

# Compression Packings Guide

Issue 11

*The comprehensive guide to compression packings for*

- **Pumps**
- **Valves**
- **Hatch lids**
- **Crucible lids**
- **Furnace doors**
- **Gland sealing duties**



## Introduction

James Walker's constant advances in materials and lubricants, product design and manufacturing techniques, bring you compression packings to match your modern fluid handling systems — and your older plant.

This guide covers packings that:

- Offer world-beating fugitive emission control down to  $\leq 5\text{ppmV}$ .
- Provide *best value* fluid sealing for your specific plant duties.
- Range from state-of-the-art materials to natural yarns.
- Work in the most abrasive and chemically aggressive environments.
- Tolerate poor mechanical conditions with off-centre shafts or worn bearings.
- Meet requirements for potable water duties.
- Reduce your stockholding levels, as one length-form packing can be used for many different valves, pumps and other fluid handling plant at a site.

Industries across the world rely on our packings to help keep their valves, pumps and other equipment operating efficiently day-in and day-out — with energy saving benefits and the minimum of fugitive emissions.



*Supagraf® Premier: our world-leading fugitive emission control packing. See pages 6, 7, 8 & 9 for valve stem sealing down to  $\leq 5\text{ppmV}$ .*

## Packed glands

The packed gland stands the test of time as:

- An exceptionally reliable fluid sealing device.
- Simple to install and maintain.
- Highly versatile.
- Remarkably cost effective in both downtime and materials — especially when compared to complex alternatives.

Contact us if you need a special-duty compression packing — we are expert at custom design and production.

With our fluid sealing and applications engineering expertise, backed by a wide range of raw materials and flexible production facilities, we can solve all of your relevant fluid sealing problems.

## Valve sealing systems

High performance compression packings constitute part of our wide-ranging package of sealing-based products and services for valve OEMs, users and refurbishers.

Please ask for full information on our:

- 'O' rings.
- Metal ring joints and gaskets.
- Valve seats in engineering plastics.
- RotaBolt® tension monitoring fasteners.

## Duties at a glance

Throughout this guide we use icons to indicate different plant applications:



**for valve stems**



**for centrifugal pumps and rotary equipment**



**for reciprocating pumps and rams**



**for static duties – tank and hatch lids, crucible lids and doors**

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### Four simple steps to find your *best value* packing

**Step 1:** Turn to **Quick reference chart** on pages 4 & 5. The left-hand column lists packings under five services:

- Rotary, Valve & Reciprocating duties
- Rotary & Valve duties
- Valve & Reciprocating duties
- Valve duties only
- Static (Lids & Doors) duties only.

**Step 2:** Compare your plant specifications with the **Service Capabilities, Media Guide** and **Industry Sectors** of each packing product that is recommended for the types of duty you need.

**Step 3:** Check the detailed specifications of each 'short listed' product in the main body of this guide.






**Step 4:** Contact your local James Walker company or distributor (**see back cover**) for **best value** prices and delivery details.

Operating limits quoted in this publication are not an indication that these values can be applied simultaneously, particularly when operating near to the extreme limits.

Please contact James Walker if you need further guidance on the suitability of any product for your specific application.

## Quick reference chart

\* Consult James Walker for pressures above 25MPa.

			SERVICE CAPABILITIES							
Recommended service type	Product name	More details on page	Rotary		Valve	Reciprocating		Static (Lids/Doors)	Temperatures	
			Shaft speed (m/s)	Pressure (MPa)	Pressure (MPa)	Rod speed (m/s)	Pressure (MPa)	Pressure (MPa)	MIN (°C)	MAX (°C)
<b>Rotary/Valve/Reciprocating</b> 	Arasele®	17	20	2.5	15	1.5	10	n/a	-50	+285
	Duramid®	16	20	2.5	15	1.5	15	n/a	-50	+250
	Fluograf®	12	22	1	8	1	8	n/a	-100	+260
	Fluolion® Emulsion XA-P	15	20	2.5	10	1	10	n/a	-50	+270
	Fluolion® Filament L	14	10	2.5	15	1	10	n/a	-100	+250
	Hornet	13	20	2	25	2	10	n/a	-50	+260
	Liongraf	13	17.5	2	12	2	8	n/a	-100	+260
	Ramiex	16	17.5	2	25	2	25	n/a	-30	+120
<b>Rotary/Valve</b> 	Supagraf® Moulded Rings (steam)	9	C	C	25	n/a	n/a	n/a	n/a	+650
	Supagraf® RibbonPak (steam)	10	25	2.5	25	n/a	n/a	n/a	n/a	+550
<b>Valve/Reciprocating</b> 	Fluolion® Filament D	14	4	1	25	0.5	5	n/a	-100	+250
<b>Valve</b> 	Grafpak	11	n/a	n/a	15	n/a	n/a	n/a	-50	+550
	Supagraf® Control	7	n/a	n/a	25	n/a	n/a	n/a	-200	+350
	Supagraf® LF Rings	8	n/a	n/a	25	n/a	n/a	n/a	-200	+350
	Supagraf® Premier	6	n/a	n/a	25*	n/a	n/a	n/a	-200	+450
	Supagraf® PremiPak	9	n/a	n/a	25	n/a	n/a	n/a	-200	+450
	Supagraf® RibbonPak M (steam)	10	n/a	n/a	30	n/a	n/a	n/a	n/a	+650
	Supagraf® Tape	11	n/a	n/a	7	n/a	n/a	n/a	-200	+500
<b>Static (Lids/Doors)</b> 	Tankatite® 250	21	n/a	n/a	n/a	n/a	n/a	0.05	-30	+100
	Tankatite® 440	20	n/a	n/a	n/a	n/a	n/a	0.07	-50	+120
	Tankatite® 660	20	n/a	n/a	n/a	n/a	n/a	0.06	-50	+230
	Tankatite® 880 Super	21	n/a	n/a	n/a	n/a	n/a	0.2	-50	+120
	Torrlid 162B	19	n/a	n/a	n/a	n/a	n/a	Vacuum	C	C
	Torrlid 297	19	n/a	n/a	n/a	n/a	n/a	Vacuum	C	C
	Valcor® Hi-Temp	18	n/a	n/a	n/a	n/a	n/a	n/a	-50	+1000

Operating limits quoted in this publication are not an indication that these values can be applied simultaneously, particularly when operating near to the extreme limits. Please contact James Walker if you need further guidance on the suitability of any product for your specific application.

## Quick reference chart

Key: ✓ = suitable product X = not suitable C = consult James Walker n/a = not applicable

pH range	MEDIA GUIDE									INDUSTRY SECTORS						
	Steam	Gases	Process water	Potable water	Strong acids	Caustic alkalis	Oils	Solvents	Chemical	Food	Marine services	Metallurgical	Petroleum	Pulp & paper	Power generation	Water & sewage
0-13	✓	✓	✓	X	X	X	✓	✓	✓	X	✓	✓	✓	✓	✓	✓
2-13	✓	✓	✓	✓	X	X	✓	✓	✓	X	✓	✓	✓	✓	✓	✓
0-14	✓	✓	✓	✓	✓	✓	✓	✓	✓	X	✓	✓	✓	✓	✓	✓
1-14	X	✓	✓	X	✓	✓	✓	X	✓	X	✓	✓	✓	✓	✓	✓
0-14	X	✓	✓	X	✓	✓	✓	✓	✓	X	✓	X	✓	✓	✓	✓
2-13	✓	✓	✓	✓	X	X	✓	✓	✓	X	✓	✓	✓	✓	✓	✓
0-14	✓	✓	✓	X	✓	✓	✓	✓	✓	X	✓	✓	✓	✓	✓	✓
4-11	X	✓	✓	X	X	X	✓	X	✓	X	✓	✓	✓	✓	✓	✓
0-14	✓	X	✓	X	✓	✓	✓	✓	✓	X	✓	✓	✓	✓	✓	✓
0-14	✓	✓	✓	X	✓	✓	✓	✓	✓	X	✓	✓	✓	✓	✓	X
0-14	✓	✓	✓	✓	✓	✓	✓	✓	✓	X	X	X	✓	✓	✓	✓
0-14	✓	✓	✓	X	✓	✓	✓	✓	✓	X	✓	✓	✓	✓	✓	X
1-14	X	✓	X	X	X	X	✓	✓	✓	X	✓	✓	✓	X	✓	X
1-14	X	✓	X	X	X	X	✓	✓	✓	X	✓	✓	✓	X	✓	X
0-14	✓	✓	✓	X	✓	✓	✓	✓	✓	X	✓	✓	✓	✓	✓	X
0-14	✓	✓	✓	X	✓	✓	✓	✓	✓	X	✓	✓	✓	✓	✓	✓
1-13	X	X	✓	X	✓	✓	✓	✓	✓	C	✓	X	✓	X	X	X
0-14	X	✓	✓	X	✓	✓	✓	✓	✓	C	✓	X	✓	X	X	X
0-14	X	X	✓	X	✓	✓	✓	✓	✓	C	✓	X	✓	X	X	X
0-14	X	✓	✓	X	✓	✓	✓	✓	✓	C	✓	X	✓	X	X	X
C	X	✓	X	X	X	X	✓	X	✓	X	X	✓	X	✓	✓	X
C	X	✓	X	X	X	X	✓	X	✓	X	X	✓	X	✓	✓	X
0-10	X	✓	✓	X	✓	X	✓	✓	✓	X	✓	✓	✓	✓	✓	✓



# Graphite-based fugitive emission control

## Supagraf® Premier

World-beating fugitive emission control



### Description

Supagraf® Premier is one of our top-of-the-range fugitive emission control products for valves. It is a **best available technique (BAT)** product for reducing industry's fugitive emissions in line with the **European Union's IPPC Directive**. In tests to API 622, it produced an average emission level of 10.5ppmV with a maximum 37ppmV over five thermal and 1510 mechanical cycles.

This cost-effective compression packing is manufactured in exfoliated graphite, reinforced in a novel way to provide additional strength plus resistance to pressure and extrusion. It incorporates an advanced lubricant system that prevents the pick-up of graphite on the valve stem.

### Typical applications

Harsh operating conditions where fugitive emissions from all types of valve need to be reduced, often to well below 50ppmV. It is widely used in systems that handle fluid media such as hydrocarbon liquid fuels, lube oils, and process chemicals.

### Specifications

Supagraf Premier is third party tested and certified to:

- ISO 15848-1 Class AH (fugitive emissions): Certified by ITIS BV, at 69MPa as a five-ring set in a BSM valve. Emission level

at 69MPa was  $\leq 5$ ppmV. Consult James Walker for pressures above 25MPa.

- API 622: average emission level of 10.5ppmV.
- TA Luft Rev 07.2002 requirements, VDI 2440, for VOC emission control in valves. Sealing system met TA Luft High Grade requirements for Ruhr Oel.
- Shell specification SPE 77/312 Class A, Rev 16.10.2002.
- Shell specification SPE 77/312 Rev 06.2007: Class B rating with 47.4MPa helium in Class 2500 valve. Seating stress of 101MPa (three-times normal) readily allowed valve stem rotation without excess actuator torque.
- API 607 Edition 4 Fire Safety, to an extended specification.

### Prime features

- Third-party verified emission control performance.
- Came top of its class in independent tests run on behalf of CAPI Group (Akzo Nobel, Shell, Dow and DSM).
- Recommended for both rotary and rising-stem valves.
- Low friction action without graphite pick up.
- No special fitting techniques needed.

### Chemical properties

Chemically inert within the range pH 1-14, *excluding* strong oxidising agents. Negligible volatile content.



### Valve stem duties

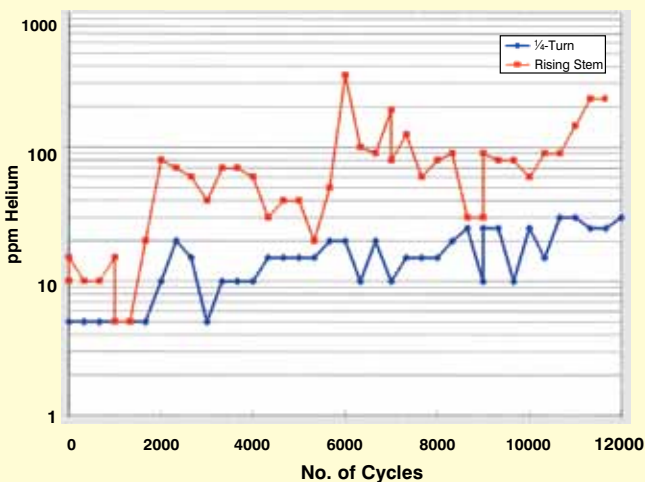
Maximum temperature	
Oxidising conditions	+450°C
Minimum temperature	-200°C
Max standard system pressure	25MPa/250bar
<i>(Certified to 69MPa/690bar in BSM valve: consult JW)</i>	

### How supplied

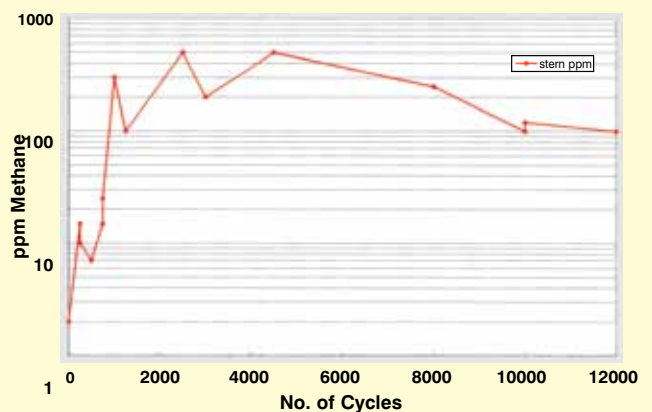
Split preformed rings and sets for ease of installation and optimal performance, or in boxes containing 8m for on-site maintenance economy.

Ex stock: all popular sections from 3mm upwards to suit standard valves. Non-standard square or rectangular sections made to order. Full fitting instructions are included.

**SEALABILITY TESTS: Leeds University Tests — 4MPa Helium**  
(Valve Body Temperature Cycling between 300°C and 200°C)



**LONGEVITY TESTS: Supagraf® Premier**  
J.W. Endurance Test — 4MPa Methane



Operating limits quoted are not an indication that these values can be applied simultaneously, particularly when operating near to the extreme limits. Please contact James Walker if you need further guidance on the suitability of any product for a specific application or for details of conditions under which any quoted testing has been undertaken.

# Graphite-based fugitive emission control

## Supagraf® Control

Fugitive emission control for control valves to TA Luft requirements



### Specifications

#### TA Luft/VDI 2440:

Masonellan control valves fitted with Supagraf Control are certified to TA Luft requirements at leak tightness with helium to  $<10^{-4}$  mbar.litre.s<sup>-1</sup>.m<sup>-1</sup>. The tests were undertaken with 10MPa at 20°C and 5.7MPa at a fluid flow temperature of 425°C for 100,000 stem cycles, including four thermal cycles and two gland adjustments.

**ISO 15848-1:** Masonellan control valves fitted with Supagraf Control are certified to ISO 15848-1

Class BH, CC3, at -29°C to +425°C. The valves showed helium leakage rates less than  $10^{-4}$  mg.s<sup>-1</sup>.m<sup>-1</sup> for 100,000 stem cycles. This was achieved with pressure of 5.75MPa at a fluid flow temperature of +425°C and 10.34MPa at -29°C to +38°C.

### Prime features

- High integrity gland sealing for control valve stems: to well below 50ppmV fugitive emission level.
- Long-term adjustment free operation: over 100,000 stem strokes possible with emission levels below 50ppmV.
- Very low coefficient of friction for smooth and accurate valve action.
- Reduced friction requirement to save on power consumption and enable smaller actuators to be used.
- Certificated by TUV-Nord to TA Luft/VDI 2440.

### Summaries of additional tests

In addition to TA Luft and ISO 15848-1 certifications shown under *Specifications*, the following impressive test results have been achieved.

**Thermal cycling:** 10,800 valve operating cycles at 20°C and 5MPa, followed by 16,700 operating cycles at 280°C and 5MPa. Recorded leakage was  $<2.2 \times 10^{-4}$  mbar.litre.s<sup>-1</sup>. (*Third party test by major manufacturer of control valves.*)

**Fugitive emission control:** 10ppmV to 15ppmV maximum emission levels for five-ring set of Supagraf Control after 1100 stem strokes and five thermal cycles between ambient and 160°C. (*Test by James Walker Technology Centre.*)

**Long-term performance:** Over 100,000 stem cycles with emission levels below 500ppmV using 4MPa methane, without gland adjustment. (*Test by James Walker Technology Centre.*)

Copies of certificates and/or full details of tests can be supplied.

### Chemical properties

Chemically inert within the range pH 1-14, *excluding* strong oxidising agents. Low volatiles content.

### Service capabilities



#### Valve stem duties

Maximum temperature	+350°C
Minimum temperature	-200°C
Max system pressure	25MPa/250bar

### How supplied

Split preformed rings and sets for ease of installation and optimal performance, or in boxes containing 8m for on-site maintenance economy.

Ex-stock: all popular sections from 3mm upwards to suit standard valves. Non-standard square or rectangular sections made to order. Full fitting instructions are included.

### Description

This innovative compression packing for control valves is proven to reduce VOC fugitive emissions to well below 50ppmV for over 100,000 stem strokes. Its use represents a **best available technique (BAT)** in line with the **European Union's IPPC Directive**.

Supagraf® Control's long-term, high integrity sealing capability, with very low stem friction for control accuracy, derive from its unique design and manufacture.

It is made of high purity exfoliated graphite, reinforced in a novel way with a non-metallic structure to provide additional strength and resistance to pressure and extrusion. An advanced lubricant system is incorporated to prevent the pick up of graphite on valve stems.

### Typical applications

Control valves in systems that handle fluid media such as hydrocarbon liquid fuels and gases, lubricating oils and hazardous process chemicals.

It can be used as a long-term replacement for the PTFE V-type packings that are readily damaged by ingress of dirt and other foreign particles to the gland area.

# Graphite-based fugitive emission control

## Supagraf® LF Rings

Low friction rings for low-torque valve action plus fugitive emission control



### Description

Supagraf® LF rings represent a major enhancement of the operational capabilities of graphite sealing rings used on valve stems.

The rings are precision moulded from high purity expanded graphite foil to which a special low friction coating has been sinter bonded. The 5µm thick coating is bonded to the expanded

graphite before the moulding process to ensure maximum service life.

### Typical applications

- Valves where fugitive emission control to 50ppmV or less is required.
- Valves that handle dry gases or other fluids, where friction on standard graphite seals is unacceptably high.
- Valves that suffer judder, hesitation or erratic action due to carbon pick-up or high-spot friction on the spindle.

### Prime features

- Greatly reduce the torque needed for efficient valve operation.
- Save on power consumption and enables smaller actuators to be used.
- Lower the break-out friction for smoother valve operation.

- Retain exceptionally low-friction characteristics with fugitive emission control for up to 20,000 valve cycles.
- Subsequent manual adjustment extends performance to 60,000 cycles.
- Fire-safe capability enables rings to be used in plant subjected to fire rating tests.
- Can be supplied live-loaded.

### Chemical compatibility

Chemically inert to most media in the range pH 0-14.

### Service capabilities



#### Valve stem duties

Maximum temperature	+350°C
Minimum temperature	-200°C
Max service pressure	25MPa/250bar

### How supplied

Precision moulded rings in endless form or with single split or as matched scarf-split halves. Sections 1.5mm to 40mm; diameters 2mm ID to over 1100mm ID. Full fitting instructions are included.

### Laboratory tests

Independent tests confirm our low-friction, low torque claims.

In comparative tests, sets of Supagraf LF Rings were compressed in a gland housing and the friction coefficients determined at two levels of compressive stress. The tests were repeated with sets of standard graphite rings.

In both cases, Supagraf LF displayed exactly half the friction coefficient of the standard graphite.

Supagraf® LF Rings	Friction coefficient
@ 10MPa stress	0.11
@ 40MPa stress	0.07*

### Standard graphite rings

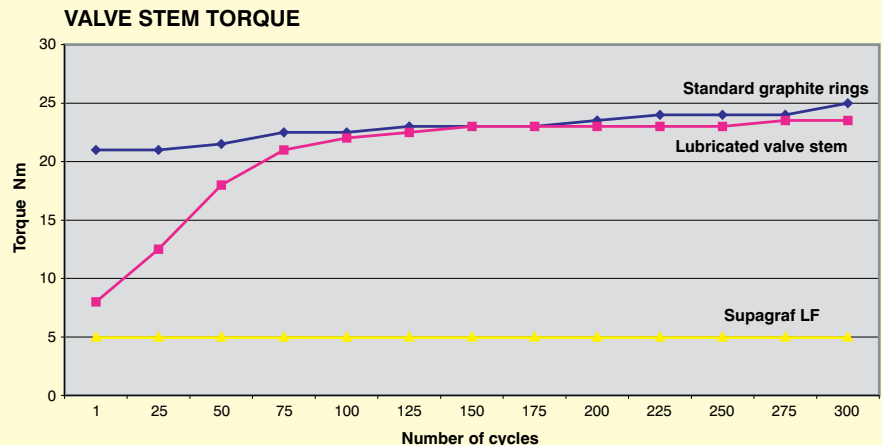
@ 10MPa stress	0.22
@ 40MPa stress	0.14*

(\*Surface characteristics improve on these graphite rings as the material compresses.)

Torque figures taken during extended valve cycling tests showed that valve stem torque remained constant at 5Nm for Supagraf LF Rings (see graph).

For standard graphite rings, the torque rose from 21Nm to 25Nm during the first 300 operating cycles.

With a lubricated valve stem, the torque for standard graphite rings increase from 7Nm to 23Nm during the first 150 cycles as the lubricant was removed by valve action.





## Graphite-based fugitive emission control

## Supagraf® Moulded Rings

Graphite rings with excellent qualities



## Description

High efficiency graphite sealing rings moulded to precise density and size. Manufactured from expanded high purity graphite foil without binders, elastomers or fillers. Highest purity **Nuclear Grade** available. Also **Wire Reinforced**

**Supagraf®** containing stainless steel wire orientated in all planes, for high loads; and **Passivated Supagraf®** with corrosion inhibitor to minimise galvanic action.

## Typical applications

Valves and rotary equipment handling virtually any media. These rings are ideal for systems handling high-temperature steam, demineralised water, heat transfer media, petroleum products, inorganic and organic acids, alkalis, hot waxes and oils.

## Prime features

- Outstanding sealing performance over long adjustment-free periods.
- Excellent chemical resistance.
- Very wide temperature range.

## Chemical properties

Chemically inert within the range pH 0-14.

**Standard Grade:** extractable chlorine ion content (typical) 25ppm; sulphur <100ppm.

**Nuclear Grade:** chlorine ion <10ppm; sulphur <60ppm.


No loss of volatiles at high temperatures.

Lower limiting temperatures apply when used with oxidising agents, eg nitric acid.

## Physical properties

Carbon content (grade dependent), %	98 – 99.8
Density range, g/cm <sup>3</sup>	1.1 – 1.8
Coefficient of linear expansion, ring of density 1.4g/cm <sup>3</sup> ,	7x10 <sup>6</sup>
Thermal conductivity, ring of density 1.4g/cm <sup>3</sup> , W/mK; axial	400
radial	6
Coefficient of friction to steel	0.05

## Service capabilities

 Valve stem duties

Maximum temperatures	
Steam	+650°C
Oxidising conditions	+500°C
Non-oxidising	+1000°C
Minimum temperature	-200°C
Max system pressure	25MPa/250bar

 Centrifugal pumps & rotary equipment

Operating temperatures	Consult James Walker
Maximum shaft speed	Consult James Walker
Max system pressure	Consult James Walker

## How supplied

Precision moulded rings in endless form, or with single split or matched scarf-split halves. Sections 1.5mm to 40mm; diameters 2mm to over 1100mm.

Recommended densities: 1.5g/cm<sup>3</sup> for rotary duties; 1.6g/cm<sup>3</sup> for valve stems (with end rings of **Grafpak**, see p11), or mixture of ring densities for special applications. Full fitting instructions are included.

## Supagraf® PremiPak

Superior combination packing sets



## Description

Supagraf® PremiPak is a superior combination packing set for valves. It is based on two of our class-leading graphite products.

We also design and supply other high performance combination packing sets for valves, to meet end users' defined standards and specifications with regard to materials, construction, and the level of fugitive emission control required.

## Construction

**End rings: Supagraf® Premier** (page 6) braided graphite filament packing for high strength and extrusion resistance, with excellent sealability and third-party certification to TA Luft emission control requirements.

**Intermediate rings:** Special moulded rings of high purity graphite foil, that offer low friction and excellent heat transfer characteristics, plus high efficiency sealing. These rings conform to Shell material specification MESC SPE 85/203.

## Typical applications

Stop valves and control valves performing arduous duties with media such as hydrocarbon liquid fuel and gases. Most applications require VOC fugitive emission control to 100ppmV or better, with a maximum working temperature capability of up to +450°C.

## Prime features

- Reduced valve stem shudder/hesitation.
- Low break-out friction.
- Long working life; minimal maintenance.

## Chemical properties

Chemically inert within the range pH 1-14, excluding strong oxidising agents.

## Typical service capabilities

 Valve stem duties

Maximum temperature	+450°C
Minimum temperature	-200°C
Max system pressure	25MPa/250bar

## How supplied

Precision moulded rings in endless form or with single split to meet customers' requirements. Sections: 3mm to 40mm. Diameters: 5mm to 500mm ID. Full fitting instructions are included. Other designs of combination set supplied to order.

## Graphite-based

### Supagraf® RibbonPak M

Length-form graphite packing with reinforcement



#### Description

Plaited length-form packing of pure exfoliated graphite ribbons that are reinforced with fine Inconel® wires to provide additional strength plus resistance to pressure and extrusion.

#### Typical applications

Valves handling steam, condensate, fuel, oils, gases, chemicals, process water or effluent. This product is widely used in petrochemical plants, refineries, power stations and steel mills.

#### Prime features

- Exceptional temperature range.
- Excellent chemical resistance.
- Long service life with rotary or rising-stem valves.
- Low friction and high thermal conductivity.
- Easy to cut, shape and install.
- Replaces moulded graphite foil rings and reduces stockholding.
- Extended shelf life – does not harden.

#### Chemical properties

Chemically inert within the range pH 0-14, *excluding* strong oxidising agents. Negligible volatile content. Low in extractable trace impurities such as chloride and sulphur.

#### Service capabilities



#### Valve stem duties

Maximum temperatures	
Steam	+ 650°C
Oxidising conditions	+ 450°C
Non-oxidising	+ 1000°C
Minimum temperature	-200°C
Max system pressure	30MPa/300bar

#### How supplied

Ex-stock: all popular square sections from 3mm upwards to suit all standard valves. In boxes containing 8m, or supplied as split preformed rings and sets. Full fitting instructions are included.

### Supagraf® RibbonPak

High rotary speeds with aggressive media



#### Description

High purity exfoliated graphite ribbons, plaited into a flexible length-form packing for convenient on-site maintenance.

#### Typical applications

High speed rotary pumps handling water or slurry in pulp and paper processing. Also a general purpose valve stem packing for steam and chemical processing duties.

#### Prime features

- Excellent chemical resistance across very wide temperature range.
- Replaces moulded graphite foil sealing rings.
- Flexible and compressible.
- Easy to install – no special tools needed.
- Reduces stockholding requirements.

#### Chemical properties

Chemically inert within the range pH 0-14, *excluding* strong oxidising agents. Negligible volatile content. Low in extractable trace impurities such as chloride and sulphur.

#### Service capabilities



#### Valve stem duties

Maximum temperatures	
Steam	+ 550°C
Oxidising conditions	+ 450°C
Non-oxidising	+ 850°C
Minimum temperature	-200°C
Max system pressure	25MPa/250bar



#### Centrifugal pumps & rotary equipment

Operating temperatures	As valve stem
Maximum shaft speed	25m/s
Max system pressure	2.5MPa/25bar

#### How supplied

Ex-stock: all popular square sections from 3mm upwards, in boxes containing 8m. Also supplied as split preformed rings and sets. Full fitting instructions are included.

## Graphite-based

**Grapak***For high temperature/pressure steam***Description**

Dense, high strength packing of cross-plaited premier quality graphite filament yarns. Treated with pure graphite before and after plaiting, and further treated with special corrosion inhibitors.

**Typical applications**

Control valves and main stop valves on high temperature/pressure steam circuits at power stations, chemical plants, industrial services, and on marine installations. Also suitable for duties with water, condensate, alkalis, acids, solvents and most chemicals.

Frequently used as end rings in conjunction with **Supagraf® Moulded Rings** (page 9).

**Prime features**

- Suitable for wide range of aggressive media.
- Low friction for low torque operation.
- Tough and resistant to fretting and extrusion.

**Chemical properties**

Chemically inert within the range pH 0-14, *excluding* strong oxidising agents.

**Service capabilities****Valve stem duties**

Maximum temperatures	
Steam & oxidising conditions	+550°C
Non-oxidising	(Significantly higher, refer to James Walker)
Minimum temperature	-50°C
Max system pressure	15MPa/150bar typical
	(Refer to James Walker for higher pressures)

**How supplied**

Ex-stock: all popular square sections from 3mm cross-section upwards to suit all standard valves. In boxes containing 8m, or supplied as split preformed rings and sets. Full fitting instructions are included.

**Supagraf® Tape***Maintenance expedient for valves***Description**

Supagraf® exfoliated graphite in an easy-to-use textured tape form. Can be supplied with self-adhesive backing.

**Typical applications**

This maintenance expedient is wound around a valve stem — then compressed into the stuffing box. It is suitable for valves handling high temperature steam, demineralised water, petroleum products, heat transfer media, organic and inorganic acids, and alkalis. Self-adhesive version can be used as an emergency gasket replacement.

**Chemical properties**

Chemically inert within the range pH 0-14. Extractable chlorine content typically 25ppm. No loss of volatiles, even at high temperatures. Lower limiting temperatures may apply when used with oxidising agents such as nitric, sulphuric or chromic acid.

**Service capabilities****Valve stem duties**

Maximum temperature	+500°C
Minimum temperature	-200°C
Max system pressure	7MPa/70bar

**How supplied**

In cassettes for protection and ease of use. 0.5mm thick tape: 10mm x 10m, 15mm x 10m, 20mm x 15m, 25mm x 15m.

## PTFE-based

### Fluograf®

#### Outstanding pump & valve packing



#### Description

A highly versatile product that adds a new dimension to compression packing reliability and performance. Made totally from WL Gore & Associates' highly-developed GFO® yarn – combining the benefits of ePTFE, graphite and high temperature lubricants – this cross-plaited packing offers the ideal balance between density, resilience, strength and durability.

#### Typical applications

Pumps and valves handling aggressive chemical media in the petrochemical, pulp and paper, power generation and metallurgical sectors, as well as potable water, and steam at up to 260°C.

#### Specifications

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

#### Prime features

- Extended service life – by up to 400% in harsh environments.
- Well proven with aggressive media.
- High thermal conductivity for cool running.
- Low coefficient of friction and minimal shaft wear.
- Very good start-up and emergency running characteristics.
- Non hardening.

#### Chemical properties

Compatible with media in the range pH 0-14, including steam, but *excluding* strong oxidising agents such as aqua regia, fuming nitric acid, oleum, and molten alkali metals.

#### Service capabilities



##### Valve stem duties

Maximum temperature	+260°C
Minimum temperature	-100°C
Max system pressure	8MPa/80bar



##### Centrifugal pumps & rotary equipment

Operating temperatures	As valve stem
Maximum shaft speed	22m/s <i>(Refer to James Walker for duties up to 28m/s)</i>
Max system pressure	1MPa/10bar



##### Reciprocating pumps & rams

Operating temperatures	As valve stem
Maximum rod speed	1m/s
Max system pressure	8MPa/80bar <i>(More severe duties can be sealed with specially designed arrangements)</i>

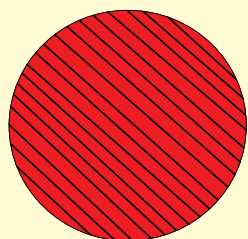
#### How supplied

Ex-stock: all popular square sections from 3mm to 25mm, in boxes containing 8m. Selected sections available in 2m maintenance packs. Also supplied as split preformed rings and sets. Full fitting instructions are included.

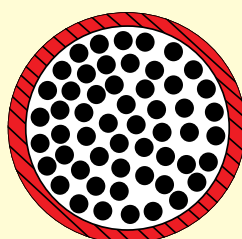
#### What is so special about GORE® GFO®?

GFO® is a homogenous fibre, developed specifically for compression packings with heat transfer and lubricant components forming an integral part of the yarn. In contrast, most other packing yarns have these components added as a coating during packing manufacture. Such coatings may be washed out during the service life of the packing.

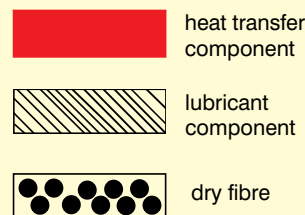
With its consistently high thermal conductivity, a GFO fibre packing ensures efficient sealing, particularly at high temperatures and speeds. Under arduous conditions where other materials can harden, dry out or even burn, a GFO fibre packing will continue to run trouble-free with controlled leakage.



homogenous fibre



coated fibre





## PTFE-based

**Hornet***For slurries & abrasive media***Description**

A high performance packing that absorbs the eccentric action of worn shafts and bearings. It has a central core of temperature resistant elastomer. The square sectioned packing is cross-plaited with tough aramid fibres at the corners to resist abrasion and wear. PTFE/graphite yarn at the centre of each side dissipates heat and presents a low friction face to the shaft.

**Typical applications**

Valves and pumps handling highly abrasive slurries in pulp and paper mills, sugar refineries, petrochemical plants, sewage works, metallurgical plants and china clay works. Also suitable for potable water and steam.

**Specifications**

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

**Prime features**

- Excellent abrasion resistance.
- Superior compression and recovery characteristics with out-of-true shafts.
- Excellent extrusion resistance.
- Low shaft wear.

**Chemical properties**

Compatible with media in the range pH 2-13, including water, fuels, oils, solvents, waxes, and mild acids and alkalis.

**Service capabilities****Valve stem duties**

Maximum temperature	+260°C
Minimum temperature	-50°C
Max system pressure	25MPa/250bar

**Centrifugal pumps & rotary equipment**

Operating temperatures	As valve stem
Maximum shaft speed	20m/s
Max system pressure	2MPa/20bar

**Reciprocating pumps & rams**

Operating temperatures	As valve stem
Maximum rod speed	2m/s
Max system pressure	10MPa/100bar

**How supplied**

Ex-stock: all popular square sections from 6.5mm to 25mm, in boxes containing 8m. Also supplied as split preformed rings and sets. Full fitting instructions are included.

**Liongraf***Our universal, economical packing***Description**

A highly reliable pump and valve packing, based on graphite and PTFE yarn, that is thermally stabilised then lubricated with a silicone-free compound. Sections of 6.5mm square and above are of cross-plaited construction; sections below 6.5mm are plaited.

**Typical applications**

Widely regarded as an economical packing for universal application and the reduction of stockholding requirements. Well proven in the petrochemical, power generation, marine and metallurgical sectors, and by pump and valve manufacturers for OEM installation.

It is suitable for duties with steam, condensate, effluents, fuels and oils, acids, alkalis and chemical solutions.

**Prime features**

- Strong, durable and extrusion resistant.
- Reliable over a wide range of duties.
- Excellent chemical resistance.
- Low friction with high thermal conductivity.

**Chemical properties**

Compatible with media in the range pH 0-14, including corrosive fluids and solvents.

**Service capabilities****Valve stem duties**

Maximum temperature	+260°C
Minimum temperature	-100°C
Max system pressure	12MPa/120bar

**Centrifugal pumps & rotary equipment**

Operating temperatures	As valve stem
Maximum shaft speed	17.5m/s
Max system pressure	2MPa/20bar

**Reciprocating pumps & rams**

Operating temperatures	As valve stem
Maximum rod speed	2m/s
Max system pressure	8MPa/80bar

**How supplied**

Ex-stock: all popular square sections from 3mm to 25mm, in boxes containing 8m. Also supplied as split preformed rings and sets. Full fitting instructions are included.

## PTFE-based

### Fluolion® Filament D

For potable water & chemical applications



#### Description

Fluolion® Filament D is a cross-plaited packing made from tough, thermally stable PTFE fibre yarn. This yarn is impregnated with densified particles of PTFE to generate additional lubrication. The packing is then cleaned of all organic matter and volatile content.

#### Typical applications

The purity of Fluolion Filament D enables it to be used as a valve packing for potable water applications. It is also suitable for slow rotary duties with pumps and plant handling chemicals.

#### Specifications

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

#### Prime features

- Excellent chemical resistance.
- High purity for applications with potable water.
- Clean and highly conformable for ease of fitting.

#### Chemical properties

Compatible with media in the range pH 0-14, including corrosive acids and alkalis.

#### Service capabilities



##### Valve stem duties

Maximum temperature	+250°C
Minimum temperature	-100°C
Max system pressure	25MPa/250bar



##### Centrifugal pumps & rotary equipment

Operating temperatures	As valve stem
Maximum shaft speed	4m/s
Max system pressure	1MPa/10bar



##### Reciprocating pumps & rams

Operating temperatures	As valve stem
Maximum rod speed	0.5m/s
Max system pressure	5MPa/50bar

#### How supplied

Ex-stock: all popular square sections from 3mm to 25mm, in boxes containing 8m. Also supplied as split preformed rings and sets. Full fitting instructions are included.

### Fluolion® Filament L

High chemical resistance



#### Description

Fluolion® Filament L is a cross-plaited packing made from tough, thermally stable PTFE fibre yarn. This yarn is impregnated with densified particles of PTFE to generate additional lubrication.

#### Typical applications

Used in pumps and valves where a high performance, chemically resistant compression packing is needed.

#### Prime features

- Excellent chemical resistance.
- High performance sealing in pump and valve applications.
- Long and efficient working life with minimum maintenance requirements.
- Clean and highly conformable for ease of fitting.

#### Chemical properties

Compatible with media in the range pH 0-14, including corrosive acids and alkalis.

#### Service capabilities



##### Valve stem duties

Maximum temperature	+250°C
Minimum temperature	-100°C
Max system pressure	15MPa/150bar



##### Centrifugal pumps & rotary equipment

Operating temperatures	As valve stem
Maximum shaft speed	10m/s
Max system pressure	2.5MPa/25bar



##### Reciprocating pumps & rams

Operating temperatures	As valve stem
Maximum rod speed	1m/s
Max system pressure	10MPa/100bar

#### How supplied

Ex-stock: all popular square sections from 3mm to 25mm, in boxes containing 8m. Also supplied as split preformed rings and sets. Full fitting instructions are included.

## PTFE-based

**Fluolion® Emulsion XA-P***High performance chemical duties***Description**

A universal packing comprising a unique synthetic yarn, densified with particles of PTFE and treated with an advanced silicone-free lubricant. The impregnated yarns are cross-plaited over an elastomeric core, which enables this packing to absorb the eccentric actions of worn shafts and bearings running in very harsh environments.

**Typical applications**

Pumps, valves and rotating plant that handle hot, abrasive and highly caustic fluid media. This packing is widely used in contact with hot slurries and effluents at pulp and paper mills, and alumina processing plants. It is also employed as a general purpose packing in the chemical industry.

**Prime features**

- Excellent chemical resistance, including strong acid and alkalis.
- Excellent abrasion resistance.
- Low friction and low wear on shaft sleeves.
- Non-contaminating lubricants.

**Chemical properties**

Compatible with media in the range pH 1-14.

**Service capabilities****Valve stem duties**

Maximum temperature	+270°C
Minimum temperature	-50°C
Max system pressure	10MPa/100bar

**Centrifugal pumps & rotary equipment**

Operating temperatures	As valve stem
Maximum shaft speed	20m/s
Max system pressure	2.5MPa/25bar

**Reciprocating pumps & rams**

Operating temperatures	As valve stem
Maximum rod speed	1m/s
Max system pressure	10MPa/100bar

**How supplied**

Ex-stock: all popular square sections from 3mm to 25mm, in boxes containing 8m. Also supplied as split preformed rings and sets. Full fitting instructions are included.

## Tough packings for harsh conditions

### Duramid®

*Aramid-based wear resistance*



#### Description

A tough, high performance packing, cross-plaited from texturised aramid yarns. Each yarn is uniformly impregnated with PTFE dispersion and a silicone-based lubricant that resists chemical attack at high temperatures.

#### Typical applications

Valves and pumps handling abrasive and aggressive media in pulp and paper mills, petrochemical plants, power stations, metallurgical plants, sewage works and china clay works. Also suitable for potable

water, medium pressure steam, and hardening fluids such as tar and bitumen.

#### Specifications

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

#### Prime features

- Suitable for very wide range of media.
- Excellent abrasion resistance.
- Long service life with minimal shaft wear.
- Resilient and responsive in operation.

#### Chemical properties

Compatible with media in the range pH 2-13, including water, oils, solvents, medium strength acids and alkalis.

#### Service capabilities

Valve stem duties	
Maximum temperature	+250°C
Minimum temperature	-50°C
Max system pressure	15MPa/150bar

#### Centrifugal pumps & rotary equipment

Operating temperatures	As valve stem
Maximum shaft speed	20m/s <i>(Refer to James Walker for higher speed duties)</i>
Max system pressure	2.5MPa/25bar

#### Reciprocating pumps & rams

Operating temperatures	As valve stem
Maximum rod speed	1.5m/s
Max system pressure	15MPa/150bar

#### How supplied

Ex-stock: all popular square sections from 3mm to 25mm, in boxes containing 8m. Also supplied as split preformed rings and sets. Full fitting instructions are included.

### Ramiex

*Our strongest natural fibre packing*



#### Description

Versatile, high-performance packing, cross-plaited from top-quality bleached ramie fibre yarns that are impregnated with an advanced PTFE dispersion lubricant. The result is a consistent packing of uniform density and compressibility.

Ramie, a tropical nettle plant, produces a fibre of extreme durability, rot resistance and significantly greater strength than flax, cotton or hemp.

#### Typical applications

Used with great success in the mining and quarrying industries on reciprocating pumps working with water containing highly abrasive particles. Also used for water-based hydraulic systems, pulp and paper processing with cellulose slurry, brine circulation, cooling water systems, and with fluids that crystallise or contain suspended solids.

#### Prime features

- Excellent extrusion resistance.
- Excellent abrasive resistance.
- Excellent rot resistance.
- Low friction and low wear.
- Kind to shafts and sleeves.

#### Chemical properties

Compatible with media in the range pH 4-11.

#### Service capabilities

Valve stem duties	
Maximum temperature	+120°C
Minimum temperature	-30°C
Max system pressure	25MPa/250bar

#### Centrifugal pumps & rotary equipment

Operating temperatures	As valve stem
Maximum shaft speed	17.5m/s
Max system pressure	2MPa/20bar

#### Reciprocating pumps & rams

Operating temperatures	As valve stem
Maximum rod speed	2m/s
Max system pressure	25MPa/250bar

#### How supplied

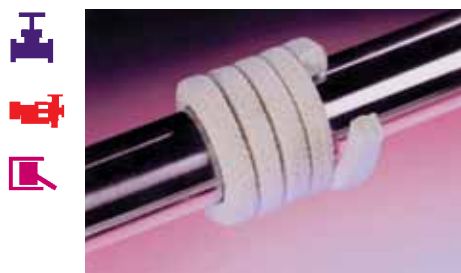
Ex-stock: all popular square sections from 3mm to 25mm, in boxes containing 8m. Also supplied as split preformed rings and sets. Full fitting instructions are included.



## Tough packings for harsh conditions

### Arasele®

Soft & tough replacement for yellow packings



#### Description

This top-performing clean white packing replaces the hard-fibre yellow products used for abrasion resistance. It effectively assists in overcoming the shaft/rod wear problems often experienced when inferior grades of aramid-based packing are used with abrasive slurries or aggressive chemicals.

Arasele® is braided from fine yarns of tough synthetic aromatic polymer fibre. The yarns are texturised and impregnated with PTFE dispersion before braiding over a central core of white elastomer. A silicone-free, inert and colourless lubricant is incorporated to provide swift running in.

#### Typical applications

Rotary or reciprocating pumps and valves that handle highly abrasive slurries or aggressive chemical solutions, typically in the mineral, pulp and paper, wastewater and chemical industries. Ideal for water, aqueous solutions and media needing a clean white non-staining packing.

With its rubber core, Arasele can absorb eccentric movement of shafts or rams that run out-of-true, and swiftly recovers from thermal or pressure shocks and cycling.

#### Prime features

- Kinder to shafts than traditional yellow packing under adverse conditions.
- Can eliminate unnecessary shaft wear.
- Resists abrasion and chemical attack.
- Resists hydrolysis — ideal for use with steam, water or hot aqueous solutions.
- Reduces stockholding, as can be used on most pumps and valves on a site.

#### Chemical properties

Compatible with media in range pH 0-13, including steam, fuels, oils, solvents, acids and alkalis. *(Chemical resistance is better than for aramid-based products.)*

#### Service capabilities



##### Valve stem duties

Maximum temperature	+285°C
Minimum temperature	-50°C
Max system pressure	15MPa/150 bar



##### Centrifugal pumps & rotary equipment

Operating temperatures	As valve stem
Maximum shaft speed	20m/s
Max system pressure	2.5MPa/25bar



##### Reciprocating pumps & rams

Operating temperatures	As valve stem
Maximum rod speed	1.5m/s
Max system pressure	10MPa/100bar

*(Note: Traditional aramid-based packings are usually limited to +250°C maximum.)*

#### How supplied

Ex-stock: all standard square sections to fit pump and valve glands, in boxes containing 8m. Also supplied as mould-formed rings and sets. Full fitting instructions are included.

## Non-hazardous silica fibre

### Valcor® Hi-Temp

Non-hazardous fibre construction for 1000°C



#### Descriptions

This innovative product is braided as a gland packing for high efficiency static and slow rotary sealing applications at up to 1000°C constant. It also fulfils other high temperature duties in different forms of construction.

Valcor® Hi-Temp is manufactured from an exceptionally stable fibre material that is soft, non-irritating, non-hazardous, and is not limited by World Health Organisation (WHO) or European Union (EU) restrictions.

The heat-resistant fibres are produced using advanced chemical fibre technology, then spun into a flexible yarn with a low percentage of glass fibre and Inconel® wire reinforcement. Our products are braided or woven from this specially developed and superior yarn.

The yarn contains no organic agents or processing additives. It therefore retains its physical and chemical properties at very high temperatures and does not decompose into hazardous substances as happens with many normal ceramics.

#### Typical applications

Compression packings of Valcor Hi-Temp are used for very high temperature

static sealing applications or slow rotary duties. It replaces ceramic yarn packing and radiation seals on BOS plant, and ceramic packings and vessel lid seals on secondary steelmaking plant.

Other examples include door seals for annealing furnaces at steelworks, kiln packings, protective surfaces on pottery kiln cars, and stem gland sealing on valves handling very high temperature gases.

Valcor Hi-Temp is also supplied in various other constructions for high temperature duties across industry, including:

- Braided insulation sleeves
- Webbing tapes
- Ladder tapes
- Twisted ropes
- Lagging ropes
- Blankets and paper
- Woven cloth.

#### Prime features

- Compression packing will seal efficiently at 1000°C, with excursions to 1100°C.
- Competitively priced, non-hazardous alternative to normal ceramic fibre based compression packings.
- Far better value for money than other non-hazardous high temperature materials such as those made of pure silica fibre.

#### Health & Safety considerations

Average diameter of the mineral fibre used in Valcor Hi-Temp is 9µm, which is considered **non-hazardous to health**.

No protection for breathing, eye, hand or body is required by the WHO or EU for the material's normal handling, storage or use. For further details, please refer to our Material Safety Data Sheet (MSDS) on Valcor Hi-Temp, which is available on request.

*Note: Normal ceramic fibres, as often used in the manufacture of very high temperature compression packings, are around 3µm in diameter. These much finer fibres are now considered **hazardous to health**, with WHO and EU restrictions applied to the products that contain them.*

#### Chemical properties

Valcor Hi-Temp is compatible with fluid media in the range pH 0-10, *excluding* hydrofluoric acid and hydrogen fluoride. It has excellent resistance to water, organic chemicals and other acids.

#### Service capabilities

Static duties — furnace doors	
Max temperature (constant)	+1000°C
Max temperature (intermittent)	+1100°C
Minimum temperature	-50°C

Valve stem duties	
Max temperature (constant)	+1000°C
Max temperature (intermittent)	+1100°C
Minimum temperature	-50°C

#### How supplied

As densely braided compression packings (square, round or rectangular) from 5mm to 100mm sections, in any length. Full fitting instructions are included.

All other constructions of Valcor Hi-Temp are manufactured to order.



## Tank lid seals

### Tankatite<sup>®</sup> range

Tankatite<sup>®</sup> represents state-of-the-art packing design and manufacture. This comprehensive range of tank lid packings has been constantly developed to meet increasingly stringent international regulations that cover the maritime transport of chemical and potentially hazardous cargoes. Extensions to the range cover the requirements of road and rail transport, and static or mobile tank containers.

#### Tankatite<sup>®</sup> 440

For all types of vessel



##### Description

A resilient elastomeric core, spirally wrapped with PTFE tape and surrounded with successive braided jackets of inert polypropylene yarn. Specially reinforced corners are incorporated to build the section to the required packing size. The braided structure is spirally wrapped with further layers of PTFE tape to provide an impermeable barrier to liquids and gases, then finally enclosed in a robust, abrasion resistant braid of PTFE yarns.

##### Typical applications

Sealing of tank lids, main hatches, inspection and cleaning covers on tankers carrying all known bulk liquid cargoes in all International Maritime Organisation (IMO) classes.

##### Specifications

- Meets US Coast Guard requirements for lid sealing of hazardous cargoes.
- Pressure tight beyond Lloyd's and DNV test criteria.

##### Prime features

- Gas-tight environmental seal.
- Protects cargo from sea water ingress.
- Withstands repeated opening/closing cycles.
- Unaffected by steam and other tank cleaning systems.
- Suitable for smooth recesses in stainless steel lids as well as those with rougher surface finishes.

##### Chemical properties

Inert to media in range pH 0-14, including all known bulk liquid cargoes in all IMO classes.

##### Service capabilities

Static duties — tank lids	
Maximum temperature	+120°C
Minimum temperature	-50°C
Maximum tank pressure	70kPa/0.7bar

##### How supplied

Any square or rectangular section of 12.5mm upwards is made to order; also endless rings to fit specific tank lid recesses. Full fitting instructions are included.

#### Tankatite<sup>®</sup> 660

For heated cargoes



##### Description

A heat resistant grade of Tankatite<sup>®</sup>. Similar in construction to Tankatite<sup>®</sup> 440, but with braided jackets of high quality glass fibre yarns instead of polypropylene.

##### Typical applications

Seals for tank lids that cover heated cargoes, such a molten bitumen, which need to be transported at elevated temperatures to prevent solidification in the tank.

##### Prime features

- Gas-tight environmental seal for heated cargoes.
- Protects cargo from sea water ingress.
- Withstands repeated opening/closing cycles.
- Unaffected by steam and other tank cleaning systems.

##### Chemical properties

Inert to media in range pH 0-14, including all known bulk liquid cargoes in all IMO classes.

##### Service capabilities

Static duties — tank lids	
Maximum temperature	+230°C
Minimum temperature	-50°C
Maximum tank pressure	60kPa/0.6bar

##### How supplied

Any square or rectangular section of 12.5mm upwards is made to order; also endless rings to fit specific tank lid recesses. Full fitting instructions are included.



## Tank lid seals

### Tankatite® 250

For road & rail tankers



#### Description

A modified form of Tankatite® 440, specifically developed for production at smaller and rectangular cross sections.

#### Typical applications

Seals to fit the smaller tank lid recesses of road and rail tankers.

#### Prime features

- Easy to cut and fit in small section lid recesses.
- Tough, resilient and long-life product.
- Withstands repeated opening/closing cycles.
- Controls emission levels from tanks.
- Protects tank contents from contamination.
- Withstands arduous cleaning systems.

#### Chemical properties

Inert to all chemical media in range pH 1-13 at normal operating temperatures, *excluding* fluorine gas.

#### Service capabilities

Static duties — tank lids	
Maximum temperature	+100°C
Minimum temperature	-30°C
Maximum pressure	50kPa/0.5bar

#### How supplied

As length form packing or endless rings, in sections to fit popular lid recess dimensions. Full fitting instructions are included.

### Tankatite® 880 Super

For static & mobile tank containers



#### Description

A clean, length form packing manufactured from an inert reinforced polypropylene yarn, impregnated with PTFE and an inert resin to provide a non-stick surface. It contains a resilient core for improved performance.

#### Typical applications

Seals for lids and fittings on tank containers for road, rail or static use, that contain chemicals, petroleum products or foodstuffs. Seals for lids and fittings on dedicated tanks that handle aggressive cargoes under an inert gas blanket. It can replace moulded rubber sealing components and low cost packings.

#### Prime features

- Excellent value for money.
- Equivalent performance to moulded rubber seals.
- Easy to cut and fit in small section lid recesses.
- Excellent sealing capability on repeated opening/closing cycles.
- Controls emission levels from tanks.
- Protects tank contents from external contamination.
- Withstands arduous cleaning systems.

#### Chemical properties

Inert to media in range pH 0-14, and totally compatible with a full range of cargoes, including chemicals, petroleum products and foodstuffs.

#### Service capabilities

Static duties — tank lids	
Maximum temperature	+120°C
Minimum temperature	-50°C
Maximum tank pressure	200kPa/2bar

#### How supplied

As coil form packing and endless rings, in sections to fit popular lid recess dimensions. Full fitting instructions are included.

## Complementary products & services

### Pre-formed packing rings

*Precision moulded to fit each gland*



#### Description

Precision moulded rings of our length-form compression packings, custom-made to an exact fit for a specific gland.

#### Typical applications

Widely used by valve and pump manufacturers for convenience and surety of installation during equipment assembly. They are also recommended for on-site maintenance and/or refurbishment when operating conditions are severe in terms of pressure and/or chemical attack.

#### Prime features

- Ease of installation.
- Minimum initial adjustment needed.
- Precise fit in gland for high integrity sealing.
- Accurately controlled packing density for duties at higher than normal pressures.

#### Service capabilities

The pressure rating of standard length form packings can often be significantly increased by special moulding techniques during the manufacture of rings. *Please discuss your specific applications with our Technical Support Team.*

#### How supplied

**Sets of rings** are custom-moulded to order and supplied with either butt or scarf cut joins as required. **Special sets** can be designed and manufactured to combine the advantages of two or more packing products, and/or supplied with extrusion resistant end rings and spacers.

### Packing Ring Cutter

*Easy-to-use hand tool for scarf joints*



#### Description

A robust and accurate cutting jig that simplifies the production of perfectly matching 45° scarf joints on packings.

#### Prime features

- Removes guesswork in cutting scarf joints for reliable sealing of valves and pumps.
- Simple to use for on-site maintenance and workshop-based refurbishment.
- Made from strong aluminium-alloy extrusions.
- Contains two precision scales: one for packing section, the other for inside diameter of ring.
- Supplied with knife to cut the toughest synthetic yarn packings. *Note: please follow local safety instructions for hazard-free use; also wear cut-resistant gloves.*

#### Service capabilities

Suitable for packing sections of 3mm to 20mm, and ring inside diameters of 10mm to 140mm. Just match the section of the packing to the ring inside diameter required, then simply cut the exact ring length required with perfect scarf joints.

#### How supplied

Ex-stock: boxed and labelled, with full instructions included.

### Packing Extractors

*Trouble free removal of old packings*



#### Description

Highly effective and widely used extraction tools, with a long flexible shank to gain access to glands in difficult positions. The corkscrew tips are designed to embed firmly in all types of length-form packing, including badly worn and hardened products. A T-handle provides good grip for both screw action and the efficient removal of packing.

#### Service capabilities

- Size 1: 5mm and 6.5mm packings.
- Size 2: 8mm and 10mm packings.
- Size 3: 11mm, 12.5mm and 16mm packings.
- Size 4: 20mm packings and larger.

#### How supplied

**Fixed-tip extractors:** individual sizes, or as full set of Sizes 1 – 4.

**Replaceable-tip extractors:** individual sizes, or as full set of Sizes 1 – 4.

**Replacement tips:** supplied individually.

## Complementary products &amp; services

**Copper Anti-Seize Compound**

General purpose lubricant paste

**Description**

High purity anti-seize lubricant in paste form. Comprises copper and graphite particles in a high melting point petroleum carrier. Contains no added lead.

**Typical applications**

Prevention of seizing, galling, thread damage and high friction problems on bolts, studs, valve stems, pipe fittings, press fits, etc.

**Prime features**

- Can be used at up to 1000°C.
- Easy to apply by brush.
- Good adhesion.
- Excess can be wiped free.

**Chemical properties**

Sample analysis of elemental impurities shows:

- Chlorine & zinc <100ppm each.
- Sulphur <50ppm.
- Fluorine <15ppm.
- Lead <5ppm.
- Cadmium, mercury & tin <2ppm each.

**Service capabilities/properties**

Maximum temperature	+1000°C
Flash point (carrier)	+240°C
Drop point (carrier)	Infusible

**How supplied**

Ex-stock: packs of 10 x 200g tubes or 500g tubs. Other quantities supplied on request.

**Silicone Grease**

General purpose lubricant

**Description**

A translucent gel that combines the properties of silicone fluid with a degree of structure to provide a stiff consistency.

**Typical applications**

A versatile grease for lubricating packings and seals prior to installation, as well as valves and taps used in the processing and potable water industries. Can be used as an anti-seize compound, and also gives a degree of protection against dust, moisture, chemicals and corrosion.

**Specifications**

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

**Prime features**

- Excellent lubricating performance across wide temperature range.
- Very low order of toxicity.
- Wide chemical resistance.
- Safe to use with most rubbers and plastics.

**Chemical properties**

Compatible with most engineering materials, including rubbers and plastics, but *excluding* items made from silicone or fluorosilicone compounds. Low halogen content: <20ppm chloride.

**Service capabilities/properties**

Maximum temperature	+200°C
Minimum temperature	-50°C
Flash point	>+300°C

**How supplied**

Ex-stock: packs of 10 x 175g tubes or 1kg tubs. Other quantities supplied on request.

## Custom-designed & non-standard products



We are expert in the custom-design and manufacture of compression packings and other braided products to solve specific problems for industry.

When you want products that are outside our standard size range — just ask. We make lengths or rings to order on our automated braiding and plaiting machines.

And, when your working parameters fall beyond the scope of our standard products, our in-house development team will work to create new or modified packings to meet your requirements.

### Non-standard products

The vast majority of items listed in this guide are held in stock. The following is a small selection of products we have developed to meet unusual demands and now manufacture to order.

### Soot blower packing rings (LRCM056):

Based on knitted copper wire and graphite yarns, these tough, dense packings will combat wear and resist the action of excessive lance movement.

### Graphite-free Hornet (LRCM085):

Similar to our Hornet packing (page 13), but cross-plaited with aramid fibres at the corners and PTFE yarns at each side. For use with abrasive media where graphite materials cannot be tolerated.

### Braided glass yarns (LRCM190):

Various types of special compression packing made from braided glass yarns. Round, square and rectangular sections are available in different densities. Yarns can also be braided over rubber cores.

**Grafpak with wire (LRCM275):** Wire-reinforced version of our graphite-based Grafpak packing (page 11) for high temperature/pressure applications.

**Aramid with PTFE (LRCM370):** Specially developed valve stem packing made from PTFE yarns containing an aramid core.

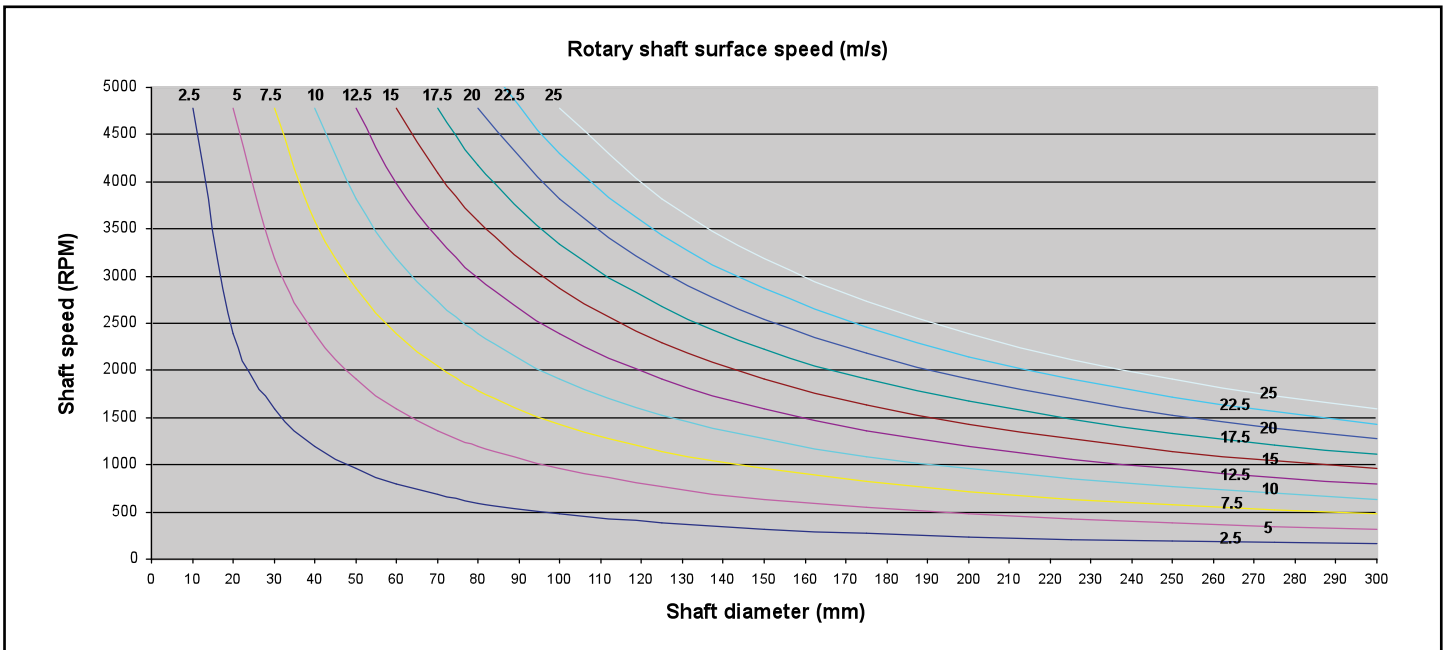
**Silicone-coated braided glass sleeving:** Protects cables and pipes from excessive heat or impact by hot particles.

### Other related products for industry:

- Glass webbing tape and ladder tape.
- Cloths.
- Rope/pipe lagging.
- Twisted cord.
- Sewing twine.
- Gauge glasses and seals.
- Packing sleeves with eyelets.

## Shaft surface speeds

This graph presents a range of rotary shaft surface speeds for given shaft diameters and RPM. It is for guidance only.





## James Walker in action

### Immediate supply



We will supply you with compression packing products, when and where you need them.

Our automated warehouse holds over 200,000 types and sizes of different sealing products ready for same day despatch. These include vast stocks of compression packings in all popular sizes and grades used by industry.

A close-knit network of James Walker companies and official distributors covers over 100 countries. This is supported by a web-based system and a highly developed logistics operation to give you surety of supply for JIT regimes and your normal maintenance schedules.

### Research & development



Teams of scientists and development engineers at the James Walker Technology Centre work at the leading edge of fluid sealing knowledge. They deliver the new materials, products and manufacturing techniques that improve the sealing of today's plant and meet tomorrow's sealing demands.

They also work on joint venture research projects with other organisations in the European Sealing Association – of which we are a founder member – and sponsor high-level research in partnership with world leading users of sealing technology.

In addition to our in-house test laboratories that verify the viability of our materials and seal designs, we regularly commission independent test houses across the world for third-party certification of our products to international and industry standards.

### James Walker customer support



We aim to supply you with the very best:

- Customer service
- Technical support
- Fluid sealing products
- Delivery
- After sales service.

Our high technology Customer Support Centre leads the fluid sealing industry with its service to tens of thousands of customers worldwide.

On-site technical advice comes from our local teams backed by highly experienced applications engineers and James Walker Technology Centre. Together they have the knowledge and facilities to solve any relevant fluid sealing problem for our customers.

User training is another important service we provide. Our specialists regularly host sessions to instruct plant engineers and designers in the selection and installation of sealing products.

### James Walker quality



We select the best raw materials for each product and use advanced manufacturing techniques with strict quality control and traceability at every stage. This culminates in an exacting inspection procedure for the finished product. Stockholding and distribution meet similar exacting standards.

Our quality systems are third-party registered to ISO 9001 and AS/EN 9100. We are also regularly assessed and quality approved by a wide range of industry bodies and individual customers, including multinational corporations, utilities and government organisations.



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## Trademark acknowledgements

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

Trademark	Company
GFO®	WL Gore & Associates
GORE®	WL Gore & Associates
Inconel®	Special Metals Corporation

## General 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. SDS (Safety Data Sheets) 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](http://www.jameswalker.biz).

**Environmental statement:** This brochure is manufactured using advanced environmentally friendly technologies and follows the strict environmental standard BS EN ISO 14001. Made from chlorine-free pulp (ECF) with post-consumer recycled fibre obtained from sustainable wood forests, and printed using vegetable-based inks, by Binfield Printers Ltd. For those who wish to reduce further their impact on the environment, this publication is also available as a PDF from: [www.jameswalker.biz](http://www.jameswalker.biz).

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