development, testing, analysis and improvement, along with a level of experience that is unmatched in the industry.

NSF
NSF-ISR
Registered to ISO 9001

# YOUR INDUSTRY - OUR EXPERTISE

General manufacturing | Infra - structure | Automotive | Marine | Oil & Gas | Chemical | Pulp & Paper | Energy | Food & Beverage | Pharma

## Whatever the application, KLINGER Thermoseal has a solution

KLINGER Thermoseal is your partner for quality sealing products and solutions. We manufacture and distribute reliable products for industrial and OEM applications. Our knowledgeable team combines excellent know-how and application and engineering expertise to support our customers' and end users' needs.

At KLINGER Thermoseal we focus on ensuring plant safety. Whether the medium to be transported is fluid or gaseous, we see it as our responsibility to ensure that the media remain where they are intended. Fully committed to this approach, our plant safety technology solutions ensure reliable and safe operation. Without leakages and subsequent harm or material damage.

Our mission is to assist in avoiding such incidents through the provision of our innovative and state of the art product range, which is tailored to meet the specific requirements of the respective industries.

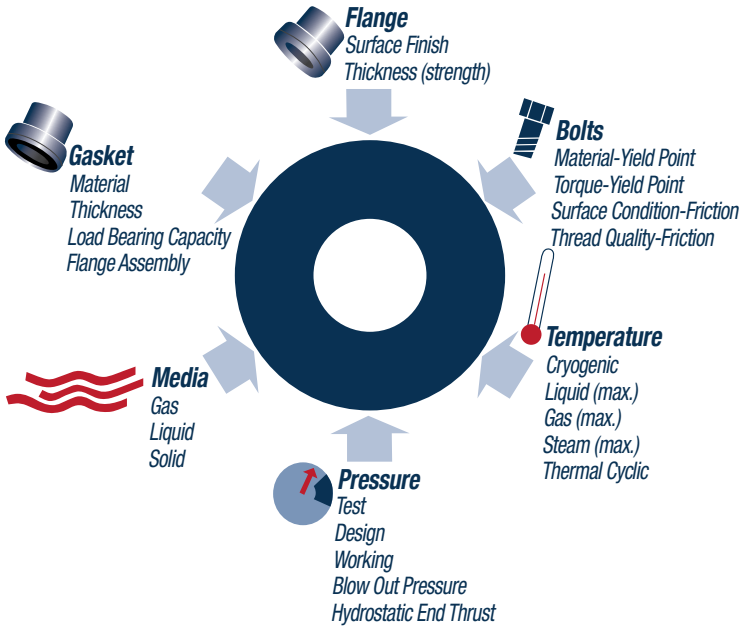
KLINGER products can be found in many different markets and sectors throughout the world. KLINGER Thermoseal develops industry and region-specific solutions that help make our customers successful today and in the future. Our leading-edge products, the know how of our specialists and the proximity to our customers are the connecting elements of our market approach. We provide solutions with a unique product portfolio for the most demanding industries.

# THE MANY, VARIED DEMANDS PLACED ON GASKETS

A common perception is that the suitability of a gasket for any given application depends on the maximum temperature and pressure conditions. This is not the case. Maximum temperature and pressure values alone cannot define a material's suitability for an application. The successful operation of a gasket depends upon a multiplicity of factors including flange surface and design, bolts, temperature, pressure, media being sealed and gasket material, design and assembly.

The ability of a gasket to make and maintain a seal depends not only on the style and quality of the gasket material, but also on medium being sealed, the flange design, the amount of pressure applied to the gasket by the bolts and how the gasket is assembled onto the flanges and tightened. These factors are beyond the manufacturer's control.

## Proper Flange Assembly




# SELECTING GASKETS WITH pT DIAGRAMS

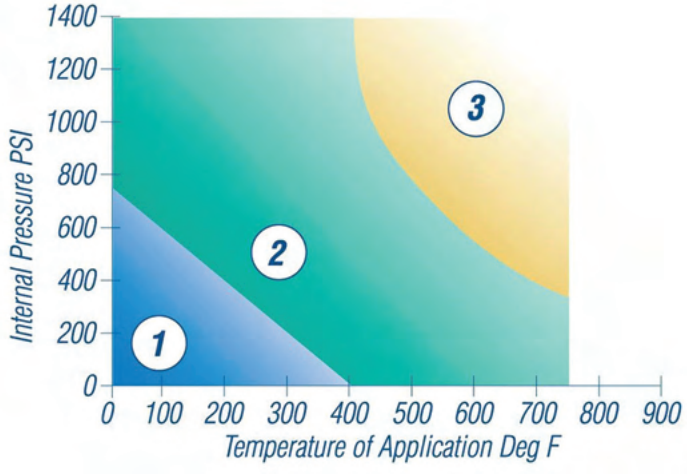
The KLINGER pressure/temperature graphs provide guidance for determining the suitability of a particular gasket material for a specific application based on the operating temperature and pressure only and depends upon a multiplicity of factors.

**Areas of Application:**

① In area one, the gasket material is normally suitable using common installation practices and subject to chemical compatibility.

② In area two, appropriate measures are necessary for the installation of the gasket to ensure maximum performance. Please call for a technical evaluation or refer to KLINGERexpert for assistance.

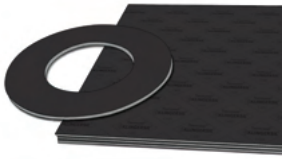
③ In area three, do not install gaskets in these applications without referring to KLINGERexpert or contacting KLINGER Thermoseal's technical support.



# COMPRESSED FIBER GASKET MATERIALS

KLINGERSIL®, KLINGER® Quantum, KLINGER®top-sil and 400Max are non-asbestos fiber based materials designed to meet the highest standards of performance. These calendered gasket materials are made from inorganic or organic fibers with rubber binders. Compressed fiber materials are easy to handle and cut and are used in a wide range of industrial applications.

## KLINGERSIL® C-4201

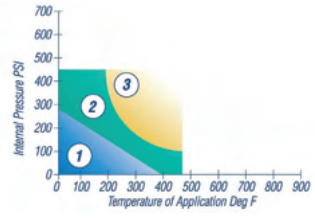


General application gasket material that offers excellent resistance to oils and solvents and is an excellent choice for OEM applications. C-4201 is manufactured with a combination of synthetic fibers reinforced with a nitrile binder.

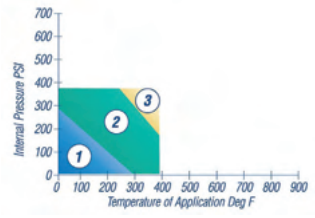
**Applications:**
Oil, solvent, water, low temperature steam and other chemical products in general.

pT diagram for 1/16" thickness

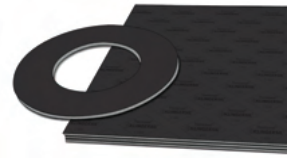
Liquids




Gases & Steam




## KLINGERSIL® C-4300

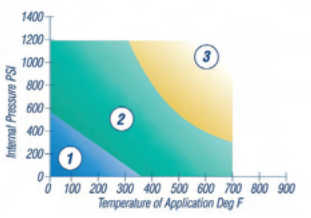


Universal high-pressure gasket material that is resistant to hot water, steam, oil, hydrocarbons and many other chemicals which makes it suitable for many different media. C-4300 is manufactured with aramid fiber reinforced with a nitrile binder.

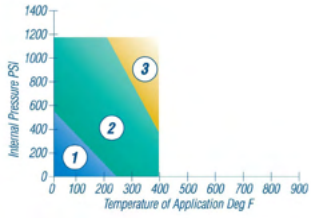
**Applications:**
Hot water, steam, oils, hydrocarbons and many other chemicals.

pT diagram for 1/16" thickness

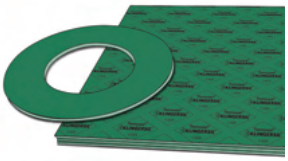
Liquids




Gases & Steam




## KLINGERSIL® C-4324

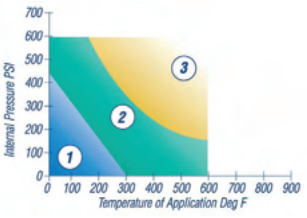


A universal gasket material for use in a wide range of applications and is a good general-purpose material. C-4324 is manufactured with a combination of synthetic high-performance fibers reinforced with a nitrile binder.

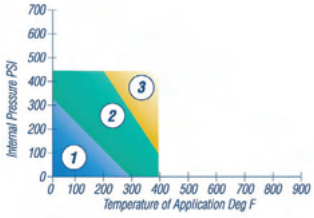
**Applications:**
Suitable for use in liquids and steam at lower pressure and temperature. Resistant to water, oils, hydrocarbons and many other chemicals.

pT diagram for 1/16" thickness

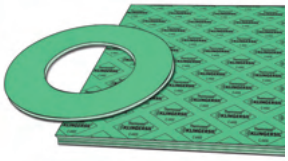
Liquids




Gases & Steam




## KLINGERSIL® C-4400

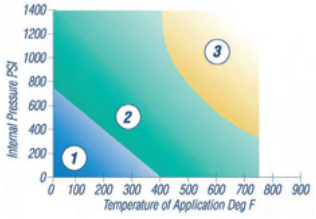


A universal material that is resistant to oils, water, steam, gases, salt solutions, fuels, alcohols, moderate organic and inorganic acids, hydrocarbons, lubricants, and refrigerants. C-4400 is manufactured with aramid fiber reinforced with a nitrile binder.

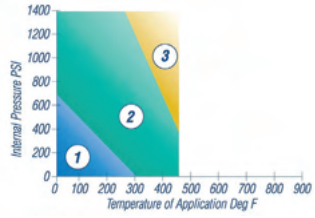
**Applications:**
Wide range of applications.

pT diagram for 1/16" thickness

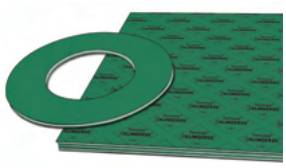
Liquids




Gases & Steam



## KLINGERSIL® C-4401

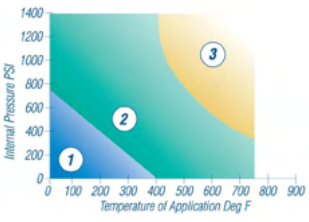


A universal, general purpose gasket material that has excellent sealability and chemical resistance. C-4401 is manufactured with aramid fiber reinforced with a nitrile binder.

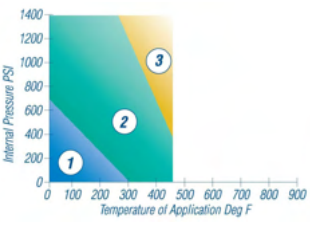
**Applications:**
Wide range of applications.

pT diagram for 1/16" thickness

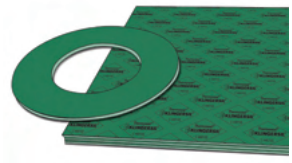
Liquids




Gases & Steam




## KLINGERSIL® C-4401SS

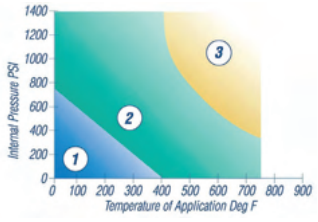


A universal, general purpose gasket material that offers excellent sealability and chemical resistance along with good creep relaxation characteristics. C-4401SS is manufactured with synthetic fiber reinforced with a nitrile binder.

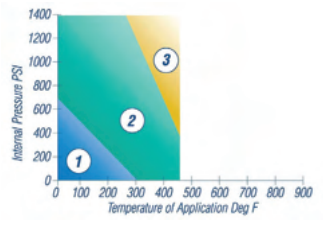
**Applications:**
Wide range of applications.

pT diagram for 1/16" thickness

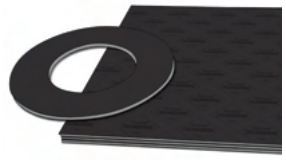
Liquids




Gases & Steam




## KLINGERSIL® C-4408

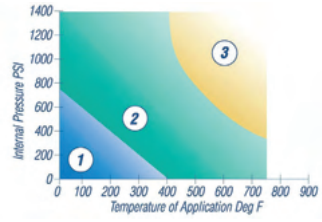


A universal high-pressure gasket material with a low carbon steel woven mesh insert that improves sress relaxation and makes this material suitable for fluctuating temperatures and pressures. C-4408 has good resistance to oils, fuels and hydrocarbons, and is manufactured with aramid fiber reinforced with a nitrile binder.

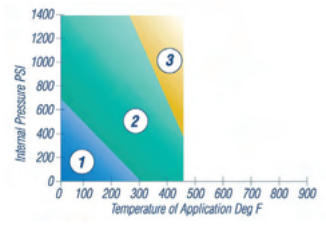
**Applications:**
Industrial applications.

pT diagram for 1/16" thickness

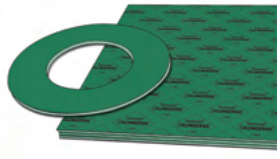
Liquids




Gases & Steam




## KLINGERSIL® C-4409

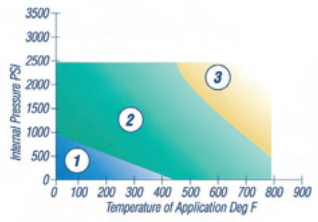


Has an expanded metal reinforcement. The galvanized low carbon steel insert makes this material suitable for conditions with high thermal and mechanical stress. C-4409 is manufactured with synthetic fiber reinforced with a nitrile binder.

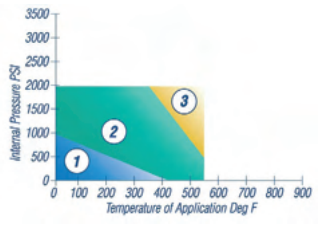
**Applications:**
Excellent in hot gases and can replace spiral wound gaskets in some applications.

pT diagram for 1/16" thickness

Liquids

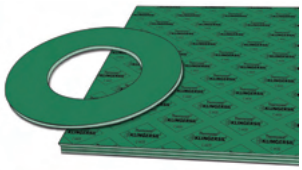



Gases & Steam



# COMPRESSED FIBER GASKET MATERIALS

## KLINGERSIL® C-4430

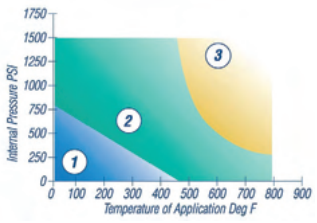


A universal gasket material with outstanding stress relaxation and resistance to hot water and steam making it suitable for a wide range of applications. C-4430 is manufactured with a combination of aramid fiber and fiberglass reinforced with a nitrile binder.

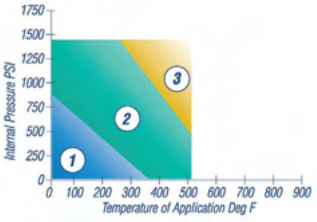
**Applications:**
Oils, gases, salt solutions, fuels, alcohols, moderate organic and inorganic acids, hydrocarbons, lubricants and refrigerants.

pT diagram for 1/16" thickness

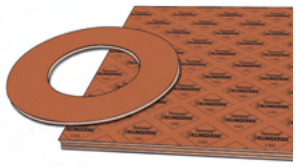
Liquids




Gases & Steam




## KLINGERSIL® C-4433

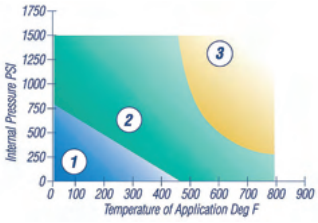


The ultimate steam sheet. It is excellent at higher temperatures and has outstanding load-bearing properties and excellent creep relaxation properties. C-4433 is manufactured with a combination of fiberglass and aramid and inorganic fibers reinforced with a nitrile binder.

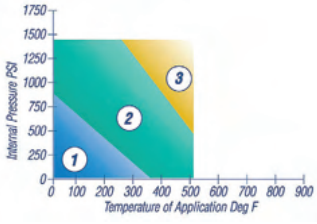
**Applications:**
Expanded for most petroleum-based media such as lubrication and hydraulic oils, solvents, and natural gas.

pT diagram for 1/16" thickness

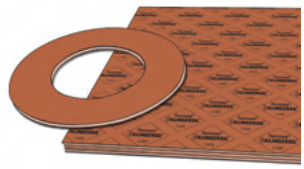
Liquids




Gases & Steam




## KLINGERSIL® C-4439

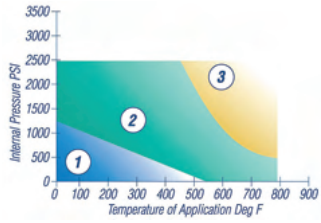


An excellent high-performance material. The expanded metal reinforcement is a galvanized low carbon steel insert which makes this material suitable when vibrations are present. C-4439 is manufactured with a combination of fiberglass and aramid and inorganic fibers reinforced with a nitrile binder.

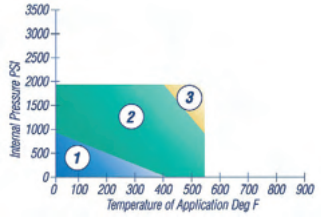
**Applications:**
High temperature and high-stress applications.

pT diagram for 1/16" thickness

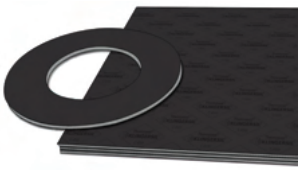
Liquids




Gases & Steam




## KLINGERSIL® C-4500

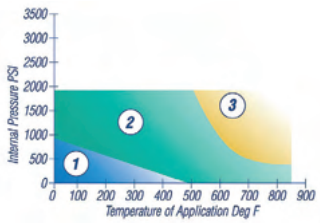


A premium grade, high-pressure gasket material designed for use in high-temperature alkaline media and superheated steam. C-4500 is manufactured with carbon fibers and special heat-resistant additives and reinforced with a nitrile binder.

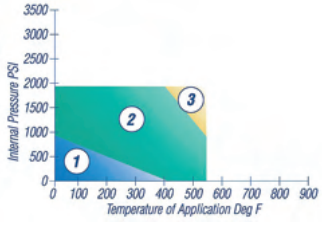
**Applications:**
Superior performance material suitable in the pulp and paper industry and the chemical industry.

pT diagram for 1/16" thickness

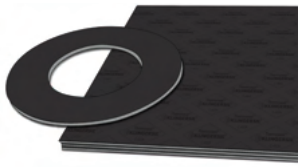
Liquids




Gases & Steam



## KLINGERSIL® C-4509

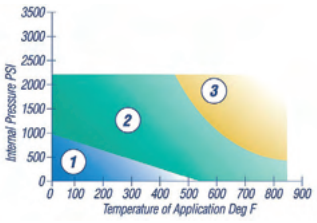


A high-pressure gasket material. The expanded metal reinforcement is a galvanized low carbon steel insert which increases the compressive strength and pressure capability. Has higher resistance against blowouts. C-4509 is manufactured with carbon fibers and special high-temperature resistance additives and reinforced with a nitrile binder.

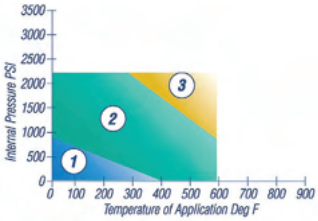
**Applications:**
High-pressure applications. Alkaline media and steam.

pT diagram for 1/16" thickness

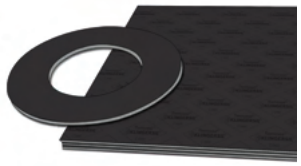
Liquids




Gases & Steam




## KLINGERSIL® C-5400

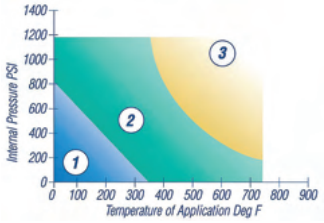


A high performance premium sheet that is chemically stable and provides excellent sealability in many applications. C-5400 is manufactured with synthetic fibers reinforced with a neoprene binder.

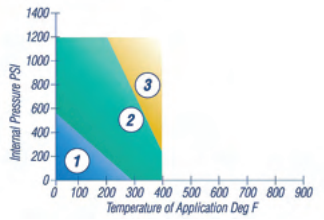
**Applications:**
Refrigerants, oils, gas, and fuels.

pT diagram for 1/16" thickness

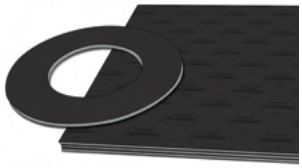
Liquids




Gases & Steam




## KLINGERSIL® C-6327

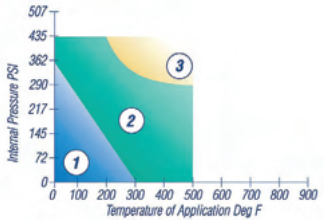


This gasket material is a good choice for liquids and steams with low-temperature and low-pressure applications. Controlled swelling in oils and fuels provides very good adaptability to any sealing surface. Offers excellent conformity to flanges at low surface bolts. C-6327 is manufactured with synthetic fiber reinforced with a modified SBR binder.

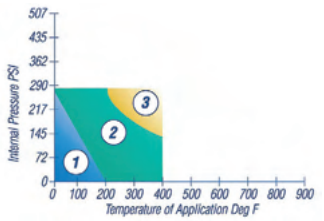
**Applications:**
Low bolt applications.

pT diagram for 1/16" thickness

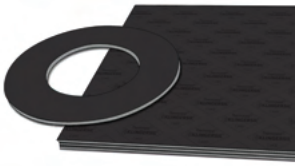
Liquids




Gases & Steam




## KLINGERSIL® C-6400

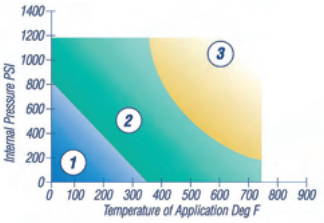


This gasket material is a good steam sheet with good anti-stick properties. Use this material in process industries. C-6400 is manufactured with synthetic fiber reinforced with an SBR binder.

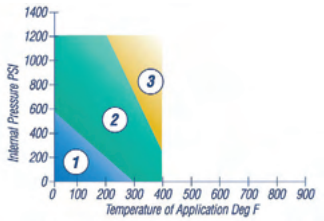
**Applications:**
Pulp and paper, power, and petrochemical.

pT diagram for 1/16" thickness

Liquids

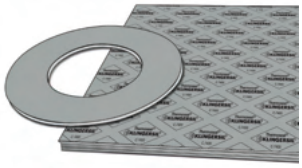



Gases & Steam



# COMPRESSED FIBER GASKET MATERIALS

## KLINGERSIL® C-7400

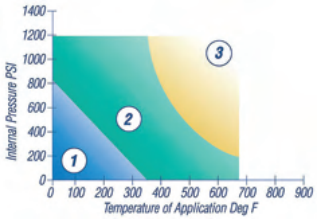


Satisfies both sealing and electrical requirements, and is resistant to moderate caustics and acids. It can also act as an insulator or barrier to the flow of electrons from one flange to another due to its high dielectric strength. C-7400 is manufactured with synthetic fiber reinforced with an EPDM binder.

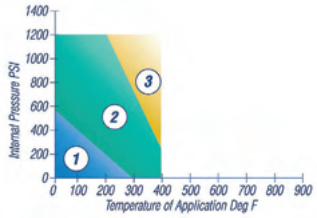
**Applications:**
Suitable for paper mills.

pT diagram for 1/16" thickness

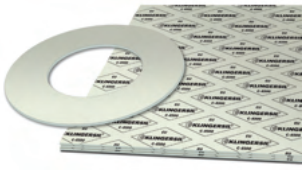
Liquids




Gases & Steam




## KLINGERSIL® C-8200

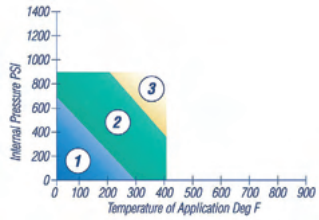


Gasket material is specifically designed for an aggressive chemical environment. It is resistant to most mineral acids and alkalis, ketones, and aldehydes. C-8200 is manufactured with a unique blend of glass fibers reinforced with a special, hypalon acid-resistant binder.

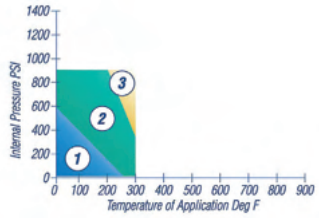
**Applications:**
Excellent choice for use with acids.

pT diagram for 1/16" thickness

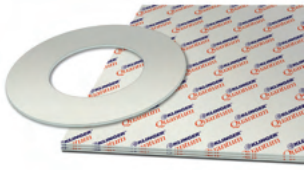
Liquids




Gases & Steam



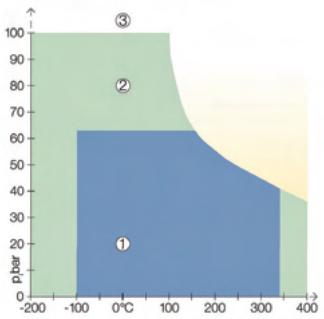

## KLINGERSIL® Quantum



Fiber-reinforced gasket material that is exclusively HNBR-bound. With a unique production process, this material can be used at higher temperatures and with a much wider range of media than any other fiber-reinforced gasket material. Quantum is manufactured with high-quality fiber and filler compound reinforced with a high-temperature resistant HNBR matrix.

**Applications:**
Use in oils, water, steam, gases, salt solutions, fuels, alcohols, weak organic and inorganic acids, hydrocarbons, lubricants, and refrigerants.

pT diagram for thickness 2.0 mm

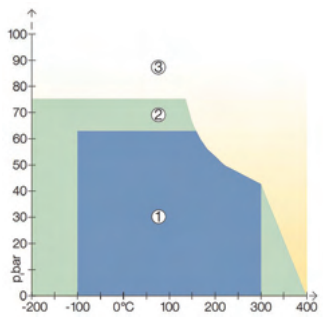



## KLINGERSIL® top-sil ML1

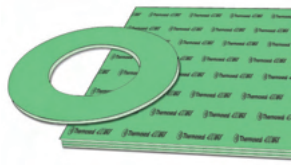
A special multi-layer gasket material with improved flexibility at higher temperatures. This material is resistant to creep and cold flow. KLINGERSIL® top-sil ML1 is manufactured with a revolutionary combination of synthetic fibers and HNBR and NBR rubbers, reinforced in a multi-layer structure. This unique multi-layer structure extends service life.

**Applications:**
Use with oils, water, steam, gases, salt solutions, fuels, alcohols, moderate organic and inorganic acids, hydrocarbons, lubricants & refrigerants.

pT diagram for thickness 2.0 mm



## 400 MAX



A general service compressed non-asbestos gasket material with a wide range of application potential. Use it in general applications. 400 MAX is manufactured with quality fibers, fillers with a nitrile binder (NBR). This material has a temperature range of -40°F to 400°F.

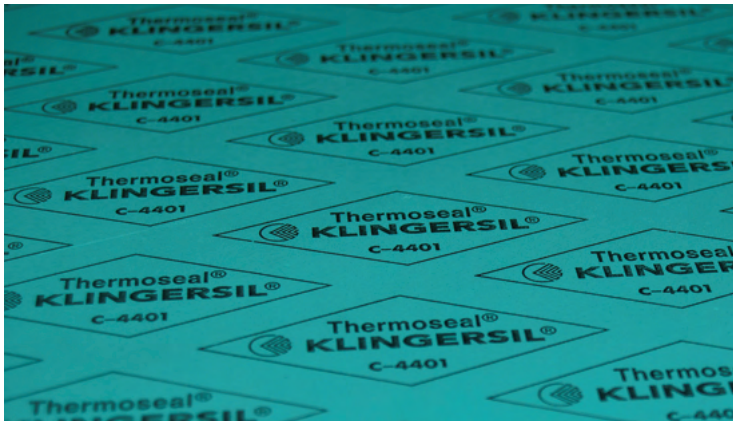
**Applications:**
Use it in liquid and gas service.

# THE ORIGINAL GREEN

## Many Materials are Green, Only One is KLINGERSIL®

## Test Results

KLINGERSIL® materials are hard to beat. So, competitors have cleverly posed their compressed gasket materials as KLINGERSIL® green (C-4401). Of course, their offerings aren't equal in quality, performance or specification. And just because it's green doesn't mean it's KLINGERSIL®. To ensure you're getting what you want and need in your compressed gasket materials, whether green, gray, tan, black or white, look for the KLINGERSIL® logo repetitively printed on the sheet. Then you'll know it's the Original KLINGERSIL®.




**KLINGERSIL® C-4401 After HCT**

**The "Green" Competition After HCT**

## Quality Assured

The KLINGERSIL® logo printed on your gasket sheet is the best assurance of quality and performance. But if you're skeptical, ask your local KLINGER sales representative for a live hot compression test. You'll see for yourself the difference between KLINGERSIL® and the other brands.

## Hot Compression Test

A key factor in maintaining a seal are the load bearing properties of the gasket. These criteria can be observed using the KLINGERSIL® Hot Compression test, which applies both constant pressure and temperature. This measures the compression set of the product, including stress/creep relaxation resistance and reserve. You can see for yourself from the photos to the right that a product stating it's the same as KLINGERSIL® C-4401 is never true.

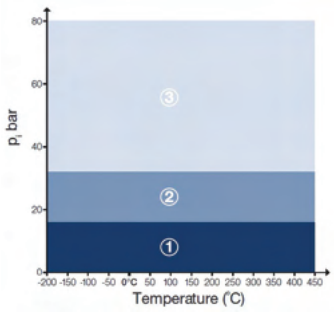
# GRAPHITE LAMINATE MATERIALS

KLINGER® Flexible graphite gasket materials use only the highest-quality graphite foils with a variety of inserts. Graphite materials are suitable for temperatures between -328°F and up to 842°F and have exceptional resistance to temperature fluctuations. KLINGER® Graphite Laminates offer resistance against a broad range of chemicals. Graphite materials do not have a rubber binder and are not subject to hardening. Anti-Stick (AS) coating is available upon request that prevents gaskets from sticking to the flange surface.

### KLINGER® Graphite Laminate HL

Graphite laminate sheet without reinforcement. HL is a homogeneous sheet made from flexible graphite foil layers. It is the standard industrial grade graphite sheeting with superior chemical resistance. The flexible graphite material is highly compressible and compactable allowing for low gas permeability with low electrical resistance. The grade is especially superior working with enamel surface as well as against strongly corrosive media.

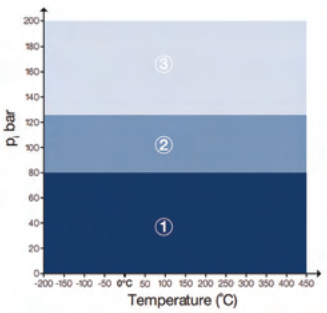
pT diagram for thickness 2.0 mm




### KLINGER® Graphite Laminate PSM

Graphite gasket material with a stainless steel tang insert. KLINGER® Graphite Laminate PSM has a 0.1 mm thick perforated stainless steel insert. The insert aids material handling properties and also increases the blow-out resistance. The insert is mechanically bonded to pure exfoliated graphite and therefore does not rely on adhesive. KLINGER® Graphite Laminate PSM is suitable for hot water.

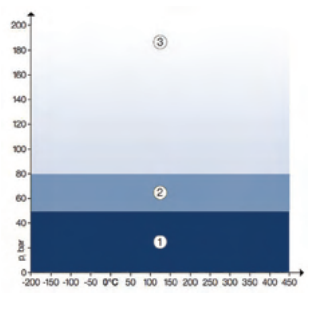
pT diagram for thickness 2.0 mm




### KLINGER®Graphite Laminate SLS

The pure graphite gasket sheet with a smooth stainless steel insert. SLS is suitable for universal use especially in combination with weak flanges at high temperatures and for sealing of liquid level gauges.The gasket material consists of pure exfoliated layers of graphite, which are mechanically bonded to a 0.05 mm thick, smooth, stainless steel insert. The insert aids material handling properties and also increases blow-out resistance.

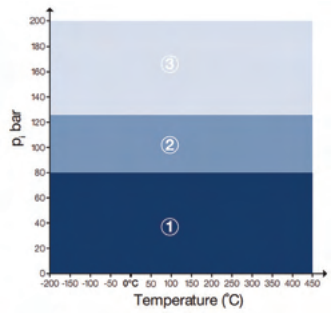
pT diagram for thickness 2.0 mm




### KLINGER® Graphite MLX Multi Layer XTREME

High performance graphite material with multiple plain stainless steel foil inserts bound by a proprietary technology without using adhesives. MLX is suitable in heavy-duty conditions because of its very high compressive strength. An excellent choice for high pressure applications. MLX gaskets are robust and adapt to any sealing surface including irregular flanges. Chose from 1, 2, 3, 5 or 7 layers of 316(L) reinforcement inserts.

pT diagram for thickness 2.0 mm



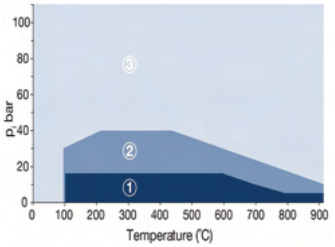
# KLINGER® MILAM MICA GASKET MATERIALS

This soft sealing material has been specifically designed to master the rigors of high-temperature sealing applications. It is the preferred choice for utilization scenarios such as exhaust pipes, turbines, turbochargers and fuel lines - it can withstand temperatures of up to 1650°F (900°C) in continuous operation.

**KLINGER® Milam PSS**

Mica sheet engineered for demanding operating conditions. KLINGER® Milam PSS is an asbestos-free sealing material with a perforated stainless steel reinforcement. This high temperature, mica-based material is specifically designed to master the rigors of high-temperature sealing applications. Because of its excellent chemical resistance to solvents, aggressive acids, alkalis and mineral oils, gaskets from this material can be used in a variety of industries.

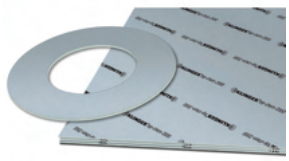
pT diagram for thickness 2.0 mm




# PTFE GASKET MATERIALS

PTFE has excellent chemical resistance and is only attacked by molten alkali metals and hydrogen fluoride compounds at elevated temperatures making it suitable for a wide range of severe chemical applications. Our PTFE-based sealing materials have outstanding creep resistance to prolong time between service periods.

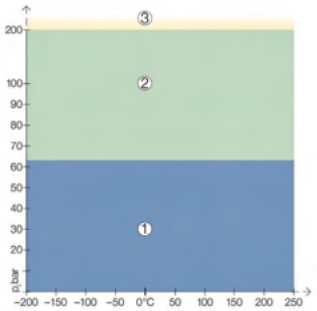
### KLINGER®top-chem 2000



Exceptional performance with high mechanical requirements at high temperatures. It is the only PTFE gasket material with a Fire-Safe Certificate. Use in strongly acidic and alkaline applications and in steam and oxygen. Suitable for a wide range of applications in the chemical and petrochemical industry, and in the ship building industry for the transport of chemicals. Material meets FDA conformity.

**Basis:** PTFE Gasket material filled with SiC (Silicon carbide).

pT diagram for thickness 2.0 mm

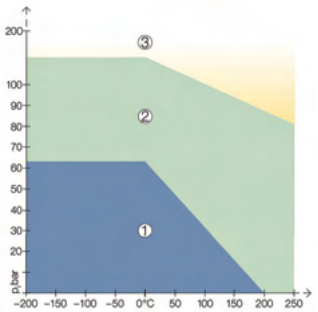



### KLINGER®top-chem 2003

KLINGER®top-chem 2003 offers high adaptability and tightness even at low surface loads. KLINGER®top-chem 2003 has excellent chemical resistance in strongly acidic and alkaline applications as well as very good properties at medium temperatures and loads. This material also meets FDA conformity.

**Basis:** Gasket material filled with hollow glass microspheres.

pT diagram for thickness 2.0 mm

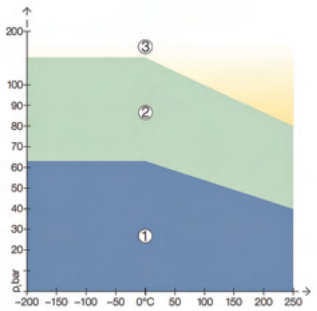



### KLINGER®top-chem 2005

KLINGER®top-chem 2005 offers outstanding performance and high chemical resistance in strong acidic applications. The material is suitable for a wide range of applications in the chemical industry. KLINGER®top-chem 2005 is resistant to cold flow and has very good mechanical properties at medium temperatures. This material also meets FDA conformity.

**Basis:** PTFE filled gasket material with inorganic fillers.

pT diagram for thickness 2.0 mm

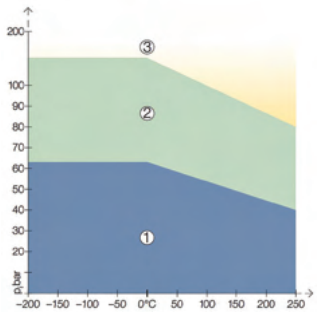



### KLINGER®top-chem 2006

KLINGER®top-chem 2006 offers an excellent resistance in strong alkaline applications and good mechanical properties at medium and low temperatures and loads. KLINGER®top-chem 2006 is suitable in a wide range of applications in the chemical industry. This gasket material is free of pigments and also meets FDA conformity.

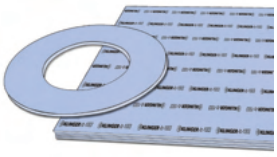
**Basis:** PTFE filled gasket material with barium sulfate.

pT diagram for thickness 2.0 mm



# PTFE GASKET MATERIALS

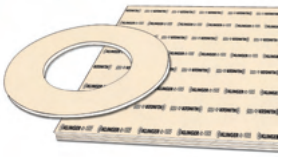
### KLINGER® tc-1003



Superior performance PTFE sheet with high compressibility. KLINGER®tc-1003 is a high quality, yet cost-effective biaxial oriented modified PTFE gasket material with hollow glass spheres. This material offers superior sealability, excellent torque retention, and reduced creep relaxation. Uses include most chemicals. It also works well on glass-lined flanges. Gaskets cut from this material are exceptionally effective when lower bolt loads are needed to effect a seal.
This material also meets FDA conformity.

**Basis:** Modified PTFE material with hollow glass spheres.

### KLINGER® tc-1005



High performance material with superior sealability. KLINGER®tc-1005 is a high quality, yet cost-effective biaxial oriented modified PTFE gasket material with silica. This material offers superior sealability, excellent torque retention, and reduced creep relaxation. Gaskets from KLINGER®tc-1005 are exceptionally effective when the reliability of a low deforming material is required. Uses include most chemicals and all concentrations of sulfuric acid. This material also meets FDA conformity.

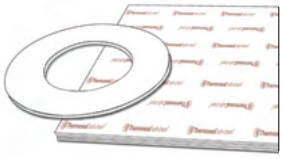
**Basis:** Modified PTFE material with silica.

### KLINGER® tc-1006

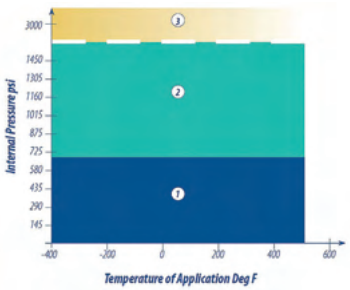
Superior performance sealing in critical applications. KLINGER®tc-1006 is a high quality, yet cost-effective biaxial oriented modified PTFE gasket material with barium sulphate that offers superior sealability, excellent torque retention, and reduced creep relaxation. Use gaskets from KLINGER®tc-1006 for most chemical applications. This gasket material is free of pigments and meets FDA conformity.

**Basis:** Modified PTFE material with barium sulphate.

### Soft-chem®



Soft-chem® expanded 100% virgin PTFE sealing material provides excellent corrosion resistance and impermeability along with superior creep resistance and sealability for use in all types of applications. A proprietary manufacturing process results in a uniform and highly fibrillated microstructure with equal tensile strength in all directions. Its superior memory characteristics ensure that bolts remain tight, so retorquing is not necessary. The material's high compressibility enables it to deform under load and conform to irregularities in flange faces for a tight seal with low, minimum sealing stress. Standardizing with it also helps to reduce maintenance, simplify inventory, and save money.



# PTFE JOINT SEALANT

### SEALEX® Joint Sealant


Sealex® joint sealant, specially processed, pure, expanded PTFE on a roll, provides soft, highly compressible gasketing for longer life and trouble-free sealing. Its form-in-place versatility also cuts maintenance and storage costs. The high compressibility of Sealex® enables it to effectively fill flange imperfections for a tight, leak-free seal. Under pressure, it provides a wide, thin, ribbon-like seal.

Unlike conventional PTFE which is prone to cold flow, Sealex® has good creep resistance and bolt torque retention properties.

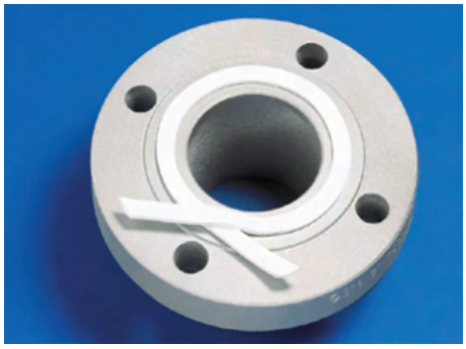
Sealex® joint sealant does not support bacterial growth or cause product contamination and is FDA compliant. It has virtually no shelf-life concerns since PTFE is unaffected by normal environmental conditions.

Sealex® has excellent resistance properties to chemical attack. It is ideal for most chemical services at temperatures to 500°F (260°C) and pressure to 2,000 psi (138 bar). It is also suitable for cryogenic use to -321°F (-196°C).

The sealant is available in roll form which helps reduce storage space, and is available in a wide variety of thicknesses and lengths.

**Sealex® joint sealant can be used wherever reliable gasketing is required.**

- » Fume ducts
- » Heat exchangers
- » Pump or compressor housing flanges
- » Glass joints
- » Water systems
- » Concrete lids
- » Fiberglass reinforced plastic vessels
- » Steam vessel flanges
- » Ceramic joints
- » Valves and piping



**Easy to Use Sealex®**

Just follow the simple installation instructions. Select the size Sealex®. Use a size with nominal width of between 1/3 and 1/2 of the effective flange sealing width.

- » Make sure that the sealing flanges are clean.
- » Cut off a length of Sealex® just a little longer than the actual circumference of the perimeter of the seal.
- » Peel off the adhesive protection strip, and press the Sealex® into position.
- » Cross the free ends of the Sealex® adjacent to the bolt hole.
- » Bolt up the mating surfaces using the recommended clamping force and bolt tightening patterns.

# OEM & AFTERMARKET GASKET MATERIALS

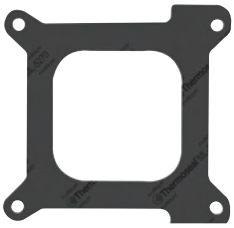
PERFORMANCE TECHNOLOGY GROUP

A unique product line developed specifically for OE and Aftermarket manufacturing. Each material is manufactured to the highest standards of quality and reliability using varied processes and compounds. It is targeted to meet a diverse range of performance and engineering requirements while satisfying demanding cost limitations. Multi-Layer Technology Grades and Advantage Roll Goods offer performance plus value. They offer a complete, yet cost-effective solution for long-lasting sealability and permeation resistance to liquids and gases in a wide range of services. These include gaskets in diesel and gasoline engines and drivelines for all types of vehicles as well as gaskets in power equipment, generators, pumps, and compressors.

## Multi-Layer Technology

Multi-Layer Technology high performance multi-layer materials provide both exceptional interfacial and interstitial sealability. Conformable outer layers prevent leakage between the gasket and flanges and a strong high-density core provides structural support while preventing leakage through the gasket. The unique Multi-Layer structure provides exceptional low flange pressure sealability and exceptional torque retention together with a more compressible core.

### ML-5270



ML-5270 is a synthetic fiber and polychloroprene binder material that is resistant to refrigerants and oil mixtures. Typical applications include gaskets in hermetic and semi-hermetic compressors and oil pan gaskets in heavy-duty diesel engines with intermittent operating temperatures up to 350°F (177°C).

### ML-N102

ML-N102 is a synthetic fiber and nitrile butadiene binder gasket material with good resistance to refrigerants and lubricating oils. Typical applications include heavy-duty diesel engines and compressors with intermittent operating temperatures up to 450°F (232°C).

### ML-N562

ML-N562 is synthetic fiber and nitrile butadiene gasket material designed for difficult sealing applications with very low flange pressure or very rough surface finishes. ML-N562 provides heat and chemical resistance in coolant, lubricant, and hot air applications. Typical applications include automotive, marine, and small engine applications with intermittent operating temperatures up to 500°F (260C°).

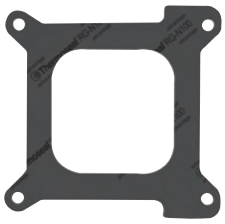
### ML-S723

ML-S723 is a controlled-swell gasket material intended for heavy-duty applications. ML-S723's blended styrene-butadiene and natural rubber binder provides exceptional sealability and conformability with low creep relaxation. Thickness increase, in the presence of oils and fuels, aids the sealing of irregular flange surfaces. Typical applications include diesel engine oil pan gaskets and gear plate and rear seal carrier gaskets with intermittent operating temperatures up to 350°F (177°C).

# Advantage Roll Goods

Advantage Roll Goods beater addition materials perform in a wide range of applications from low-cost aftermarket to higher performing OEM seals. Continuous length rolls allow efficient and economical fabrication with high speed die cutting equipment. When your customers want an “equivalent” or alternative to the currently specified material, there is an Advantage Roll Good for the job.

### RG-N100



RG-N100 is a nitrile butadiene rubber, reinforced cellulose fiber and mineral filler general purpose gasket material. Its low density provides good conformability in sealing fuels, oils, and water in applications such as automobile water pumps, miscellaneous cover gaskets, and many small engine applications. RG-N100 is suitable for applications with intermittent operating temperatures up to 350°F (177°C).

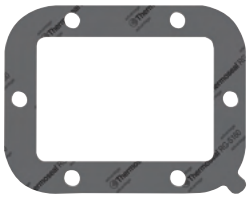
### RG-N120

RG-N120 is a reinforced cellulose gasket material with a nitrile butadiene rubber binder and inorganic fillers that provides very good crush resistance at high flange pressures. RG-N120 seals oils, water, and coolants in applications such as small engine intake and cover gaskets, automotive water pump and throttle body gaskets. RG-N120 is suitable for applications with intermittent operating temperatures up to 350°F (177°C).

### RG-S140

RG-S140 is a controlled-swell gasket material. After establishing initial sealability, the styrene-butadiene binder fully vulcanizes with time and heat of component operation providing long-lasting performance. It contains a blend of aramid, mineral, cellulose fibers and mineral fillers to provide enhanced crush and temperature resistance. Applications include gaskets for sealing hot oil or coolant in machinery including small engines, automotive and heavy-duty diesel engines with intermittent operating temperatures up to 550°F (288°C).

### RG-S160



RG-S160 offers exceptional sealability and crush resistance in a wide range of applications. RG-S160 is composed of a blend of aramid, mineral, cellulose fibers, graphite, and other inorganic fillers with a styrene-butadiene binder. A factory-applied release coating on both sides aids in flange removal. Typical applications range from power sport and other small engine gaskets to heavy-duty diesel service. RG-S160 is suitable for applications with intermittent operating temperatures up to 550°F (288°C).

# CUT GASKETS

Soft, cut gaskets are widely used to safely seal flanged connections within the industrial MRO and OEM markets. They are commonly used in general purpose, low to medium pressure and temperature applications. However special material grades are also available for more severe service conditions. Gaskets are cut from sheet materials to suit any flange design ranging from standard pipe flanges to highly irregular or complex flange geometries.


Ring gaskets are supplied for use on standard raised-face flanges.

Full face gaskets are supplied for use on flat-face flanges.

Both ring and full face gaskets are manufactured in accordance to ASME B16.21 dimensions 1/2” through 24”. Gaskets for other flange standards such as EN or JIS are also available as well as custom dimension with appropriate drawings.

A wide range of materials available in thicknesses from 1/64” to 1/4”. Standard pipe flange gaskets are commonly supplied in 1/16” or 1/8” thicknesses.

### Typical Materials

- » KLINGERSIL®
- » KLINGER® Quantum
- » KLINGER® Thermica
- » KLINGER®top-sil ML-1
- » 400 Max
- » KLINGER®top-chem
- » Soft-chem
- » KLINGER® Graphite Laminates
- » KLINGER® Milam PSS

# KLINGER MAXIFLEX SPIRAL WOUND GASKETS

KLINGER® Maxiflex spiral wound gaskets have the ability to recover under the action of fluctuating loads caused by process fluid pressure and temperature changes, flange face temperature variations, flange rotation, bolt stress relaxation and creep. The gasket sealing element consists of a pre-formed metallic winding strip with layers of a softer, more compressible sealing material which, during compression, is densified and flows to fill imperfections in the flange surfaces. The metal strip holds the filler giving the gasket mechanical resistance and resilience.

## Spiral Wound Gaskets

**Applications**

Spiral wound gaskets are widely used in piping and pressure vessel flange connections, in medium to high pressure and temperature duties. The sealing element of a spiral wound gasket is manufactured from a preformed metallic strip in combination with a soft filler material. Inner and/or outer rings can be incorporated to suit the flange face design and application parameters.

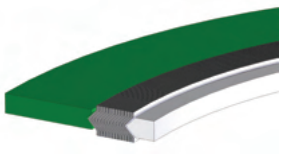
**Dimensions**

The dimensional requirements for spiral wound gaskets are provided in ASME B16.20 for various flange standards. Gaskets are also available to meet the dimensional requirements of other flange standards, such as EN or JIS. Custom sized gaskets can be produced from customer supplied information. Three standard sealing element thickness options are available: 0.125”, 0.175” and 0.250”. Other thicknesses are available on request.

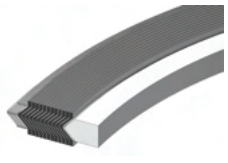
**Styles Available**

Style R » Sealing element only

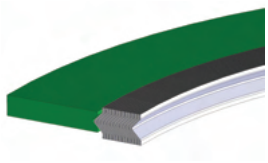
Style CRIR » Sealing element with inner and outer ring



Style HTX » Style RIR with inner ring and centralizing overwind

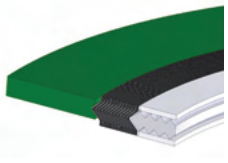


Style CR » Sealing element with outer ring



Style RIR » Sealing element with inner ring

Maxiflex Pro » Style CRIR with Maxiprofile inner ring



# SEMI-METALLIC AND METALLIC GASKETS

## Kammprofile Serrated Gaskets

Kammprofile grooved gaskets consist of a serrated metallic core with a soft facing material. The Maxiprofile gasket is mainly used in vessel applications where the gasket width is limited. Maxiprofiles are often used as an upgrade on applications currently using metal jacketed gaskets due to the improved leak tightness, ease of installation and possibility of reuse.

### Applications

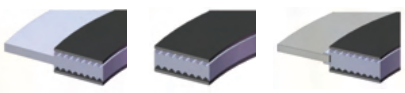
Kammprofile gaskets are used in heat exchanger and vessel applications, in high and low temperatures and pressures of up to 3625 psi (250 bar). Use in low bolt loads, small flange widths and/or damaged flanges.

### Materials

Maxiprofiles can be manufactured from a range of core materials according to media compatibility and temperature considerations.

### Styles Available

| LA1/CA1: Integral centering ring | LA1/CA2: No centering ring | LA3/CA3: Floating centering ring |
|---|---|---|



## Metal Jacketed Gaskets

Single and double jacketed gaskets have a soft, compressible filler material enclosed in a metallic jacket. Due to robust construction, these gaskets are easy to handle and install. They require relatively high bolt loads to provide an effective seal and exhibit good blow-out resistance. Single jacket style can be used where worn or pitted sealing surfaces are present. Pass partition bar configurations are welded into position.

### Applications

Metal jacketed gaskets can be used in high temperature and pressure applications, depending on the appropriate material selections. Commonly used applications involve narrow flanges, heat exchangers, valve bonnets and exhausts.

### Materials

Commonly used metal jackets are carbon steel, SS 304 and SS 316L. Most commonly used filler materials include flexible graphite, PTFE, compressed fiber and mica. Other material combinations available upon request.

### Styles Available

| 100 Double Jacketed | 101 Single Jacketed |
|---|---|

## KLINGER® Kempchen Corrugated Gaskets

Corrugated metal gaskets consist of a corrugated metallic core encapsulated by a graphite coating. Excellent microsealing performance from the graphite is combined with strength of the corrugated metallic core. The result is a robust and easy-to-handle gasket with excellent leak-tightness at low bolt loads.

### Applications

Corrugated metal gaskets are an economical alternative to kammprofile and spiral wound gaskets in standard Class 150# and Class 300# piping flanges. They can also be used in custom designed heat exchanger or pressure vessel girth flanges.

### Materials

Standard metal core material is SS 326L but also available in SS 304. Graphite is the standard facing; PTFE and Mica are also available. Other metal alloy materials available for chemical compatibility or process specific applications.

### Available

Corrugated metal gaskets for standard pipe flanges are sized identically to compressed fiber gaskets in accordance with ASME B16.21. Custom dimensions can be manufactured and supplied in accordance with drawings or customer-provided dimensions.

# Metallic Ring Type Joints

RTJs are precision machined sealing components designed to be used in specific flange faces with machined RTJ grooves. Gasket materials need to be softer than the flange material, by approximately 30 BHN, to ensure that the gasket is sufficiently deformed without damaging the flange seating surface.

### Applications

Ring Type Joint (RTJs) are heavy duty, high-pressure gaskets largely used in oil and gas, crude oil refining and petrochemical industries.

### Materials

Common materials include soft iron, low carbon steel, 5 Cr- ½ Mo, SS 304, SS 316L and alloy 400. Other alloy metals available upon request.

### Styles Available

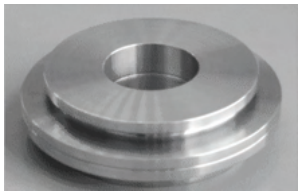
RTJ gaskets manufactured according to ASME B16.20 and API 6A. Custom sizes upon request.

Style R (oval) Style R (octagonal)

Style RX Style BX

# KLINGER® Kempchen Weld Ring Gaskets

Weld ring gaskets are used in any place a welded seal is necessary, due to the danger presented by a loss of functionality or medium, but where the connection also needs to be detachable to a certain degree. Weld ring gaskets consist of two halves welded to the respective flanges and then seal welded to each other following final assembly. Weld ring gaskets provide an absolutely lead-free sealing option for critical joints.



### Applications

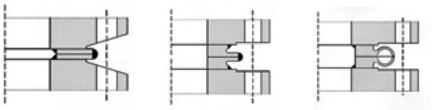
Standard weld ring or membrane styles are available for piping flanges in hazardous or toxic media service. Hollow lip styles are available for applications where differential thermal expansion effects are present within a flanged joint such as heat exchangers. Weld ring gaskets can be cut and rewelded in the event that flange joints need to be opened for maintenance purposes.

### Styles

A21 » Membrane Weld Ring Gasket

A22 » Standard Weld Ring Gasket

A24 » Hollow Lip Weld Ring Gasket



Auxiliary gaskets, such as spiral wounds or kammprofiles can be incorporated into Styles A22 and A24.

# Heat Exchanger Baffle Seals

The baffle seal plays an important role in effectively sealing the gap between the longitudinal baffle and the heat exchanger shell in high-performance heat exchangers. The seals are fitted easily, and under most circumstances require no additional tooling, drilling or bolting of the seal to the baffle plate.

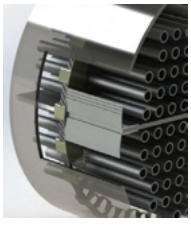
### Applications

The thermal efficiency of shell and tube heat exchangers can be improved by using baffle seals as a means of sealing the clearances between the tube bundle baffle plates and the shell inside diameter.

### Styles

Longitudinal baffle seals are used on heat exchangers with two-pass or split process flows within the shell. Transverse baffle seals are used to reduce clearance between the shell and transverse baffle plates.

Longitudinal Baffle Seal

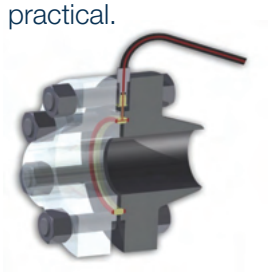


Traverse Baffle Seal

# SPECIALTY PRODUCTS

## KLINGER® Sentry Gaskets

The KLINGER® Sentry Reverse Integrity Gasket allows leak testing on individual flanged joints rather than full piping systems. This reduces or eliminates the need for pre-startup service tests that carry heavy production downtime. Use in piping systems where the cost of redoing pressure tests, as a result of leaking gasketed joints, is prohibitive or not practical.



### Applications

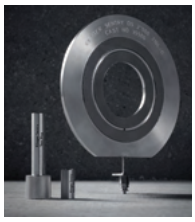
Test the integrity of flanged connections in pipelines, valves or vessels and validate joints after installation avoiding the need for full-scale testing. Ideal for subsea piping, when removing spades or blanks from flanged joints or in lethal, toxic or severe service pressurized systems.

### Styles

Sentry RTJ gaskets fit ASME B16.5 and ASME B16.47 flanges with RTJ facings. Sentry DS gaskets are an IBC dual-seal Maxiprofile gasket designed to fit standard raised face flanges.

Sentry RTJ

Sentry DS



## Insulation Kits

Insulation kits are specified to offer electrical protection where two dissimilar flange materials are mated together. The sets remove the possibility of the system acting as a galvanic cell and reduces risk of corrosion of the pipe work. They also offer cathodic protection by isolating protected piping systems and preventing the flow of electro-static charges.

### Applications

Use to eliminate any metal-to-metal contact between the flange face and the fasteners. Can also be used when dissimilar metal flanged joints are present in order to eliminate galvanic corrosion effects commonly found where piping spec breaks occur. Insulation kits can be used as part of cathodic protection systems, where electrical currents are required to be confined within certain circuits.

### Styles

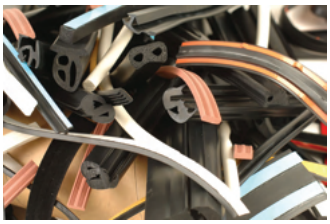
» Basic for Class 150# flanges with KLINGERSIL® C-4430 or KLINGER®top-chem 2003 gasket.
» ISOMAX LPS for Class 300# flanges with G10 with PTFE seal.
» ISOMAX HPS for Class 6/9/1500# flanges with laminated G10 on metal core with PTFE Seal.

### Kits Include:

» One full face or ring insulating gasket
» One insulating sleeve for each bolt
» Two insulating washers per bolt
» Two metal washers per bolt

## Custom Extruded Rubber

Closed cell sponge and dense rubber extrusion are fabricated in continuous large batch productions with intricate profile shapes and in various colors. Extruded parts are forced through a precise die under high pressure using a continuous cure process. Various shapes, sizes and materials offer many choices that are both strong and flexible.



### Applications

Extruded rubber products are used to seal and protect from weather, drown out noise and eliminate vibration and are ideal for OEMs in a variety of industries and functions. Industries include automotive and transportation, construction and building products, healthcare, consumer products and electronics.

### Polymers Available

Seals can be manufactured in EPDM, neoprene and nitrile rubbers.

# Pipe Safety Shields

Pipe safety shields also known as flange guards are used in a variety of industries, where their primary application is the prevention of harmful spray-outs and mist formations of toxic, corrosive and dangerous liquids such as acid, oil or steam. Designed to not indefinitely contain leaks, but to prevent harmful spray outs that can cause injury to plant personnel and damage plant assets.



### Applications

Spray shields provide protection on flanged pipe joints, screwed connections, valve bonnets, filters, expansion joints and any component that could pose a leakage risk. Industries include Oil & Gas, Marine, Power, Chemical, Food & Drink, Wind Turbines, and more.

### Styles

» SUREBAND Clear PTFE can be used with aggressive chemical media. Quick installation with heavy-duty hook and loop.
» SUREBAND Steel SS 316 can be used with higher temperature and pressure processes. Quick installation with mechanical latch.
» SUREBAND Pressure Diffusion Technology uses a special multi-layered mesh against the flange. Pressure is controllably diffused preventing dangerous spray outs and mist formations.
» FlangeGuard PTFE, Clear PTFE or PVC original bag and tie design.
» Can fit ASME B16.5 flanges ½" - 24"; Class 150#, 300# and 600#. Custom sizes upon request.

KLINGER Thermoseal is the US Distributor for FlangeGuards Ltd.

# KLINGER-Saver® Hand Safety Tool

KLINGER-Saver® guards mitigate hand and finger injuries during bolt tightening/untightening and joint assembly activities. This tool supports and secures work tools like wrenches in place and keeps fingers and hands safe and away from danger. Workers can better position and extend their reach from a safe distance.

This safety tool is a necessity for maintenance and mechanics in industries where piping and bolted joints are present.

The KLINGER-Saver® kit includes a light weight extension tube for hard to reach areas.

# TECHNICAL SERVICES

Our focus has always been on technical excellence, product innovation and dedication to the customer and their needs. We are proud of our long-term relationships with our partners and customers. Our experienced technical team has been solving the toughest sealing problems for many years. Our services have been developed and customized to provide our customers with additional, significant benefits, and they are aligned with the KLINGER quality standards that are relied on around the globe.

## Gasket and Bolted Joint Training

Our goal for this in-depth gasket training is the same as yours: to help you sell high-quality products at greater volumes. KLINGER Thermoseal's Distributor Gasket Training program will give your sales force a better understanding of today's competitive, price-driven marketplace as well as an understanding of the complexities of flanged joint processes.


Training will provide immediate and applicable knowledge to become a reliable information source to help you grow sales dollars and increase profit margins.

Attendees will leave with an enhanced familiarity with industry standards and gasket terminology to confidently approach engineers and decision makers.

Classes are held in our Sidney, Ohio and Houston, Texas factories. We can also customize the course and conduct training on location for your sales team or for your end user customer.

## Lab Testing and Engineering Service

KLINGER Thermoseal's commitment to quality and ongoing product improvement is perhaps best demonstrated in our on-site lab and testing facilities, a rarity in the industry. Here, quality assurance specialists subject sealing materials to a battery of punishing tests. The on-site lab is backed by tens of thousands of hours of scientific development, QA and comparative testing, and analysis. This ensures that customers can rely on the highest level of quality at any given time and instead focus on their core business. Standard and non-standard material testing and evaluation can be performed upon request.


Engineering is prepared to support customers and end users from prototype to the field. Contact KLINGER Thermoseal for technical support, applications review and material recommendations.

# GEP Streamlines Gasket Quoting

GASKET ESTIMATING PROGRAM

The Gasket Estimating Program (GEP) is a powerful costing/pricing tool for gasket fabricators that combines high level material utilization functionality with SQL databasing of materials. The web-based program utilizes mathematical best practices for maximizing material yield estimates and provides consistent, controlled pricing. Because the program is web based, it can be accessed 24/7/365 by your team anywhere and on any web enabled device.

GEP comes pre-loaded with KLINGER's most popular sheet and roll materials, and users customize it with their catalog of materials, cutting equipment and labor/ production costs. Users define their own profit levels in their safe and secure account database.

A plug-down module optimizes material yield and determines the best nesting/layout along with the total material required for a job.


# KLINGER®expert Gasket Sealing Calculation Software

Identifying the correct gasket material as well as the optimal gasket design are important steps in the design of a joint. There may be dozens of gaskets that will create a seal, with some better than others. KLINGER®expert is a powerful gasket design software that selects suitable non-metallic gasket materials and calculates the necessary bolt torques.

The program uses industry standards to determine a gasket suitable for both the flange and medium being sealed and the torque requirements.

**Program Functions:**

» Identification of the best gasket material for specific applications
» Design of gasket assemblies
» Checks of chemical and temperature suitability
» Calculation of bolt torque requirements
» Graphic illustration of the scatter of various bolt-up methods

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