James Walker®

Gaskets & Jointings Guide

Issue 5.1

James Walker's comprehensive guide to quality gasket products for industry worldwide

High Performance Sealing Technology

James Walker

Introduction & Index

James Walker is a dynamic global manufacturing organisation that supplies a vast range of specialised products and services to virtually every industrial sector.

We have more than 50 production, engineering, distribution and customer support facilities worldwide — backed by extensive IT networks, e-commerce systems and logistics operations — to serve customers in over 100 countries.

Our world-leading expertise and capabilities in high performance fluid sealing and bolting technology, led by engineering design and materials science, embraces the complete industrial cycle from research, development and manufacture to product application and plant monitoring. These activities help keep global industry running safely, efficiently and with improved environmental performance, year-in, year-out.

Flange sealing technology

Our work at the frontier of sealing technology gives us a clear understanding of the roles that gaskets must play, for example:

- *If joint faces are absolutely flat and aligned true.*
- *If flanges do not distort under load.*
- *If loaded bolts do not stretch or relax…*

…There is no need for a gasket, because the joint will be perfect.

In the real world, such perfection is very expensive to achieve and almost impossible to maintain. Therefore a gasket is the most practical and cost effective way to seal a bolted flange joint.

The problem for designers and maintenance engineers is to select the correct gaskets to ensure the integrity and safe operation of their fluid handling plant.

In the following pages we give details of our vast range of gaskets and jointings. These include brand names such as our Chieftain® and Centurion® non-asbestos jointings, Supagraf® expanded graphite jointings, Moorside® ring joints, and Metaflex® spiral wound and Metakamm® Kammprofile gaskets.

Worldwide service for industry

Our teams of local experts, applications engineers and materials scientists will help you select gaskets to match your exact operational specifications. If off-the-shelf gaskets will not solve your flange sealing problem, then they can custom-design products that will.

We also establish long-term partnering contracts with industrial corporations for the global supply of products to their plants.

These contracts are administered by dedicated managers with teams of specialists who are responsible for servicing the needs of a customer's sites across different countries and continents. Our service covers not only planned maintenance and unscheduled shut-downs, but also expert help with complex fluid sealing problems and the generation of *best-value* solutions to introduce cost savings for the plant operator.

Non-asbestos sheet jointings

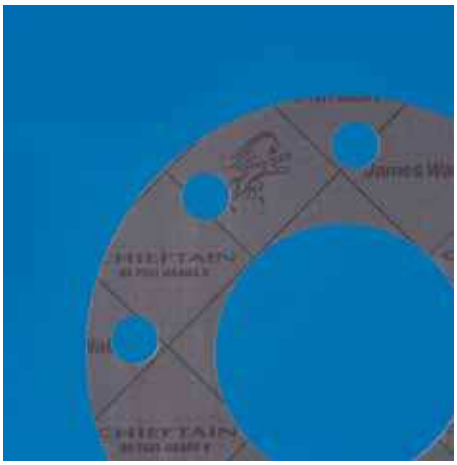
Supagraf® expanded graphite jointings

Spiral wound & metallic gaskets

Cork-elastomer jointings

Non-asbestos sheet jointings

Chieftain®



Description
Chieftain® is James Walker's premium grade universal sheet jointing. Its formulation contains an advanced carbon fibre material and a nitrile rubber (NBR) binder. An anti-stick finish to both surfaces is supplied as standard.

Prime features
- Carbon fibre for strength and stability.
- 450°C maximum temperature.
- Outstanding chemical and steam resistance.
- User friendly – easy to cut, handle and remove from flanges.

Specifications
- Easily meets the requirements of BS 7531 Grade X.
- Suitable for ASME Class 300 flange ratings to at least 260°C.

Physical properties
(Typical values for 1.5mm thick material)

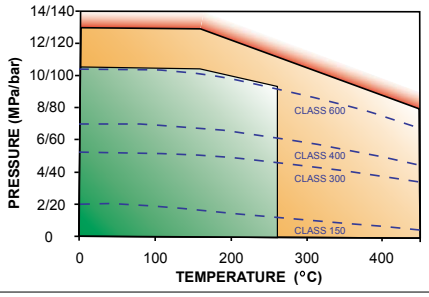
Density, Mg/m³	1.6	
Transverse tensile strength, MPa	9.0	(ASTM F152)
Residual stress, MPa	28.0	(BS 7531)
Compressibility, %	9.0	(BS 7531)
Recovery, %	60.0	(ASTM F36J)
Flexibility after accelerated ageing	Pass	(BS F125)
Gas permeability, ml/min	<1.0	(BS 7531)
Leachable chloride ion content, ppm	<100	

Fluid immersion properties

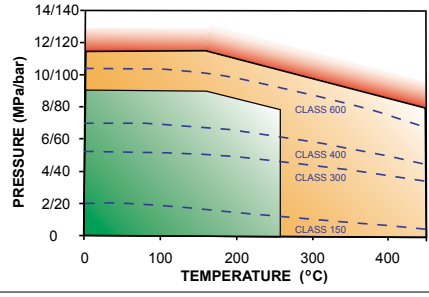
IRM 903, % thickness increase, 5h @ 150°C	6.0	(BS 7531)
Water, % thickness increase, 5h @ 100°C	5.0	(BS 7531)
ASTM Fuel B, % thickness increase, 5h @ RT	8.0	(ASTM F146)
Sodium hydroxide, (50% conc.) % thickness increase, 10h @ 100°C	13.0	

Service capability graphs

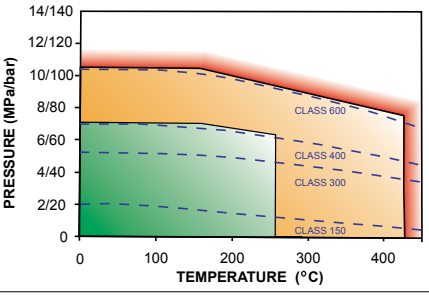
Chieftain, up to and including 0.75mm thickness: maximum working pressure against temperature guidelines.



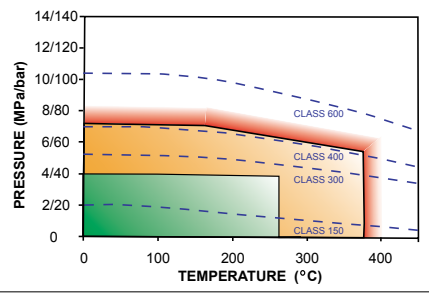
Chieftain, up to and including 1.0mm thickness: maximum working pressure against temperature guidelines.



Chieftain, up to and including 1.5mm thickness: maximum working pressure against temperature guidelines.



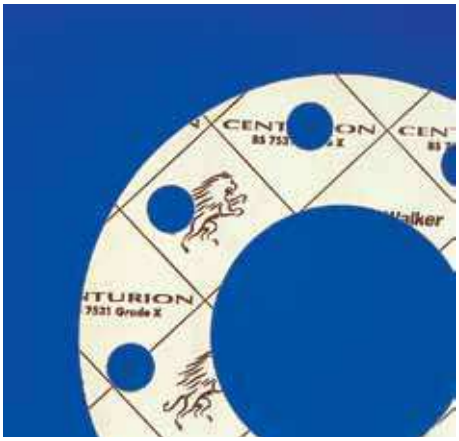
Chieftain, up to and including 2.0mm thickness: maximum working pressure against temperature guidelines.



Service capability
For applications falling into the green zone of each graph, the product may normally be used without consultation. In the amber zone we recommend that our Technical Support Team be contacted for confirmation of suitability. If the pressure/temperature combination is in the red zone then we must be consulted before the product is used. Class lines refer to ASME B16.5.

How supplied
Precision cut gaskets to any shape, size and quantity. In sheets 2.0m x 1.5m, 1.5m x 1.0m. Thicknesses: 0.5mm, 0.75mm, 1.0mm, 1.5mm, 2.0mm. Please note that 3.0mm is also available but is not recommended *(see page 45 for advice on gasket use)*.

Centurion®



Description

Centurion® is a high performance sheet jointing, based on glass and aramid fibres with a nitrile rubber (NBR) binder. An anti-stick finish to both surfaces is supplied as standard.

Prime features

- Well proven on industrial plants worldwide.
- Chemically and thermally stable for duties up to 440°C.
- Suitable for a wide range of media.
- Non-pigmented.

Specifications

- Meets the requirements of BS7531 Grade X.
- BAM approved for use with gaseous oxygen in flange connections of copper, copper alloys or steel at operating conditions up to 100bar and 85°C.

Physical properties

(Typical values for 1.5mm thick material)

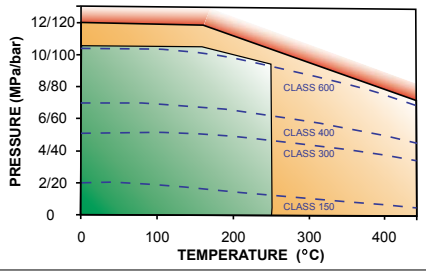
Density, Mg/m³	1.7	
Transverse tensile strength, MPa	9.0	(ASTM F15A)
Residual stress, MPa	27.0	(BS 7531)
Compressibility, %	9.0	(BS 7531)
Recovery, %	60.0	(ASTM F36J)
Gas permeability, ml/min	<1.0	(BS 7531)
Leachable chloride ion content, ppm	<100	

Fluid immersion properties

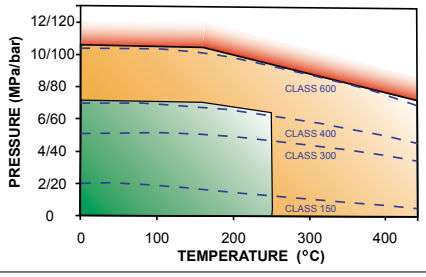
IRM 903, % thickness increase, 5h @ 150°C	5.0	(BS 7531)
ASTM Fuel B, % thickness increase, 5h @ RT	7.0	(ASTM F146)
Water, % thickness increase, 5h @ 100°C	5.0	(BS 7531)

Service capability graphs

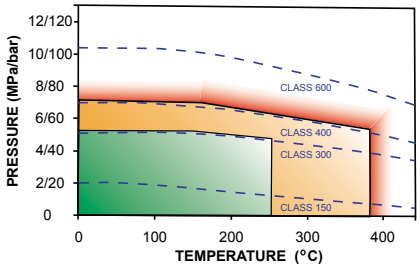
Centurion, up to and including 0.75mm thickness: maximum working pressure against temperature guidelines.



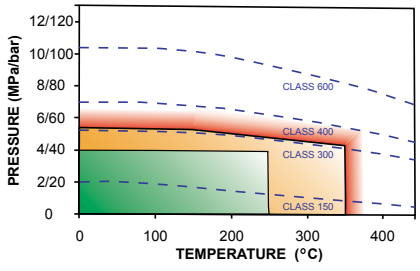
Centurion, up to and including 1.0mm thickness: maximum working pressure against temperature guidelines.



Centurion, up to and including 1.5mm thickness: maximum working pressure against temperature guidelines.



Centurion, up to and including 2.0mm thickness: maximum working pressure against temperature guidelines.



Service capability

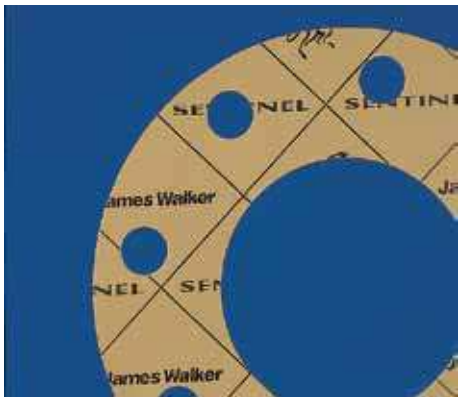
For applications falling into the green zone of each graph, the product may normally be used without consultation. In the amber zone we recommend that our Technical Support Team be contacted for confirmation of suitability. If the pressure/temperature combination is in the red zone then we must be consulted before the product is used. Class lines refer to ASME B16.5.

How supplied

Precision cut gaskets to any shape, size and quantity. In sheets 2.0m x 1.5m, 1.5m x 1.0m. Thicknesses: 0.5mm, 0.75mm, 1.0mm, 1.5mm, 2.0mm. Please note that 3.0mm is also available but is not recommended *(see page 45 for advice on gasket use)*.

Non-asbestos sheet jointings

Sentinel®



Description
Sentinel® is James Walker's general purpose sheet jointing. It comprises compressed aramid fibres with nitrile rubber (NBR) binder. An anti-stick finish to both surfaces is supplied as standard.

Prime features
- Replaces CAF for most industrial duties up to 400°C.
- Suitable for wide range of media.
- Offers outstanding performance for its class.

Specifications
- Exceeds the property requirements of BS 7531 Grade Y.
- WRAS approved for use with cold and hot potable water up to 85°C.

Physical properties

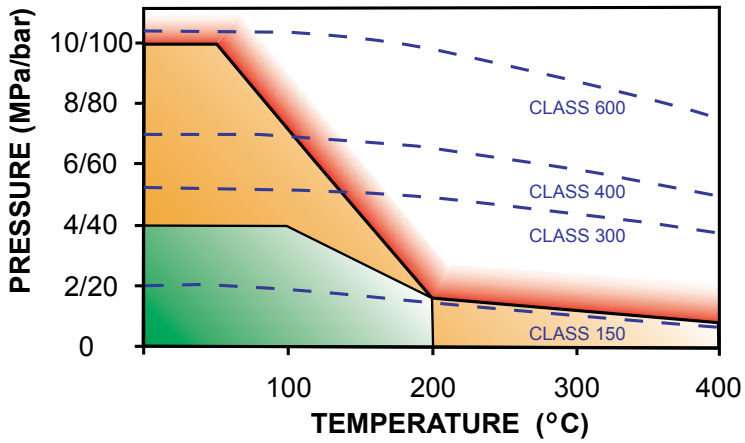
(Typical values for 1.5mm thick material)		
Density, Mg/m³	1.6	
Transverse tensile strength, MPa	8.0	(ASTM F15A)
Residual stress, MPa	25.0	(BS 7531)
Compressibility, %	10.0	(BS 7531)
Recovery, %	45.0	(ASTM F36J)
Gas permeability, ml/min	<1.0	(BS 7531)
Leachable chloride ion content, ppm	<100	

Fluid immersion properties

IRM 903, % thickness increase, 5h @ 150°C	5.0	(BS 7531)
ASTM Fuel B, % thickness increase, 5h @ RT	6.0	(ASTM F146)
Water, % thickness increase, 5h @ 100°C	9.0	(BS 7531)

Service capability graph

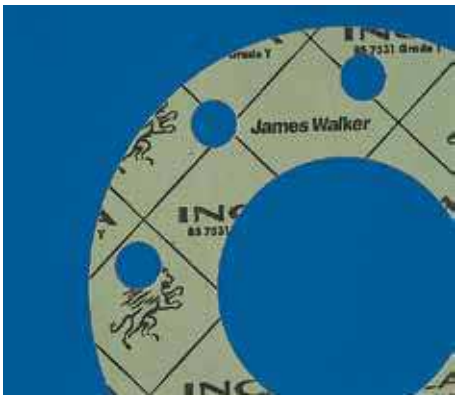
Sentinel, up to and including 2mm thickness: maximum working pressure against temperature guidelines.



Service capability
For applications falling into the green zone, the product may normally be used without consultation. In the amber zone we recommend that our Technical Support Team be contacted for confirmation of suitability. If the pressure/temperature combination is in the red zone then we must be consulted before the product is used. Class lines refer to ASME B16.5.

How supplied
Precision cut gaskets to any shape, size and quantity. In sheets 2.0m x 1.5m, 1.5m x 1.0m. Thicknesses: 0.5mm, 0.75mm, 1.0mm, 1.5mm, 2.0mm. Please note that 3.0mm is also available but is not recommended *(see page 45 for advice on gasket use)*.

Inca



Description
Inca is a high quality and reliable, yet economically priced, jointing based on glass and aramid fibres combined with a nitrile (NBR) binder. It is supplied in a mid-green surface finish. An anti-stick finish to both surfaces is supplied as standard.

Prime features
- A durable jointing for general purpose, medium performance, duties.
- Suitable for steam, condensate, water, air, oils, solvents and a wide range of other media.
- Value engineered to provide excellent value for money.

Specification
- Readily meets all the requirements of BS 7531 Grade Y.
- WRAS approved for use with cold and hot potable water up to 85°C.

Physical properties

(Typical values for 1.5mm thick material)

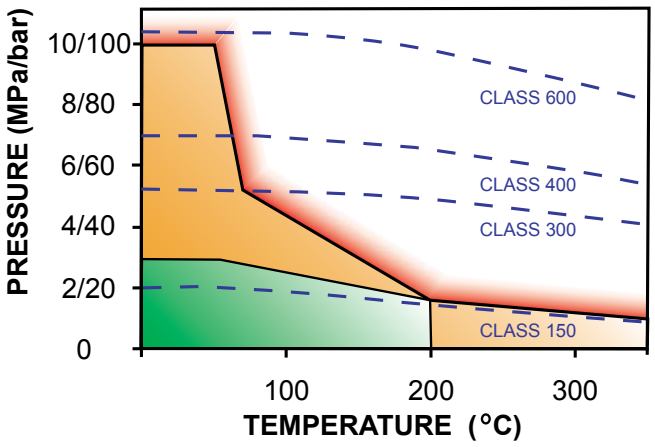
Density, Mg/m³	1.85	
Transverse tensile strength, MPa	7.0	(ASTM F15A)
Residual stress, MPa	23.0	(BS 7531)
Compressibility, %	10.0	(BS 7531)
Recovery, %	55.0	(ASTM F36J)
Gas permeability, ml/min	<1.0	(BS 7531)
Leachable chloride ion content, ppm	<100	

Fluid immersion properties

IRM 903, % thickness increase, 5h @ 150°C	5.0	(BS 7531)
ASTM Fuel B, % thickness increase, 5h @ RT	6.0	(ASTM F146)
Water, % thickness increase, 5h @ 100°C	5.0	(BS 7531)

Service capability graph

Inca, up to and including 2mm thickness: maximum working pressure against temperature guidelines.



Service capability
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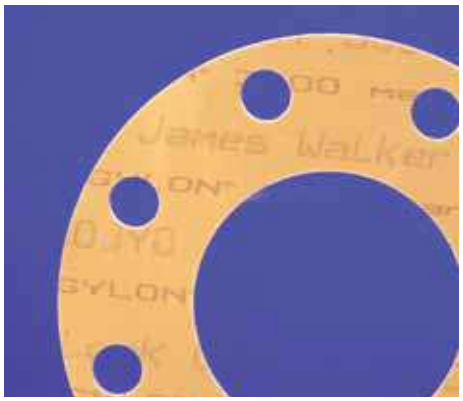
How supplied
Precision cut gaskets to any shape, size and quantity. In sheets 2.0m x 1.5m, 1.5m x 1.0m. Thicknesses: 0.5mm, 0.75mm, 1.0mm, 1.5mm, 2.0mm. Please note that 3.0mm is also available but is not recommended *(see page 45 for advice on gasket use)*.

Non-asbestos sheet jointings

James Walker Gylon® 3500



Description
James Walker Gylon® 3500 comprises PTFE with silica filler. It is fawn in colour. The unique Gylon® manufacturing process retains all the positive characteristics of PTFE, but minimises or eliminates the creep and flow problems associated with conventional PTFE products.

Background
James Walker Gylon brings together the gasket expertise of James Walker and the best-in-class Gylon modified-PTFE products of Garlock Sealing Technologies. By this means we provide customers with the perfect flange-sealing combination for their plant and equipment — Gylon modified-PTFE, backed by the worldwide service, support and applications engineering expertise of James Walker.

Typical applications
This multi-purpose gasket material is recommended for the chemical and petrochemical industries, as well as food processing applications.

Prime features
- Excellent chemical resistance.
- Improved performance over conventional PTFE.
- Resistance to cold flow and creep.
- Excellent bolt load retention.
- Outstanding dimensional stability under thermal stress.
- Resistance to wear and abrasion.

Specifications
- Conforms to FDA requirements.
- Conforms to American Bureau of Shipping (ABS) requirements.
- Conforms to US Department of Agriculture (USDA) requirements.
- ASTM F104 Line call out F451999A9B4E99K6M6.

Chemical properties
- Resistant to strong acids (except hydrofluoric), steam, solvents, hydrocarbons, chlorine, and cryogenics. Will not burn.

Biological properties
- Will not support bacterial growth.

Physical properties

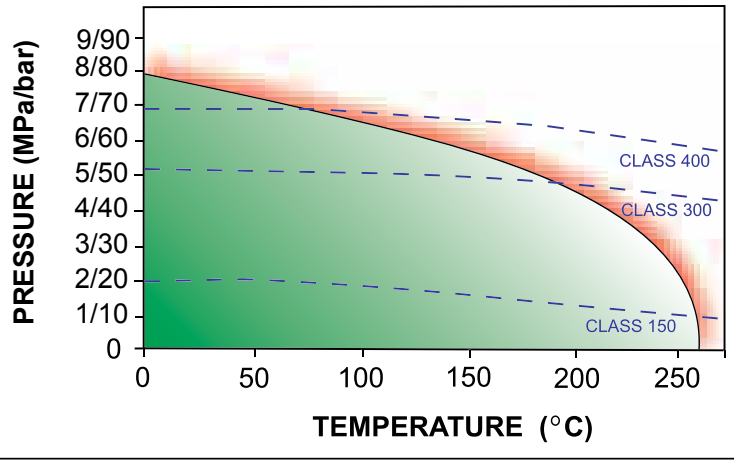
Density, Mg/m^3	2.10	(ASTM D792)
Transverse tensile strength, MPa	13.8	(ASTM F152)
Modulus at 100% elongation, MPa	11.0	(ASTM D1708)
Compressibility, %	7-12	(ASTM F36)
Recovery, %	40	(ASTM F36)
Gas permeability, ml/min	<0.015	(DIN 3535-4)

Operating limits

Temperature range (continuous operation)	-268°C to +260°C
Maximum working pressure	8.3MPa/83bar

Service capability graph

James Walker Gylon® 3500, up to and including 2.0mm thickness: maximum working pressure against temperature guidelines.



Service capability
For applications falling into the green zone, the product may normally be used without consultation. If the temperature/pressure combination is in the red zone, our Technical Support Team must be consulted before the product is used. Class lines refer to ASME B16.5.

How supplied
Precision cut gaskets to any shape, size and quantity, or in sheet form to maximum size 1.524m x 1.524m. Thicknesses: 0.8mm, 1.0mm, 1.6mm, 2.0mm. Please note that 3.2mm is also available, but is not recommended *(see page 45 for advice on gasket use).*

James Walker Gylon® 3504

Description

James Walker Gylon® 3504 is a highly compressible grade of Gylon®, comprising PTFE with a filler of glass microspheres. It is blue in colour. The unique Gylon manufacturing process retains all the positive characteristics of PTFE, but minimises or eliminates the creep and flow problems associated with conventional PTFE products.

Background

James Walker Gylon brings together the gasket expertise of James Walker and the best-in-class Gylon modified-PTFE products of Garlock Sealing Technologies. By this means we provide customers with the perfect flange-sealing combination for their plant and equipment — Gylon modified-PTFE, backed by the worldwide service, support and applications engineering expertise of James Walker.

Typical applications

This highly-compressible modified-PTFE material is designed for applications where efficient flange sealing is required at low bolt loads. It is recommended for use with glass-lined, enamelled or plastic flanges in the chemical, pharmaceutical, food processing, and electronics sectors.

Prime features

- Resists a wide range of chemicals.
- Highly compressible with excellent bolt-load retention.
- Improved performance over conventional PTFE.
- Outstanding dimensional stability.
- Resists wear and abrasion.

Specifications

- Conforms to FDA requirements.
- Meets US Pharmacopoeia (USP) requirements.
- Conforms to American Bureau of Shipping (ABS) requirements.
- TUV certified in accordance with TA-Luft VDI 2440.
- ASTM F104 Line call out F456999A9B7E99K3M6.

Chemical properties

- Resistant to moderate concentrations of acid, some caustics, solvents, hydrocarbons, hydrogen peroxide, refrigerants, and cryogenics. Will not burn.

Biological properties

- Will not support bacterial growth.

Physical properties

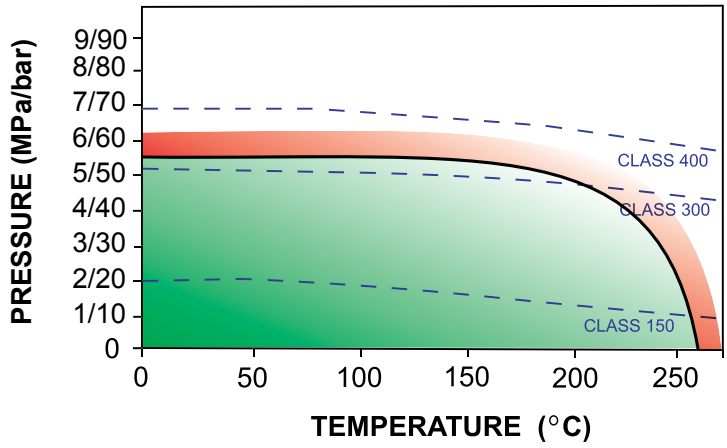
Density, Mg/m^3	1.70	(ASTM D792)
Transverse tensile strength, MPa	13.8	(ASTM F152)
Modulus at 100% elongation, MPa	10.3	(ASTM D1708)
Compressibility, %	25-45	(ASTM F36)
Recovery, %	30	(ASTM F36)
Gas permeability, ml/min	<0.015	(DIN 3535-4)

Operating limits

Temperature range (continuous operation)	-268°C to +260°C
Maximum working pressure	5.5MPa/55bar

Service capability graph

James Walker Gylon® 3504, up to and including 2.0mm thickness: maximum working pressure against temperature guidelines.



Service capability

For applications falling into the green zone, the product may normally be used without consultation. If the temperature/pressure combination is in the red zone, our Technical Support Team must be consulted before the product is used. Class lines refer to ASME B16.5.

How supplied

Precision cut gaskets to any shape, size and quantity, or in sheet form to maximum size 1.524m x 1.524m. Thicknesses: 0.8mm, 1.0mm, 1.6mm, 2.0mm. Please note that 3.2mm is also available, but not recommended *(see page 45 for advice on gasket use)*.

James Walker Gylon® 3510

Description
James Walker Gylon® 3510 comprises PTFE with barium sulphate filler, and is the most chemically resistant of our Gylon® grades. It is off-white in colour. The unique Gylon manufacturing process retains all the positive characteristics of PTFE, but minimises or eliminates the creep and flow problems associated with conventional PTFE products.

Background
James Walker Gylon brings together the gasket expertise of James Walker and the best-in-class Gylon modified-PTFE products of Garlock Sealing Technologies. By this means we provide customers with the perfect flange-sealing combination for their plant and equipment — Gylon modified-PTFE, backed by the worldwide service, support and applications engineering expertise of James Walker.

Typical applications
With its high resistance to chemical attack, this grade is recommended for flange duties with highly aggressive media in the chemical and petrochemical sectors. It is of particular value for use on electrolytic baths in plating processes.

Prime features
- Excellent chemical resistance.
- Improved performance over conventional PTFE.
- Resistant to cold flow and creep.
- Excellent bolt load retention.
- Outstanding dimensional stability under thermal stress.
- Resistance to wear and abrasion.

Specifications
- Conforms to FDA requirements.
- Conforms to American Bureau of Shipping (ABS) requirements.
- TUV certified in accordance with TA-Luft VDI 2440.
- ASTM F104 Line call out F451999A9B2E99K5M6.

Chemical properties
- Resistant to strong caustics, moderate acids, chlorine, gases, water, steam, cryogenics, hydrocarbons, and aluminium fluoride. Will not burn.

Biological properties
- Will not support bacterial growth.

Physical properties

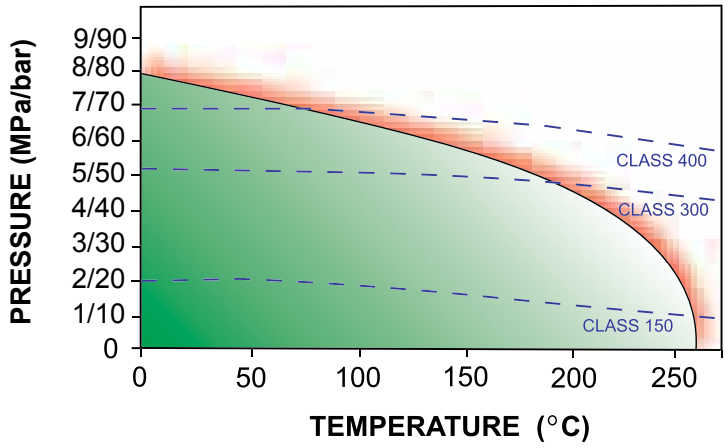
Density, Mg/m^3	2.80	(ASTM D792)
Transverse tensile strength, MPa	13.8	(ASTM F152)
Modulus at 100% elongation, MPa	9.6	(ASTM D1708)
Compressibility, %	4-10	(ASTM F36)
Recovery, %	40	(ASTM F36)
Gas permeability, ml/min	<0.015	(DIN 3535-4)

Operating limits

Temperature range (continuous operation)	-268°C to +260°C
Maximum working pressure	8.3MPa/83bar

Service capability graph

James Walker Gylon® 3510, up to and including 2.0mm thickness: maximum working pressure against temperature guidelines.



Service capability
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How supplied
Precision cut gaskets to any shape, size and quantity, or in sheet form to maximum size 1.524m x 1.524m. Thicknesses: 0.8mm, 1.0mm, 1.6mm, 2.0mm. Please note that 3.2mm is also available, but is not recommended *(see page 45 for advice on gasket use)*.

Non-asbestos sheet jointings chemical suitability guide

● *Suitable product.*

Where chemical compatibility is not indicated, or a chemical is not listed, please consult our Technical Support Team for a recommendation to be made.

NON-ASBESTOS SHEET JOINTINGS	CHIEFTAIN®	CENTURION®	SENTINEL®	INCA	JW GYLON® 3504	JW GYLON® 3500	JW GYLON® 3510
STEAM	●	●	●	●	1MPa	1MPa	1MPa
STEAM CONDENSATE	●	●	●	●	●	●	●
WATER	●	●	●	●	●	●	●
AIR	●	●	●	●	●	●	●
ACETIC ACID	●	●	50%	50%	●	●	●
ACETONE	●	●	●	●	●	●	●
ACETYLENE	●	●	●	●	●	●	●
ADIPIC ACID	●	●	●	●	●	●	●
ALUMINIUM CHLORIDE	●	●	NO	●	●	●	●
AMMONIA (ANHYDROUS, DRY)	●	●	●	●	●	●	●
AMMONIA (WET)	●	●	NO	●	●	●	●
AMMONIUM CHLORIDE	●	●	NO	●	●	●	●
AMMONIUM HYDROXIDE	●	●	10%	●	●	●	●
ANILINE	●	●	●	●	●	●	●
BENZENE	●	●	●	●	●	●	●
BITUMEN & HEAVY BOTTOMS	●	●	●	●	●	●	●
BLACK LIQUOR	●	●	NO	●	NO	NO	●
BLEACH SOLUTIONS	●	●	NO	NO	●	●	●
BOILER FEED WATER	●	●	●	●	●	●	●
BRINE	●	●	●	●	●	●	●
BROMINE	NO	NO	NO	NO	●	●	●
BUNKER FUEL	●	●	●	●	●	●	●
BUTANE	●	●	●	●	●	●	●
CALCIUM CHLORIDE	●	●	●	●	●	●	●
CALCIUM HYDROXIDE	●	●	●	●	●	NO	●
CALCIUM HYPOCHLORITE	●	●	NO	NO	●	●	●
CARBON DIOXIDE	●	●	●	●	●	●	●
CARBON DISULPHIDE	NO	NO	NO	NO	●	●	●
CARBON TETRACHLORIDE	●	●	NO	NO	●	●	●
CHLORINE (DRY)	●	●	●	●	●	●	●
CHLORINE (WET)	●	NO	NO	NO	●	●	●
CHROMIC ACID	NO	NO	NO	NO	NO	●	NO
CREOSOTE	●	●	●	●	●	●	●
DIESEL OIL	●	●	●	●	●	●	●
DIETHYL ETHER	●	●	●	●	●	●	●
DOWTHERM®	●	●	NO	NO	●	●	●
ETHANE	●	●	●	●	●	●	●
ETHANOLAMINES	●	●	●	●	●	●	●
ETHER	●	●	●	●	●	●	●
ETHYL ALCOHOL (Ethanol)	●	●	●	●	●	●	●
ETHYLAMINE	●	●	●	●	●	●	●
ETHYLENE	●	●	●	●	●	●	●
ETHYLENE GLYCOL	●	●	NO	●	●	●	●
ETHYLENE OXIDE	●	●	NO	NO	●	●	●
FERRIC CHLORIDE (WET)	NO	NO	NO	NO	●	●	NO
FLUORINE	NO	NO	NO	NO	NO	NO	NO
FORMALDEHYDE	●	●	●	●	●	●	●
FORMIC ACID	●	●	50%	10%	●	●	●
GASOLINE	●	●	●	●	●	●	●
GREEN LIQUOR	●	●	NO	NO	NO	NO	●
HEAVY OILS	●	●	●	●	●	●	●
HYDROBROMIC ACID	NO	NO	NO	NO	NO	●	●
HYDROCHLORIC ACID	NO	NO	NO	NO	NO	●	●
HYDROFLUORIC ACID	NO	NO	NO	NO	NO	NO	NO
HYDROGEN CHLORIDE GAS (DRY)	●	●	NO	NO	●	●	●
HYDROGEN PEROXIDE (<30%)	●	●	●	●	●	●	●
HYDROGEN SULPHIDE	●	●	NO	●	●	●	●
ISOPROPYL ALCOHOL	●	●	●	●	●	●	●
KEROSENE	●	●	●	●	●	●	●

NON-ASBESTOS SHEET JOINTINGS	CHIEFTAIN®	CENTURION®	SENTINEL®	INCA	JW GYLON® 3504	JW GYLON® 3500	JW GYLON® 3510
LINSEED OIL	●	●	●	●	●	●	●
LIQUID PETROLEUM GAS	●	●	●	●	●	●	●
LYE	●	●	NO	●	NO	NO	●
METHANE	●	●	●	●	●	●	●
METHYL ALCOHOL (Methanol)	●	●	●	●	●	●	●
METHYL CHLORIDE	●	●	●	●	●	●	●
METHYL ETHYL KETONE	●	●	●	●	●	●	●
METHYL TERTIARY BUTYL ETHER	●	●	●	●	●	●	●
METHYLATED SPIRITS	●	●	●	●	●	●	●
METHYLENE CHLORIDE	●	NO	NO	NO	●	●	●
MINERAL OILS	●	●	●	●	●	●	●
NAPHTHA	●	●	●	●	●	●	●
NATURAL GAS	●	●	●	●	●	●	●
NITRIC ACID	NO	NO	NO	NO	NO	●	●
NITROGEN	●	●	●	●	●	●	●
OCTANE	●	●	●	●	●	●	●
OLEUM	NO	NO	NO	NO	NO	●	NO
OXALIC ACID	●	●	NO	50%	●	●	●
OXYGEN	NO	NO	NO	NO	NO	NO	NO
PERCHLOROETHYLENE	●	●	●	●	●	●	●
PHENOLS	●	●	NO	NO	●	●	●
PHOSPHORIC ACID (50%)	●	●	NO	10%	NO	NO	●
POTASSIUM DICHROMATE (10%)	●	●	●	●	●	●	●
POTASSIUM HYDROXIDE (50%)	70°C	70°C	NO	NO	100°C	NO	●
PROPANE	●	●	●	●	●	●	●
PYRIDINE	●	●	NO	NO	●	●	●
RAPE SEED OIL	●	●	●	●	●	●	●
REFRIGERANT R12 (eg Freon® 12)	●	●	●	●	●	●	●
R22 (eg Freon® 22)	●	●	NO	NO	●	●	●
R134a (eg KLEA® 134a)	●	●	●	●	●	●	●
R404a (eg KLEA® 404a)	●	●	●	●	●	●	●
R407 series (eg KLEA® 407 series)	●	●	●	●	●	●	●
SEA WATER	●	●	●	●	●	●	●
SODA ASH	●	●	●	●	●	●	●
SODIUM CARBONATE	●	●	●	●	●	●	●
SODIUM DICHROMATE (10%)	●	●	●	●	●	●	●
SODIUM HYDROXIDE (50%)	70°C	70°C	NO	NO	100°C	NO	●
SODIUM HYPOCHLORITE	NO	●	NO	NO	●	●	●
STARCH	●	●	●	●	●	●	●
STYRENE	●	●	●	●	●	●	●
SULPHUR DIOXIDE (DRY)	●	●	NO	NO	●	●	●
SULPHUR DIOXIDE (WET)	NO	NO	NO	NO	●	●	●
SULPHUR TRIOXIDE	NO	NO	NO	NO	●	●	●
SULPHURIC ACID	NO	NO	NO	NO	NO	●	NO
TANNIC ACID	●	●	●	NO	●	●	●
TITANIUM DIOXIDE	●	●	●	●	●	●	●
TITANIUM TETRACHLORIDE	●	●	NO	NO	●	●	●
TOLUENE (TOLUOL)	●	●	●	●	●	●	●
TRANSFORMER OIL	●	NO	NO	NO	●	●	●
TRICHLOROETHANE	●	●	NO	NO	●	●	●
TRICHLOROETHYLENE	●	●	●	●	●	●	●
TURPENTINE	●	●	●	●	●	●	●
UREA	●	●	●	●	●	●	●
VINYL ACETATE	●	●	●	●	●	●	●
VINYL CHLORIDE	●	●	●	●	●	●	●
WHITE LIQUOR	●	●	NO	NO	NO	NO	●
WHITE SPIRIT	●	●	●	●	●	●	●
XYLENE	●	●	●	●	●	●	●

Due to the complexity of making a recommendation for any given duty, this section on chemical suitability is intended only as a guide. The possible effect of elevated temperatures should be considered when determining the compatibility of these products with a chemical. If necessary, please contact our Technical Support Team for assistance.

James Walker

Supagraf® expanded graphite jointings

General description

James Walker's Supagraf® comprises chemically expanded flake graphite that is calendered into sheets of controlled thickness. It is made without fillers or elastomeric content. This information and the **Prime features** shown below apply to all Supagraf products on pages 12 to 15.

Prime features

- Excellent chemical resistance.
- Exceptionally wide temperature range: from cryogenic up to 400°C in oxidising environments and, under certain circumstances, to 2500°C in inert conditions.
- Excellent resistance to stress relaxation, even at elevated temperatures.
- High levels of joint stability.
- Outstanding sealing integrity over extended periods.
- Accommodates flange distortions where traditional sheet jointings fail to seal.
- Exceptionally low leachable chloride content to resist corrosion.
- Totally compatible with stream, air and water.
- Recommended for use with heat transfer fluids and demineralised water.

Supagraf® Plain

Description

Sheet jointing of 98% pure exfoliated graphite. An **Ultra High Purity** (99.8%) grade is available for nuclear industry applications.

Prime features

- Widest temperature range.
- Potable water duties and repeated use with foodstuffs.
- Very easy to cut – but large gaskets may need support during carriage and fitting.

Specification

WRAS approved for use with cold and hot potable water up to 85°C.

Physical properties

(Typical values for 1.5mm thick sheet)

Density, Mg/m³	1.0	
Compressibility, %	49	(ASTM F36A)
Recovery, %	16	(ASTM F36A)
Leachable chloride ion content, ppm	<50	

Service capabilities

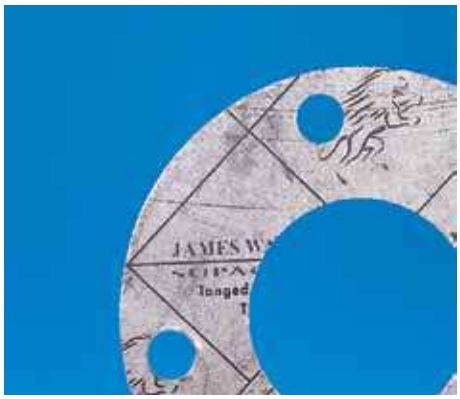
Maximum temperature (oxidising media)	+400°C
Maximum temperature (*inert/reducing media)	+2500°C
Minimum temperature	–200°C

(* Ensure that temperatures above +400°C on atmosphere side of flange do not cause gasket to oxidise inwards from outside edge.)

How supplied

Precision cut gaskets to any shape, size and quantity. In sheets: 1m x 1m, 0.5m x 1m. Sheet thicknesses: 1.0mm, 1.5mm, 2.0mm, 3.0mm. Rolls up to 60m long; widths 1.0m. Roll thickness: 0.5mm.

Supagraf® Tanged T10



Prime features
- Exceptional resistance to blow-out and crushing.
- Extra strength for ease of handling and fitting.
- *Anti-stick coating available.

Physical properties

(Typical values for 1.5mm thick sheet)

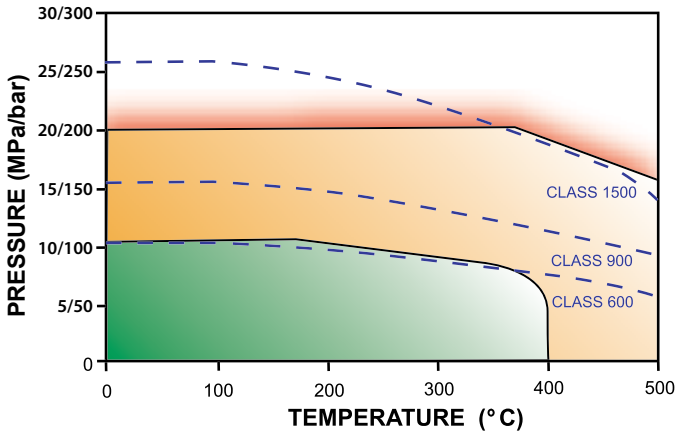
Density (graphite), Mg/m³	1.0	
Compressibility, %	35	(ASTM F36A)
Recovery, %	17	(ASTM F36A)
Leachable chloride ion content, ppm	<50	

Description

Sheet jointing of 98% pure exfoliated graphite reinforced with a central layer of 0.1mm thick tanged stainless steel. The graphite is compressed onto the perforated metal sheet to give a secure mechanical lock without adhesive.

Service capability graph

Supagraf Tanged T10, up to and including 2mm thickness: maximum working pressure against temperature guidelines, for steam, air and other oxidising media.



Service capabilities

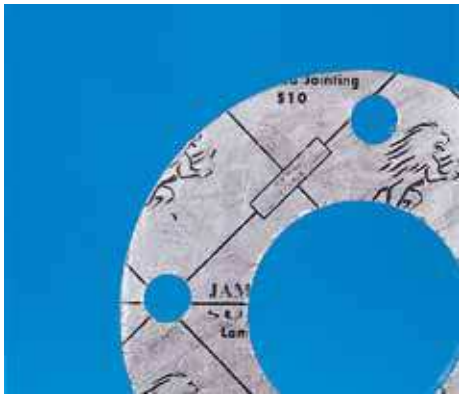
For applications falling into the green zone, the product may normally be used without consultation. In the amber zone we recommend that our Technical Support Team be contacted for confirmation of suitability. If the pressure/temperature combination is in the red zone then we must be consulted before the product is used. Class lines refer to ASME B16.5. For inert/reducing media the maximum temperature is +700°C, but ensure that temperatures above +400°C on atmosphere side of flange do not cause gasket to oxidise inwards from the outside edge. Minimum operating temperature is –200°C.

How supplied

Precision cut gaskets to any shape, size and quantity. In sheets: 1.5m x 1.5m (*1m x 1m if anti-stick). Thicknesses: 1.0mm, 1.5mm, 2.0mm, 3.0mm.

Supagraf® expanded graphite jointings

Supagraf® Laminated S10



Description
Sheet jointing of 98% pure exfoliated graphite with a bonded central layer of 50μm thick stainless steel foil. Sheets thicker than 2.0mm have two layers of metal foil and three of graphite.

Prime features
- Extra strength for ease of handling and fitting.
- Excellent sealing integrity.
- Can be cut with hand tools.

Physical properties
(Typical values for 2.0mm thick sheet.)

Density (graphite) Mg/m^3	1.0	
Compressibility, %	41	(ASTM F36A)
Recovery, %	22	(ASTM F36A)
Leachable chloride ion content, ppm	<50	

Service capabilities

Maximum temperature (oxidising media)	+400°C
Maximum temperature (*inert/reducing media)	+700°C
Minimum temperature	–200°C

(*Ensure that temperatures above +400°C on atmosphere side of flange do not cause gasket to oxidise inwards from the outside edge.)

How supplied
Precision cut gaskets to any shape, size and quantity. In sheets 1.0m x 1.0m. Thicknesses: 1.0mm, 1.5mm, 2.0mm, 3.0mm.

Supagraf® Laminated N7

Description
Sheet jointing of 98% pure exfoliated graphite with a bonded central layer of 50μm thick nickel foil. Sheets thicker than 2.0mm have two layers of metal foil and three of graphite.

Prime features
- Extra strength for ease of handling and fitting.
- Excellent sealing integrity.
- Can be cut with hand tools.

Physical properties
(Typical values for 1.5mm thick sheet)

Density (graphite), Mg/m^3	0.7	
Compressibility, %	45	(ASTM F36A)
Recovery, %	17	(ASTM F36A)

Service capabilities

Maximum temperature (oxidising media)	+400°C
Maximum temperature (*inert/reducing media)	+1000°C

(*Ensure that temperatures above +400°C on atmosphere side of flange do not cause gasket to oxidise inwards from the outside edge.)

How supplied
Precision cut gaskets to any shape, size and quantity. In sheets 0.5m x 1.0m, 1.0m x 1.0m. Thicknesses: 1.0mm, 1.5mm, 2.0mm, 3.0mm.

Supagraf® products chemical suitability guide

● *Suitable product.*

Where chemical compatibility is not indicated, or a chemical is not listed, please consult our Technical Support Team for a recommendation to be made.

SUPAGRAF® PRODUCTS	SUPAGRAF® PLAIN & HIGH PURITY	SUPAGRAF® TANGED T10	SUPAGRAF® LAMINATED N7	SUPAGRAF® LAMINATED S10
STEAM	●	●	●	●
STEAM CONDENSATE	●	●	●	●
WATER	●	●	●	●
AIR	●	●	●	●
ACETIC ACID	●	NO	●	NO
ACETONE	●	●	●	●
ACETYLENE	●	●	●	●
ADIPIC ACID	●	●	NO	●
ALUMINIUM CHLORIDE	●	●	NO	●
AMMONIA (ANHYDROUS, DRY)	●	●	●	●
AMMONIA (WET)	●	●	●	●
AMMONIUM CHLORIDE	●	●	●	●
AMMONIUM HYDROXIDE	●	NO	NO	NO
ANILINE	●	●	●	●
BENZENE	●	●	●	●
BITUMEN & HEAVY BOTTOMS	●	●	●	●
BLACK LIQUOR	●	●	NO	●
BLEACH SOLUTIONS	NO	NO	NO	NO
BOILER FEED WATER	●	●	●	●
BRINE	●	NO	NO	NO
BROMINE	NO	NO	NO	NO
BUNKER FUEL	●	●	●	●
BUTANE	●	●	●	●
CALCIUM CHLORIDE	●	●	●	●
CALCIUM HYDROXIDE	●	●	●	●
CALCIUM HYPOCHLORITE	30%	30%	30%	30%
CARBON DIOXIDE	●	●	●	●
CARBON DISULPHIDE	●	●	NO	●
CARBON TETRACHLORIDE	●	●	●	●
CHLORINE (DRY)	20°C	20°C	20°C	20°C
CHLORINE (WET)	NO	NO	NO	NO
CHROMIC ACID	NO	NO	NO	NO
CREOSOTE	●	●	●	●
DIESEL OIL	●	●	●	●
DIETHYL ETHER	●	●	●	●
DOWTHERM®	●	●	●	●
ETHANE	●	●	●	●
ETHANOLAMINES	●	●	●	●
ETHER	●	●	●	●
ETHYL ALCOHOL (Ethanol)	●	●	●	●
ETHYLAMINE	●	●	●	●
ETHYLENE	●	●	●	●
ETHYLENE GLYCOL	●	●	●	●
ETHYLENE OXIDE	●	●	●	●
FERRIC CHLORIDE (WET)	●	●	NO	●
FLUORINE	NO	NO	NO	NO
FORMALDEHYDE	●	●	●	●
FORMIC ACID	●	●	●	●
GASOLINE	●	●	●	●
GREEN LIQUOR	NO	NO	NO	NO
HEAVY OILS	●	●	●	●
HYDROBROMIC ACID	37%	NO	NO	NO
HYDROCHLORIC ACID	●	NO	NO	NO
HYDROFLUORIC ACID	●	NO	NO	NO
HYDROGEN CHLORIDE GAS (DRY)	●	●	●	●
HYDROGEN PEROXIDE (<30%)	●	●	●	●
HYDROGEN SULPHIDE	●	●	●	●
ISOPROPYL ALCOHOL	●	●	●	●
KEROSENE	●	●	●	●
LINSEED OIL	●	●	●	●
LIQUID PETROLEUM GAS	●	●	●	●

SUPAGRAF® PRODUCTS	SUPAGRAF® PAIN & HIGH PURITY	SUPAGRAF® TANGED T10	SUPAGRAF® LAMINATED N7	SUPAGRAF® LAMINATED S10
LYE	●	●	●	●
METHANE	●	●	●	●
METHYL ALCOHOL (Methanol)	●	●	●	●
METHYL CHLORIDE	●	●	●	●
METHYL ETHYL KETONE	●	●	●	●
METHYL TERTIARY BUTYL ETHER	●	●	●	●
METHYLATED SPIRITS	●	●	●	●
METHYLENE CHLORIDE	●	●	●	●
MINERAL OILS	●	●	●	●
NAPHTHA	●	●	●	●
NATURAL GAS	●	●	●	●
NITRIC ACID (50%)	40°C	NO	NO	NO
NITROGEN	●	●	●	●
OCTANE	●	●	●	●
OLEUM	NO	NO	NO	NO
OXALIC ACID	●	●	●	●
OXYGEN	NO	NO	NO	NO
PERCHLOROETHYLENE	●	●	●	●
PHENOLS	●	●	●	●
PHOSPHORIC ACID (85%)	●	60°C	20°C	60°C
POTASSIUM DICHROMATE (10%)	●	●	●	●
POTASSIUM HYDROXIDE (50%)	●	●	●	●
PROPANE	●	●	●	●
PYRIDINE	●	●	●	●
RAPE SEED OIL	●	●	●	●
REFRIGERANT R12 (eg Freon® 12)	●	●	●	●
R22 (eg Freon® 22)	●	●	●	●
R134a (eg KLEA® 134a)	●	●	●	●
R404a (eg KLEA® 404a)	●	●	●	●
R407 series (eg KLEA® 407 series)	●	●	●	●
SEA WATER	●	20°C	20°C	20°C
SODA ASH	●	●	●	●
SODIUM CARBONATE	●	●	●	●
SODIUM DICHROMATE (10%)	●	●	●	●
SODIUM HYDROXIDE (50%)	●	●	●	●
SODIUM HYPOCHLORITE (25%)	●	NO	20°C	NO
STARCH	●	●	●	●
STYRENE	●	●	●	●
SULPHUR DIOXIDE (DRY)	●	●	●	●
SULPHUR DIOXIDE (WET)	●	●	●	●
SULPHUR TRIOXIDE	NO	NO	NO	NO
SULPHURIC ACID	70%	70%	50%	70%
TANNIC ACID	●	●	●	●
TITANIUM DIOXIDE	●	●	●	●
TITANIUM TETRACHLORIDE	●	●	●	●
TOLUENE (TOLUOL)	●	●	●	●
TRANSFORMER OIL	●	●	●	●
TRICHLOROETHANE	●	●	●	●
TRICHLOROETHYLENE	●	●	●	●
TURPENTINE	●	●	●	●
UREA	●	●	●	●
VINYL ACETATE	●	●	●	●
VINYL CHLORIDE	●	●	●	●
WHITE LIQUOR	NO	NO	NO	NO
WHITE SPIRIT	●	●	●	●
XYLENE	●	●	●	●

Due to the complexity of making a recommendation for any given duty, this section on chemical suitability is intended only as a guide. The possible effect of elevated temperatures should be considered when determining the compatibility of these products with a chemical. If necessary, please contact our Technical Support Team for assistance.

Metaflex® Spiral Wound Gaskets

Description
This gasket is certified for emission control applications.

James Walker Metaflex® gaskets will seal flanges where temperature, pressure, vibration or flow rates are beyond the capability of conventional jointing materials.

They are wound in V-section metal strip and a softer filler material so that flange faces are presented with a spiral of alternate metal/filler layers.

Typical applications
Pipelines and pressure vessels on steam, petrochemical, metallurgical, nuclear, marine and hydraulic plant; also heat exchangers. **Metaflex® Lolode** gaskets are recommended for flange joints where bolt loading is limited.

Prime features
- Gaskets are made to a wide variety of sizes and shapes.
- Combinations of metal winding strip and filler are selected to suit the fluid media and other operating conditions.
- Quick to install and remove.
- Operate at temperatures from cryogenic up to +1000°C.
- System pressures from high vacuum to over 35MPa/350bar.
- Support rings, inside and/or outside of spiral winding, make gasket suitable for high line pressure on flat or raised flange faces.

Specifications
- Metaflex® gaskets with graphite or PTFE fillers are certified as meeting TA-Luft emission control requirements.
- Products are manufactured in accordance with all relevant gaskets standards to suit flange designations: ASME B16.5, BS1560 (only part 3.2 is still current), ASME B16.47 Series A (MSS-SP44), ASME B16.47 Series B (ASME B16.47 supersedes API 605), BS EN 1092 (supersedes BS4504); plus DIN, JIS and NF.

Maximum operating temperatures of filler materials

SPG Standard purity graphite (oxidising media)	+500°C
SPG Standard purity graphite (inert/reducing media)	+600°C
SPG Standard purity graphite (steam)	+650°C
HPG High purity graphite (oxidising media)	+500°C
HPG High purity graphite (inert/reducing media)	+600°C
HPG High purity graphite (steam)	+650°C
Fluolion® PTFE	+260°C
HTF High temperature filler	+1000°C

Aluminium and lead fillers are also available.

Operating pressure
Metaflex gaskets seal efficiently up to 35MPa/350bar, although higher pressures can be considered.

Metal winding strips
Standard materials: stainless steels to BS EN 10088-2-1.4306 (formerly Grade 304L) and BS EN 10088-2-1.4404 (formerly Grade 316L). Other materials include a selection of alternative stainless steels, a wide range of nickel alloys, and titanium.

Support rings
Standard material: carbon steel. Other materials include wide ranges of stainless steels and nickel alloys; and Fluolion® PTFE (inner ring only).

Standard sizes

Nominal thickness (mm)	Compressed thickness (mm)	Minimum diameter (mm)	Maximum diameter (mm)
2.5	1.9 - 2.1	10	300
3.2	2.4 - 2.6	10	760
4.5	3.2 - 3.45	10	1520
7.3	4.7 - 4.9	60	3550

Non-standard gaskets well in excess of 5000mm diameter are manufactured.

How supplied
Almost any combination of component materials is available. Profiles include circular, obround, square, oval and diamond. Gaskets for non-standard flanges are made to order.

Metaflex® SG/IR Fire-Safe

Description
Metaflex® SG/IR Fire-Safe is a fire-safe certified spiral wound gasket, comprising a stainless steel inner support ring and winding strip, and a carbon steel outer support ring.

It has PTFE filler in the inner sealing area, and graphite filler in the outer. PTFE enables the gasket to work with highly corrosive or high purity media. The graphite-filled area provides a secondary seal under fire conditions.

Specifications
- Fire Test certification to ANSI/API 607, Fifth edition; and ISO 10497: 2004. Third party tests were carried out by CEWAC/EID and witnessed by Lloyds.
- Manufactured in accordance with all relevant gasket standards to suit flange designations: ASME B16.5, BS1560, ASME B16.47 Series A (MSS-SP44), ASME B16.47 Series B (API 605), BS EN 1092 (BS4504); plus DIN, JIS and NF.

Typical applications
High pressure flange sealing duties in aggressive environments where it is essential to prevent leakage of flammable, corrosive or toxic media under emergency fire conditions. Recommended for pipelines and pressure vessels on steam, petrochemical, nuclear, marine and hydraulic plant; and heat exchangers.

Prime feature
- Recorded zero leakage under API 607/ISO 10497 test conditions that covered preliminary hydro test, fire type-testing and post burn leakage.

Materials
Winding strip & inner support ring: stainless steel to BS EN 10088-2-1.4404 (formerly Grade 316L). ***Outer support ring:*** carbon steel. Nickel alloys are available.

Service capabilities

Maximum temperature (continuous operation)	+260°C
Maximum operating pressure	35MPa/350bar

How supplied
Sizes: DN10 to DN1200, pressure ratings PN10 to PN40; ½″ to 48″, pressure ratings Classes 150 to 600.

Corrusafe FS (Fire-Safe)

Description
Corrusafe FS is a fire-safe certified gasket comprising corrugated support rings of stainless steel with dual material sealing faces.

The inner sealing envelope of PTFE is chemically inert to eliminate the risk of process contamination. The outer elements of graphite provide a secondary seal under fire conditions.

Specifications
- Fire Test certification to ANSI/API 607, Fifth edition; and ISO 10497: 2004. Third party tests were carried out by CEWAC/EID and witnessed by Lloyds.
- Manufactured in accordance with all relevant gasket standards to suit flange designations: ASME B16.5, BS1560, ASME B16.47 Series A (MSS-SP44), ASME B16.47 Series B (API 605), BS EN 1092 (BS4504); plus DIN, JIS and NF.

Typical applications
Flange sealing duties in aggressive environments where it is essential to prevent leakage of flammable, corrosive or toxic media under emergency fire conditions. Recommended for pipelines and pressure vessels on steam, petrochemical, nuclear, marine and hydraulic plant; and heat exchangers.

Prime feature
- Recorded zero leakage under API 607/ISO 10497 test conditions that covered preliminary hydro test, fire type-testing and post burn leakage.

Support ring material: stainless steel to BS EN 10088-2-1.4404 (formerly Grade 316L).

Service capabilities

Maximum temperature (continuous operation)	+260°C.
Maximum operating pressure	5MPa/50bar

How supplied
Sizes: DN10 to DN1200, pressure ratings PN10 to PN40; ½″ to 48″ for ASME flange Classes 150 to 600.

Spiral wound & metallic gaskets

Metakamm® Kammprofile Gaskets

Description
This gasket is certified for emission control applications.

Our grooved metal, Kammprofile-type gaskets comprise a metal core with concentric grooves on either side. They usually have a soft layer of sealing material bonded to both grooved faces.

Typical applications
Flanges of high temperature/pressure pipework and vessels where operating conditions can fluctuate. They are also recommended for heat exchangers.

Prime features
- Suit vast ranges of operating conditions.
- Work at line temperatures and pressures to +650°C or 25MPa/250bar.
- Undamaged cores can often be factory-fitted with new soft faces to reduce plant maintenance costs.
- **Metakamm® Easy-Fit (EF type)** gaskets come with two or four fitting lugs to aid installation.
- **Metakamm® Multifit** gasket fits flanges from Class 150 to 2500.

Specifications
- Metakamm® gaskets with facings of graphite or PTFE fillers are certified as meeting TA-Luft emission control requirements.
- Products are manufactured in accordance with all relevant gaskets standards to suit flange designations: ASME B16.5, BS1560 (only part 3.2 is still current), ASME B16.47 Series A (MSS-SP44), ASME B16.47 Series B (supersedes API 605), BS EN 1092 (supersedes BS4504); plus DIN, JIS and NF.

Maximum operating temperatures of facing materials

SPG Standard purity graphite (oxidising media)	+500°C
SPG Standard purity graphite (inert/reducing media)	+600°C
SPG Standard purity graphite (steam)	+650°C
HPG High purity graphite (oxidising media)	+500°C
HPG High purity graphite (inert/reducing media)	+600°C
HPG High purity graphite (steam)	+650°C
Fluolion® PTFE	+260°C

Aluminium and silver facings are also available.

Operating pressure
Standard gaskets 25MPa/250bar (maximum)

Serrated metal cores
Available in wide ranges of stainless steels and nickel alloys, titanium and copper.

Sizes
Standard diameters: 10mm to 3600mm NB. Standard thicknesses: 3.0mm and 4.0mm cores with 0.5mm soft facings. Non-standard thicknesses: 2.0mm core upwards.

How supplied
Six designs for different flange faces, in any combination of component materials. Special profiles: oval, rectangular, and heat exchanger shapes with pass bars.

Metakamm® Easi-Fit (EF type)
For easier fitting and reduced material costs, larger Metakamm gaskets can be supplied as EF types with either two or four mounting lugs. The lugs aid fitting by minimising the number of flange bolts that need to be removed to allow accurate gasket positioning.

Metakamm® Multifit
Metakamm with four self-locating lugs that minimises the number of gaskets to fit flange Classes 150 to 2500. Sizes: ½" to 24" NB, and DIN equivalents to 600mm NB.

Corrugated metal gaskets

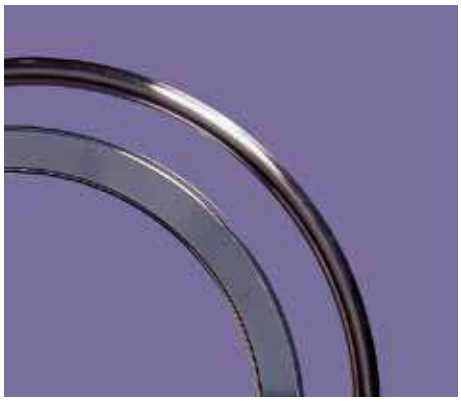
Description
Thin metal sheet gaskets with pressed corrugations — usually concentric to the bore.

Prime features
- Gaskets can adapt to irregular flanges without undue compressive load.
- Provide excellent seal under varying conditions of temperature and pressure.

Materials
Usually 0.25mm thick brass, but virtually any malleable material will be considered.

How supplied
In material to suit the application, and to any practical shape, size and quantity.

Moorside® Ring Joint Gaskets



Description
Manufactured in the UK by API licensee James Walker Moorflex, these precision machined ring joint gaskets are used worldwide in high-pressure oilfield applications as well as on refining and processing plant.

James Walker Moorflex is licensed under API Spec 6A-0038, by the American Petroleum Institute, to apply the API monogram to gaskets in accordance with API 6A PSL4 requirements.

Specifications
- To API 6A (oilfield use) standard.
- To ASME B16.20 (general use) standard.
- To fit ASME, BS and DIN flanges.

LICENSED UNDER
API Spec 6A-0038

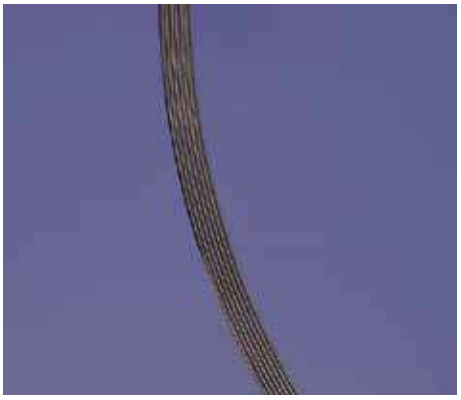
Ring joint types
- R type (oval and octagonal) solid sections to fit standard ring joint flanges with trapezoidal grooves.
- Types RX and BX with complex bevelled edge sections for wellhead pressures exceeding 69MPa/690bar (10,000psi).
- Lens section, convex, wedge, double cone, and weld ring types.

Materials
Standard: soft iron, low carbon steel, plus ranges of alloy steels and stainless steels.
Non-standard: high nickel alloys, super alloy steels, and additional stainless steels.

Ancillary equipment
- PTFE inner rings, for sitting in the cavity between the flange bore and ring joint to reduce turbulence and flange erosion.
- Flange protectors, for installation around the external diameter of flange joint to minimise ingress of moisture and dirt.
- Rubber coated ring joints: soft iron ring joint gaskets encapsulated in nitrile rubber for testing wellhead assemblies and valves. Rings can be reused and do not damage the flange grooves.

How supplied
All sizes and materials to the standards listed. We also manufacture customers' proprietary designs where confidentiality agreements are in force.

Machined Metal Gaskets



Description
Solid metal gaskets that are precision manufactured to a variety of complex profiles for high-specification industrial and defence duties.

Typical applications
Ultra-high vacuum equipment, refrigeration plant, hydraulic systems, etc.

Prime features
- Lens section — resists overstressing in high pressure duties.
- Convex section — centralised loading of gasket is achieved by a reduction in loaded area.
- Wedge section — positively locates a gasket in a cylindrical application. Gasket lip is energised by bolting or internal pressure.
- Double cone section — for large diameter, high pressure duties.
- Weld ring gaskets — for critical applications where a leak-proof joint is essential. Back-up gasket may be required.
- Ring joint orifice/blanking gaskets.

Materials
Include: soft carbon steel, stainless steels, alloy steels, and nickel alloys. Also Urea Grade stainless steel for highly corrosive environments.

How supplied
Manufactured to industry, national and international standards. We also manufacture customers' proprietary designs where confidentiality agreements are in force.

Spiral wound & metallic gaskets

Metcom® Gaskets

Description
This gasket is certified for emission control applications.

It comprises a thin corrugated steel joint with pressed concentric grooves 6mm wide. Two adjacent grooves on opposite surfaces are filled with beads of Supagraf® Tape — either standard or high purity grades. When compressed between flanges, the metal corrugations provide a sealing capability that is enhanced by the graphite beads.

Typical applications
Pipelines and pressure vessels with Class 150 to 2500 flanges, or equivalent.

Prime features
- Thinner than a spiral wound gasket and can usually be fitted in place of a sheet jointing gasket in a pipe run.
- Self locating, and often easier to install than a sheet graphite gasket.
- When supplied with taper-slot legs, this gasket can be used on a variety of flanges with differing bolt diameters and pitch circles.

Specifications
- Metcom® Type FG316L gasket is certified as meeting TA-Luft emission control requirements.

Physical properties
Standard metal cores in a selection of stainless steels. Other alloys are available.

Supagraf graphite thickness, mm	0.35 to 0.5
Nominal overall thickness, mm	1.5
Compressed thickness, mm	0.5

Service capabilities

Maximum temperature (oxidising media)	+500°C
Maximum temperature (non-oxidising)	+550°C
Maximum temperature (steam)	+650°C
Pressure rating (depending on temperature)	Vacuum to 40MPa/400bar

Optional groove filler material
PTFE is available for aggressive chemical conditions, but restricted service capabilities apply. Please contact our Technical Support Team for assistance.

How supplied
Multi-flange configuration: ½" to 12", Classes 150 – 2500.
Individual flange configuration: ½" to 24", Classes 150 – 2500.
Other sizes on application.

Metal Jacketed Gaskets

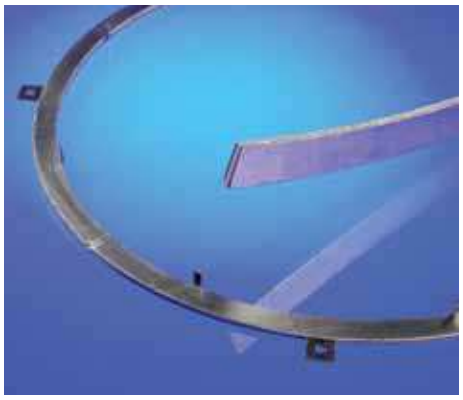
Description
Gasket with a soft pliable core, surrounded by a metal jacket that totally or partially encloses the filler. Pass partition bars can be incorporated, either integrally or welded into the gasket. The jacket may be corrugated.

Typical applications
- Heat exchangers.
- Boilers and flues.
- Autoclaves and other pressure vessels.
- Gas mains.
- Pumps and valve bonnets.
- Duties involving high temperature and dry heat.

Materials
Fillers: inert organic compounds, expanded graphite, Fluolion® PTFE, ceramic fibre.
Jackets: soft iron, low carbon steels, stainless steels, nickel alloys, aluminium, brass, copper, titanium.

How supplied
To industry, national and international standards, or customer specification. Material combinations are selected to suit operating conditions.

Supagraf® Furnasele



Description
These gaskets consist of a supporting metal ring with a relatively thick layer of graphite bonded to both faces. The support ring enables the graphite sealing faces to be positioned accurately on large vertical flanges. Without support, the graphite elements would have to be supplied and transported in segments.

By using thicker graphite layers than normal an effective seal can be made with a light bolt loading, and on applications where flanges are uneven or warped.

Typical applications
Supagraf® Furnasele was initially developed to solve sealing problems on blast furnace ducts with warped flanges. Long-term reliability and sealing performance has made it a standard fitment at many metallurgical plants. It also solves flange sealing problems in other industries where a large conformable one-piece gasket is needed for medium or high temperature duties — especially on vertical flanges.

Design features
- ***Supagraf Furnasele Type A:*** 7mm total thickness; for gaskets of 1m or greater overall diameter.
- ***Supagraf Furnasele Type B:*** 5mm total thickness; for gaskets of less than 1m overall diameter.
- Face widths are usually 40mm to 50mm.
- Other thickness combinations can be produced as required.
- On very hot applications, a thermal barrier can be supplied to protect the graphite from oxidation. This is usually unnecessary in metallurgical plants where the installation is water-cooled.

Materials of manufacture
Graphite: 98% purity expanded graphite.
Metal ring: Generally hot-rolled carbon steel. Stainless steels are readily available, with a range of nickel alloys supplied on request.

How supplied
Supagraf Furnasele gaskets are custom designed and manufactured to suit each application. Diameters range from 500mm to well in excess of 2000mm.

Supagraf® Eyeletted Gaskets

Description
Gaskets of Supagraf® Tanged T10, Supagraf® Laminated N7 and Supagraf® Laminated S10 supplied with metal eyelets (usually stainless steel) that shroud the inside or outside diameter.

Prime features
- Erosion of graphite is prevented at high fluid velocity, when fitted to inside diameter.
- Reinforces gasket surfaces and reduces risk of over-compression at high bolt loads.

Physical properties & service capabilities
Generally as quoted for the Supagraf® grade being used.

How supplied
Made to order.

Metagraf Gaskets

Description
These gaskets have a corrugated metal core, normally of stainless steel, with Supagraf® expanded graphite facings. Available as **Metagraf PL** with a wide chemical compatibility for pipeline duties, and **Metagraf HX** for heat exchangers.

Temperature limits

Oxidising atmosphere	-200°C to +400°C
Steam	+600°C (maximum)

How supplied
Metagraf PL: To fit ASME Classes 150 and 300, and DIN flanges.
Metagraf HX: Custom made to order.

James Walker

Spiral wound & metallic gaskets chemical suitability guide

Notation:

A = Fully resistant (less than 0.009mm penetration per month)
B = Satisfactory (0.009mm-0.09mm per month)
C = Fairly resistant (0.09mm-0.25mm per month)
D = Slightly resistant (0.25mm-0.9mm per month)
E = Non-resistant (over 0.9mm per month)
0 = Insufficient data available.

Where chemical compatibility is not indicated, or a chemical is not listed, please consult our Technical Support Team for a recommendation to be made.

METAL COMPONENTS	STAINLESS STEELS UNS S30403, S32100, S34700	STAINLESS STEELS UNS S31600, S31603	NICKEL UNS N02200	NICKEL ALLOY UNS N04400	NICKEL-CHROME ALLOY UNS N06625
STEAM	A	A	A	A	A
STEAM CONDENSATE	A	A	A	A	A
WATER	A	A	A	A	A
AIR	A	A	A	A	A
ACETIC ACID (50% @ boiling)	C	B	B	A	B
ACETIC ANHYDRIDE (boiling)	A	A	A	A	A
ACETONE (boiling)	A	A	A	A	A
ALUMINIUM CHLORIDE (20°C)	D	C	B	B	C
AMMONIA LIQUOR (boiling)	A	A	C	C	A
AMMONIUM CHLORIDE (50%, boiling)	B	A	A	A	B
AMMONIUM NITRATE (boiling)	A	A	E	E	B
ANILINE (concentrated @ 20°C)	A	A	A	A	A
BARIUM CHLORIDE (boiling)	B	A	B	A	B
CHROMIUM PLATING BATH (20°C)	A	A	C	C	A
CITRIC ACID (15%, boiling)	B	A	B	A	A
COPPER SULPHATE (saturated, boiling)	A	A	C	C	C
CREOSOTE/COAL TAR (hot)	A	A	A	A	A
ETHER (20°C)	A	A	A	A	A
ETHYL ALCOHOL (boiling)	A	A	A	A	A
ETHYL CHLORIDE (20°C)	A	A	A	A	A
ETHYLENE CHLORIDE (20°C)	A	A	A	A	A
FERRIC CHLORIDE (1% @ 20°C)	B	A	B	C	C
FLUORINE (20°C)	E	E	A	A	A
FORMALDEHYDE (Formalin 40%)	B	A	A	A	A
FORMIC ACID (5% @ 65°C, still)	B	A	A	A	A
FUEL OIL (hot)	A	A	B	B	A
FUEL OIL (+sulphuric acid)	C	B	B	B	B
HYDROCHLORIC ACID (20°C)	E	E	B	B	C
HYDROFLUOSILICIC ACID (20°C)	E	D	A	A	B
HYDROGEN PEROXIDE (boiling)	B	A	0	0	0
HYDROGEN SULPHIDE (wet)	B	A	A	A	A
KEROSENE	A	A	A	A	A
LACTIC ACID (10% @ 65°C)	C	B	B	B	B
LINSEED OIL (20°C)	A	A	A	A	A
MAGNESIUM CHLORIDE (5%, hot)	C	B	A	A	A
MAGNESIUM SULPHATE (hot)	A	A	A	A	A

METAL COMPONENTS	STAINLESS STEELS UNS S30403, S32100, S34700	STAINLESS STEELS UNS S31600, S31603	NICKEL UNS NO2200	NICKEL ALLOY UNS N04400	NICKEL-CHROME ALLOY UNS N06625
METHYL ALCOHOL (65°C)	C	B	A	A	A
NAPHTHA (20°C)	A	A	A	A	A
NICKEL CHLORIDE SOLUTION (20°C)	A	A	B	B	B
NICKEL SULPHATE (hot/cold)	A	A	A	A	A
NITRIC ACID (50% @ 20°C)	A	A	E	E	A
(65%, boiling)	B	B	E	E	D
OIL - CRUDE (hot/cold)	A	A	A	A	A
OIL – VEG/MINERAL (hot/cold)	A	A	A	A	A
OXALIC ACID (10%, boiling)	D	C	B	A	B
PHENOL	A	A	A	A	A
PHOSPHORIC ACID (10% @ 20°C)	C	B	B	B	B
PICRIC ACID (70%)	A	A	0	0	0
POTASSIUM BICHROMATE (20°C)	A	A	A	A	A
POTASSIUM CHLORIDE (5%, boiling)	A	A	A	A	A
POTASSIUM HYDROXIDE (50%, boiling)	B	A	A	A	A
POTASSIUM NITRATE (5%, hot)	A	A	A	A	A
POTASSIUM SULPHATE (5%, hot)	A	A	A	A	A
POTASSIUM SULPHIDE (salt)	A	A	A	A	A
SEA WATER	A	A	A	A	A
SEWAGE	A	A	A	A	A
SODIUM CARBONATE (5% @ 65°C)	A	A	A	A	A
SODIUM CHLORIDE (saturated, boiling)	B	A	A	A	A
SODIUM HYDROXIDE	A	A	A	A	A
SODIUM HYPOCHLORITE (5%, still)	B	A	C	C	C
SODIUM NITRATE (fused)	C	B	A	B	A
SODIUM SULPHATE (20°C)	A	A	A	A	A
SULPHUR DIOXIDE (moist, 20°C)	B	A	D	C	C
SULPHUR (wet)	B	A	B	B	A
SULPHURIC ACID (10% @ 20°C)	C	B	B	A	C
(fuming, 20°C)	C	B	C	B	B
SULPHUROUS ACID (saturated, 190°C)	C	B	E	E	E
TANNIC ACID (65°C)	A	A	A	A	A
TRICHLORACETIC ACID (20°C)	E	E	B	B	B
ZINC CHLORIDE (5%, boiling)	B	B	B	B	B
ZINC SULPHATE (25%, boiling)	A	A	A	A	A

Filler & facing materials

Expanded graphite: See details for Supagraf® Plain on page 15.

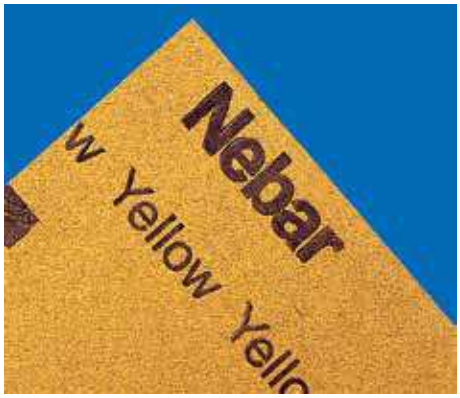
HTF (High temperature filler): When used with suitable winding steel grades, this material resists the majority of common media including: hot oil, fuels, acids, alcohols, and esters. It should NOT be used with: sulphuric, phosphoric, hydrofluoric or other strong mineral acids.

PTFE (with 25% glass fibre): This material is chemically inert to most media, with a few exceptions as follows.

- It offers only fair resistance to: ammonium hydroxide, bromine, chromic acid, hydroboric acid, hydrochloric acid, hydrocyanic acid, nitric acid (0-50%), phenol, and sodium hydroxide.
- It should NOT be used with: fluorosilicic acid, hydrofluoric acid, hydrogen sulphide solution, or sodium silicate.

Due to the complexity of making a recommendation for any given duty, this section on chemical suitability is intended only as a guide. The possible effect of elevated temperatures should be considered when determining the compatibility of these products with a chemical. If necessary, please contact our Technical Support Team for assistance.

Nebar® Yellow: Premium Nitrile



Description
Premium quality, nitrile based cork-elastomer jointing developed to meet the requirements of Specification BS F 66. Previously designated Nebar® A/CT.

Prime features
- High compressibility at low bolt loadings.
- Resists a wide range of fluid media.
- 110°C maximum operating temperature in liquids.
- Retains flexibility down to –20°C.
- All Nebar products are easy to cut, handle and install.

Specifications
Conforms to BS F 66.

Physical properties
(Tested to ASTM F104 procedures)

Hardness, IRHD	60 to 75	(ASTM D1415)
Tensile strength (minimum), MPa	1.72	(ASTM F152B)
Compressibility @ 2.8N/mm², %	20 to 30	(ASTM F36B)
Recovery, minimum %	75	(ASTM F36B)
Fluid resistance, % volume swell in:		
ASTM Oil No.1, 72h @ 100°C	–5 to +15	(ASTM F146)
IRM 903, 72h @ 100°C	+5 to +20	(ASTM F146)
ASTM Fuel A, 22h @ ambient	+5 to +15	(ASTM F146)
BS 148 Transformer Oil, 14 days @ 90°C	+1	(ASTM F146)

How supplied
Precision cut gaskets to any shape, size and quantity. In sheets 1.2m x 1.0m with a split surface finish. Thicknesses 0.75mm, 1mm, 1.5mm, 3mm.

Nebar® Red: High Pressure

Description
A high quality blend of cork and polychloroprene that withstands high pressures and high bolt loads, particularly in the electrical industry. Previously designated Nebar® HP.

Prime features
- Developed for high pressure applications in switchgear and transformers.
- High resistance to mineral oils.
- Withstands higher bolt loadings than other Nebar® grades.
- 110°C maximum operating temperature in liquids.
- Retains flexibility down to –35°C.

Specifications
Complies with DTD 900/4911(DTD specs declared obsolescent); AFS 721; and ASTM F104 line call out F224000M2.

Physical properties
(Tested to ASTM F104 procedures)

Hardness, IRHD	70 to 85	(ASTM D1415)
Tensile strength (minimum), MPa	2.35	(ASTM F152B)
Compressibility @ 2.8N/mm², %	10 to 30	(ASTM F36B)
Recovery, minimum %	75	(ASTM F36B)
Fluid resistance, % volume swell in:		
ASTM Oil No.1, 72h @ 100°C	–5 to +5	(ASTM F146)
IRM 903, 72h @ 100°C	+10 to +30	(ASTM F146)
ASTM Fuel A, 22h @ ambient	0 to +10	(ASTM F146)
BS 148 Transformer Oil, 14 days @ 90°C	+10	(ASTM F146)

How supplied
Precision cut gaskets to any shape, size and quantity. In sheets 1.2m x 1.0m for 0.75mm thickness; sheets 1.2m x 1.2m for thicknesses 1.5mm, 2.5mm, 3mm, 6mm, 6.4mm, 9.5mm, 22mm.

Cork-elastomer jointings

Nebar® Black: Hi-Performance Electrical

Description
Cork-elastomer jointing based on nitrile/polychloroprene blend. Previously designated Nebar® C947/3.

Prime features
- Specifically for hydrogen coolers or where SF_6 gas is present.
- 10^{10}ohm.cm resistivity at 100Vdc.
- 110°C maximum operating temperature in liquids.
- Retains flexibility down to –15°C.

Specification
Complies with ASTM F104 line call out F224000M2.

Physical properties

(Tested to ASTM F104 procedures)		
Hardness, IRHD	65 to 80	(ASTM D1415)
Tensile strength (minimum), MPa	2.45	(ASTM F152B)
Compressibility @ 2.8N/mm², %	15 to 25	(ASTM F36B)
Recovery, minimum %	85	(ASTM F36B)
Fluid resistance, % volume swell in:		
ASTM Oil No.1, 72h @ 100°C	–2.7	(ASTM F146)
IRM 903, 72h @ 100°C	+10.7	(ASTM F146)
ASTM Fuel A, 22h @ ambient	+1	(ASTM F146)
BS 148 Transformer Oil, 14 days @ 90°C	+1	(ASTM F146)

How supplied
Precision cut gaskets to any shape, size and quantity. In sheets 1.2m x 1.0m for 2.5mm thickness; 1.8m x 1m for 3mm thickness; 1.2m x 1.2m for 5mm thickness.

Nebar® Brown: General Purpose

Description
General purpose, high quality cork-elastomer jointing. Below 3mm thickness it comprises a predominately nitrile bonded cork; 3mm and above the cork is bonded with a polychloroprene/nitrile blend. Previously designated Nebar® N1.

Prime features
- Extensively used in automotive, engineering and electrical industries.
- Suitable for a wide range of flanges.
- 110°C maximum operating temperature in liquids.
- Retains flexibility down to –20°C (<3mm) or –30°C (⩾3mm).

Specifications
Complies with ASEA 1169 5012E-204; and ASTM F104 line call out — <3mm, F224000M2; 3mm & >3mm, F225000M2.

Physical properties

(Tested to ASTM F104 procedures)	<3mm	⩾3mm	
Hardness, IRHD	65 to 80	65 to 85	(ASTM D1415)
Tensile strength (minimum), MPa	1.75	1.75	(ASTM F152B)
Compressibility @ 2.8N/mm², %	15 to 25	20 to 30	(ASTM F36B)
Recovery, minimum %	75	75	(ASTM F36B)
Fluid resistance, % volume swell in:			
ASTM Oil No.1, 72h @ 100°C	–3 to +10	0 to +10	(ASTM F146)
IRM 903, 72h @ 100°C	0 to +25	+5 to +30	(ASTM F146)
ASTM Fuel A, 22h @ ambient	–5 to +10	0 to +15	(ASTM F146)
BS 148 Transformer Oil, 14 days @ 90°C	+23	+8	(ASTM F146)

How supplied
Precision cut gaskets to any shape, size and quantity. In sheets 1.2m x 1.2m for thicknesses 0.75mm, 1mm, 1.5mm, 2mm, 2.5mm, 3mm, 4mm, 5mm, 6mm, 6.4mm. Sheets 0.9m x 9m for thicknesses 0.75mm, 1.5mm, 2mm, 3mm, 5mm.

Nebar® White: Premium Neoprene Electrical

Description
Premium quality cork-elastomer jointing, based predominantly on polychloroprene. Proven over many years in heavy electrical plant. Previously designated Nebar® N6/25.

Prime features
- Top grade product for transformers and switchgear.
- Developed for prolonged contact with mineral oils.
- 105°C maximum operating temperature in liquids.
- Retains flexibility down to –35°C.

Specification
Complies with ASTM F104 line call out F225000M2.

Physical properties

(Tested to ATSM F104 procedures)		
Hardness, IRHD	65 to 85	(ASTM D1415)
Tensile strength (minimum), MPa	1.75	(ASTM F152B)
Compressibility @ 2.8N/mm², %	20 to 30	(ASTM F36B)
Recovery, minimum %	80	(ASTM F36B)
Fluid resistance, % volume swell in:		
ASTM Oil No.1, 72h @ 100°C	–5 to +10	(ASTM F146)
IRM 903, 72h @ 100°C	+5 to +30	(ASTM F146)
ASTM Fuel A, 22h @ ambient	0 to +15	(ASTM F146)
BS 148 Transformer Oil, 14 days @ 90°C	+10	(ASTM F146)

How supplied
Precision cut gaskets to any shape, size and quantity. In sheets 1.2m x 1.2m. Thicknesses 0.75mm, 1.5mm, 2mm, 3mm, 4mm, 5mm, 6mm, 6.4mm, 8mm, 9.5mm.

Nebar® Orange: Neoprene Electrical

Description
Economical, high quality cork-elastomer jointing based on a polychloroprene/ nitrile/SBR blend. Previously designated Nebar® N7E.

Prime features
- Recommended for switchgear and transformers.
- 110°C maximum operating temperature in liquids.
- Retains flexibility down to –30°C.

Specifications
Complies with ASTM F104 line call out F225000M2.

Physical properties

(Tested to ASTM F104 procedures)		
Hardness, IRHD	65 to 80	(ASTM D1415)
Tensile strength (minimum), MPa	1.45	(ASTM F152B)
Compressibility @ 2.8N/mm², %	20 to 35	(ASTM F36B)
Recovery, minimum %	75	(ASTM F36B)
Fluid resistance, % volume swell in:		
ASTM Oil No.1, 72h @ 100°C	–5 to +10	(ASTM F146)
IRM 903, 72h @ 100°C	0 to +30	(ASTM F146)
ASTM Fuel A, 22h @ ambient	0 to +15	(ASTM F146)
BS 148 Transformer Oil, 14 days @ 90°C	+5 to +15	(ASTM F146)

How supplied
Precision cut gaskets to any shape, size and quantity. In sheets 1.2m x 1.2m. Thicknesses 1.5mm, 2mm, 2.5mm, 3mm, 5mm, 6mm, 9.5mm.

Cork-elastomer jointings

Nebar® Grey: Premium Nitrile Electrical

Description
Premium quality, medium hardness jointing based on nitrile rubber, that meets ABB specification for transformers and switchgear. Previously designated Nebar® N80.

Prime features
- Suitable for a wide range of duties.
- Used extensively in automotive, engineering and electrical industries.
- 110°C maximum operating temperature in liquids.
- Retains flexibility down to –25°C.

Specifications
Meets ABB specifications for transformers and switchgear. Complies with ASTM F104 line call out F225000M2.

Physical properties
(Tested to ASTM F104 procedures)

Hardness, IRHD	70 to 75	(ASTM D1415)
Tensile strength (minimum), MPa	1.75	(ASTM F152B)
Compressibility @ 2.8N/mm², %	20 to 30	(ASTM F36B)
Recovery, minimum %	80	(ASTM F36B)
Fluid resistance, % volume swell in:		
ASTM Oil No.1, 72h @ 100°C	–2 to +10	(ASTM F146)
IRM 903, 72h @ 100°C	–2 to +15	(ASTM F146)
ASTM Fuel A, 22h @ ambient	–2 to +10	(ASTM F146)
BS 148 Transformer Oil, 14 days @ 90°C	+2	(ASTM F146)
Dow Corning 561 Transformer Fluid	–5	(Non-ASTM test)

How supplied
Precision cut gaskets to any shape, size and quantity. In sheets 1.2m x 0.9m. Thicknesses 1.5mm, 3mm, 5mm, 6mm.

Nebar® Purple: Nitrile Electrical

Description
High quality, medium-to-hard grade of cork-elastomer jointing based on nitrile elastomer. Replacement material for Nebar® N67.

Prime features
- Robust grade for heavy electrical duties.
- More resistant to over-compression than normal cork-elastomer grades.
- Resists all commonly used transformer fluids.
- 110°C maximum recommended operating temperature in liquids; tolerates intermittent excursions to 120°C.
- Retains flexibility down to –25°C.

Specification
Complies with ASTM F104 line call out F225000M2.

Physical properties
(Tested to ASTM F104 procedures)

Hardness, IRHD	60 to 80	(ASTM D1415)
Tensile strength (minimum), MPa	1.75	(ASTM F152B)
Compressibility @ 2.8N/mm², %	15 to 25	(ASTM F36B)
Recovery, minimum %	75	(ASTM F36B)
Fluid resistance, % volume swell in:		
ASTM Oil No.1, 72h @ 100°C	–5 to +15	(ASTM F146)
IRM 903, 72h @ 100°C	+5 to +20	(ASTM F146)
ASTM Fuel A, 22h @ ambient	+5 to +15	(ASTM F146)
BS 148 Transformer Oil, 14 days @ 90°C	+1	(ASTM F146)

How supplied
Precision cut gaskets to any shape, size and quantity. In sheets 1.2m x 0.9m for thicknesses 1.5mm, 3mm, 4mm, 5mm, 6mm, 6.4mm. Sheets 1.27m x 1.014m for thicknesses 1.5mm, 5mm.

Nebar® Blue: Unleaded Services

Description
Premium quality nitrile based cork-elastomer jointing, especially recommended for use with unleaded fuels. Previously designated Nebar® PR.

Prime features
- Exceptional resistance to a wide range of fuels, oils and solvents.
- Suitable for many fluid sealing applications in the automotive, engineering and electrical industries.
- Originally developed for use with Askarel transformer fluids.
- 115°C maximum operating temperature in liquids.
- Retains flexibility down to –5°C.

Specification
Complies with ASTM F104 P2245A; and ASTM F104 line call out F226000M1.

Physical properties

(Tested to ASTM F104 procedures)		
Hardness, IRHD	60 to 70	(ASTM D1415)
Tensile strength (minimum), MPa	1.45	(ASTM F152B)
Compressibility @ 2.8N/mm², %	25 to 40	(ASTM F36B)
Recovery, minimum %	75	(ASTM F36B)
Fluid resistance, % volume swell in:		
ASTM Oil No.1, 72h @ 100°C	–5 to +10	(ASTM F146)
IRM 903, 72h @ 100°C	–5 to +15	(ASTM F146)
ASTM Fuel A, 22h @ ambient	–2 to +10	(ASTM F146)
BS 148 Transformer Oil, 14 days @ 90°C	+1	(ASTM F146)
Unleaded petrol, 8 months @ 18-22°C	+11	(ASTM F146)

How supplied
Precision cut gaskets to any shape, size and quantity. In sheets 1.2m x 1.0m for 2mm thickness. Sheets 1.2m x 1.2m for thicknesses 3mm, 8mm.

Nebar® Green: Sponge

Description
Soft cork-elastomer jointing of closed-cell construction based on polychloroprene elastomer. Previously designated Lioncelle® CS.

Prime features
- For sealing at low bolt loads, and on uneven or delicate flanges.
- Exceptional oil resistance.
- Suitable for low-medium fluid pressures.
- 100°C maximum operating temperature in liquids.
- Retains flexibility down to –30°C.

Specifications
Complies with ASTM F104 P2357A.

Physical properties

(Tested to ASTM F104 procedures)		
Hardness, IRHD	35 to 50	(ASTM D1415)
Tensile strength (minimum), MPa	0.53	(ASTM F152B)
Compressibility @ 0.7N/mm², %	25 to 45	(ASTM F36F)
Recovery, minimum %	75	(ASTM F36F)
Fluid resistance, % volume swell in:		
ASTM Oil No.1, 72h @ 100°C	–10 to +10	(ASTM F146)
IRM 903, 72h @ 100°C	+15 to +50	(ASTM F146)
ASTM Fuel A, 22h @ ambient	0 to +25	(ASTM F146)
BS 148 Transformer Oil, 14 days @ 90°C	+15	(ASTM F146)

How supplied
Precision cut gaskets to any shape, size and quantity. In sheets 1.2m x 1m. Thicknesses: 3mm, 5mm, 6.4mm.

James Walker

Cork-elastomer jointings chemical suitability guide

Key: ● Suitable for use **LP** Not suitable at high pressure

NEBAR®:	YELLOW	BLACK	RED	BROWN	WHITE	PURPLE	ORANGE	GREY	BLUE	GREEN
AIR	●	●	●	●	●	●	●	●	●	LP
WATER	●	●	●	●	●	●	●	●	●	●
ALCOHOLS	●	●	●	●	●	●	●	●	●	●
FUEL & DIESEL OIL	●	●	●	●	●	●	●	●	●	●
LUBRICATING OIL – MINERAL	●	●	●	●	●	●	●	●	●	●
LUBRICATING OIL – SYNTHETIC	●	●	-	-	-	●	-	●	●	-
HYDRAULIC OIL – MINERAL	●	●	●	●	●	●	●	●	●	●
WATER/GLYCOL	●	●	●	●	●	●	●	●	●	●
WATER/OIL EMULSION	-	●	-	-	-	-	-	-	-	-
ASTM OIL NO.1	●	●	●	●	●	●	●	●	●	●
IRM 903	●	●	●	●	●	●	●	●	●	●
ASTM FUEL A	●	●	●	●	●	●	●	●	●	●
BS 148 OIL	●	●	●	●	●	●	●	●	●	●
UNLEADED FUEL	-	-	-	-	-	-	-	-	●	-

Note: None of the above Nebar® grades is suitable for use with potable water, dilute acids or alkalis, phosphate ester (aliphatic or aromatic), or foodstuffs.

Due to the complexity of making a recommendation for any given duty, this section on chemical suitability is intended only as a guide. The possible effect of elevated temperatures should be considered when determining the compatibility of these products with a chemical. If necessary, please contact our Technical Support Team for assistance.

General description

Fluolion® is the James Walker trade name for its ranges of special PTFE grades. In addition to these, we offer world beating modified-PTFE products and virgin grades from other carefully selected and highly respected manufacturers.

Prime features

- Outstanding chemical resistance.
- Non-corrosive, non-wetting, non-contaminating and odourless.
- Can work at temperatures from cryogenic up to +260°C.
- Excellent electrical and thermal insulators in virgin form.

For general fluid sealing duties, PTFE's impressive list of properties is often marred by creep characteristics that cause lack of sealing stress with time. These negative properties are minimised by using fillers, biaxial orientation, and other devices that enable the manifold advantages of PTFE gaskets to outweigh the possible disadvantages.

James Walker Gylon®

Description

We supply three best-in-class grades of modified PTFE, manufactured specially for us by Garlock Sealing Technologies. These are James Walker Gylon® 3500, 3504 and 3510.

Our selected Gylon grades are all modified to combat creep and improve resilience for flange sealing duties. They are recommended for flanges on plant that handle highly aggressive chemical media, and where hygiene is top priority — such as the food processing, pharmaceutical, and electronics industries.

For further details of James Walker Gylon 3500, 3504, and 3510, please see the entries under *Non-asbestos sheet jointings* on pages 8, 9 and 10, and details of chemical suitability on page 11.

Walflon Joint Sealant

Description

Soft and pliable rectangular cord material of expanded Fluolion® PTFE, with a self-adhesive backing to aid installation.

Typical applications

This is an excellent maintenance expedient for flanged joints where temperatures and pressures are modest. It is ideal for emergency flange sealing when the correct gasket or joining material is unavailable.

Prime features

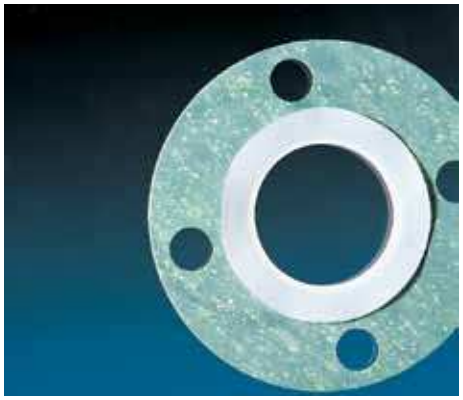
- Forms 'instant' gaskets very economically.
- Conforms readily to irregular surfaces.
- A ring of Walflon in a flange joint compresses to a high-density PTFE gasket when bolt load is applied.
- Can be used with a very wide range of fluid media.

How supplied

As seven cross-sections from 1.5mm x 3mm to 7mm x 20mm, in packs containing lengths of 5m to 30m.

PTFE gaskets

Fluolion® Envelope Gaskets



Description
A resilient fibre material encased in a thin cover of PTFE.

The resulting gasket combines the inertness of virgin PTFE with the mechanical properties of the compressed fibre sheet.

James Walker supplies three envelope designs: Fin Type; Machined Square Type; Folded Tape Type.

Typical application
Flanged joints handling highly aggressive fluid media that would swiftly destroy the integrity of other materials. Often used with soft insert material on glass-lined pipework systems. Also used in food processing, where cleanliness and non-contamination are essential.

Fin type
- Standard design: most economical envelope gasket.
- Suits majority of applications where highly abrasive media are NOT used, and turbulent flow will NOT create problems.
- Needs clearance between insert and envelope inside diameter to enable insert to be fitted.

Machined square type
- Provides continuity with pipeline bore for smooth flow.
- Recommended where flange sealing width is restricted or thick inserts are used.
- Supplied with serrated surface.

Folded tape type
- Has smooth surface finish – tape of PTFE is folded and joined by welding.
- Used for diameters over 300mm.
- Can be adapted to non-circular planforms.

Service capability

Maximum temperature	Typically +260°C for PTFE envelope, but also dependent on filler material

Materials
Cover: virgin Fluolion® PTFE.
Inserts: compressed non-asbestos fibre, synthetic rubber-proofed woven cloth, and laminated combinations of these.

How supplied
Custom made to suit all standard flanges and non-standard shapes.

Fluolion® Sheet Gaskets

Description
Custom-cut gasket of plain (virgin), expanded or filled PTFE.

Typical application
- Gaskets for food, pharmaceutical and other hygienic applications are made from suitably approved Fluolion® PTFE.
- Expanded PTFE gaskets are used on flanges that have rough or damaged faces. Also on glass, porcelain and plastic flanges where low bolt loads are essential.
- Gaskets of filled-Fluolion are used for applications where the mechanical properties of PTFE need to be improved at the expense of chemical resistance and other inherent benefits.

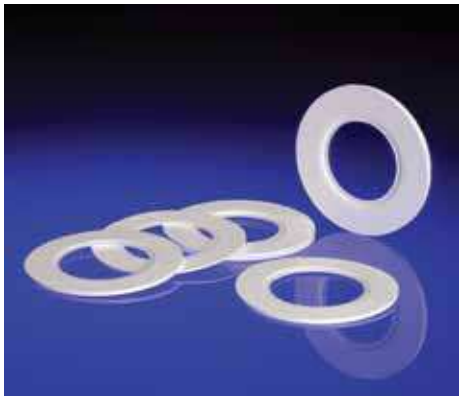
Service capabilities

Maximum temperature	+260°C
Chemical suitability	See recommendations on page 33.

Materials
Fluolion® PTFE: pure PTFE. Fluolion® G15 & G25: contain 15% or 25% glass, by weight. Fluolion® GS: 25% glass plus wear-resistant additives. Fluolion® G15M: 15% glass and 5% molybdenum disulphide. Fluolion® B60: 60% bronze. Fluolion® GR: 25% carbon/graphite. Fluolion® BR65: 60% bronze and 5% graphite.

How supplied
Precision cut gaskets to any shape, size or quantity. In sheets: 1.5m x 1.5m. Standard thicknesses: 1.0mm, 1.5mm, 2.0mm, 3.0mm.

GORE™ Universal Pipe Gasket (Style 800)



Description
A gasket for all types of standard piping, manufactured by WL Gore & Associates, from 100% ePTFE with multi-directional strength.

Typical applications
Flange sealing in the chemical processing sector — especially where it is desirable to standardise on one gasket type for duties withy many different piping materials. These gaskets are used with steel, glass-lined steel and FRP piping systems, wherever a non-metallic gasket is normally applied.

Specifications
- Manufactured from raw materials listed in FDA 21 CFR Parts 175-186.

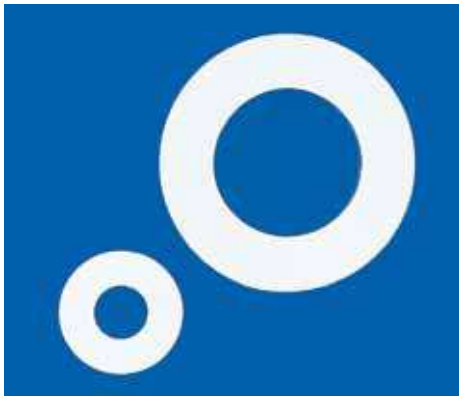
Prime features
- Dimensionally stable — resists creep, cold flow and blow-out.
- Seals efficiently at the low bolt loads required on fragile flanges.
- One gasket type can be used system-wide — protects against the use of a wrong product.
- Superior sealing reliability and long gasket life for lower total sealing costs.
- Chemically resistant to all media in the range pH 0-14, except molten alkali metals and elemental fluorine.

Service capabilities

Operating temperature (maximum)	+260°C (with short excursions to +315°C)
Operating temperature (minimum)	-240°C
Pressure range	Vacuum to 20MPa/200bar, depending on application and operating conditions.

How supplied
Precision gaskets to fit Class 150 and Class 300 flanges, from ½" to 24" nominal pipe sizes.

GORE™ GR Sheet Gasketing



Description
Sheet material of ePTFE with high multi-directional strength, manufactured by WL Gore & Associates.

Typical applications
Flanges on plant handling aggressive chemicals or high purity media. Ideal for rough or damaged flange faces, where excellent results can be achieved with limited bolt loads.

Specifications
- Manufactured from raw materials listed in FDA 21 CFR Parts 175-186.

Prime features
- Not subject to ageing — can be stored indefinitely.
- Chemically resistant to all media in the range pH 0-14, except molten alkali metals and elemental fluorine.
- Soft and conformable material that compresses to form a tight seal.
- Dimensionally stable, with increased resistance to creep and cold flow.
- High tensile strength.

Service capability

Operating temperature (maximum)	+260°C (with short excursions to +315°C)
Operating temperature (minimum)	-240°C
Pressure range	Vacuum to 20MPa/200bar, depending on application and operating conditions.

How supplied
As precision cut gaskets to any shape, size and quantity. In sheets 1.5m x 1.5m maximum. Thicknesses: 1.6mm, 3.2mm.

PTFE Gaskets

GORE™ Series 300 Gasket Tape

Description
WL Gore & Associates' 100% virgin PTFE in tape form, with an adhesive backing to enable gaskets to be formed quickly in place. This material has a strong multi-directionally orientated structure to minimise creep.

Typical applications
Formed-in-place gaskets on the metallic flanges of shell and tube heat exchangers, air coolers, vessels and columns.

Specifications
- Manufactured from raw materials listed in FDA 21 CFR Parts 175-186.

Prime features
- Easy-to-install alternative to cut gaskets.
- Very economical in use — virtually no material wastage.
- Minimises inventory costs.
- Dimensionally stable — resists creep and cold flow.
- Soft and conformable material that compresses to form a tight seal.
- Chemically resistant to all media in the range pH 0-14, except molten alkali metals and elemental fluorine.

Service capabilities

Operating temperature (maximum)	+260°C (with short excursions to +315°C)
Operating temperature (minimum)	-240°C
Pressure range	Vacuum to 6.8MPa/68bar, depending on application and operating conditions.

How supplied
Tape form with adhesive backing. Widths: 10mm, 15mm, 20mm, 25mm, 40mm, 50mm. Thicknesses: 2mm, 3mm. On spools containing 7.5m, 15m or 30m depending on width.

GORE™ Series 600 Gasket Tape

Description
WL Gore & Associates' 100% virgin ePTFE in tape form with an adhesive backing that enables gaskets to be formed quickly in place. Material in this range is physically wider that GORE™ 300 Gasket Tape, and shares the same strong multi-directionally orientated structure to minimise creep.

Typical applications
Seals for large diameter glass-lined flanges on mixer vessels, columns, storage tanks and receiver tanks — especially where flanges have irregular surfaces.

Specifications
- Manufactured from raw materials listed in FDA 21 CFR Parts 175-186.

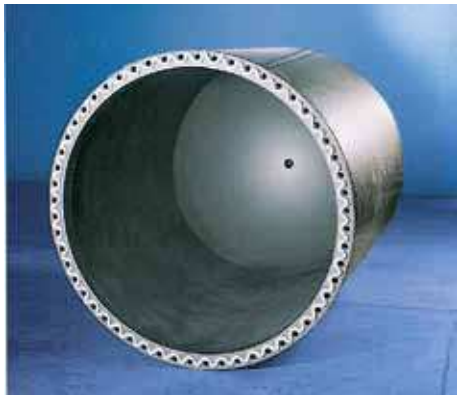
Prime features
- Easy to install, and economical in use with minimal wastage.
- Overlays can compensate for imperfections in flange surface.
- Dimensionally stable — resists creep and cold flow.
- Soft and conformable material that compresses to form a tight seal.
- Chemically resistant to all media in the range pH 0-14, except molten alkali metals and elemental fluorine.

Service capability

Operating temperature (maximum)	+260°C (with short excursions to +315°C)
Operating temperature (minimum)	-240°C
Pressure range	Vacuum to 600kPa/6bar (consult our Technical Support Team if higher pressure duty is anticipated)

How supplied
Tape form with an adhesive backing. Widths: 25mm, 30mm, 40mm, 50mm, 65mm. Thicknesses: 6mm, 9mm. On spools containing 4.5m, 9m or 15m, depending on width.

GORE™ Joint Sealant



Description
Made from 100% expanded PTFE by WL Gore & Associates, this form-in-place gasket tape has a self-adhesive backing for swift and simple installation.

When compressed, it forms a thin yet strong, durable gasket that is highly resistant to creep and cold flow.

Typical applications
Used predominantly for sealing large, complex or damaged flanges, where it reduces maintenance time and process disruption.

Specifications
- Manufactured from raw materials listed in FDA 21 CFR Parts 175-186.

Prime features
- Easy and economical too install — minimal material wastage.
- Exceptionally versatile — can be used on highly complex flange shapes.
- Ideal for large or damaged flange surfaces.
- Resistant to all common chemicals in the range pH 0-14, except molten alkali metals and elemental fluorine.
- Reliable, long-term sealing performance.

Service capabilities

Operating temperature (maximum)	+260°C (with short excursions to +315°C)
Operating temperature (minimum)	-240°C
Pressure range	Vacuum to 20MPa/200bar, depending on application and operating conditions.

How supplied
Tape form with self-adhesive backing. Widths: 3mm, 4.8mm, 6mm, 9.5mm, 12.5mm, 16mm, 19mm, 25mm. On spools containing 4.5m to 30m, depending on width.

PTFE gaskets chemical suitability guide

The chemical resistance of virgin PTFE is almost universal. It is suitable for applications involving chemical media in the range pH 0-14, with the exception of molten alkali metals, fluorine gas, elemental fluorine and any materials that may generate these at the operating temperatures and pressures involved.

However, PTFE materials that contain fillers to enhance their mechanical properties may have a lower resistance to certain chemical media than virgin PTFE. Therefore, prior to the use of filled-PTFE products, please check chemical compatibility with James Walker's Technical Support Team.

James Walker

Specification grade elastomers

We process and/or supply many Specification Grades of elastomer as sheet jointings and precision cut gaskets. In addition to those on this page, we have many other customer and industry specification materials that suit particular applications.

Natural Rubber (NR)
- BS1154 Grades Z40, Z50, Z60, Z70, Z80.

Nitrile Rubber (NBR)
- BS2751 Grades BA40, BA50, BA60, BA70, BA80, BA90.
- BS6996 Grades BO60, BO80.
- DTD 5594A Grades 60, 70, 80, 90.
- DTD 5509 Grades A, B, C, D.

Chloroprene/Neoprene (CR)
- BS2752 Grades C40, C50, C60, C70, C80.

Butyl (IIR)
- BS3227 Grades B60, B70.

Ethylene-propylene terpolymer (EPDM)
- BS6014 Grades EP60S, EP70S, EP80S.
- Elast-O-Pure® EP75 Black grade to FDA and USP for food and pharmaceutical processing.

Silicone (VMQ, MQ)
- BS F 152 Grades 50, 60, 70, 80.
- BS F 153 Grades 50, 60, 70, 80.
- Elast-O-Pure® SIL70 Translucent grade to FDA and USP for food and pharmaceutical processing.

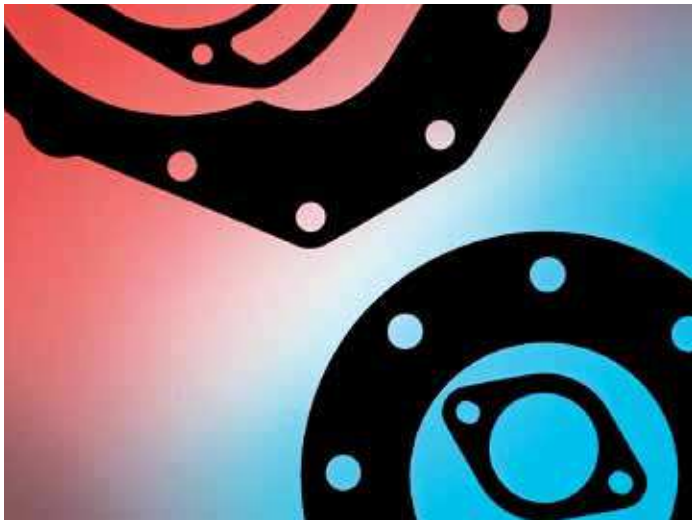
Fluorosilicone (FMQ)
- BS F154 Grade 60 for defence and aerospace duties where resistance to fuels and hydraulic fluids (mineral and synthetic oils) is required.

Fluoroelastomer dipolymer (FKM)
- Elast-O-Pure® GF75 Black grade, based on Viton® GF-600S, to FDA and USP for food and pharmaceutical processing.
- DTD 5543B Grades 60, 70, 80, 90 (all in black and green).
- DTD 5612A Grades 50, 60, 70, 80, 90 (all in black and green).

Kalrez® Perfluoroelastomer (FFKM)
We are Authorised Distributor in the UK, Ireland and France for design, supply and technical support of sealing and fluid handling parts made from DuPont Performance Elastomers' Kalrez®.

Various Kalrez® grades are recommended for critical or high purity sealing applications in different industries:
- Food and pharmaceutical processing: Kalrez® 6211 and 6230 to FDA and USP.
- Semiconductor fabrication.
- Oil, gas, chemical and petrochemical processing.
- Defence and aerospace.

Note: Specifications in red have been declared OBSOLESCENT.



Commercial Natural Rubber 263C

Description
Good quality commercial grade of natural rubber; black in colour with smooth finish.

Typical applications
Gaskets for use with hot and cold water, ethylene glycol, dilute acids and alkalis. Temperature range is -25°C to +70°C.

Physical properties
(Unless otherwise stated, values are typical)

Hardness, IRHD	65
Density, Mg/m³	1.49
Tensile strength, MPa min	4
Elongation at break, % min	200
Compression set, % max (22h @ 70°C)	43

How supplied
Precision gaskets to any shape, size or quantity. Also in rolls or sheets, width: 1.4m. Thicknesses: 1.5mm, 3mm, 5mm, 6mm. Other dimensions can be supplied.

Commercial Tan Natural Rubber 261C

Description
'Soft' natural rubber with a high resistance to abrasion. It is tan in colour and has a smooth finish.

Typical applications
Gaskets for applications involving water, dilute acids and alkalis, lower alcohols, and silicone greases and oils. Temperature range is -30°C to +70°C.

Physical properties
(Unless otherwise stated, values are typical)

Hardness, IRHD	40
Density, Mg/m³	1.02
Tensile strength, MPa min	18
Elongation at break, % min	700

How supplied
Precision gaskets to any shape, size or quantity. Also in rolls or sheets, width: 1.4m. Thicknesses: 1.5mm, 3mm, 5mm, 6mm. Other dimensions can be supplied.

Commercial White Food-Quality Natural Rubber 259C

Description
White coloured natural rubber with a smooth finish. This grade is compounded especially to meet the requirements of the food and beverage industries. It conforms to FDA 21 CFR 177.2600.

Typical applications
Gaskets for food plant where temperature is between -30°C and +70°C. The material can also be used with dilute acids and alkalis, lower alcohols, and silicone greases and oils.

Physical properties
(Unless otherwise stated, values are typical)

Hardness, IRHD	60
Density, Mg/m³	1.51
Tensile strength, MPa min	6
Elongation at break, % min	500
Compression set, % (24h @ 70°C)	39

How supplied
Precision gaskets to any shape, size or quantity. Also in rolls or sheets, width: 1.4m. Thicknesses: 1.5mm, 3mm, 5mm, 6mm. Other dimensions can be supplied.

Commercial Natural Insertion 332C

Description
Good quality commercial grade of natural rubber sheet containing a layer of polyester scrim reinforcement to give additional resistance to spread under compression.

Typical applications
Gaskets for use with hot and cold water, ethylene glycol, dilute acids and alkalis, and silicone greases and oils. Temperature range is -30°C to +70°C.

Physical properties
(Unless otherwise stated, values are typical)

Hardness, IRHD	70
Density, Mg/m³	1.52

How supplied
Precision gaskets to any shape, size or quantity. Also in rolls or sheets, width: 1.4m. Thicknesses: 1.5mm, 3mm, 5mm, 6mm. Other dimensions can be supplied.

Commercial grade elastomers

Commercial Neoprene 264C

Description
Black coloured polychloroprene (neoprene) rubber, with a smooth finish.

Typical applications
Used for gaskets because of its good resistance to many types of oils and greases — mineral, silicone and animal-based — as well as aliphatic hydrocarbons. Also good resistance to ozone, sunlight and atmospheric ageing. Temperature range is -20°C to +110°C.

Physical properties
(Unless otherwise stated, values are typical)

Hardness, IRHD	70
Density, Mg/m³	1.13
Tensile strength, MPa min	12
Elongation at break, % min	380
Compression set, % max (22h @ 70°C)	14

How supplied
Precision gaskets to any shape, size or quantity. Also in rolls or sheets, width: 1.4m. Thicknesses: 1.5mm, 3mm, 5mm, 6mm. Other dimensions can be supplied.

Commercial Neoprene Insertion 283C

Description
Similar to 264C above, but contains a layer of polyester scrim reinforcement to give additional resistance to spread under compression.

Typical applications
As for 264C above, but with temperature range of -20°C to +90°C.

Physical properties
(Unless otherwise stated, values are typical)

Hardness, IRHD	60
Density, Mg/m³	1.45

How supplied
Precision gaskets to any shape, size or quantity. Also in rolls or sheets, width: 1.4m. Thicknesses: 1.5mm, 3mm, 5mm, 6mm. Other dimensions can be supplied.

Commercial Neoprene Closed-Cell Sponge 265C

Description
A conformable, 'medium' density, polychloroprene (neoprene) based closed-cell sponge.

Typical applications
For low duty gasket service where good resistance is required to media such as oils, greases and aliphatic hydrocarbons. Temperature range is -40°C to +70°C constant, with excursions to +100°C.

Physical properties
(Unless otherwise stated, values are typical)

Hardness, Shore C	22
Density, Mg/m³	0.170
Tensile strength, MPa min	>0.7
Elongation at break, % min	150
Load for 25% compression deflection, kPa	60
Load for 50% compression deflection, kPa	131

How supplied
Precision gaskets to any shape, size or quantity. Also in rolls or sheets, width: 1.0m. Thicknesses: 1.5mm, 3mm, 5mm, 6mm, 8mm, 10mm, 12mm. Other dimensions can be supplied.

Commercial Nitrile 269C

Description
Black coloured acrylonitrile-butadiene rubber with a smooth finish.

Typical applications
Gasket service with all types of oils and greases — mineral, silicone, vegetable, animal and synthetic — as well as hydrocarbon fuels and water/glycol-based hydraulic fluids. Temperature range is -20°C to +110°C.

Physical properties
(Unless otherwise stated, values are typical)

Hardness, IRHD	60
Density, Mg/m³	1.50
Tensile strength, MPa min	6.0
Elongation at break, % min	500
Compression set, % max (22h @ 70°C)	32

How supplied
Precision gaskets to any shape, size or quantity. Also in rolls or sheets, width: 1.4m. Thicknesses: 1.5mm, 3mm, 5mm, 6mm. Other dimensions can be supplied.

Commercial White Food-Quality Nitrile 260C

Description
White coloured acrylonitrile-butadiene rubber, with a smooth finish, developed especially for the food and beverage industries. It conforms to FDA 21 CFR 177.2600.

Typical applications
Gaskets for food plant, where good resistance is needed to vegetable and animal oils and fats. Temperature range is -20°C to +110°C.

Physical properties
(Unless otherwise stated, values are typical)

Hardness, IRHD	60
Density, Mg/m³	1.55
Tensile strength, MPa min	6
Elongation at break, % min	650

How supplied
Precision gaskets to any shape, size or quantity. Also in rolls or sheets, width: 1.4m. Thicknesses: 1.5mm, 3mm, 5mm, 6mm. Other dimensions can be supplied.

Commercial Nitrile Insertion 337C

Description
Similar to 269C *(see page 36)*, but with a layer of polyester scrim insertion to give additional resistance to spread under compression.

Typical applications
As for 269C, but with temperature range of -20°C to +90°C.

Physical properties
(Unless otherwise stated, values are typical)

Hardness, IRHD	60
Density, Mg/m³	1.44

How supplied
Precision gaskets to any shape, size or quantity. Also in rolls or sheets, width: 1.4m. Thicknesses: 2mm, 3mm, 5mm, 6mm. Other dimensions can be supplied.

Commercial Ethylene-Propylene 280C

Description
Black coloured ethylene-propylene rubber with a fine fabric finish.

Typical applications
Gaskets in the water supply industry. Also where good resistance is needed to dilute acids, animal fats and vegetable oils. It has excellent weathering properties, and operates in the temperature range -40°C to +120°C.

Physical properties
(Unless otherwise stated, values are typical)

Hardness, IRHD	70
Density, Mg/m³	1.18
Tensile strength, MPa min	12
Elongation at break, % min	350

How supplied
Precision gaskets to any shape, size or quantity. Also in rolls or sheets, width: 1.6m. Thicknesses: 1.5mm, 3mm, 5mm, 6mm. Other dimensions can be supplied.

Commercial Red Silicone 327C

Description
Red coloured silicone rubber with a fine fabric finish. It conforms to FDA 21 CFR 177.2600.

Typical applications
Rubber gaskets where a wide temperature range is beneficial: -60°C to +230°C constant, with excursions +250°C. It has good ozone resistance and very good electrical insulation properties.

Physical properties
(Unless otherwise stated, values are typical)

Hardness, IRHD	60 ±5
Tensile strength, MPa min	5.5
Elongation at break, % min	250
Compression set, % max (24h @ 150°C)	30

How supplied
Precision gaskets to any shape, size or quantity. Also in rolls or sheets, width: 1.2m. Thicknesses: 1mm, 1.5mm, 3mm, 5mm, 6mm. Other dimensions can be supplied.

Commercial grade elastomers

Commercial White Food-Quality Silicone 284C

Description
White coloured silicone rubber with a smooth finish. It conforms to FDA 21 CFR 177.2600.

Typical applications
Gaskets for food plant where a wide temperature range is beneficial: -60°C to +230°C constant, with excursions to +250°C.

Physical properties
(Unless otherwise stated, values are typical)

Hardness, IRHD	60 ±5
Tensile strength, MPa min	5.5
Elongation at break, % min	250
Compression set, % max (24h @ 150°C)	30

How supplied
Precision gaskets to any shape, size or quantity. Also in rolls or sheets, width: 1.2m. Thicknesses: 1mm, 1.5mm, 3mm, 5mm, 6mm. Other dimensions can be supplied.

Commercial Translucent Food-Quality Silicone 336C

Description
Translucent silicone rubber with a smooth finish. It conforms to FDA 21 CFR 177.2600.

Typical applications
Gaskets for food plant where a wide temperature range is beneficial: -60°C to +230°C constant, with excursions to +250°C.

Physical properties
(Unless otherwise stated, values are typical)

Hardness, IRHD	60 ±5
Tensile strength, MPa min	5.5
Elongation at break, % min	250
Compression set, % max (24h @ 150°C)	30

How supplied
Precision gaskets to any shape, size or quantity. Also in rolls or sheets, width: 1.2m. Thicknesses: 1mm, 1.5mm, 3mm, 5mm, 6mm. Other dimensions can be supplied.

Butyl rubber 338C

Description
Butyl (isobutylene-isoprene) rubber, black in colour with a smooth finish.

Typical applications
Duties where the extremely low permeability of butyl is required, together with good resistance to phosphate esters, dilute acids and alkalis. Temperature range is -40°C to +120°C.

Physical properties
(Unless otherwise stated, values are typical)

Hardness, IRHD	60
Density, Mg/m^3	1.50
Tensile strength, MPa min	5
Elongation at break, % min	500

How supplied
Precision gaskets to any shape, size or quantity. Also in rolls or sheets, width: 1.4m. Thicknesses: 1.5mm, 3mm, 5mm, 6mm. Other dimensions can be supplied.

Commercial Fluorocarbon 340C

Description
Genuine Viton® grade fluorocarbon elastomer, black in colour with a smooth finish.

Typical applications
Suitable for a wide range of gasket duties and fluid media. It has an exceptional temperature range for a rubber (-10°C to +250°C constant, with excursions to +315°C), plus good resistance to mineral oils, fuels, and non-polar solvents including high aromatic and chlorinated types.

Physical properties
(Unless otherwise stated, values are typical)

Hardness, IRHD	72 ±5
Density, Mg/m^3	1.99
Tensile strength, MPa min	4
Elongation at break, % min	165
Compression set, % max (22h @ 175°C)	55

How supplied
Precision gaskets to any shape, size or quantity. Also in rolls or sheets, width: 1.2m. Thicknesses: 1mm, 1.5mm, 3mm, 5mm, 6mm. Other dimensions can be supplied.

General elastomers chemical suitability guide

Notation:
A = Suitable product
B = Fair: some volume swell/chemical attack
C = Static use only
D = Unsuitable: do NOT use
★ Suitability can depend on the grade selected

Note on temperature: All media considered to be at 20°C unless otherwise stated.
Where chemical compatibility is not indicated, or a chemical is not listed, please consult our Technical Support Team for a recommendation to be made.

GENERAL ELASTOMER	NATURAL RUBBER (NR)	NEOPRENE RUBBER (CR)	NITRILE RUBBER (NBR)	ETHYLENE-PROPYLENE RUBBER (EPM, EPDM)	SILICONE RUBBER (VMQ)	FLUOROCARBON RUBBER (FKM)	BUTYL (IIR)	KALREZ® (FFKM)
STEAM (<120°C)	D	D	D	A	D	D	C	A
WATER	A	B	A	A	A	A	A	A
WATER (POTABLE)	★	★	★	★	★	★	★	★
AIR	A	A	A	A	A	A	A	A
ACETIC ACID (10%)	D	C	D	A	A	D	A	A
ACETONE	B	C	D	A	D	D	A	A
ACETYLENE	D	C	A	D	C	A	D	A
ADIPIC ACID	A	A	A	A	–	–	A	A
ALUMINIUM CHLORIDE	A	A	A	A	C	A	A	A
AMMONIA (ANHYDROUS, DRY)	D	A	C	A	C	D	A	A
AMMONIUM CHLORIDE	A	A	A	A	C	A	A	A
AMMONIUM HYDROXIDE (10%)	B	B	B	A	B	B	A	A
ANILINE	D	D	D	B	D	C	B	A
BENZENE	D	D	D	D	D	C	D	A
BLEACH SOLUTIONS	D	D	D	A	C	A	A	A
BRINE	D	D	D	D	D	A	D	A
BROMINE (ANHYDROUS)	–	D	D	D	D	A	D	A
BUNKER FUEL	D	D	A	D	C	A	D	A
BUTANE	D	B	A	D	D	A	D	A
BUTYL ALCOHOL (50°C)	A	A	A	C	C	A	C	A
CALCIUM CHLORIDE	A	A	A	A	A	A	A	A
CALCIUM HYDROXIDE	B	A	B	A	B	A	A	A
CALCIUM HYPOCHLORITE (15%)	C	D	D	A	C	A	A	A
CARBON DIOXIDE	B	C	A	C	C	C	C	A
CARBON DISULPHIDE	D	D	D	D	D	A	D	A
CARBON TETRACHLORIDE	D	D	D	D	D	A	D	A
CHLORINE (DRY)	D	D	D	D	D	B	D	A
CHLORINE (WET)	D	D	D	D	D	B	D	B
CHROMIC ACID (40%)	D	D	D	C	D	A	D	A
CREOSOTE	D	D	B	D	D	A	D	A
DIESEL OIL	D	C	A	D	D	A	D	A
DIETHYL ETHER	D	D	D	D	D	D	D	A
ETHANE	D	C	A	D	D	A	D	A
ETHANOLAMINES (less than 5%)	B	D	D	B	B	D	B	★
ETHER	D	D	D	D	D	D	D	A
ETHYL ALCOHOL (Ethanol)	B	A	A	A	A	A	A	A
ETHYLENE	–	–	A	B	–	D	–	A
ETHYLENE GLYCOL	B	A	A	A	A	A	A	A
ETHYLENE OXIDE	D	D	D	D	D	D	D	A
FERRIC CHLORIDE (WET)	A	C	A	A	C	A	A	A
FOODSTUFFS	★	★	★	★	★	★	★	★
FORMALDEHYDE (40%)	B	D	D	A	C	D	B	A
FORMIC ACID	C	B	D	A	C	D	D	A
GLYCERINE	A	A	A	A	A	A	A	A
GREEN LIQUOR (SULPHATE)	B	C	C	A	A	A	A	A
HEAVY OILS	–	–	–	–	–	A	–	A
HYDROBROMIC ACID (37%)	A	D	D	A	D	A	A	A
HYDROCHLORIC ACID (37%)	C	D	C	C	D	A	C	A
HYDROFLUORIC ACID (48%)	C	A	D	B	D	A	B	A
HYDROGEN PEROXIDE (<30%)	D	B	B	A	A	A	D	A
HYDROGEN SULPHIDE (DRY, 5%)	A	A	A	A	D	D	A	A
ISOBUTYL ALCOHOL	B	A	C	C	A	A	A	A
ISOPROPYL ALCOHOL	B	A	C	A	A	A	A	A
KEROSENE (70°C)	D	D	A	D	D	A	D	A
LIQUID PETROLEUM GAS	D	C	A	D	D	A	D	A
LYE	B	C	C	A	C	C	A	A

GENERAL ELASTOMER	NATURAL RUBBER (NR)	NEOPRENE RUBBER (CR)	NITRILE RUBBER (NBR)	ETHYLENE-PROPYLENE RUBBER (EPM, EPDM)	SILICONE RUBBER (VMQ)	FLUOROCARBON RUBBER (FKM)	BUTYL (IIR)	KALREZ® (FFKM)
MAGNESIUM CHLORIDE	A	A	A	A	A	A	A	A
METHANE	D	C	A	D	D	C	D	A
METHYL ALCOHOL (Methanol)	A	A	A	A	A	D	A	A
METHYL CHLORIDE	D	D	D	D	D	C	D	A
METHYL ETHYL KETONE	D	D	D	A	D	D	A	A
METHYLENE CHLORIDE	D	D	D	D	D	C	D	A
MINERAL OILS	D	B	A	D	B	A	D	A
NAPHTHA	D	D	B	D	D	A	D	A
NATURAL GAS	D	B	A	D	B	A	D	A
NITRIC ACID (10%)	B	B	D	A	B	A	A	A
NITROGEN	A	A	A	A	A	A	A	A
OCTANE	D	D	B	D	D	A	D	A
OLEUM	D	D	D	D	D	C	D	A
OXALIC ACID (25%, 70°C)	B	C	C	B	C	A	A	A
OXYGEN (DEGREASED SEALS)	B	A	C	A	A	A	A	A
PERCHLOROETHYLENE	D	D	D	D	D	A	D	A
PHENOLS	A	C	D	B	A	A	A	A
PHOSPHORIC ACID (50%)	C	C	D	A	C	A	A	A
POTASSIUM DICHROMATE (10%)	B	A	A	A	A	A	A	A
POTASSIUM HYDROXIDE (50%)	C	C	B	A	C	D	A	A
POTASSIUM NITRATE	A	A	A	A	A	A	A	A
PROPANE	D	C	A	C	D	A	D	A
PYRIDINE	D	D	D	D	D	D	C	A
REFRIGERANTS (UNCONTAMINATED)								
R12 (eg Freon® 12)	D	A	A	C	D	C	C	B
R13 (eg Freon® 13)	A	A	A	A	D	C	A	B
R22 (eg Freon® 22)	B	A	D	A	D	D	A	A
R134a (eg KLEA® 134a)	A	A	A	A	B	D	A	C
SEA WATER	A	B	A	A	A	A	A	A
SOAP SOLUTION	B	B	A	A	A	A	A	A
SODA ASH	A	A	A	A	A	A	A	A
SODIUM CARBONATE	A	A	A	A	A	A	A	A
SODIUM DICHROMATE (10%)	–	–	–	A	–	–	–	A
SODIUM HYDROXIDE (50%)	C	B	C	B	B	D	B	A
SODIUM HYPOCHLORITE (20%)	C	D	C	B	C	C	C	A
STYRENE	D	D	D	D	D	D	D	A
SULPHUR DIOXIDE (DRY)	B	D	D	A	C	A	B	A
SULPHUR DIOXIDE (WET)	–	–	D	A	C	A	A	A
SULPHUR TRIOXIDE	B	D	D	C	C	A	C	A
SULPHURIC ACID (10%)	B	B	C	A	D	A	A	A
TANNIC ACID	A	C	A	A	C	A	A	A
TITANIUM TETRACHLORIDE	D	D	B	D	D	C	D	B
TOLUENE (TOLUOL)	D	D	D	D	D	A	D	A
TRANSFORMER OIL	D	C	A	D	B	A	D	A
TRICHLOROETHANE	D	D	D	D	D	B	D	A
TRICHLOROETHYLENE	D	D	D	D	D	A	D	A
TURPENTINE	D	D	A	D	D	A	D	A
UREA SOLUTION (30%)	–	A	A	A	–	A	A	A
VINYL CHLORIDE	D	D	D	C	–	A	D	A
WHITE SPIRIT	D	D	B	D	D	A	D	A
XYLENE	D	D	D	D	D	A	D	A

Due to the complexity of making a recommendation for any given duty, this section on chemical suitability is intended only as a guide. The possible effect of elevated temperatures should be considered when determining the compatibility of these products with a chemical. If necessary, please contact our Technical Support Team for assistance.

Boiler gaskets

These gaskets are recommended for general boiler duties. For higher temperatures/pressures, see Metaflex® on page 16.

Topog-E® Moulded Rubber Gaskets

Description
Topog-E® moulded rubber gaskets are known as 'the world's most recognised and respected brand of boiler gaskets'. They are manufactured by the Topog-E Gasket Company of Oklahoma, USA, using its own proprietary compound. These gaskets are supplied throughout Europe by James Walker's companies and official distributor network.

Typical applications
Gaskets for handholes and manholes on pressure vessels of all types, including: boilers, hot water vessels, steam cookers, refrigeration plant, compressed air tanks and water towers.

Prime features
- Combine easy and fast inspection with improved pressure vessel life.
- Conform to the topography of mating surfaces.
- Stop leakage that causes corrosion around handholes and manholes.
- Simple to install and remove.

Specifications
Certified by TÜV Rheinland Cologne for manhole openings in steam pressure vessels at 193°C maximum steam service when used at 1.3MPa/13bar maximum steam pressure.

Service life and capabilities
- Gaskets should be replaced at 12 months or less when subjected to maximum certified temperature and pressure levels with steam. Higher steam duties will reduce gasket life *(refer to our Technical Support Team before exceeding 1.3MPa/13bar)*.
- On air compressors the gaskets have been used at 2.1MPa/21bar to 2.4MPa/24bar.

Chemical compatibility
Excellent resistance to steam and hot and cold water. Good resistance to alcohols, ketones, phosphate polyesters, silicone oils/greases, dilute acids, bases, salts, glycols, ammonia, selected refrigerants, and animal and vegetable fats. Water treatment chemicals used in accordance with a supplier's guidelines should have no significant effect on the service life of properly installed Topog-E gaskets. The gaskets must ***not*** be exposed to aromatic hydrocarbons, chlorinated solvents or petroleum-based products.

How supplied
Moulded gaskets and sheet materials are a nominal 1/4 inch (6mm) thickness. Gaskets are available in standard sizes to fit every boiler in production today, and most of those now out of production. **Ex-stock:** elliptical gaskets in standard inch and metric sizes; obround and round gaskets to fit virtually all types of pressurised air and water containers. Sheet materials and custom gaskets are cut or moulded on request.

Other gasket products & devices

Gaskoid

Description
An economical cellulose-based material impregnated with plasticised gelatine. It is brown in colour with a smooth finish. This material has excellent resistance to fuels, oils and most organic solvents, and is ideal for use at low bolt loadings.

Typical applications
Used predominantly in the automotive industry as a gasket material for carburettors, fuel and oil pumps, gear casings and pipeline flanges.

Service capabilities

Operating pressure (maximum)	1MPa/10bar
Operating temperature range	-20°C to +120°C

Physical properties

(Unless otherwise stated, values are typical)		
Residual stress, MPa	26.0	(BS7531)
Tensile strength, MPa	12	(ASTM F152)
Compressibility @ 70kg/cm², %	20-40	(ASTM F36G)
Fluid ageing (22h @21°C):		
IRM 903, weight increase, % maximum	15	
Thickness increase, % maximum	5	
ASTM Fuel B, weight increase, % maximum	15	
Thickness increase, % maximum	5	

How supplied
Precision cut gaskets to any shape, size or quantity. Thicknesses: 0.15mm, 0.25mm, 0.4mm, 0.5mm, 0.8mm, 1mm, 1.2mm, 1.6mm, 2mm. 3.2mm. Rolls: 1m wide any length.

Super Twilstele® XA/G

Description
A glass-fibre based material, reinforced with stainless steel wire and proofed with a synthetic rubber. It has a grey surface.

Typical applications
High temperature dry heat duties where operating pressure is low, such as exhausts of gas turbines and large diesels, open-ended fume extraction systems, and refractory services. This very tough and flexible material can be cut with hand tools.

Service capability

Operating temperature (maximum)	+650°C
Operating pressure	Not rated

How supplied
Cut gaskets to any shape, size or quantity. Sheets: 1.2m x 1.2m. Thicknesses: multiples of 1.3mm.

Compact Gasket Cutter

Description
Precision made hand tool for efficient on-site cutting of circular gaskets from compressed fibre jointings, rubber and cork-elastomer sheet.

Prime features
- Readily adjustable for diameters from 20mm (13/16”) to 600mm (24”).
- Long extension bar available for diameters up to 900mm (35”).
- Dual metric/inch calibration.
- Cuts compressed fibre jointings up to 5mm thickness; cork-elastomer to 12mm.

How supplied
Boxed kit containing main body, extension bar, ten blades, and operating instructions. Cutting board, long extension bar, and straight edges are available as optional extras.

Other gasket products & devices

RotaBolt® Tension Control Fasteners

Description
RotaBolt® fasteners are modified bolts and studs that allow specific tensions to be accurately applied. Correct tension is easily checked, using either a finger-feel device or visual indicator built into the fastener.

Typical applications
Extensively used for flange jointing duties in many industries including offshore, petrochemical, mining, defence, nuclear and power generation. They prove particularly valuable where the unreliability of a flange joint may have a cost, health and safety or environmental impact.

Prime features
- Every RotaBolt is factory-calibrated to ensure the achievement of design load is accurately monitored.
- The RotaBolt system is far more reliable than a torque wrench or hydraulic tensioner, where bolt loads at the end of tightening cycles are unknown and uncontrollable.
- With RotaBolts 1 and 2, tension is easy to finger-check, even when wearing protective gloves or diving equipment.
- RotaBolt® Vision is readily monitored at a distance and in many locations that are difficult to access.
- Suit a wide range of bolting systems in different industrial environments.
- Resist corrosion, elevated and cryogenic temperatures, shock and vibration.

Service settings

• Standard load settings	5t to 250t.
• Indicator for RotaBolt 1	One setting of ±5%.
• Indicator for RotaBolt 2	Upper and lower settings as required.

How supplied
Standard range: M12 to M125 bolts, M18 to M125 studs.
Materials: Alloy steels up to 12.9 strength grade, stainless steels, cupro-nickel, nickel and titanium alloys.
Other sizes and materials available. Customer-supplied fasteners can be modified.

Flange Insulation Sets

Description
Each Flange Insulation Set comprises an electrically insulating flange gasket, plus insulating bolt sleeves and washers to prevent electrical conduction through bolts.

Typical applications
These sets are used widely in cathodic protection systems and to help eliminate galvanic corrosion, as well a reducing the risk of eddy current build-up. They prove of particular value on long distance pipelines for water, oil or gas.

Materials
Gaskets, standard: Neoprene-faced phenolic. Other materials: Reinforced phenolic with nitrile seals, high dielectric strength CNAF, glass reinforced epoxy with fluoroelastomer seals, or plastic coated soft iron.
Sleeves, standard: polyester or DuPont™ Mylar®. Other material: DuPont™ Nomex®.
Insulation washers, standard: reinforced phenolic. Other material: glass-reinforced epoxy.
Back-up washers: zinc-plated carbon steel or stainless steel.

How supplied
Four designs of set to cater for many different flange sizes, specifications and arrangements — including those with 'O' ring grooves or handling very high pressures.

Immediate supply

James Walker is dedicated to meeting industry's immediate demand for precision-cut gaskets from our full range of sheet jointings, as well as for spiral wound and other metallic types.

We hold over eight million sealing products ready for same day despatch throughout the world. Many of these stocked items are gaskets to suit flanges across all sectors of industry.

If we do not have your gaskets in stock, we can usually manufacture them economically within minutes.

For cut gaskets we use highly accurate CAD/CAM controlled water-jet cutters, ready programmed with every gasket design to industry and international standards. We hold large stocks of non-asbestos sheet jointings, PTFE sheet, cork-elastomer sheet, Supagraf® materials and elastomers, all in standard thicknesses, specifically for this purpose.

Custom-cut gaskets

Using water-jet technology enables us to make any shape, size and quantity of non-standard cut gaskets to high-precision levels — and meet seemingly impossible deadlines. We work directly from customers' CAD files, sent via email or disk. In addition, we digitise profiles from drawings, templates or samples: no tooling is needed.

Our state-of-the-art water-jet cutters operate with all major CAD languages. Nesting pattern software, combined with video acquisition equipment to capture the complex shape of a previously cut sheet, ensure that the maximum number of gaskets is produced with minimum material wastage.

These systems are highly economical for prototype cutting as well as large batch runs.

For tougher materials, such as Supagraf® Tanged T10 Jointing with its central layer of stainless steel, we use an abrasive water-jet cutter. This easily slices intricate designs from ***any*** sheet material — including high-strength alloys and titanium — leaving a clean edge without heat distortion. Each hair thin water-jet is loaded with crushed garnet and operates at Mach 2 and 400MPa.

Joint Integrity Programme

James Walker's Joint Integrity Programme (JIP) is a service that monitors, maintains and refurbishes all bolted flange joints at oil, gas and chemical sites — onshore and offshore. It covers ducts and pipework, pressure vessels, heat exchangers, valves and other plant items that rely on bolted joints.

Our approach of **evaluate, design and apply** delivers long-term solutions rather than short-term fixes that need to be repeatedly applied at considerable cost. The aim is to:

- Maximise plant uptime.
- Keep expensive product loss to a minimum.
- Reduce leaks to improve health & safety and environmental performance.

JIP comprises a series of modules that can be tailored to a client's requirements, with all services integrated under a single project manager. The modules include:

- Tagging, data management and reporting.
- Leak detection and repair (LDAR).
- Heat exchanger and pressure vessel bolted joint programme.

James Walker in action

James Walker research & development

James Walker Technology Centre runs extensive research and development programmes that are targeted to deliver new materials and products that will meet tomorrow's fluid sealing requirements before they arise.

Problem solving is a challenge we enjoy. Our world-class materials research and product testing laboratories are staffed by teams of scientists and technologists who prove the design integrity and quality of every item we supply.

We supplement our in-house R&D facilities with those at leading universities, research establishments and other organisations that work at the forefront of materials science, tribology and sealing technology. Co-operation between such centres of excellence is invaluable as we strive to develop products to work across greater temperature ranges, at higher pressures and under more aggressive conditions.

James Walker is a founder member of the European Sealing Association and belongs to many other influential bodies.

James Walker service

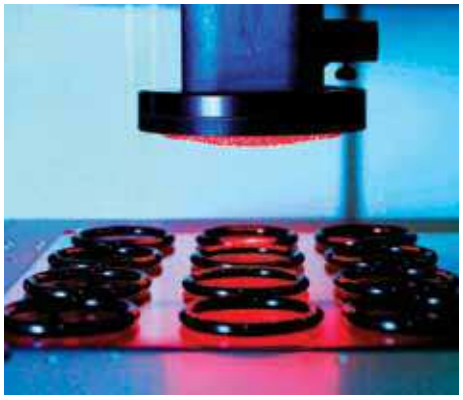
Our customers expect the very best, and we supply it in terms of efficient customer support, technical services, products, delivery and after sales service.

James Walker's high-technology customer support centre provides a personalised service to tens of thousands of customers worldwide, plus short response times for quotations and order processing.

With eight-million items stocked for immediate despatch, backed by flexible production for non-stocked items, we can react very swiftly to industry's urgent demands for sealing products to bring a plant back on stream.

On-site advice worldwide is provided by large teams of local experts, backed by industry specialists, applications engineers and materials scientists. Between them they have the knowledge, practical skills and technical facilities to solve any relevant fluid sealing problem for our customers and offer *best-value* solutions.

James Walker quality



Our quality systems are third-party registered to BS EN ISO 9001:2008. We are also regularly assessed and quality approved by a wide range of industry bodies including multinational corporations, utilities and government organisations.

We always use the best available raw materials for each product, and use advanced manufacturing techniques with strict quality control and traceability at every stage. Our manufacturing process culminates in an exacting inspection procedure for the finished product. Our stockholding and distribution facilities meet similar exacting standards.

Certificates of conformity to international or customer-specific standards can be supplied on request, with packaging and labelling available to individual specifications.

Material Safety Data Sheets (MSDS) are available on request for every product we supply.

James Walker's advice on gasket use

This information is for general guidance only

YES…

- **Check that the gasket is compatible with the media at required operating temperature and pressure ranges.**
- **Use gasket material and bolt grades that suit the tensile loading requirements of the flange.**
- **Ensure the gasket is the correct size for the flange.**
- **Specify the thinnest gasket that will suit the flange finish and parallelism.**
- **If appropriate, use an anti-stick coated gasket where joints are frequently broken for operational reasons.**
- **Ensure the flange is clean, undamaged and without radial scores, free from grease and oil, and has the correct surface finish.**
- **Remove all traces of protective material before assembling the gasket.**
- **Ensure that a cut gasket is free from burrs or ridges at bolt holes and edges to avoid uneven stress loading.**
- **Lightly lubricate the flange bolts and check that the nut can run freely down the threads before use.**
- **Use RotaBolt® tension control fasteners on all important joints where unreliability may have a cost, health and safety or environmental impact.**
- **Tighten down the gasket evenly in several stages using an approved bolting sequence. This avoids flange distortion and gives an even stress distribution within the gasket.**
- **Use feeler gauges to check any predetermined level of gasket compression that is needed. This often applies to cork-elastomer gaskets.**
- **Non-metallic gaskets should be stored flat, at a moderate temperature (ie, +15°C to +20°C), in dry conditions, away from direct sunlight and heat, and remote from any electrical equipment that may produce ozone.**

NO…

- **Never reuse an old gasket.**
  (But it may be possible for James Walker to fit new soft faces to the undamaged cores of Metakamm® Kammprofile-types.)
- **Do not use low quality gaskets or jointings. Any initial cost savings will soon be lost in plant downtime and production delays caused by joint failures.**
- **Never use sealing compounds or grease on joints. They reduce the friction between the gasket and its flanges, which can allow a gasket to stress-relax and creep, leading to premature failure.**
- **Avoid using impact adhesives or pressure sensitive tapes at temperatures exceeding 40°C. Above this temperature the tackifying resins may melt and act as a lubricant.**
- **Do not mate flange faces that have different surface finishes.**
- **Do not retighten bolts after use at elevated temperatures on flanges sealed with gaskets of compressed non-asbestos fibre.**

Seating stress guide for gaskets

Gasket type	Minimum operational stress (N/mm²)	Maximum initial stress (N/mm²)
Compressed non-asbestos fibre (Chieftain®, Centurion®, Sentinel®, Inca)	15	50
Supagraf® Plain	5	100
Supagraf® Tanged T10	6	150
Supagraf® Laminated S10	5	60
Metaflex® Spiral Wound + SPG filler	30-40	Not applicable
Metakamm® Kammprofile-type	25	200
Metcom® Gasket	20	100
Nebar® Red cork-elastomer	1	10
Nebar® Brown cork-elastomer	1	6
GORE™ GR Sheet Gasketing	24	70

NOTES

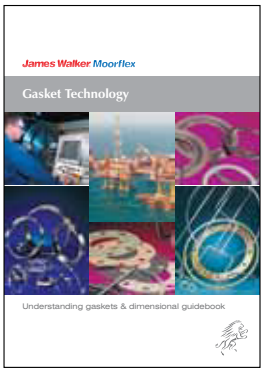
1) All values shown are for guidance only.
2) Levels of sealability/gas tightness will depend on system pressure and media involved, as well as operational stress.
3) Flange and bolt stiffness will affect the uniformity and level of stress applied, and hence the sealing capability.
4) Each gasket type will show a different level of gas tightness at the minimum operational stress value given. Also, maximum leak tightness will be different for each gasket type.

James Walker

General information

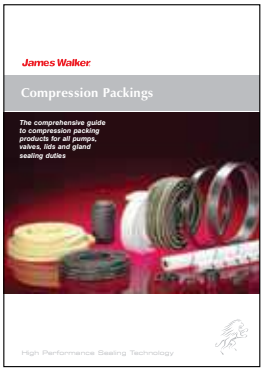
Please ask for these free guides to our other product ranges and services. These, and many more, can also be downloaded as pdf files from www.jameswalker.biz.

Total flange management

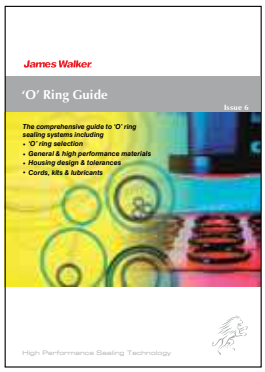


Gasket technology

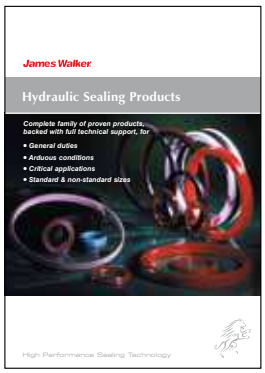
Joint integrity programme



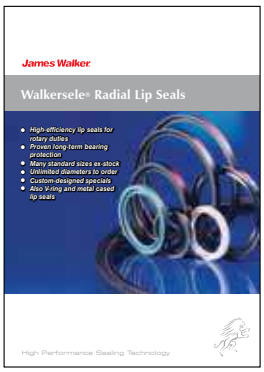
Compression packings



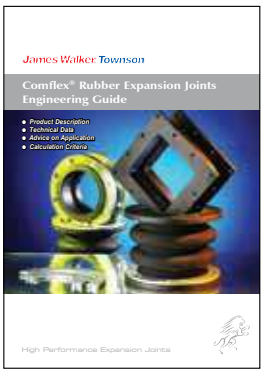
'O' rings



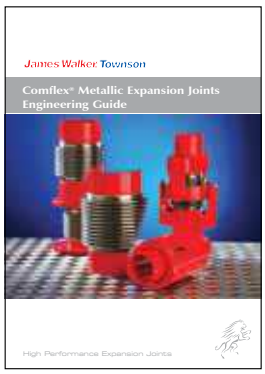
Hydraulic seals



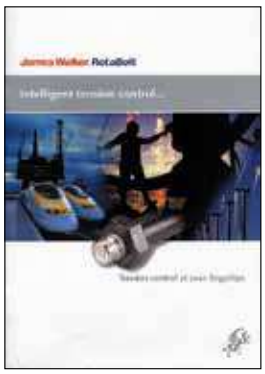
Walkersele® radial lip seals



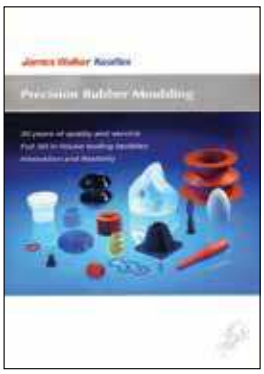
Comflex® rubber expansion joints



Comflex® metal expansion joints



RotaBolt® tension control



Precision rubber moulding

Global contracts for sealing products & services

Alphabetical index of products

Trademark acknowledgements

James Walker acknowledges the following trademarks as mentioned in this document. All other names bearing the ® symbol are registered trademarks of James Walker.

Dowtherm®	Dow Chemical Company
Freon®	El DuPont de Nemours
GORE™	WL Gore & Associates
Gylon®	Garlock Sealing Technologies
Kalrez®	DuPont Performance Elastomers
KLEA®	ICI C&P
Mylar®	El DuPont de Nemours
Nomex®	El DuPont de Nemours
Topog-E®	Topog-E Gasket Company
Viton®	DuPont Performance Elastomers

Information

Health warning: *If PTFE or fluoroelastomer (eg, FKM, FFKM, FEPM) products are heated to elevated temperatures, fumes will be produced which may give unpleasant effects, if inhaled. Whilst some fumes are emitted below 250°C from fluoroelastomers or below 300°C from PTFE, the effect at these temperatures is negligible. Care should be taken to avoid contaminating tobacco with particles of PTFE or fluoroelastomer, or with PTFE dispersion, which may remain on hands or clothing. Material Safety Data Sheets (MSDS) are available on request.*

Information in this publication and otherwise supplied to users is based on our general experience and is given in good faith, but because of factors which are outside our knowledge and control and affect the use of products, no warranty is given or is to be implied with respect to such information. Unless governed by type approval or contract, specifications are subject to change without notice. Statements of operating limits quoted in this publication are not an indication that these values can be applied simultaneously.

To ensure you are working with the very latest product specifications, please consult the relevant section of the James Walker website: www.jameswalker.biz.

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