

Flexitallic[®]

SIGMA[®] ONE

Low load to seal.
Increased load retention.
Widest chemical compatibility.





**MAKING THE WORLD
SAFER & CLEANER
THROUGH ENGINEERED
SEALING SOLUTIONS.**



CHEMICALLY RESISTANT.
UNIFORMLY STRONG. INHERENTLY CLEAN.



INNOVATIVE MATERIALS, ENGINEERED SOLUTIONS

Utilizing a unique manufacturing process exclusive to Flexitallic, we created SIGMA®, an innovatively engineered line of biaxially-orientated PTFE gasket materials.

Developed for processes ranging from cryogenic temperatures to 500°F (260°C), and suitable for sealing virtually every chemical medium across the entire pH range (0-14), SIGMA® pairs the outstanding chemical resistance of PTFE with enhanced dimensional stability to improve overall material stress retention.

The non-stick properties of the SIGMA® range of materials offer excellent removal after usage to dramatically reduce the downtime on shutdown. In addition, all components in the SIGMA® range are FDA compliant. This inherently clean nature makes them ideal for use in industries where product contamination is of concern such as food, pharmaceuticals and electronics.

TOTAL INTEGRITY

For applications involving aggressive chemicals, SIGMA® provides enhanced levels of sealing performance when compared to conventional materials.

While conventional PTFE-based sealing materials have long been the choice for superb chemical resistance, they are not ideally suited to achieve the maximum reduction of creep in situations where seal integrity is paramount - a vital consideration for stringent long-term emission control.

Utilizing a unique manufacturing process exclusive to Flexitallic, SIGMA® represents the latest generation of biaxially-orientated PTFE gasket materials. Specified by more than 500 major companies, SIGMA® stands side by side with Flexitallic metal gaskets and Thermiculite® gasket materials, to provide you with the complete and innovative sealing solutions you demand to handle all your sealing applications.

By designing seals that last longer in the most difficult applications, SIGMA® helps production processes increase their output capabilities.

INTRODUCING: SIGMA[®] ONE

HIGH PERFORMING BIAXIALLY ORIENTATED PTFE
WITH A SILICON CARBIDE (SiC) FILLER.

Flexitallic's SIGMA[®] One was developed to meet the industry's most critical chemical service applications. Research & Development efforts extended over two years in order to provide the market with a PTFE based sealing material that was truly ideal for service.



**WIDE CHEMICAL
COMPATIBILITY**



**BIAXIALLY
ORIENTATED**



**ENHANCED LOAD
RETENTION**



**INVENTORY
CONSOLIDATION**



**NOTICEABLY
RIGIDITY**



**ALLEVIATE
MISAPPLICATION**



**LOW LOAD
TO SEAL**



**CREEP & COLD FLOW
RESISTANCE**



**TECHNICIAN
FRIENDLY**

SiGMA[®] ONE

- Flexitallic's proprietary manufacturing process allows for high-performance in every direction (biaxial).
- The formula incorporates PTFE & Silicon Carbide (SiC), which are both well-known for their exceptional chemical resistance.
- Reduced risk of misapplication and inventory consolidation are a result of SIGMA[®] One's excellent chemical compatibility.
- High compressibility provides easier installation and lower load to seal. Minimizing the likelihood of equipment damage.
- SIGMA[®] One provides superior creep & cold flow resistance, increased sealability, decreased emissions & peace-of-mind
- SIGMA[®] One's biaxially-orientation makes it the ideal solution for applications with elevated mechanical requirements.

THE FACTS ABOUT PTFE

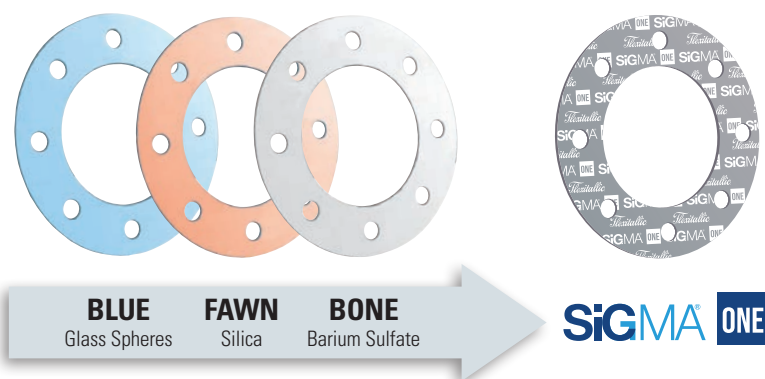
UNIVERSAL CHEMICAL COMPATIBILITY

Until now, chemical manufacturing facilities have been required to utilize a variety of conventional-filled PTFE materials to cover the chemical range in its entirety. Thus, increasing the likelihood of gasket misapplication.

COMPARISON: SIGMA® ONE vs. Conventional-Filled PTFE				
	SIGMA ONE®	BLUE	FAWN	BONE
STRONG ACIDS	●	●	●	●
STRONG BASES	●	●	●	●
COOKING LIQUORS	●	●	●	●
SULFURIC ACID	●	●	●	●
SODIUM HYDROXIDE (CAUSTIC)	●	●	●	●
OLEUM FUMING SULFURIC ACID	●	●	●	●
HYDROFLUORIC ACID	●	●	●	●

● COMPATIBLE ● CAUTION: CONSULT FLEXITALLIC ENGINEERING ● NOT COMPATIBLE

When compared to other conventional-filled PTFE (glass spheres, silica, barium sulfate) sheet sealing materials, SIGMA® ONE's near universal chemical compatibility minimizes the risks associated with gasket misapplication.



- PTFE is commonly used for sealing within chemical service applications.
- 100% Pure PTFE provides excellent chemical compatibility, but does have its drawbacks.
- Pure PTFE is not stable under heat & pressure, which is known as "creep." Excessive "creep" results in loss of load on the gasket, and therefore increasing the likelihood of leakage.
- In order to minimize creep, fillers are commonly added to PTFE during the manufacturing process.
- Fillers help to stabilize the gasket, but each has its own chemical compatibility limits and related trade-offs.
- The most common fillers are glass spheres (blue), silica (fawn) and barium sulfate (bone or off-white).
- Many companies must utilize a wide variety of materials in order to properly seal the assortment of chemical service applications.
- Companies that utilize a variety of PTFE sealing materials are more at risk of misapplication, which can negatively impact safety, reliability and up-time.

WHAT IS SILICON CARBIDE?

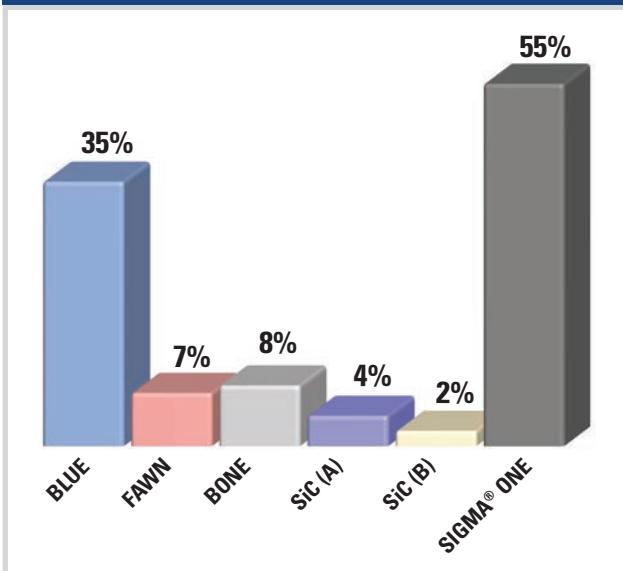
A CLOSER LOOK AT THE 2ND MOST ABUNDANT COMPOUND ON EARTH AND IT'S USE IN SEALING MATERIALS.

SILICON CARBIDE POWDER



- Carborundum or Silicon Carbide has a chemical formula of SiC.
- The compound itself is linked by a strong covalent bond and is a very hard substance, which is why it commonly used in abrasive products.
- Silicon Carbide has a hardness that is between that of a diamond and fused alumina.
- It boasts excellent chemical resistance and can be used with alkalis as well as acids.
- Silicon Carbide is actually used in other PTFE sealing materials, but the compressibility of these materials is extremely low (as low as 2%).

COMPRESSIBILITY (ASTM F36) COMPARISON



SIGMA® One outperforms both conventional-filled PTFE (glass spheres, silica, barium sulfate) sheet sealing materials as well as other Silicon Carbide Filled sheets that are currently found on the market. Based on available datasheet information.

WHAT DOES "LOW" PERCENTAGE OF COMPRESSION MEAN?

A low percentage of compression generally suggests that a material is especially hard. Meaning that it does not compress easily.

DRAWBACKS & CONCERNS

- Not being able to compress the gasket between flanges and/or potentially overloading the flanges.
- Thus, leading way to an increased risk for leakage and damage to the flanges, which can prove costly.

SIGMA® ONE boasts compressibility of 55% and is a ideal for non-metallic flanges or applications requiring lower bolt loads.

SIGMA[®] ONE

TYPICAL PHYSICAL & MECHANICAL PROPERTIES

TYPICAL TECHNICAL DATA (for thickness 1/16")			
TEMPERATURE °F (°C)			
Min:			-418°F (-250°C)
Max:			500°F (250°C)
Continuous Service Max:			500°F (250°C)
PRESSURE PSIG (BARG):			
Max:			1230 (85)
Continuous Service Max:			725 (50)
COMPRESSIBILITY (%)	ASTM F36		55
RECOVERY (%)	ASTM F36		27
INCREASE AFTER FLUID IMMERSION		Oil 3	Fuel B
Thickness (%)	ASTM F146	0	0
Weight (%)	ASTM F146	8.9	25.7
TENSILE, (MPa)		Cross Grain	With Grain
Across Grain, (MPa)	ASTM F152	5.7	5.5
DENSITY lb/ft.³ (g/cm³)	ASTM F1315		79.2 (1.27)
DESIGN FACTORS			
"m" factor	ASTM F3149-15		1.4
"y" factor, psi (N/mm ²)	ASTM F3149-15		1740 (12)

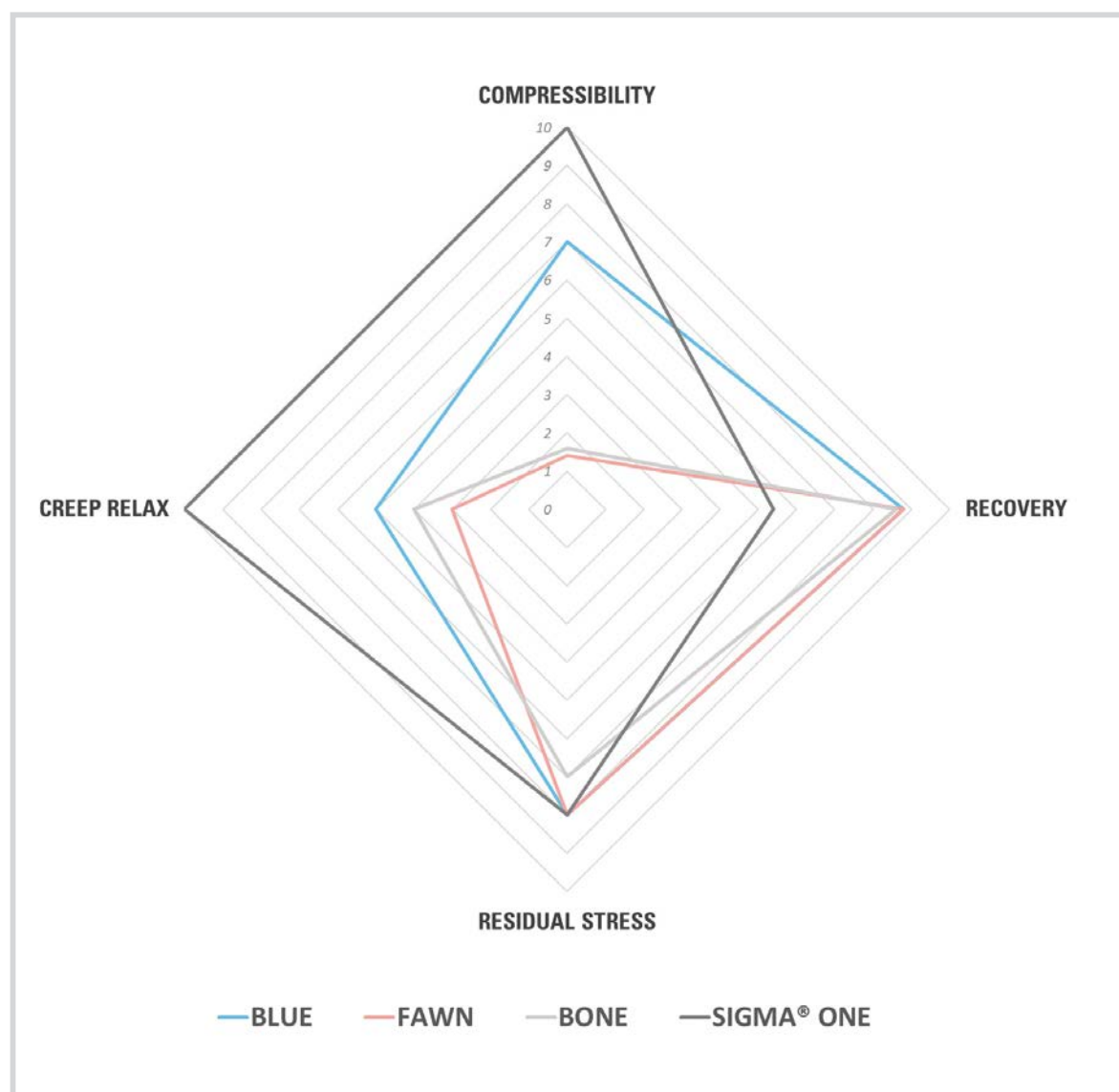
SEALING CHARACTERISTICS	ASTM F37B - Fuel A	ASTM F37B - Nitrogen	BS 7531 - Nitrogen
Thickness (")	1/32"	1/32"	1/16"
GASKET LOAD , psi (N/mm ²)	1000 (7)	3000 (20.7)	4640 (32)
INTERNAL PRESSURE , psig (barg)	9.8 (0.7)	30 (2)	580 (40)
LEAKAGE	0.18l/hr	0.12ml/hr	0ml/min

GENERAL INFORMATION	
COLOR	Gray
APPROPRIATE APPLICATIONS	Suitable for sealing most chemicals across the whole pH range (0-14) with the exception of molten alkali metals and fluorine gas.
ASTM LINE CALL OUT	F458000B4M3

AVAILABILITY	
SHEET DIMENSIONS	60" x 60"
THICKNESS RANGE	1/32", 1/16", 1/8". Other thicknesses available on request
TOLERANCES	Length and width: +1%. Thickness: -10%, +5%

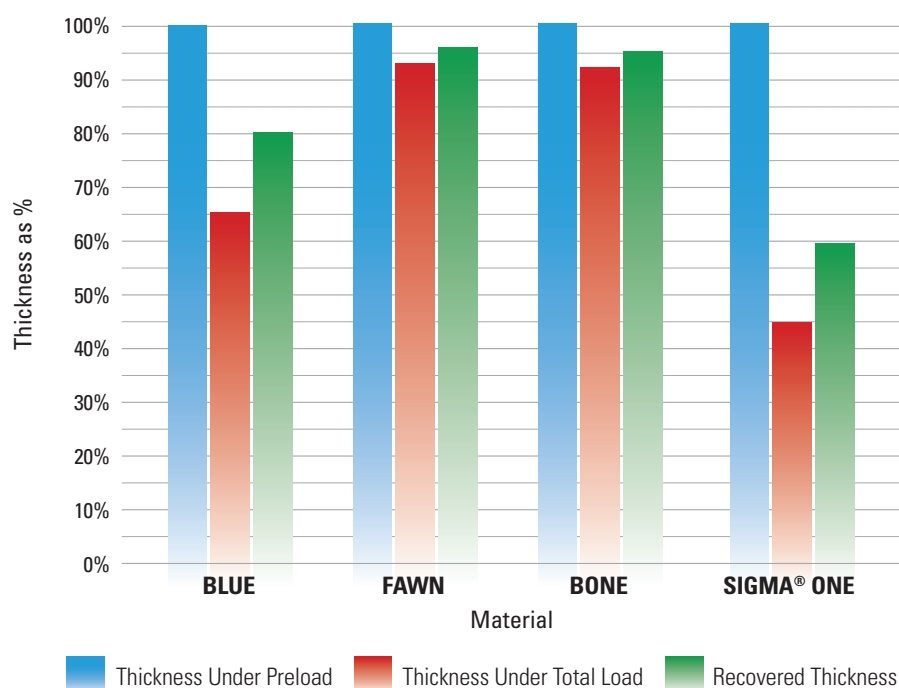
SIGMA® ONE vs. CONVENTIONAL-FILLED PTFE

SIGMA® One offers a superior combination of sealing related properties that make it an ideal fit over other conventional-filled PTFE materials that are currently found in the market.



ONE

COMPRESSIBILITY & RECOVERY ANALYSIS



Compressibility & Recovery properties of SIGMA® One against conventional-filled PTFE (glass spheres, silica, barium sulfate) sheet sealing materials. Based on available datasheet information. Thickness @ 100% = 1/16"

COMPRESSIBILITY

The ability to conform to the distortions of mating flanges.

RECOVERY

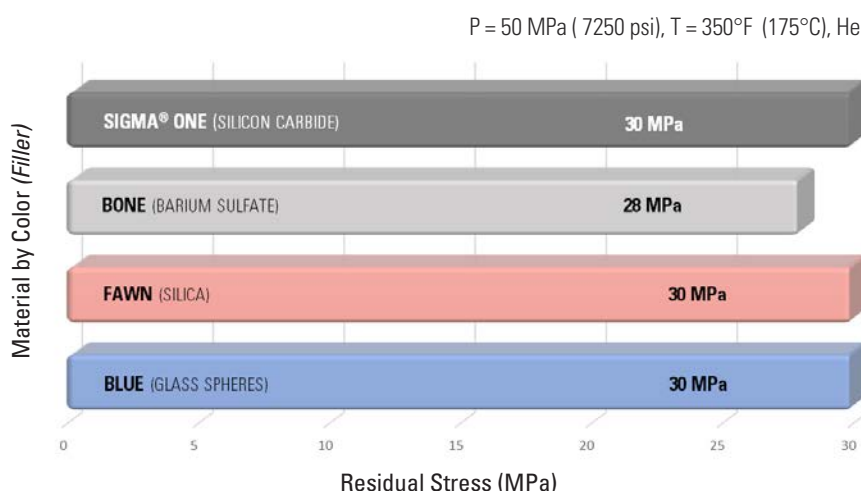
The follow the motions of the flanges caused by mechanical (or thermal) forces.

COMPRESSIBILITY & RECOVERY

Recovery is related to compressibility. The percent recovery is based on the amount the sample has been compressed under full load. This has to be considered in light of the percent compressibility. Recovery measures the ability of a material with a specific compressibility to maintain a seal during the flange transitions encountered in service.

ONE

DIN 52913: RESIDUAL STRESS TEST



SIGMA® ONE boasts compressibility of 55% and is a ideal for non-metallic flanges or applications requiring lower bolt loads.

WORLD-CLASS ENGINEERING



ENGINEERING SUPPORT

Flexitallic's Application Engineering Teams offer a range of engineering services that are designed to complement and enhance Flexitallic's product offering. Allowing customers to operate their plants, complete projects and start-up from turnarounds safely and efficiently. Our goal is to help customers achieve leak free start-up and operation within the scheduled maintenance cycle.

These services include:

- Engineering Drawings
- Bolt Torque and Load Calculations
- End User Support for Problematic Sealing Applications
- Design reviews for Bespoke Connections and Critical Equipment
- Piping and Gasket Specifications
- Gasket Selection and Installation
- Pressure Vessel Design Review (Flange)
- Technical Consultation
- Joint Integrity and Flange Integrity Training
- Gasket Installation Supervision

JOINT INTEGRITY TRAINING

The Academy was formed to provide the process industry with access to the best training and engineering services available to ensure the efficient operation of plants and equipment. A comprehensive range of accredited training courses are aligned to *Industry Best Practice* and provide a blend of sealing technology and practical elements associated with flange assembly.

All training can be offered across our network of locations utilising specialist mobile training rigs (FADU). Free site Integrity surveys are available providing cost effective proposals for Integrity Management solutions, with a focus on safety and compliance directives.

POWER TO THE FUTURE.



WORLD-CLASS APPLICATION ENGINEERING SUPPORT

Available via: phone, email and live chat.



PROFESSIONAL GRADE TRAINING, WORKSHOPS AND SEMINARS,

Which are centered on "Best Practices" approach to installation / bolt-up procedures. Sessions range from 2-6 hours, but are completely customizable to fit your specific needs.

ARE YOU FLEXITALLIC SAFE?



Interested in having a technical conversation about Flexitallic's SIGMA[®] or one of our other innovative products?

Our team of World-Class Application Engineers are available to answer any of your technical questions via: phone, email or live chat.



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EMAIL: dpengineering@flexitallic.com

LIVE CHAT: <https://www.flexitallic.com/us>

THE FLEXITALLIC GROUP

The Flexitallic Group is the international market leader in the manufacture and supply of high quality, high value industrial static sealing products, delivering industrial gaskets on a global scale.

ABOUT

As the developer of the spiral wound gasket in 1912, we have built on this legacy of innovation with revolutionary products including Thermiculite® and Sigma®, The Flange Rescue Gasket winner of the NACE and Dupont Plunkett Awards, and most recently the Change™ Gasket, set to transform the global sealing industry. We have a global network of Allied Distributors across 30 countries. This ensures local demand is met quickly, providing a combination of the highest product quality and outstanding customer service.

Our extensive and varied product offering includes spiral wound gaskets, RTJ gaskets, Flexpro™ Kammprofile, sheet materials, dynamic and static packings, pipe support and custom rubber products. Drawing upon the group's rich history and present day values of leadership, quality, service and technology, we are at the forefront of developing sealing solutions for industries around the world. In addition to a wide range of products, we also deliver world-class technical support and Joint Integrity training.

INNOVATIVE PRODUCT RANGE

We have a rich history of innovation, which has seen us lead the industry with many new products. Over the years, our products have gained a reputation for quality, reliability and technology that is second to none.

CUSTOMIZED ENGINEERING SOLUTIONS

Our Application Engineering, Production Engineering and R&D teams work closely together to design, develop and manufacture bespoke sealing solutions.

We have been responsible for a number of truly revolutionary products, including Thermiculite®, Sigma® and the Flange Rescue Gasket, which ensure we are able to continually meet the ever more stringent requirements of our customers.

INSIDE INDUSTRY

We pride ourselves on not simply supplying products, but by supporting customers with a detailed knowledge of their industry and applications, so that products and services are tailored to their specific needs. This unique approach means that we focus on providing more than just a product, but also a complete solution that adds genuine value to our clients.

OUR COMMITMENT TO QUALITY

We place great emphasis on maintaining international quality standards, and are approved to ISO 9001:2008, ISO 14001:2004 and OHSAS 18001:2007, API 6A and API 17D, to ensure we meet the highest possible standards for all our products and services.

We also invest heavily in test and quality assurance equipment to maintain our reputation for the highest quality products.

Our materials are subjected to a wide range of tests as specified by statutory regulations and customer requirements. These approvals enable our customers to make informed choices as to the suitability of a product for each and every application.

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About The Flexitallic Group

The Flexitallic Group is a global leader in specialized sealing solutions and products serving the oil and gas, power generation, chemical and petrochemical industries in emerging and developed markets. Focused on the upstream, downstream and power generation sectors, it has operations in France, the United States, Canada, Mexico, the United Kingdom, Germany, Italy, Belgium, the United Arab Emirates, Thailand and China plus a network of worldwide licensing partners and distributors.