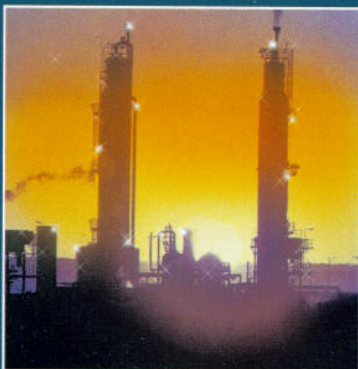
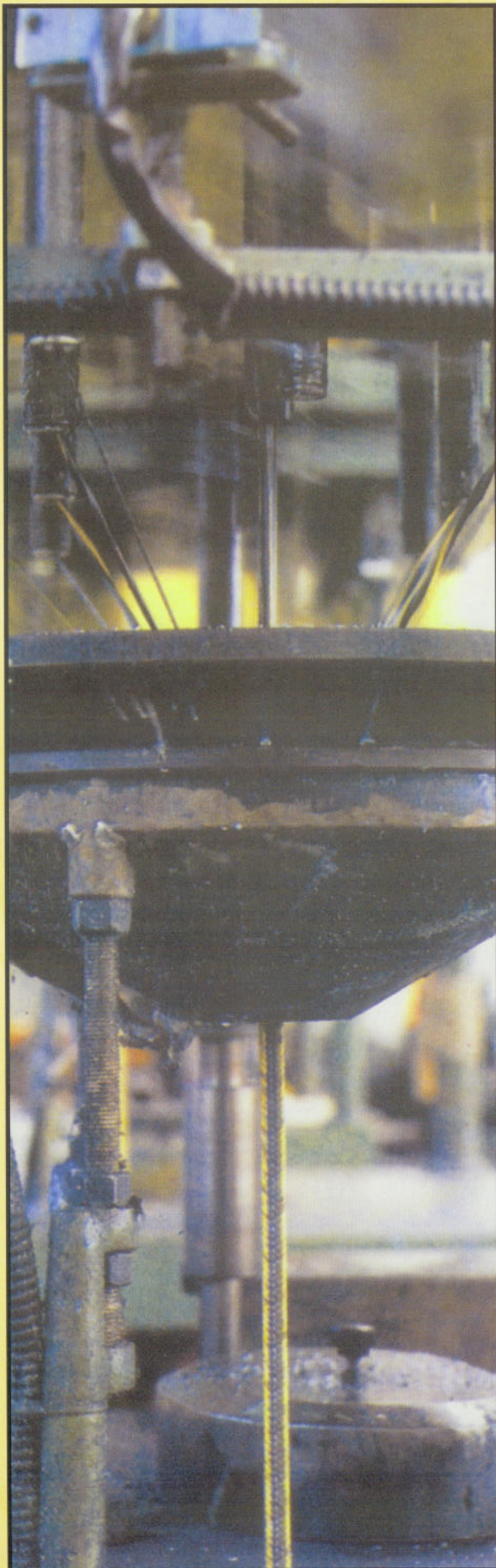


# Vulcan<sup>TM</sup> Mechanical Gland Packings







# VULCAN

## GLAND PACKINGS

Vulcan offer an extensive range of gland packings designed and constructed to minimise maintenance costs. Our philosophy is to offer the most suitable packing for each application from the wide selection available, using the most advanced packing fibres, the highest quality braiding methods and the best lubrication processes.

The actual cost of a packing is often less than 3% of the cost of utilisation when compared to the total cost of plant downtime, equipment wear, product or fluid loss, labour and gland maintenance.

It is therefore of paramount importance when specifying a gland packing to choose from the best modern packing fibres available, using the most advanced and durable, square inter-braid construction. Combining this quality, with extensive stock holding and experienced technical advice, completes the Vulcan packing service.





## PACKING CONSTRUCTION

All Vulcan™ packings are square-braided on the most advanced specification braiding machines available. Twenty four and thirty six track braiders are utilised to produce four-ply, square inter-braid packings on all sizes from  $\frac{3}{8}$ " (10mm) upwards. Fibres are run from the core of the packing section to the corner-posts and surfaces, whilst being cross-locked in a square, lattice construction, to produce maximum resilience and a highly dense, square packing.

The quality of a packing's braiding significantly affects the service life of the packing. Packings produced using smaller or outdated braiding machines lack the strength of true Cross-lock construction, are less dense and are not as square in cross-section. The looser the braid of a packing, the lower its durability will be. Additionally, greater gland pressure is required to perform a seal, resulting in increased mechanical stress. As the packing deteriorates, frequent gland adjustments are required, causing more mechanical stress on the packing, leading to accelerated failure.

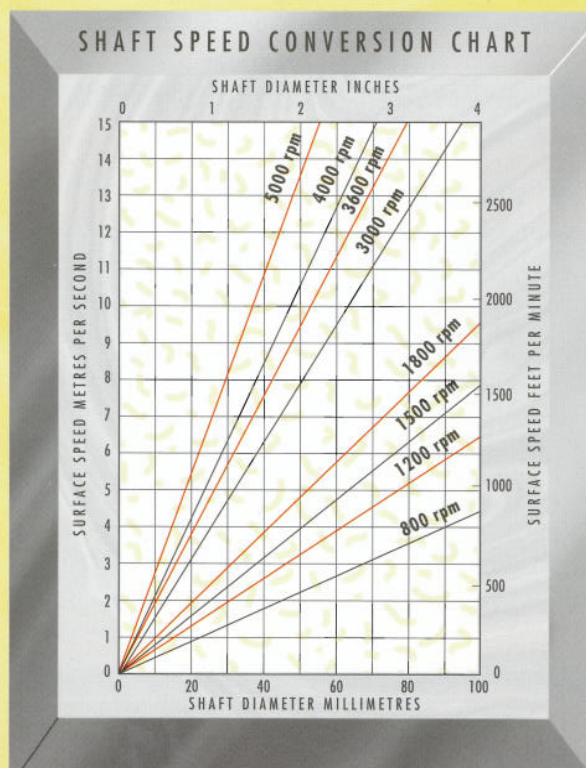
Vulcan™ packings show a high degree of resilience and consistency of volume. Their superior, lattice, square inter-braid construction needs less gland pressure to seal, resulting in reduced equipment wear, reduced gland maintenance and increased packing life.

### IMPORTANT NOTICE

All information in this brochure is given in good faith, but without warranty, and is based on our functional evaluations, experience and published technical data.

As such, the Service Capabilities shown in this brochure are indicative only. Particularly, they should not be used in conjunction as maximums applicable in any application. Service and equipment conditions greatly affect product capability and performance.

The purchaser should thoroughly test any application and independently conclude satisfactory performance of the product, for his intended use.







## PAN FIBRE PACKINGS

### TYPE VT2



#### SERVICE CAPABILITY

Pressure Rating: 100 Bar	Rotary Speed: 18m/s
Temperature: -40 +250°C	pH Range: 2-14

### Product Information

Vulcan™ VT2 is braided from pure Poly Acrylic Nitrile (P.A.N.) fibres which are the basis of the outstanding capabilities and performance of our PAN Fibre Packings. To maximise the performance of this remarkable synthetic fibre, VT2 is thoroughly impregnated, yarn by yarn, with heavy PTFE dispersion and further treated with special lubricants. Type VT2 has been specifically designed to replace traditional packings, giving enhanced performance without the shaft wear problems or the elevated costs of other synthetic fibres.

VT2 is a true, high specification, process industry packing. The combination of an exceptional packing fibre with advanced lubrication, gives a clean, smooth running packing, for extended life even at high shaft speeds and pressures within a wide Ph and temperature range.

### Applications

Wide variety of process plant including pumps, valves, mixers, reactor vessels and reciprocating applications. Against general chemicals, solvents, oils, water and steam. A wide ranging packing, for use in arduous conditions in process applications, especially where alternative packings contaminate, cause excessive wear or require frequent maintenance and replacement. VT2 does not contaminate nor stain, making it particularly suitable for use in the food, water and paper industries.

### TYPE VG2



#### SERVICE CAPABILITY

Pressure Rating: 80 Bar	Rotary Speed: 10m/s
Temperature: -50 +250°C	pH Range: 4-12

### Product Information

Type VG2 is constructed using a composite yarn manufactured from high-quality PAN fibres combined with pure Carbon fibres. The in-built lubrication and superior packing fibre properties of this composite yarn are further enhanced by a thorough graphite impregnation and high temperature lubricants.

Vulcan™ VG2 is a soft, conformable packing, with a square, inter-braid, lattice construction, which creates improved sealing contact with less gland pressure. The self-lubricating PAN fibre, re-inforced with Carbon and heavily coated and impregnated with graphite lubricants, practically eliminates shaft scoring. VG2 gives extended packing life, with reduced shaft wear and gland maintenance.

### Applications

Vulcan™ Type VG2 is an exceptional performance and cost general purpose packing suitable for most plant applications. Designed to replace and out-perform traditional Graphited Asbestos, Glass Fibre and Natural Fibre packings. Suitable for use against oils, water, steam, solvents and general chemicals.

### TYPE VT6 TANK LID PACKINGS



#### SERVICE CAPABILITY

Pressure Rating To Tank Test	Rotary Speed: Static Only
Temperature: -40 +250°C	pH Range: 1-14

### Product Information

Vulcan™ VT6 is a static use variant of our Type VT2 which has been specifically designed and produced for Man-Lids on Tanks. VT6 is dense, square inter-braided from P.A.N. fibres that are thoroughly impregnated with P.T.F.E. dispersion.

Increasing environmental awareness and legislation make consideration of the material, braid quality and performance of Tank Lid Packings of paramount importance. Vulcan VT6 is widely used in the static and road tank industry as the quality example of a braided tank packing.

For the increased resilience of a rubber core, we offer Vulcan Type VS2. This is our Type VT6 braided round a Silicone Rubber Core. Vulcan Type WW31 is manufactured from pure P.T.F.E. fibres with a rubber core to provide a static seal on large tank covers.

Vulcan VT6 is available from stock in all standard road tank sizes whilst Types VS2 and VW31 are produced to order.

### Applications

Man-Lids, Tank Covers and Hatches against all chemicals that are compatible with PTFE.





## GLASS FIBRE PACKINGS

### TYPES VG8L/VG8D



#### SERVICE CAPABILITY (VG8L)

Pressure Rating: 150 Bar	Rotary Speed: 12m/s
Temperature: -40 +280°C	pH Range: 2-12

#### Product Information

Vulcan™ VG8L is interbraided from continuous filament, textured, air-blown glass yarns. The glass fibres are heavily lubricated and thoroughly impregnated with PTFE dispersion and an inert lubrication, both prior to and subsequent to braiding.

Vulcan VG8L can replace traditional packings in general, non-arduous duties, whilst being of superior square inter-braid construction. Consider that Type VG8L's air-blown glass fibres are kinder to the shaft and you have a naturally square packing that will seal with less gland pressure, significantly reduce shaft wear and gland adjustment and thus increase packing life in light duties.

#### Applications

Type VG8L is a smooth, cool running packing for a wide variety of uses in a plant. Particularly useful on water and mildly abrasive slurries, solvents and chemicals in reciprocating and centrifugal pumps, mixers and valves.

Vulcan alternative Type VG8D is the self-same packing but the inert lubricants are replaced by an increased PTFE dispersion. VG8D is designed as a valve packing that is also suitable for a variety of static or slow moving applications up to 4 m/s.

### TYPE VG1D



#### SERVICE CAPABILITY

Pressure Rating: 250 Bar	Rotary Speed: 1m/s
Temperature: -100 +550°C	pH Range: 4-11

#### Product Information

Vulcan™ Type VG1D is square braided from continuous filament, textured glass fibres re-inforced with Inconel wire and impregnated yarn by yarn with pure Graphite powder and a corrosion inhibitor.

Type VG1D Graphited Glass packing is designed as a substitute to classic Asbestos packings with high temperature capability. The addition of Inconel wire reinforcement results in a true high pressure and high temperature traditional valve packing that has the advantage of being non-asbestos.

#### Applications

General purpose, non-asbestos valve packing against steam, water, oils, air, alkalis, mild acids and chemicals. Not suitable for very arduous conditions.

### TYPE VG1L



#### SERVICE CAPABILITY

Pressure Rating: 150 Bar	Rotary Speed: 10m/s
Temperature: -100 +480°C	pH Range: 4-11

#### Product Information

Vulcan™ VG1L is an alternative packing for light duties. VG1L is interbraided from continuous filament, textured air-blown glass fibres thoroughly impregnated with mineral oil lubricants and graphite. A dressing and corrosion inhibitor is further applied to the yarns to improve wear resistance.

Type VG1L will handle non-mechanically demanding Plant Applications whilst requiring low gland pressure to seal thus reducing shaft wear and gland maintenance.

Specify Type VG1L for general plant service, at elevated temperatures, only if Carbon or Graphite fibres are not required. Glass fibres offer exceptional temperature resistance but are relatively low strength. Up to 250°C, use Vulcan VG2 for superior performance or Type VK1L where higher mechanical load or very abrasive conditions exist. At higher temperatures, Types VC5 or VG4 are preferred.

#### Applications

General purpose packing for rotary and reciprocating pumps, mixers and valves against steam, water, oils, air, alkalis, mild acids and chemicals.





## KEVLAR ARAMID FIBRES

### TYPE VK4B



#### SERVICE CAPABILITY

Pressure Rating:	400 Bar	Rotary Speed: 15m/s
Temperature:	-100 +280°C	pH Range: 1-13

### Product Information

Vulcan VK4B is an interlace, square braid packing manufactured from KEVLAR Aramid fibres impregnated with PTFE dispersion and specially treated with high temperature break-in lubricant. KEVLAR offers a unique combination of extremely high tensile strength, lasting resilience, low thermal expansion, low coefficient of friction and wide chemical resistance.

Vulcan VK4B KEVLAR gold fibre packing is a true multi-service packing that is well suited to the needs of many industries, particularly where physical strength in a packing is required. The strength of KEVLAR is ideal for use as anti-extrusion, abrasion resistant, back-up rings, with other packing types, to increase the life of any packing combination.

### Applications

For pumps (rotary and reciprocating) and valves, including high pressure or high mechanical loading conditions, against abrasive slurries, sewage, effluents, water, oils, solvents and most chemicals.

The non-staining, superior lubrication of Vulcan VK4B leads to less wear and a higher shaft speed capability than some other KEVLAR packings. Suitable for use in the paper industry.

### TYPE VK4T



#### SERVICE CAPABILITY

Pressure Rating:	250 Bar	Rotary Speed: 15m/s
Temperature:	-100 +280°C	pH Range: 0-14

### Product Information

Vulcan VK4T combines the physical strength of KEVLAR with the sealing properties of TEFLON fibres. The packing is further lubricated yarn by yarn with PTFE dispersion and inert lubricants.

VK4T, KEVLAR and PTFE fibre packing, is square inter-braided to maximise the benefits of these two remarkable fibres. KEVLAR fibres are specially braided from the core to the corner-posts for dimensional stability and to take maximum advantage, within the packing construction, of the yarns steel-like strength. The TEFLON yarns are braided to the packing surfaces to enhance sealing capability.

### Applications

Vulcan Type VK4T combines low-friction, complete pH range chemical resistance with high mechanical and dimensional strength. A wide ranging packing, for specification especially in high pressure conditions in chemical or abrasive applications, where alternative single fibre packings may extrude or cause significant shaft wear.

The construction and materials of VK4T makes this packing ideal for piston sealing on reciprocating, chemical, slurry and high pressure pumps.

### TYPE VK4



#### SERVICE CAPABILITY

Pressure Rating:	150 Bar	Rotary Speed: 20m/s
Temperature:	-100 +280°C	pH Range: 1-13

### Product Information

Vulcan VK4 is manufactured from KEVLAR Aramid fibres. In order to get maximum benefit from this material, VK4 is specially treated with a high concentration of resilient, food quality lubricants and heavy PTFE dispersion. The resulting packing significantly reduces the shaft wear problems which have sometimes been associated with other KEVLAR packings and, with this increased lubrication, higher shaft speeds of up to 20m/s can be handled. VK4, KEVLAR Aramid fibre lube packing, is a durable, economic general service packing for 80% of plant needs. The strength of fibre and construction of Vulcan VK4 leads to long packing life with extended periods between necessary gland adjustments.

### Applications

For rotary and reciprocating pumps, stern glands, hydraulic presses, mixers and valves against abrasive slurries, sewage, effluents, water, oils, solvents and all bar the most aggressive chemicals.

Non-staining lubrication and resilient performance make Vulcan VK4 ideal for use in the paper industry.





## ARAMID PACKINGS

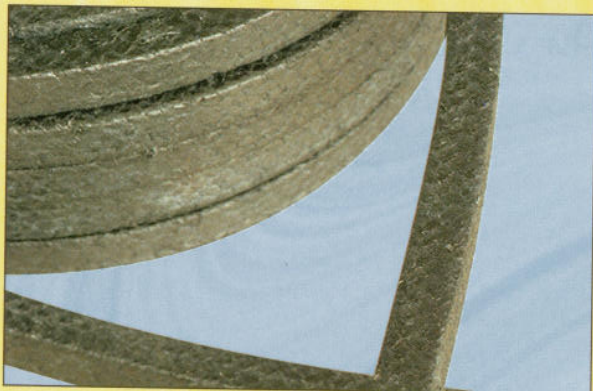
### TYPES VM1/VM5



#### SERVICE CAPABILITY

Pressure Rating:	130 Bar	Rotary Speed: 20m/s
Temperature:	-100 +250°C	pH Range: 2-12

### TYPES VK1L/VK1D



#### SERVICE CAPABILITY

Pressure Rating:	VK1L-200 Bar; 400 Bar VK1D	Rotary Speed: 12m/s-VK1L 1m/s-VK1D
Temperature:	-100 +300°C	pH Range: 1-13

### TYPE VK5



#### SERVICE CAPABILITY

Pressure Rating:	250 Bar	Rotary Speed: 25m/s
Temperature:	-150 +280°C	pH Range: 0-14

### Product Information

Vulcan™ VM1 is a Universal Paper-Mill and Sugar-Mill Packing, made of a unique Aramid composite fibre. This special fibre combines an exceptionally high tensile strength (27,000 Kg/cm<sup>2</sup>), outstanding heat resistance, linked to low friction and excellent cool running properties.

This is a strong Thermoset Fibre Packing but it is also extremely soft, assisted by our exclusive, three-stage, lubrication process. The low-friction factor reduces abrasion to upto 1/10 that of Aramidic Fibres, giving high reliability and life, even in the most demanding of applications. VM1 is heat resistant and will not glaze, like usual Paper Mill & PTFE Packings, even at high shaft speeds.

Type VM5 is a very similar product in more economical form. It will provide the same service but care must be taken not to over-tighten the gland nor starve the packing of product or flush lubrication.

### Applications

Universal Paper-Mill, Sugar-Mill and demanding application Packing, that is white non-staining, with excellent chemical resistance and is suitable for Kraft processes. Easy to cut and install, fast to break-in and with low susceptibility to adverse conditions, at installation or in-use.

### Product Information

Vulcan™ Type VK1L has been designed to replace and outlast traditional packings, particularly in abrasive media and high pressure rotary applications. VK1L is a square-braided packing made from KEVLAR Aramid fibres thoroughly impregnated with pure Graphite powder and inert lubricant. The performance of the packing is further enhanced with corrosion inhibitors and Molybdenum Disulphide lubricant.

Vulcan Style VK1D is inter-braided from KEVLAR Aramid fibres further re-inforced with Inconel wire and impregnated with pure graphite and a corrosion inhibitor.

### Applications

VK1L is a general purpose, wide-ranging, durable arduous duty packing. For use in rotary, reciprocating and static applications particularly against abrasive fluids, weak chemicals and water.

Vulcan VK1D is a high strength valve packing also suitable for plunger pumps, turbines and static seals. Particularly for use against oils, air, water, hot steam and asphalt.

### Product Information

Vulcan™ Type VK5 combines the benefits of the remarkable properties of two outstanding gland packing fibres. GFO has the best combination of features of any packing fibre but it may extrude or deteriorate in high mechanical loading conditions. The addition of DU PONT'S KEVLAR adds steel-like strength. VK5 GFO KEVLAR combi-packing is square inter-braided to add the strength of KEVLAR where it is most needed on the corner-posts. KEVLAR fibres are specially braided from the core to the corner-posts for dimensional stability and to resist extrusion. The GFO yarns are braided to the packing surfaces to enhance smooth running and sealing capability.

Vulcan VK5 is THE packing for extended life in high pressure or mechanical load conditions, particularly on worn or large tolerance equipment and in the most demanding chemical environments. Shaft wear is virtually eliminated, and high speeds and aggressive chemicals can be handled, because of the presence of GFO on the sealing faces. Extrusion and gland maintenance is negligible, even in the most arduous of applications, due to the inter-locked braiding of KEVLAR.

### Applications

Type VK5 combines mechanical strength with surface lubricity to give a long lasting, high performance sealing, near universal packing, for use in all rotary, reciprocating and static gland applications.





## PTFE PACKINGS

### TYPE VT9D



#### SERVICE CAPABILITY

Pressure Rating: 200 Bar	Rotary Speed: 6m/s
Temperature: -200 +280°C	pH Range: 0-14

### TYPE VT9L



#### SERVICE CAPABILITY

Pressure Rating: 120 Bar	Rotary Speed: 12m/s
Temperature: -40 +280°C	pH Range: 0-14

### TYPE V02



#### SERVICE CAPABILITY

Pressure Rating: 200 Bar	Rotary Speed: Static only
Temperature: -100 +260°C	pH Range: 0-14

### Product Information

Vulcan VT9D is solely manufactured from pure PTFE in the form of fine multi-filament yarns. The PTFE yarns are further vacuum impregnated with PTFE dispersion to enable the packing to handle steam and gas services as well as liquids.

This PTFE packing offers exceptional chemical resistance along with high strength and low coefficient of friction. The interbraid construction and the fact that VT9D will not harden in service over many years usage, ensures that "a valve packed with VULCAN VT9D is packed for life."

As a packing seal, VT9D is far superior to machined or moulded PTFE rings in that its tensile strength is 20 times higher, but at a fraction of the cost. VT9D has a tensile strength of up to 50,000 PSI (3,500Kg/cm<sup>2</sup>).

### Guarantee

Vulcan VT9D is guaranteed to last the life of the valve into which it is packed. Should the packing fail it will be replaced free of charge.

### Applications

For low speed pumps, mixers, reciprocating rods and valves against up to the strongest chemicals, solvents and steam. Exceptions are molten and alkali metals and fluorine.

### Product Information

Vulcan Type VT9L is braided from pure PTFE fibres, in the form of multi-filament yarns, vacuum impregnated with PTFE dispersion and saturated with chemically resistant lubricants. The PTFE fibres are pre-shrunk and square inter-braided to produce a dimensionally stable packing.

Type VT9L chemical pump packing exhibits high mechanical strength and high operational stability under demanding operation conditions, in addition to excellent non-friction characteristics.

Shaft wear is virtually eliminated and Vulcan VT9L is capable of performing in service conditions far beyond conventional packings.

### Applications

The enhanced lubrication and multi-filament yarn treatment of Vulcan VT9L allows greatly extended service capability in pumps up to 12/ms surface shaft speed. For use against solvents and virtually all chemicals with the exceptions of molten and alkali metals and fluorine.

Specify VT9L to replace VT9D in higher speed, or in the most corrosive, duties.

### Product Information

Vulcan Type V02 is a braided flange gasketing tape made from strong, resilient PTFE yarns thoroughly impregnated with PTFE dispersion and inert lubricants. V02 is made in widths from  $\frac{3}{4}$  to 2" (20 to 50mm) with  $\frac{1}{8}$ " or  $\frac{1}{4}$ " (3 or 6mm) thicknesses available.

The construction of Vulcan Type V02 PTFE Gasket Tape has been specially designed to create a gasket that is particularly easy to compress. Type V02 may be utilised as a near universal gasket on chemicals. It is especially suited for use with glass or metal flanges, where low flange pressure or flange irregularities require easy compression of the gasket.

The tough, braided yarn, construction greatly reduces the creep problems associated with standard solid, or envelope, PTFE gaskets whilst the conformability of V02, allows the gasket to take up flange irregularities, which are beyond the capabilities of relatively hard cut gasket materials. Style V02 is supplied in rolls to form gaskets which removes the need to stock individual cut gaskets.

### Applications

Vulcan Type V02 forms an endless seal for any diameter flange on chemical reactor vessels, tank covers, ducts, etc. Vacuum can be sealed up to 30" Hg. The maximum pressure this product can handle is strongly determined by temperature and other factors. Care should be taken when first installed.





## PTFE GRAPHITE PACKINGS

### TYPE VP1



#### SERVICE CAPABILITY

Pressure Rating: 120 Bar	Rotary Speed: 25m/s
Temperature: -200 +280°C	pH Range: 0-14

### Product Information

Vulcan Type VP1 is 100% GORE GFO fibre packing. This remarkable yarn is constructed from PTFE and Graphite intimately blended and locked and then treated with a high temperature, break-in lubricant. Vulcan VP1 is an outstanding packing for use in aggressive or arduous duties including the most difficult chemical environments. It is essentially chemically inert over the entire pH range. The unique combination of locked Graphite and PTFE creates a yarn with very high thermal conductivity, that does not harden, shrink, swell nor dry out and that is exceptionally smooth running with negligible shaft wear. User experience with GFO fibre has shown that, in practically all cases, greatly extended service life can be expected.

In order to obtain maximum benefit from this fibre, Vulcan VP1 is square interbraided via a CROSS-LOK process. The construction of VP1 increases the durability of the packing and reduces the gland pressure required to perform a seal. Periods between gland maintenance and packing replacement are thus even further extended and Type VP1's CROSS-LOK braiding helps overcome extrusion problems, which can be the one negative of this fibre, particularly in lower quality braids.

### Applications

See below as per Style VP2.

### TYPE VP2



#### SERVICE CAPABILITY

Pressure Rating: 120 Bar	Rotary Speed: 25m/s
Temperature: -200 +280°C	pH Range: 0-14

### Product Information

VP2 packing is manufactured from 100% Vulcan Type G1 fibre. This newly developed outstanding yarn is very similar in material construction to the original GORE GFO fibre and has been manufactured to optimise performance at an improved cost.

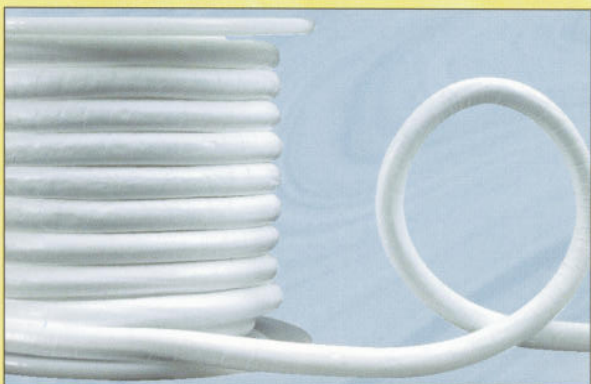
G1 yarn is constructed from PTFE tape and Graphite inter-locked to create a true synergy between these two premier packing materials. High temperature break-in and running lubricants are added to the yarns, prior to braiding in our CROSS-LOK lattice. The result is an exceptional process packing that gives, often many times, longer service life in the vast majority of applications. With the exceptions of high mechanical load (highly abrasive media or high pressure) or temperatures above PTFE's limit of 280°C, Vulcan VP2 is the ultimate packing.

Vulcan VP2 resists all chemicals across the entire Ph range (except Oleum, Aqua Regia, fuming Nitric Acid and Fluorine), is self lubricating and does not shrink, harden nor dry out. The packing is very cool running with exceptionally good thermal conductivity thus practically eliminating shaft scoring.

### Applications

For use wherever the value of the best quality and material packing can be realised. Since the actual purchase cost of a packing is typically only 3% of the true utilisation cost, Vulcan recommend these PTFE GRAPHITE packings for all possible applications. They will increase service life whilst minimising wear and gland adjustments, against nearly all media in static, rotary and reciprocating uses.

### TYPE VT8



#### SERVICE CAPABILITY

Pressure Rating: 150 Bar	Rotary Speed: 1m/s
Temperature: -100 +260°C	pH Range: 0-14

### Product Information

Vulcan Type VT8 is supplied as a double construction of a 100% unscintered PTFE core with a spiral covering of PTFE tape. VT8 provides the versatility of an extruded malleable core with the additional strength and extrusion resistance of the PTFE tape covering. The result is a low friction, extrusion resistant, TEFLON packing with near universal chemical resistance.

VT8 will not harden nor shrink in application and provides an instant packing and instant gasket on one very economical spool. In valves, wrap VT8 round the stem to fill the gland (no need for cut rings), tighten the gland follower and the PTFE moulds to form a tight leak free seal. VT8 is guaranteed to last the life of the valve to which it is fitted.

### Applications

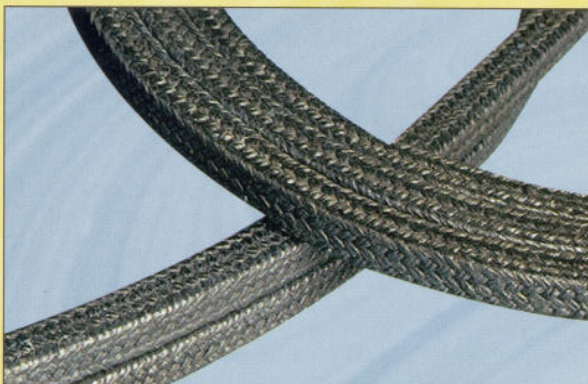
Universal PTFE sealing material for gasketing and life-long valve packing. For practically all chemicals. Not suitable for liquid or gaseous oxygen.





# CARBON GRAPHITE FIBRES

## TYPE VG4



### SERVICE CAPABILITY

Pressure Rating: 300 Bar	Rotary Speed: 20m/s	pH Range: 0-14
Temperature: up to 427°C in oxidising environments		
Temperature: up to 2760°C in inert environments		

## TYPE VR4



### SERVICE CAPABILITY

Pressure Rating: 300 Bar	Rotary Speed: 30m/s	pH Range: 0-14
Temperature: -100 +650°C (Inert ATM)		
Temperature: -100 +450°C (In Air)		

## TYPES VC5/VC51



### SERVICE CAPABILITY (VC5)

Pressure Rating: 200 Bar	Rotary Speed: 15m/s
Temperature: -150 +350°C	pH Range: 3-12

## Product Information

Vulcan™ Type VG4 is a 100% pure Graphite packing which is capable of near universal application. VG4 is inter-braided from pure Graphite yarn impregnated fibre by fibre with pure Graphite powder. The Graphite powder increases the natural sealing effect of the Graphite yarns and acts as a surface lubricant to produce a virtually non-scoring packing.

Graphite fibre is superior to any other yarn in the degree to which it combines outstanding packing properties, namely; excellent thermal conduction, smooth running, near universal chemical resistance and extreme temperature capability. The use of Vulcan Type VG4 pure Graphite fibre packing provides the opportunity to extend the use of the packed gland into extreme areas of speed, temperature and chemical resistance. In more normal applications, the quality of Type VG4 will result in maintenance savings many times in excess of the actual packing cost.

## Applications

For pumps and valves in extreme conditions or where the value of the best quality packing can be realised. Universal chemical resistance (sole exceptions are fuming nitric acid, oleum, aqua regia and fluorine.) Suitable and certified for use in nuclear power plants. Percentage of soluble chloride is less than 50 ppm.

## Product Information

Vulcan™ Type VR4 combines and maximises the performance of Expanded Graphite and Graphite fibres. Expanded Graphite is the ultimate valve sealing material, but it may extrude or deteriorate, in more, mechanically demanding, rotary applications. The addition of Pan Graphite fibres adds strength and increases heat dissipation, which further enhances the packings life and performance.

VR4 is square inter-braided, with the Pan graphite fibres running from core to the corner posts, to give dimensional stability and to resist extrusion. The Expanded Graphite fibres are braided to the packing surfaces, to enhance smooth running and sealing performance.

Vulcan™ VR4 is THE Expanded Graphite packing for use in rotary applications. Shaft wear and gland maintenance are virtually eliminated, as the packing is self-lubricating and includes passive, corrosion inhibitors.

## Applications

Maximum capability, rotary gland packing, for an extreme range of duties, against virtually all chemicals and temperature conditions.

## Product Information

Vulcan™ VC5 is square-braided from high quality Carbon yarns impregnated with pure Graphite, special high temperature lubricants and Molybdenum Disulphide. The Carbon yarns are dense braided to provide a near frictionless, self-lubricating seal. Graphite powder provides non-migrating lubrication between the packing and the shaft. The non-glazing, high temperature lubricant protects during the packing break-in period. The addition of Molybdenum Disulphide gives high temperature and high pressure lubrication with shaft wear protection even when contact pressures between packing and shaft are excessive.

Type VG5 Carbon fibre packing is swift to break-in because of its low friction, lubricant intensive constituents and these characteristics allow its extended life in arduous duties. Vulcan Type VCS can be used in services where many other lubricated fibre packings fail, due to migration or loss of lubrication and consequent fibre burning, hardening or glazing.

Type VC51 is Inconel Wire re-inforced for high pressure static applications to 350 Bar to give an exceptional capability, performance and lasting valve packing for use up to 1 m/s.

## Applications

VC5 is ideal as a rotary duty, multi-service, packing particularly for boiler feed applications.





# EXPANDED GRAPHITE PACKINGS

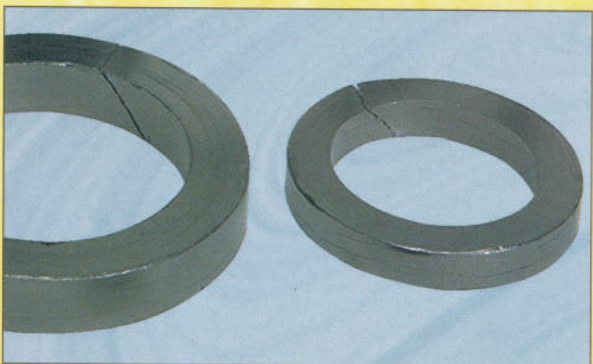
## TYPE VR1



### SERVICE CAPABILITY

Pressure Rating: 200 Bar	Rotary Speed: 1m/s	pH Range: 0-14
Temperature: -200 +3000°C (Inert ATM)		
Temperature: -200 +600°C (In Air)		

## TYPE VR2



### SERVICE CAPABILITY

Pressure Rating: 200 Bar	Rotary Speed: 30m/s	pH Range: 0-14
Temperature: -200 +3000°C (Inert ATM)		
Temperature: -200 +600°C (In Air)		

## TYPES VR3/VR31



### SERVICE CAPABILITY

Pressure Rating: 200 Bar (VR3)	Rotary Speed: 30m/s (VR3)	pH Range: 0-14
360 Bar (VR31)	1m/s (VR31)	
Temperature: -200 +3000°C (Inert ATM)		
Temperature: -200 +600°C (In Air)		

## Product Information

Vulcan™ Grafan material is essentially pure carbon in Graphite form processed into a flexible foil material without any fillers, binders nor other additives. The product is self lubricating, dimensionally stable, impervious to gases and fluids, and shows exceptional temperature and chemical resistance. Grafan offers unrivalled sealing capabilities under extreme temperature, media and pressure conditions giving extended packing life.

Graphite in this form is self-lubricating with a low coefficient of friction (comparable to Teflon), high thermal conductivity and permanent volumetric elasticity (spring back) which results in no volume reduction (compression set) in use. Resilient with ideal fluid and gas sealing characteristics and extreme capabilities, Grafan offers the ultimate range and performance in a packing material.

Vulcan Type VR1 is a crimped Graphan Ribbon Tape, available from 6mm to 75mm wide, for in-situ packing of valve stems and then it is easily compressed into a uniform packing ring. Using this system, a small tape inventory can pack any size of gland with superior service results.

## Applications

As below, but for static use only.

## Product Information

Type VR2 Die-Formed Rings are produced by compressing an exact amount of Grafan Ribbon Tape in precision metal moulds. The result: uniform quality, dense, smooth finished, close tolerance, Die-Formed Rings.

A large range of Grafan rings are available ex-stock. Any custom size or shape can be produced, usually from existing tooling with a range of densities available from 1 to 1.8 gm/c.c.. VR2 die-formed Rings are supplied just to size for ease of fitting. When energised in the gland, the rings compress to effect a perfect leak-free seal on valves. It is well proven that valves packed with this material have been in service for years, leak free without maintenance. where previous braided packings have failed in weeks or months.

## Applications

As below.

## Product Information

Vulcan™ Types VR3 and VR31 are braided packings, constructed from 100% Grafan yarns, to form a truly exceptional capabilities and performance, pure Expanded Graphite packing. Type VR31 is additional re-inforced with Inconel Wire to create the ideal packing for high temperature, high pressure valves.

Under compression in the gland, Types VR3/VR31 die-form into packing rings like VR2, whilst offering the advantage of avoiding the need to laboriously wrap VR1 ribbon tape around valve stems or the cost of an inventory of many sizes of individual VR2 die-formed rings.

Types VR3/VR31 can be merely cut to length and spiraled into the gland. There is no need for individual cut rings, as is the case with conventional braided packings. Grafan is self-lubricating and will not shrink nor harden nor dry out in use.

## Applications

Extreme condition, long life and zero leakage packing for all uses, up to high temperature, high pressure, high speed applications on pumps, valves, mixers, agitators, expansion joints, ball valve seats and other static seals. Types VR1 and VR31 are designed for use in static applications only. Against all acids, alkalis and solvents (except very strong oxidisers), gases, feed water and superheated, or saturated, steam.





## NATURAL FIBRES

### TYPE VC6



#### SERVICE CAPABILITY

Pressure Rating: 100 Bar

Rotary Speed: 12m/s

Temperature: -30 +120°C

pH Range: 4-12

### TYPE VT5



#### SERVICE CAPABILITY

Pressure Rating: 100 Bar

Rotary Speed: 12m/s

Temperature: -30 +120°C

pH Range: 2-12

### TYPE VF4



#### SERVICE CAPABILITY

Pressure Rating: 130 Bar

Rotary Speed: 10m/s

Temperature: -30 +120°C

pH Range: 2-12

### Product Information

This packing is made from twisted Cotton yarns thoroughly impregnated, during and after braiding, with PTFE dispersion and special inert lubricants. The addition of PTFE dispersion widens the chemical resistance of VC6 compared to standard graphited or plain Cotton packings. The special lubricants ease fibre to metal contact and embody very high lubricating properties, tenaciously adhering to metal shafts.

Vulcan Type VC6 is a soft, strong, absorbent, Cotton packing that prevents shaft wear because the Cotton constantly absorbs the liquid being pumped along with any abrasive media. VC6 provides high flexibility with a very low co-efficient of friction and maintains a soft, moist pliable running face to the shaft.

### Applications

The special lubrication of Type VC6 is sea-water and slurry resistant. VC6 can be used for sealing stern glands, pumps and valves against water, sewage, solvents, oils, fats and abrasive solutions.

### Product Information

Vulcan Type VT5 is an outstanding PTFE impregnated and lubricated packing, made to replace traditional PTFE Asbestos packings, without sacrificing the strength and natural sealing qualities of Asbestos. Asbestos replacement packings normally have a payoff in terms of capabilities of the fibre used, or in the terms of cost. VT5 is a low cost, quality packing giving outstanding service life. Vulcan VT5 is braided from natural Ramie fibres which are extremely strong and therefore highly resistant to wear and to rotting. A long-term PTFE impregnation is bound to each yarn in a special process and the packing is further treated with inert lubricants.

VT5 PTFE Ramie fibre packing is especially suitable for aqueous mixtures containing abrasive media such as found in the water, sewage, paper and marine industries. VT5 is non-staining and smooth running to give a high level of shaft protection. This packing is characterised by its long service life with high mechanical strength and excellent volumetric stability.

### Applications

Multi-purpose pump and valve packing for exceptional trouble-free service life against general and abrasive media. For use in the water, marine, brewing, food, chemical, petro-chemical and paper industries.

### Product Information

VF4 is braided from selected, long fibre, heavy duty, flax yarns thoroughly impregnated yarn by yarn with PTFE and treated with break-in lubricants. The packing is designed to give a very low coefficient of friction, resistance to wear and rotting, good compressibility, high flexibility, high tensile strength and comparative ease of installation and take-up especially on large cross-sections.

Vulcan VF4 PTFE Flax packing is especially designed to seal large cross-sectional areas and is ideal to solve the exacting sealing requirements of stern glands in the marine field. The packing will also be of superior service in heavy reciprocating machinery, rotary applications handling abrasive media and heavy duty static applications such as tank lid seals.

### Applications

For use in paper, marine, chemical, pharmaceutical, sugar and water industries against salt water, slurries, hydrocarbons, oils, greases and solvents.





## TYPE VF225



### SERVICE CAPABILITY

Pressure Rating: 50 Bar	Rotary Speed: 8m/s
Temperature: -20 +120°C	pH Range: 5-9

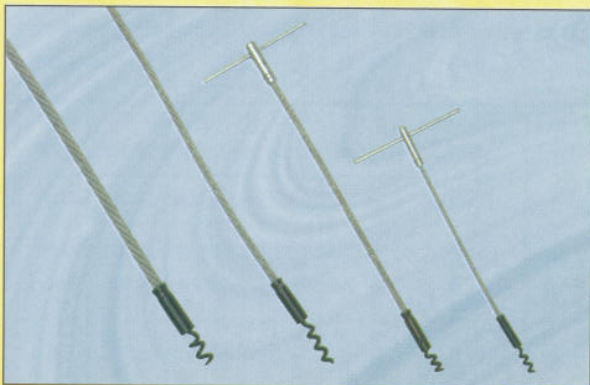
## TYPES VGC 206



### SERVICE CAPABILITY (VT9S)

Pressure Rating: 50 Bar	Rotary Speed: 8m/s
Temperature: -20 +120°C	pH Range: 4-10

## FLEXIBLE PACKING EXTRACTORS



## NATURAL FIBRES

### Product Information

Vulcan Type VF225 is square-braided from long, heavy duty natural fibre yarns. These high-strength yarns are thoroughly impregnated, before and after braiding, with a specially blended lubricant.

The packing is designed to give a very low coefficient of friction, resistance to wear and rotting, good compressibility, high flexibility, high tensile strength and ease of installation.

VF225 is an excellent, general purpose packing especially for water duties. Its resilience, low shaft wear, ease of fitting and economic cost makes Vulcan VF225 an effective choice for many standard applications.

### Applications

Type VF225 is suitable for all general water-based applications in pumps and valves, up to 120 Deg C.

### Product Information

Vulcan VGC206 is a densely braided, cotton packing impregnated with a blend of mineral lubricants and graphited. Special lubricants are added to the fibres during and after braiding. These preparations produce a thorough lubrication that will not readily migrate, leading to minimal shaft friction and wear and extended packing life.

Vulcan VGC206 lubricated Graphited Cotton is a quality sample of a traditional water pump packing VGC206 is designed to give low-cost, good packing life in general fluid handling services.

### Applications

Dynamic applications handling water, oil and ammonia products. General purpose pump and valve packing for water duties.

### Product Information

These flexible extractors are designed to facilitate the removal of old packing of any size. The long flexible shank of the flexextractors makes access easy, even to those glands in the most awkward positions. The hardened and tempered steel screw end is designed to give maximum penetration into the packing.

The Extractors are supplied in four sizes, as follows:

Size No. 1 for 3/16" and 1/4" packing.

Size No. 2 for 5/16" and 3/8" packing.

Size No. 3 for 7/16" and 1/2", 9/16" and 5/8" packing

Size No. 4 for 3/4" packing and upward.

Extractors may be ordered in any quantity of individual size or in boxed sets comprising one each of the four sizes.

The pattern "C" extractors have the corkscrew tip integral with the extractor while the pattern "R" has a replaceable tip. The preferred type should be specified when ordering.





# APPLICATION INFORMATION

PREFERRED RANGE OF OPTIMUM PERFORMANCE PACKINGS						
PACKING STYLE	MATERIAL DESCRIPTION	TEMPERATURE °C	PH RANGE	PRODUCT DETAIL	BEST RECOMMENDED APPLICATIONS ARE IN RED	
					= Valves               = Pumps & mixers               = Reciprocating Rods	
VP2	100% Vulcan Type G1 Fibre	-200°C +280°C	0-14	The <b>Preferred</b> , optimum cost/performance, process & pump packing		Pressure 30 Bar Speed 25m/s
VP1	100% Gore GFO Fibre Packing	-200°C +280°C	0-14	Process & Chemical pump packing, 100% GFO fibre		Pressure 60 Bar Speed 2m/s
VT2	P.A.N Fibres PTFE Dispersion	-40°C +250°C	2-14	The <b>Preferred</b> , low cost, general plant pump packing		Pressure 30 Bar Speed 25m/s
VG2	P.A.N Fibres Graphite Dispersion	-50°C +250°C	4-12	Graphite lubricated, lowest cost, synthetic fibre, general plant pump packing		Pressure 60 Bar Speed 2m/s
VK4	Kevlar Aramid Fibres, Heavy PTFE Lubrication	-100°C +280°C	1-13	Optimum cost, lower wear, Aramid pump packing for abrasive media / arduous duties		Pressure 100 Bar Speed 1.5m/s
VM1	Special Aramid Fibre, with PTFE	-100°C +250°C	2-12	Universal Paper/Sugar-Mill Etc., white packing for demanding applications		Pressure 80 Bar Speed 2m/s
VK4B	Kevlar Aramid Fibres, PTFE Lubrication	-100°C +280°C	1-13	Kevlar, Aramid fibre, pump packing for the most abrasive media / arduous duties		Pressure 40 Bar Speed 20m/s
VR4	Expanded Graphite with Graphite Fibres	In Air =450°C Inert =650°C	0-14	<b>Preferred</b> , Expanded Graphite, packing for rotary applications		Pressure 50 Bar Speed 15m/s
VT9L	Pure PTFE Fibres with PTFE Lubrication	-40°C +280°C	0-14	100% Pure PTFE, general chemical pump, pure white, packing		Pressure 100 Bar Speed 2m/s
VT5	PTFE Romie Fibres	-30°C +120°C	2-12	Low cost, natural fibre packing, for general duty pumps		Pressure 60 Bar Speed 2m/s
VR31	Expanded Graphite with Inconel Wire	In Air =600°C Inert =3000°C	0-14	The <b>Preferred</b> valve packing, especially for high temperature, high pressure applications		Pressure 100 Bar Speed 1.5m/s
VR3	Braided Expanded Graphite Packing	In Air =600°C Inert =3000°C	0-14	<b>Preferred</b> valve packing, for moderate pressure		Pressure 300 Bar Speed 0.5m/s
VT9D	Fine Pure PTFE Fibres with PTFE Lubrication	-200°C +280°C	0-14	100% Pure PTFE, packing for all valves to 250°C		Pressure 150 Bar Speed 1m/s
VT8	100% Unsintered PTFE & PTFE Tape	-100°C +260°C	0-14	Low cost, PTFE small valve packing		Pressure 200 Bar Speed 1m/s
VF4	PTFE Lubrication, Flux Yarns	-30°C +120°C	2-12	The most common packing used for marine stern tubes		Pressure 100 Bar Speed 1m/s
VT6	P.A.N Fibres, PTFE Dispersion	-40°C +250°C	1-14	The industry standard, road tanker man-lid, braided packing		Not Recommended
STATIC TANKS ONLY						Pressure 25 Bar Speed 10m/s





## PREMATURE GLAND PACKING FAILURE MODES

A used or worn set of packing can be of value as it often indicates causes of premature packing failure. Examine same carefully. The following table should assist in identifying causes of packing trouble.

INDICATION	FAILURE MECHANISM	ACTION
No leakage at start up.	Gland over tightened.	Back off gland to encourage initial leakage and lubrication. If negative suction, install lantern ring and connect to discharge.
Excessive leakage at start up.	Incorrect sizing or fitting of packing.	Check for correct packing size. Were rings installed correctly?
Leakage along outside of gland follower.	Packing improperly fitted.	Repack with care after checking shaft for wear.
Excessive leakage.	Packing swollen or decomposed.  Leakage through ring joints. (Rings cut too short or wrongly assembled.) Washout of lubricants.  Shaft eccentricity.  Expansion of stuffing box.	Change to compatible packing.  Use correct size ring.  Change to a packing which resists the action of the sealed fluid.  Check shaft runout. Examine shaft bearings. Check stuffing box material. Arrange cooling if box is liable to run hot.
Packing extruded into space between shaft and housing or gland follower.	Designed clearance excessive or part worn by abrasives or shaft bearings inadequate.	Reduce clearances, check bearings, apply bushing. May also be excessive gland pressure. Use a COMBI packing.
Packing rings extruded into adjacent rings.	Rings cut too short.	Repack with accurately cut rings.
Rings disappear in set.	Packing entering the system.	Install bottom bushing or one ring of Vulcan VK4B
Packing rings flattened out on ID under the rod or shaft.	Worn bearings may be causing whip or runout.	Check alignment of shaft and condition of bearings.
Used packing scored on outside surface, possibly leakage along bore of box housing.	Packing rotating with shaft due to being undersized.	Check dimensions of housing and packing.
Packing rings near gland follower very compressed.	Packing improperly fitted.	Repack with care.
Bore of used packing charred or blackened, possibly shaft material adhering to packing.	Lubrication failure.	Change packing to one of more suitable lubricants or material, or fit lantern ring with lubricant feed.
Shaft badly worn along it's length.	Lubrication failure.	Change packing to one with more suitable lubricants or fit lantern ring with lubricant feed.
Packing abraded.	Abrasives in fluid.	Fit filter. Flush stuffing box with clean fluid.





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VULCAN ENGINEERING LIMITED • UNITS 1B-3 • SOUTHWEST CENTRE • TROUTBECK ROAD • SHEFFIELD S8 0JR • ENGLAND • Tel: +44 (0) 114 249 3333 • Fax: +44 (0) 114 249 3322 • Email: [sales@vulcan-eng.co.uk](mailto:sales@vulcan-eng.co.uk)

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