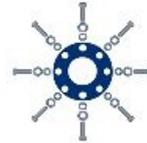


Flexitallic[®]



innovate / customize / educate



WILLIAM JOHNSTON
& COMPANY LIMITED

SIGMA[®]

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sales@williamjohnston.co.uk | www.williamjohnston.co.uk

Chemically resistant.
Uniformly strong.
Inherently clean.
Total integrity for the most
demanding applications.



www.flexitallic.eu

SIGMA

The *Flexitallic* Group

FLEXITALLIC

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 us

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[™] Kammprofiles, 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.





● Allied distributors

Based on sales and geographic reach, the Flexitallic Group has become *the* global supplier of industrial gaskets.

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.

Customised 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.

Flexitallic® Safe

The Flexitallic approach to safety is more than a program it's a way of doing business that started in 1912. We believe our commitment to innovate, customize and educate adds another level of protection to our customers' operations.

From the first Spiral Wound Gasket in 1912 to the ever evolving applications for Thermiculite®, our goal is to develop materials that push the parameters of heat, pressure and chemical resistance.

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.

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.

Global Distribution... Local Support

Our products are distributed through a global network of Allied Distributors.

These carefully selected distribution partners are strategically located within their territory to deliver the best possible service and products to our customers. This approach means our products and know-how are available to the global industries we service.

ARE YOU *Flexitallic* SAFE?

Allied Distributor



Flexitallic

Licensee Manufacturer



Flexitallic

SIGMA®



For applications where chemical resistance is paramount, SIGMA® is the only option.

SIGMA

Innovative Materials, Engineered Solutions

Utilising a unique manufacturing process exclusive to Flexitallic, SIGMA® represents the latest generation of biaxially orientated PTFE 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.

Total Integrity

When it comes to 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.

Utilising 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.

Material Compliance and Approvals

TUV, BAM, WRAS, FDA, DVGW.

For total sealing reliability, inventory consolidation and strict long-term emission control, nothing out-performs SIGMA® – The innovation of integrity.

SIGMA®



Innovative materials,
engineered solutions.

SIGMA

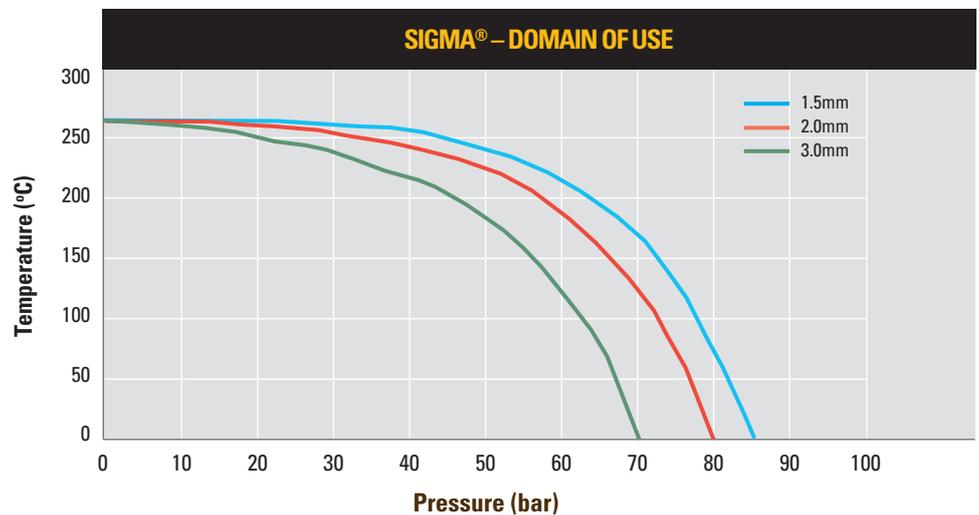
PRESSURE CONTAINMENT AND TEMPERATURE

Thickness	up to 1/16" (1.5mm)	0.08" (2.0mm)	1/8" (3.0mm)
Max. Temperature	500°F (260°C)	500°F (260°C)	500°F (260°C)
Max. Pressure psig (bar)	1235 (85)	1160 (80)	1088 (75)

Note: The pressure/temperature (shown above) cannot be used simultaneously.

pH Range		0-14
Sheet Sizes*	Metric	1.5m x 1.5m
	US Standard	60" x 60"
Sheet Thicknesses*	Metric	0.75mm – 3.0m
	US Standard	1/32" – 1/8"
Recommended Surface Finish	Metric	3.2 – 6.3 µm
	US Standard	125 – 250 µin

Note: Other sheet sizes and thicknesses are available on request.



SIGMA® PRODUCT RANGE



Unparallel sealing performance SIGMA® – the innovation of integrity.



SIGMA® 500



- Enhanced compressibility for low bolt loads
- Improved flexibility over conventional calendered and graphite sheets
- Suitable for use in alkali, acid and chlorine service
- Can be used for all concentrations of sulphuric acid
- WRAS approved for hot and cold potable water services.

SIGMA® 511



- Standard compressibility
- Strong acids (except hydrofluoric) to general chemicals
- Can be used for all concentrations of sulphuric acid
- WRAS approved for hot and cold potable water services
- Suitable for oxygen & peroxide service.

SIGMA® 533



- Standard compressibility
- Ideal for sealing food, pharmaceutical and non-contamination applications
- Strong alkalis and other general chemicals
- Aqueous hydrofluoric acid below 49%
- Not suited for sealing molten alkali metals or fluorine gas.

SIGMA® 588



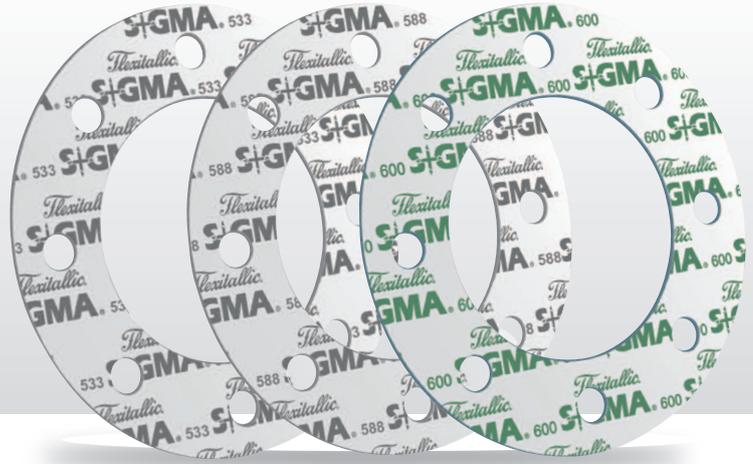
- Unique cellular structure – low load sealing for damaged contact surfaces
- Layered structure enhances dimensional stability and assists installation of larger gaskets
- Layers bonded by direct sintering – no adhesive layer or potential leak paths
- Suitable for use in both concentrated acid and alkali service
- Ease of use – Eliminate jacket 'fold over' associated with large envelope gaskets.

SIGMA® 600



- High compressibility for ultra-low bolt loads; plastic and glass lined equipment
- Suitable for use across a wide range of chemical media; acids, alkalis, halogens and hydrocarbons
- Universal – minimises inventory requirements and eliminates 'mis-application'
- Easy to cut, handle, install and remove
- Pigment and filler free – suitable for 'contamination sensitive' applications.

SIGMA® PRODUCT RANGE



TYPICAL PHYSICAL AND MECHANICAL PROPERTIES

	Unit	Standard	SIGMA® 500	SIGMA® 511	SIGMA® 533	SIGMA® 588	SIGMA® 600
Colour		na	Blue	Pink	Off-white	White	White
Density	g/cm ³ (lb/ft ³)	ASTM F1513	1.4 (87)	2.2 (137)	2.9 (180)	1.1 (68)	0.8 (50)
Filler System	na	na	Glass Microspheres	Silica	Barytes	na	na
Tensile Strength	MPa (psi)	ASTM F152	14 (2030)	15 (2175)	15 (2175)	10 (1450)	8 (1160)
Compressibility	%	ASTM F36	35	7	8	55	68
Recovery	%	ASTM F36	44	44	43	24	5
Residual Stress (175°C)	MPa	DIN 52913	30	30	28	28	34
Creep Relaxation	%	ASTM F38	31	35	33	<50	<50
Gas Leakage	mL/min	DIN 3754	0.0	0.0	0.0	0.0	0.0
Liquid Leakage (50psi internal pressure)	mL/hr	ATSM F37	0.7	1.8	1.8	1.5	1.2

GASKET CONSTANTS & DESIGN INFORMATION – ASME / PVRC (Data based on 1/16" (1.5mm) thickness material)

	Unit	Standard	SIGMA® 500	SIGMA® 511	SIGMA® 533	SIGMA® 588	SIGMA® 600
m Factor	na	ASME	1.4	1.4	1.4	1.4	1.4
Y Value	MPa (psi)	ASME	13 (1885)	16 (2320)	16 (2320)	11 (1595)	11 (1595)
Gb	psi	PVRC ROTT	4	209	115	317	405
a	na	PVRC ROTT	0.80	0.36	0.38	0.29	0.27
Gs	psi	PVRC ROTT	11.5 x 10 ⁻²	4.9 x 10 ⁻³	6.5 x 10 ⁻⁵	1.1 x 10 ⁻⁶	24 x 10 ⁻²
Tpmax [†]	na	PVRC ROTT	13150	24750	26800	50250	31850
Qsmax (RT)	MPa	EN13555	> 220	> 220	> 220	> 220	tba*
Qsmax (175°C)	MPa	EN13555	> 220	> 220	> 220	> 220	tba*
Qsmax (225°C)	MPa	EN13555	> 180	> 220	> 220	> 220	tba*
PQr (60 MPa/175°C)**	na	EN13555	0.72	0.74	0.60	0.51	tba*
Qmin/0.01***	MPa	EN13555	16	34	31	16	15
Qmin/0.01****	MPa	EN13555	< 10	15.0	< 10	< 10	< 10

[†]Draft 9 Test Procedure. *For further information please call the Flexitallic Applications Engineering Dept.

Stiffness: 500kN/mm. *Leak rate: mg/m². ****QA: 40 MPa. Additional EN13555 data is available on request.



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Disclaimer

Please note, failure to select the correct materials or products we supply ("the Products") may result in damage to plant, equipment or property. In some instances, it may cause death or personal injury. We are not designers and do not give advice about design related matters concerning the Products. We can help and assist with the technical specifications for the Products. In specific applications, particularly where critical conditions exist, we will try to assist you within the limitations of the services that we offer. All information supplied by us is intended as technical co-operation outlining the specifications of the different Products which we supply. To the extent permitted in law, no warranty is given in respect of any information supplied by us. The customer must satisfy themselves as to the suitability of the Products for their intended application and use. The correct fitting of Products is the responsibility of the customer. Your statutory rights remain unaffected. Save in respect of death, personal injury or fraud, our entire liability to you, however arising from the supply of Products shall be limited to the £10M indemnity amount provided by our insurers.

About The Flexitallic Group

The Flexitallic Group is a global leader in specialised 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, the United Arab Emirates, Saudi Arabia, Kazakhstan and China plus a network of worldwide licensing partners and distributors.

www.theflexitallicgroup.com