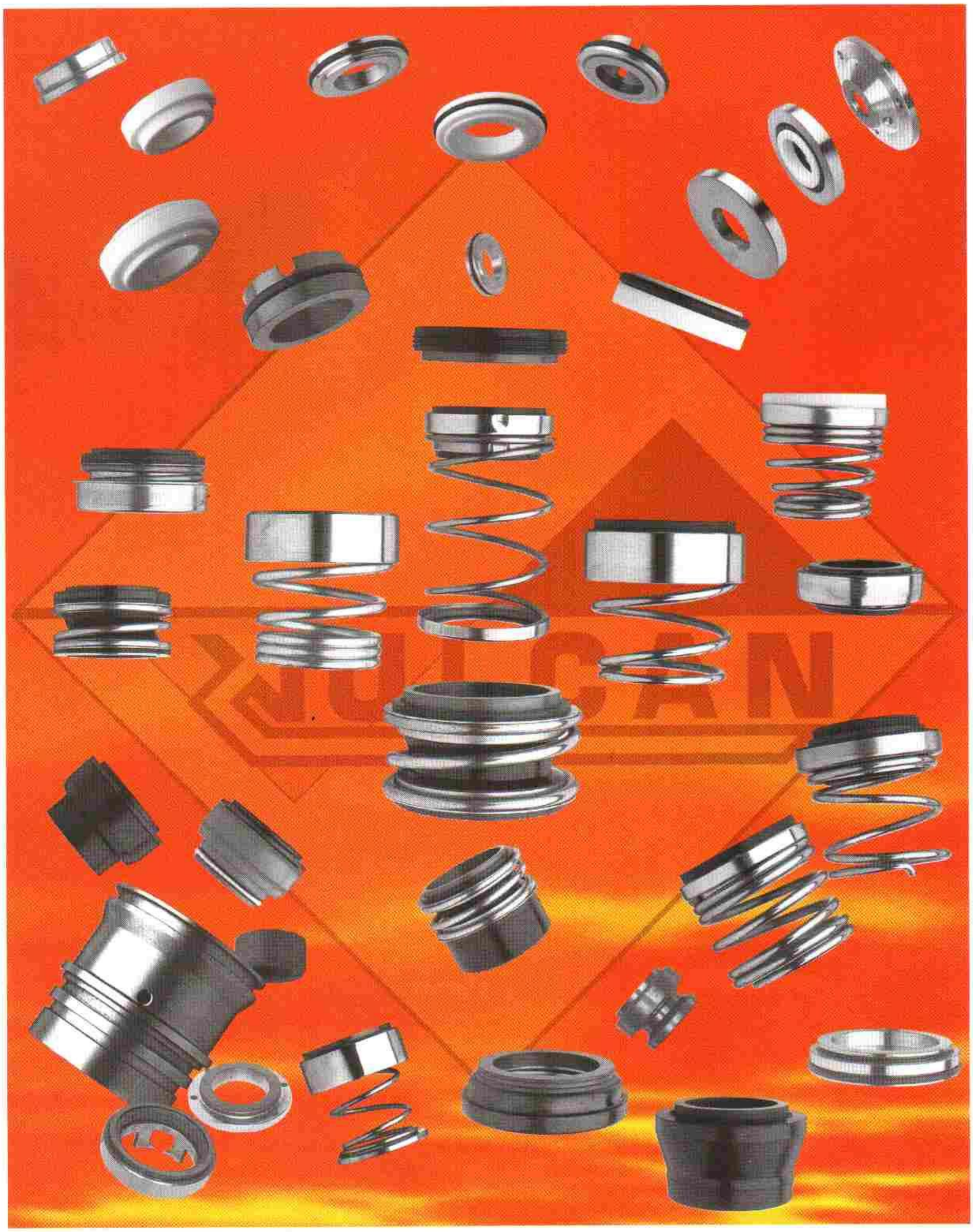
VULCAN Mechanical Seals

NOVOLINE

THE VULCAN STOCK RANGE

Vulcan offer the broadest range of Single Spring Mechanical Seals available from any one source. Vast stocks are held, on all types shown, with a comprehensive choice of seal face materials and elastomers. Standard, stocked seals only are shown - many other seals are produced to individual customers' specifications.

Guarantee: Every seal and seat type, in all standard face materials listed, in each of Nitrile, EPDM and Viton®, are held ex-stock at our world wide distribution centre in Sheffield, if previously sold twice. Over fifty thousand stock-lines and millions of same day build combinations. You may check our stock at any time as it is constantly updated on our website.



Materials Manufacture: Example Silicon Carbide

- Raw Silicon Powder Manufacture Through To Final Component.
- Advanced, Modern, Plant and Equipment.
- Producing High Specification, Sintered & Reaction Bonded Silicon Carbide.

Electronic Logistics

- The Electronic Seal Warehouse: To Distributors In Over 70 Countries.
- Industry Leading Automated Logistics & Service.
- Unique, Distributor Specific, Web Portals.
- Unbeatable Stocks, Product, Service & Prices.

CONTENTS

"THE BEST 'STANDARD' MECHANICAL SEAL COMPANY TO DO BUSINESS WITH".

INTRODUCTION

Vulcan, with someway over two hundred and fifty staff, in our factories and our world wide distribution centre, are one of the worlds leading mechanical seal manufacturers.

Founded in 1987, Vulcan continues to rapidly grow through our exceptional investments in material and design development, vertically integrated, advanced, modern factories with increasingly automated manufacturing machinery, and electronically controlled extensive stock-holding and distribution.

Vulcan have established new industry standards, with our product range, performance/quality, ex-stock service and price.

We continue to be immensely motivated and dedicated to being the Worlds Best 'Standard Mechanical' Seal Company. The key features of this policy goal and our company are;

- Advanced production facilities, automated wherever possible.
- In-house component and material manufacture and development.
- The very best quality and inspection systems, CMM checked and electronically controlled.
- The widest range and stock of seals, available from any company, accessible to our customers, via the internet.
- Well motivated and rewarded staff working in excellent facilities.
- Fully computer controlled, integrated and automated seal ordering, stocking and supply systems.
- **To be The Electronic Mechanical Seal Warehouse to The Industry.**

VERTICALLY INTEGRATED MANUFACTURE

Vulcan's modern production facilities exceed 17,000 square metres of total floor space. The factories were architecturally designed and built to create world-class facilities. We continue to heavily invest in our production processes, machinery, systems and people. This focus has naturally led to extra-ordinary annual rates of growth in our factories capacity and employment. Growth needed to meet the growth in our customers demands.

DESIGN, RANGE AND STOCK-HOLDING

All Vulcan seals are manufactured in-house to our own production drawings and designs. We have eliminated the faults common in some original and many copy designs, through close attention to design detail and material improvements.

Vulcan have the widest range of "Standard" Mechanical Seals, available from any manufacturer in the world. We back this very extensive range with a guaranteed ex-stock holding, that is accessible to our customers to view on the internet. All seal types, in all sizes and materials, shown in our Mechanical Seal Brochures, are available ex-stock, if previously sold. In total over 50,000 stock lines (with an exceeded 99.8% ex-stock target). We can also manufacture practically any special and will even stock them for you, to agreement, for repeat requirements.

MATERIAL DEVELOPMENT

Most "Single Spring" Seal Companies buy in product or merely assemble components in-house. Previously no manufacturer made all their own parts and components and practically all their own materials.

Vulcan do. We produce all our seals and practically everything for them. For example, all of our eight grades of TC and SIC hard-faced materials are made in-house from raw powder. We mould all of our elastomers and even make the moulds for the same.

This vertical integration enables us to absolutely Quality and Cost Control all parts of the Vulcan seal. With our Can Do Philosophy, this also enables us to produce many special designs of seals for customers, with quantities, costs and lead times lower than our competitors, because we primarily do it all in-house.

Material quality is vital to the capability, performance and life of a seal. So Vulcan only use 99.5% purity Aluminium Ceramics. M106K+ is our standard carbon grade. We have heavily invested in even further developing Reaction and Sintered Sic and Nickel and Cobalt TC scintering processes, so that we can exceed previous Single Spring Seals norms. This focus on the best quality face materials is standard throughout the Vulcan seal range.

QUALITY ASSURANCE

All Vulcan Mechanical and Encapsulated Seals are solely produced in our own modern factories. Our manufacturing facilities have been audited and certified to ISO9001 and our distribution operations are examined and certified to ISO.9001.2000.
Vulcan have extremely extensive and intensive Quality, Inspection and Work Documentation Systems. In-depth, electronically integrated, process documents and assessment systems govern all aspects of manufacture, assembly, inspection and supply.

We do not buy seals nor component assemblies from anyone else. Every Vulcan component and seal is produced and processed via our Global Inspection System. This system incorporates all of the above controls cumulating in CNC Co-ordinate Measuring Inspection Machine batch sampling verification, prior to despatch from our factories and then again, upon receipt at our World Wide Distribution Centre.

Thus a Vulcan Seal Means Quality and Reliability Assured.

ELECTRONIC INVESTMENT

Vulcan are firmly focused on the future. Our philosophy is to heavily invest in IT, automation, technology and our people, in order to be the world leaders in "Standard" Mechanical Seals.

Our over-riding ethos is Quality and Efficiency through electronic automation of our entire company processes and operations. Manufacturing is increasingly automated and supported by computer-controlled inspection machines and systems.

Vulcan create individual Web Portals, for each of our customers, to access a vast database of information on our company, products and all commercial or technical detail. This can also be utilised to initiate a complete electronic supply chain, of bar-coded product, moving through all of our processes, from electronic receipt of Portal Enquiry/Order to supply, from our ranks of eight computer integrated and controlled carousel stock machines.

SUPPLY PHILOSOPHY

Our ethos is to do extraordinarily well, whatever the customer reasonably requires. We have a **can-do** mentality, backed by truly exceptional customer service. Vulcan's commercial policy is to focus on our products, manufacture, stock holding and supply to the seal trade.

It is not our intention to be diverted into becoming an end-user sales organisation. Our strengths lie in our unrivalled product range, quality, service and prices. **Vulcan will maintain its strong distributor and trade sale focus.**

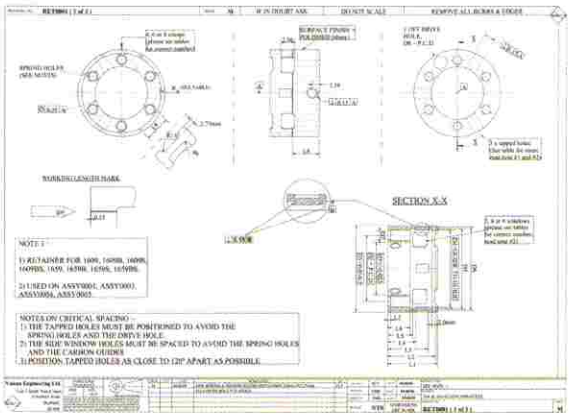
Our vision is to be **The Electronic Seal Warehouse** to the trade and to continue to provide increasing levels of service, product and information to our distributors or resellers in, already, over seventy countries. We enable companies, who wish to sell our products, to market the same, under our Vulcan or their own brand.

CONCLUSION

People (customers and staff) are our premier concern. In order to see our commitment, facilities and processes in full, please visit us and experience the Vulcan difference.

Unbeatable Designs

All Vulcan Mechanical Seals are manufactured to our designs and drawings. Three Vulcan design departments, at Vulcan Sheffield, NB Vulcan Manufacturing and in New Zealand, are utilised to produce the most advanced designs and carefully controlled engineering detail possible. Competitor seals are studied and tested and improvements are incorporated into our new design. Technical advice is available to combat application problems and extend seal reliability and life.



'In-House' Quality Assured

All Vulcan Mechanical Seals are manufactured in Vulcan's high-spec factories, as are practically all our components and materials. We do not purchase any seals from anybody else.

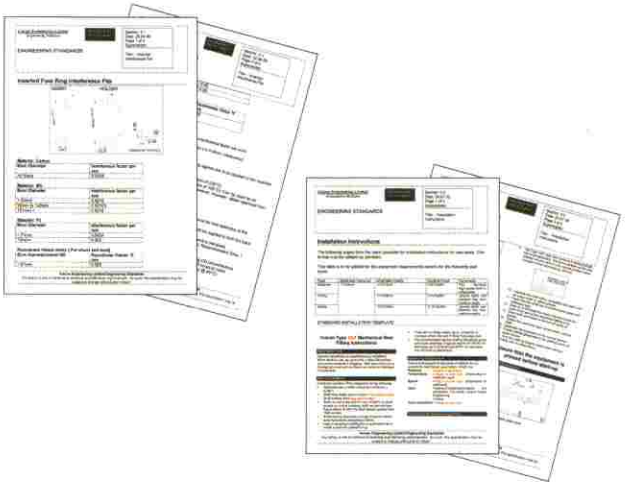
NB Vulcan Mechanical Seals Manufacturing Company Limited is certified to ISO9001 and our world-wide distribution centre to ISO9001.2000.

Modern, increasingly automated, machinery is utilised to produce our designs, via carefully controlled, advanced management and production procedures.

Each stage and final inspection, is governed by electronically documented and managed, extensive and intensive, Inspection Systems and Forms.

Comprehensive Engineering Standards

Vulcan's Engineering Department produces and documents, in our Engineering Standards Electronic System and Library, extensive and comprehensive detail on all the key technical features of our Mechanical Seal Design, Manufacture, Fitting, Assembly, Inspection and ultimate Seal Installation. Please contact us for details on any aspect.



Exceptional Materials

We are one of the world's highest volume manufacturers of mechanical seals and associated products.

Vulcan's policy is to produce superior designs of and stock the widest range of, all common mechanical seals, manufactured extremely well and specified to contain high quality materials, especially on the critical faces.

We primarily manufacture these materials ourselves and details of the grades utilised/made are documented on the following pages. For a full listing of the grade of every material in each seal, please contact our Technical Department.

Manufactured To Seal - Designed To Last

Technical And Material Standards

Section 2

"QUALITY AND RELIABILITY ASSURED".

QUALITY MECHANICAL SEALS

In our industry, 'QUALITY' is the key word. Vulcan fully understands the true meaning and importance of Quality and have long practiced the principle of Total Product and Supply Quality, through a dedication to installing built-in reliability and quality into every aspect of our company. Electronic production, inspection and process control is integral to every area of our production and logistics. The foundation for this Total Quality Philosophy is our focus upon investment in and development of world class manufacturing facilities, electronic processes and our Technical and Material Standards.

RELIABLE PRODUCT

There are many alternative mechanical seal suppliers around the world. At first sight, their product may look similar but often lacks the many vital aspects which go to make a Quality Mechanical Seal. Failures in supply, fitting or operation often result.

The key is surety, safety, reliability and the resultant seal capability, performance and life. We pride ourselves on being The Most Cost Competitive, Lowest Total Cost Provider of Quality Mechanical Seals.

Vulcan welcomes visitors to view all of our production and distribution facilities. To see for yourselves the Total Quality and Customer Satisfaction Policy, which is central to our success.

MECHANICAL SEAL TESTING

Vulcan have designed, specified and installed a unique, tri-parate, static air pressure test rig, into our seal assembly department. This is utilised partly for seal testing purposes but primarily to sample inspect and test seals, from each batch of production assembly. In addition, we offer 100% batch inspection and test, to agreed parameters, as part of our supply to individual customer contracts and specification.

All of the Vulcan mechanical seal stock types shown in this brochure have been extensively tested on our rotary test facilities. The seal performance data produced, more than supports our conservative Suggested Operating Limits for our seals and our technical information, such as the PV charts.

Dynamic Test Results Data Sheets are available for your consideration and use. In addition, Vulcan can conduct individual specific seal testing to your requirements. Our Test Data Sheets routinely illustrate that the maximum operating parameters of our seals are far in excess of our general advice on Suggested Operating Limits. There are however many factors which can affect safe product specification. Hence why we suggest conservative figures but also offer Test Data Sheets and specific testing to support customers, in their own decision, to evaluate a seals suitability for any particular application.

LASER MARKING

Reliable identification of product is useful and can add to seal quality and reliability. Vulcan has invested in, high specification and cost, laser etching machines to mark both elastomer and stainless steel components. We provide this as a service to individual customer contract specification and are increasing it's use throughout our product range.

IN HOUSE PRODUCTION OF QUALITY MATERIALS

Vulcan are the world's most vertically integrated mechanical seal manufacturer. This has naturally followed from our policy and dedication to specifying optimum material standards. Then developing our in-house manufacture of these materials and subsequent components.

As a result, not only is every Vulcan Standard Mechanical Seal solely produced in our own Vulcan factories but also practically all of our component parts and materials. We consider material manufacture and development to be fundamental to the quality, performance, reliability and economy of our mechanical seals

Two recent developments which illustrate Vulcan's continuous commitment to developing our materials capabilities and uses are;

SINTERED SILICON CARBIDE MANUFACTURING

Vulcan have for over a decade manufactured Reaction Bonded Silicon Carbide for use within our seals. In 2004, following agreement with a global manufacturer and supplier of Carbides, Vulcan purchased an entire Sintered Silicon Carbide production plant, as part of a purchase, installation and technology swap and supply agreement.

As is our practice, we then rapidly developed this plant and facility; adding equipment such as new, more efficient furnaces, isostatic presses, over twenty CNC internal and external grinders and a test and electronic inspection facility. We also subsequently opened and developed the in-house expertise and infrastructure to manufacture our own raw material; Sintered Silicon Carbide powder.

Our goals in these developments is not to become a manufacturer and supplier of Silicon Carbide components but to incorporate the optimum quality materials, reliability and cost control into our mechanical seals.

E.C. FOOD INDUSTRY REGULATIONS AND FDA REQUIREMENTS: MATERIALLY COMPLIANT SEALS FROM VULCAN

Vulcan now offer from stock all common food and dairy seals, specified and specifically manufactured to be complaint with F.D.A. and E.C. Food Industry Regulations.

The principle underlying European Community (E.C) Regulation Number 1935/2004 "On Materials and Articles Intended to Come into Contact with Food" is that any material or article intended to come into contact directly or indirectly with food, must be sufficiently inert to preclude substances from being transferred to food, in quantities large enough to endanger human health, or to bring about an unacceptable change in the composition of the food, or a deterioration in its organoleptic properties".

Understanding the implications of these regulations is increasingly leading to food industry manufacturers stipulating that all materials, including mechanical seals, that come into contact with food should be made from F.D.A. compliant materials, which comply with the above E.C. Regulations (as required in Paragraph 8) and have full traceability of said materials (Paragraph 18).

In order to comply with these regulations where specified and as an integral part of Vulcan's standard policy to only offer superior designs and materials, we have made available from stock, all of our market leading range of food industry seals, specified to be manufactured from certified compliant materials to meet U.S. and European Food Industry Regulations.

These materials are specified to comply firstly with Part 177 of Title 21 of the Food and Drug Administration Regulations for safe use as articles or components of articles for producing, manufacturing, processing, preparing, treating, packing, transporting or holding food, in accordance with FDA Regulation 21. CFR.177.1550. and 177.2600.

Secondly, The Sub Group Mechanical Seals of the European Hygienic Engineering & Design Group (EHEDG), Specification of August 2002, stipulates requirements for component materials of mechanical seals, which come into contact with food. The materials, production and surface finish of Vulcan's Food Industry Compliant Seals have been carefully specified to meet all of the EHEDG recommendations and criteria. Full details are available upon request.

This range of Vulcan seals offer superior performance, reliability and life. They are specified to be compliant to the existing known regulations applicable in Europe and North America.

In order to specify or purchase these seals, merely add the prefix Y - to the existing stock code (replacing the W – prefix if you are already specifying the same). All common types are available ex-stock.

We can provide Vulcan's Certificates of Compliance, to the above Vulcan Specifications, upon request.

Note;

Please note that constantly developing legislation and Vulcan practices, may negate the advice given in this brochure. All of the information supplied within is given in good faith and in Vulcan's best judgment and is meant for guidance purposes only. We make no warranty that any Vulcan part will perform satisfactorily in a given application and would strongly recommends an independent evaluation prior to acceptance. Vulcan reserves the right to amend all statements, dimensions and technical data without prior notice.

VULCAN ELASTOMERS

In order to ensure absolute cost and quality control, all standard secondary seal materials are manufactured in-house by Vulcan (except for 'O'-Rings). We compound and manufacture the final elastomer and then mould our components, from moulds produced in our machine shops.
The Vulcan factories' moulding section utilises modern moulding machinery and techniques to produce any and all elastomeric components required for our seals, or as specials to customer needs.
Vulcan thus, uniquely in the mechanical seal industry, produce all our standard elastomer components, through final compounding of elastomer material, vulcanisation, oven curing, production of moulds, moulding, final curing and automatic flash removal.

NITRILE RUBBER; VULCAN GRADE VN19 SPECIFICATION

Raw material = BAYER Compound XL34.19

MATERIAL ANALYSIS

Nitrile	100.0
Calcium Carbonate	10.0
Steric Acid	1.0
Paraffins	1.0
Retarder	1.5
Zinc Oxide	5.0
Sulphur	1.8
H.A. Carbon Black	50.0
Re-inf. Carbon Black	20.0
Plasticiser 88	5.0
Plasticiser FH	5.0
Brimstone	1.8
Accelerant CZ	1.2
Accelerant MS	0.4
Accelerant MB	0.6

PROPERTIES

Original

Specific Gravity	ASTM D1817	1.28
Hardness: Shore A	ASTM D2240	70
Tensile Strength (Mpa)	ASTM D412	18.0
Elongation at Break (%)	ASTM D412	415.0

Heat Ageing in hot air at 100°C for 70hr (ASTM D573)

Tensile Strength (Mpa)	19.3
Elongation at Break (%)	250.0
Weight loss grams (%)	negligible

Fluid Immersion in ASTM3 oil at 100°C for 70hr (ASTM D472)

Tensile Strength (Mpa)	19.8
Elongation at Break (%)	315.0
Weight increasing ratio (%)	4.8
Volume increasing ratio (%)	2.9

E.P RUBBER; VULCAN GRADE VEP.MAR.4045 SPECIFICATION

MATERIAL ANALYSIS

EPDM	100.0
Zinc Oxide	5.0
Steric Acid	1.5
Naphthene Oil	8.0
H.A. Carbon Black	32.0
S.F. Carbon Black	18.0
Curing Agent	4.5
MBTS Vulcanising accelerant	0.6
TMTD Vulcanising accelerant	1.0
C. Oil	10.0
P. Oil	10.0

PROPERTIES

Original

Specific Gravity	ASTM D1817	1.42
Hardness: Shore A	ASTM D2240	70.0
Tensile Strength (Mpa)	ASTM D412	9.8
Elongation at Break (%)	ASTM D412	440.0

Heat Ageing in hot air at 125°C for 70hr (ASTM 0573)

Tensile Strength (Mpa)	12-1
Elongation at Break (%)	201.0
Weight loss grams	Negligible

Fluid Immersion in ASTM 3 oil at 150°C for 70hr (ASTM D471)

Volume Change (%)	+2.2
Elongation Change (%)	-12
Tensile Strength Change (Mpa)	-6.8

NEOPRENE RUBBER; VULCAN GRADE VNE11 SPECIFICATION

MATERIAL ANALYSIS

Neoprene	100.0
Magnesium Oxide	4.0
Zinc Oxide	5.0
H.A. Carbon Black	20.0
S.R. Carbon Black	40.0
Di- Octyl-Phthalate	15.0
D.D Accelerator	1.0
C.B.S Accelerator	1.0
E.T Accelerator	0.5
Sulphur	0.5
Steric Acid	1.0

PROPERTIES

Original

Specific Gravity	ASTM D1817	1.50
Hardness: Shore A	ASTM D2240	70
Tensile Strength (Mpa)	ASTM D412	11.3
Elongation at Break (%)	ASTM D412	480

Heat Ageing in hot Air at 100°C for 70hr (ASTM D573)

Hardness change points shore A	+2
Elongation change (%)	-20
Tensile strength change (Mpa)	-0.48
Weight loss grams	Negligible

Fluid Immersion in ASTM 3 oil at 100°C for 70hr (ASTM D471)

Hardness change points shore A	-26.1
Elongation change (Mpa)	-2.0
Tensile Strength change (Mpa)	-3.0

VITON® RUBBER; VULCAN GRADE V3F.FE2602 SPECIFICATION

Vulcan compound is genuine Viton® with a true Viton® mixing content of 75%. The Viton® content is of course vital for the chemical and heat resistant properties of the elastomer. Beware of "Viton®" rubbers with incorrect Viton® content, sometimes only 30% or even less. It is important to obtain the Viton® content specification.

MATERIAL ANALYSIS

Viton®	100.0
S.F Carbon Black	17.0
Hydroxide Calcium	3.0
Magnesium Oxide	10.0
Curing Agent	2.5
Zinc Sterate	1.0

PROPERTIES

Original

Specific Gravity	ASTM D1817	1.85
Hardness: Shore A	ASTM D2240	75
Tensile Strength (Mpa)	ASTM D412	14.2
Elongation at Break (%)	ASTM D412	260

Heat ageing in hot air at 250°C for 70hr (ASTM D573)

Hardness change point shore A	+3
Elongation change (%)	-32
Tensile Strength change (Mpa)	+2.1
Weight loss grams	Negligible

Fluid Immersion in ASTM3 oil for 70hr at 150°C (ASTM D471)

Volume change (%)	+3.8
Hardness change point shore A	0.6
Elongation change (%)	-6.8
Tensile strength change (Mpa)	0.49

AFLAS; VULCAN GRADE SP AFC-3501 SPECIFICATION

MATERIAL ANALYSIS

Aflas Polymer	100.0
Ca (OH)2	6.0
MT Carbon Black	30.0
MgO	3.0
TAIC	3.0
Peroxide	1.0

PROPERTIES

Original

Specific Gravity	ASTM D1817	1.61
Hardness: Shore A	ASTM D2240	72
Tensile Strength (Mpa)	ASTM D412	18.2
Elongation at Break (%)	ASTM D412	220

Heat Ageing in hot Air at 250°C for 96hr

Tensile (%, Retention)	90
Elongation (%, Retention)	80
Hardness (Point, Change)	4

ELASTOMER CODES

CODE	MATERIAL
A	Aflas® Elastomers
D	Combined PTFE wedge & Neoprene 'O'-ring, PTFE gasket on seat (16xx series only)
E	E.P. Elastomers
EN	Double seal, with E.P. Elastomers inboard, and Nitrile outboard
F	FEP/Silicone Encapsulated 'O'-rings
G	FEP/Viton® Encapsulated 'O'-rings
H	HNBR Terban Elastomers
J	PFA/Silicone Encapsulated 'O'-rings
K	Kalrez® 'O'-rings
L	FDA Compliant EP Elastomers
N	Nitrile Elastomers
O	Neoprene Elastomers
P	P.T.F.E. wedges or gaskets
R	Glass filled PTFE wedges and gaskets
V	Viton® Elastomers
X	No Elastomers fitted (Gasket for Type 23, 25 & 27 seats)

ELASTOMER GRADES

Secondary Seal Materials		
AFLAS®	-	Vulcan Grade SP AFC-3501
E.P.	-	Vulcan Grade VEP.MAR.4045
FEP/SIL	-	Vulcan manufactured Encapsulated 'O'-Rings - please see our Chem Ring brochure
FEP/VIT	-	Vulcan manufactured Encapsulated 'O'-Rings - please see our Chem Ring brochure
KALREZ®	-	Du Pont ® Grade 4079 or 6375
NEOPRENE	-	Vulcan Grade VNE11
NITRILE	-	Vulcan Grade VN19
PFA/SIL	-	Vulcan manufactured Encapsulated 'O'-Rings - please see our Chem Ring brochure
VITON®	-	Vulcan Grade V3F.FE2602

Unless specified upon order or our quote, the Secondary Seal Material Grades utilised and fitted to elastomer codes are as above.

AFLAS®

Vulcan are now final compounding and moulding AFLAS®. We can offer to produce any of our Mechanical Seals with AFLAS® elastomers and can mould components, parts or 'O'-Rings to customer requirements.

AFLAS® has superior characteristics to Nitrile, E.P or Viton® and can be used to replace all these with one elastomer. For further information, please ask us for an AFLAS® material and technical brochure.

W.R.A.S® APPROVED ELASTOMERS AND SEAL FACE MATERIALS

The elastomers and face materials utilised are generally suitable for use in contact with potable water and food processing. The following materials are UK Water Regulation Advisory Scheme Approved: it is neccessary for you to specify your requirements upon order and obtain our confirmation.

MATERIAL	VULCAN GRADE	APPROVAL NUMBER	NOTES
Silicon Carbide	VES2	0506504	W.R.A.S® approved R.B. SIC.
Alumina Ceramic	V99.CER	0506503	W.R.A.S® approved Ceramic.
Carbon	M825	0509506	Specify Carbon required upon enquiry/order
Alternative Carbon	CN825	0310501	
Viton®	V3F. FE2602	0506502	Moulded components
Nitrile	ME0995	0507521	Available for 'O'-Ring only. Ask for other Nit./E.P. components
E.P.	VEP.MAR.4045	0308510	

Please ask for approval details on other seal materials and elastomers.

VULCAN FACE MATERIALS

A seal's capability, performance and life is significantly influenced by the grade, quality and combination of face materials used. Vulcan's policy is to therefore only utilise the best grades of face materials and to control their specification and manufacture from raw powder.

As such, Vulcan manufacture in-house all of our hard face materials. Silicon Carbide (both Reaction Bonded and Sintered) and Tungsten Carbide (Nickle and Cobalt bound) are produced by Vulcan in all stages, from raw powder to final ground and lapped component.

Extensive research and technological development, allied to advanced manufacturing techniques and facilities, with intensive Quality Control and testing, has enabled Vulcan to produce materials which exceed the standards supplied from competitor, specialist, international T.C./SiC manufacturers.

Vulcan specify and fit 99.5% Purity Alumina Ceramic, as standard, to all seal/seat Types. Practically all of our "single spring seal" competitors utilise the lower cost and quality 95/96% purity and may only offer 99.5%, for improved capability and performance, at a premium cost. Our policy is to specify and utilise as standard, only the best quality on all our face materials.

Vulcan Grade M106K + is thus fitted to all our Single Spring Seals (except moulded face seals Types 60 and 70) giving significant improvements compared to the common standard carbons seen.

Unless specified by the customer the Face Material Grades utilised and fitted, to the codes opposite, are as follows;

Face Materials Grade

Ceramic - Vulcan Grade V99 CER 99.5% Purity Alumina Ceramic.

Ni-Resist - Vulcan Grade Ni-A436-84.

Silicon Carbide - Vulcan Grade VES2 Reaction Bonded SiC is the standard on all seals and seats. Except for 16 Series seals and seats (1609,1645,1659, 1677 and1678) and Type 23, 25 and Type 27 seats, which are sintered Please specify if Sintered SiC (Vulcan Grade VES9) is required on any other product.

Tungsten Carbide - Vulcan Grade Ni10 for rotary seal face and Ni 6 for stationary face, Nickle bonded T.C., If Cobalt bound T.C. is required, please specify.

Carbon - as per the following table:

CARBON GRADE	M825/CN825	M106K+	M205K	KC-6709
	Triple Phenolic Resin Impregnated Carbon/Graphite	Double Phenolic Resin Impregnated Carbon/Graphite	Moulded Phenolic Carbon	Antimony Metal Impregnated Carbon/Graphite
Flexural Strength	78 Mpa	70 Mpa	58.2 Mpa	96 Mpa
Compressive Strength	250 Mpa	220 Mpa	167 Mpa	225 Mpa
Density	1.80 g/cm³	1.78 g/cm³	1.65 g/cm³	3.32 g/cm³
Hardness	100 Hs	90 Hs	75 Hs	84Hs
Porosity	<0.3%	<0.3%	0.31%	<0.58%
Temperature Limit	260°C	230°C	133°C	350°C
Coefficient of Thermal Expansion	5.0×10^{-6}/°C (20-200°C)	5.2×10^{-6}/°C (20-200°C)	3.0×10^{-4}/°C (20-200°C)	7.0×10^{-6}/°C (20-200°C)

Notes:

1. Unless otherwise stated Carbon Grade M106K+ is used on all Vulcan single spring seal range production, except: Type 60/65 and Type 70/75 = M205K, Types A1 - A5 = CN825 and 1677/1678 = KC-6709 All multiple spring Vulcan seals, including the 1609,1659,1645 series, use M825
2. CN825 and M825 are N.W.C. approved for use in contact with potable water. M825 grade technical data is essentially the same as CN825
3. FC-6709 Antimony Impregnated Carbon or CN825 or M825 may be specified to be fitted to any Vulcan seal, at additional cost.

VES2 REACTION BONDED SILICON CARBIDE

Purity of Silicon Carbide	>90	%
Hardness (Vickers)	<2600	Kg/mm²
Compressive Strength	>2100	Mpa
Fracture Strength (single edge notched beam)	>4	Mpa.m.$^{0.5}$
Flexural Strength	>400	Mpa
Weibull Modulus	>12	-
Density	>3.05	g/cm³
Grain Size	<15	microns
Thermal Conductivity	>150	W/mK
Themal Expansion	<4.4	10^{-6}/°C
Porosity	0%	-
Youngs Modulus	>380	Gpa
Poisson Ratio	0.15	-
Heat Resistance	>46.5	cal/cm.sec
Maximum Working Temp	1400	°C

WNV2 GRADE SINTERED SILICON CARBIDE

Purity of Pure Silicon Carbide	>98	%
Hardness Vickers)	>2600	Kg/mm²
Compressive Strength	>2200	Mpa
Fracture Strength (single edge notched beam)	>3.2	Mpa.m.$^{0.5}$
Flexural Strength	>400	Mpa
Weibull Modulus	>10	-
Density	>3.10	g/cm³
Grain Size	<5	microns
Thermal Conductivity	>110	W/mK
Themal Expansion	<4.8	10^{-6}/°C
Youngs Modulus	>410	Gpa
Maximum Working Temp	1600	°C

NOTE: Vulcans production now off-sets our mirror lapping finish on all SIC rotary faces, in order to avoid the possibility of binding between SIC rotary and stationary faces.

Notes:

Vulcan manufacture and stock Reaction Bonded, and two grades of Sintered, Silicon Carbide. We supply both Reaction Bonded and CNV1 Sintered as standard, so please check the stock code or specify should you require a specific grade.

VULCAN GRADE V99 CER; 99.5% PURITY ALUMINA CERAMIC

Purity	> 99.3%
Density	3.85 - 3.90 gm/cc
Apparent Porosity	0.04
Hardness	> 90 Hs
Bond Strength	> 3000 Kgf/cm²

SAMPLE DRIED AT 110 DEG C.

Silica	0.15%	(Si02)
Titania	< 0.01%	(Ti02)
Ferric Oxide	0.04%	(Fe203)
Lime	0.04%	(Ca0)
Magnesia	0.55%	(Mg0)
Potash	< 0.01%	(K20)
Soda	< 0.03%	(Na20)
Phosphorus Pentoxide	< 0.02%	(P205)
Chromium Sesquioxide	< 0.01%	(Cr203)
Manganic Oxide	< 0.01%	(Mn304)
Zirconia	< 0.02%	(Zr02)
Hafnia	< 0.01%	(Hf02)
Lead Monoxide	< 0.02%	(Pb0)
Barium Oxide	< 0.01%	(Ba0)
Strontia	< 0.01%	(Sr0)
Stannic Oxide	< 0.01%	(Sn02)
Loss on Ignition	0.04%	
Sulphur Trioxide	< 0.05%	(S03)
Alumina	99.35%	(Al203)

VULCAN NI-RESIST MATERIAL GRADE Ni-A436-84

MATERIAL SPECIFICATION:

Chemical Composition (by weight)

Carbon	=	< 3.0%
Silicon	=	1.0 to 2.8%
Manganese	=	0.5 to 1.5%
Nickle	=	13.5 to 17.5%
Chromium	=	1.5 to 2.5%
Copper	=	5.5 to 7.5%
Sulphur	=	< 0.12%
Iron	=	Balance

Chemical properties;

Tensile Strength	=	> 172 Mpa
Hardness	=	131 - 183 HB
Pressure Strength	=	690 - 828 Mpa
Distortion Modulus	=	31.0 Gpa
Elasticity Modulus	=	83 - 97 Gpa
Bend Strength	=	8895 - 9787 N
Fatigue Strength	=	83 Mpa

VULCAN NICKEL BOUND TUNGSTEN CARBIDE GRADES Ni6 FOR SEAT FACES AND Ni10 FOR SEAL FACES

MATERIAL SPECIFICATION: Ni6 NICKEL BASED T.C.

Chemical Composition (by weight)

Tungsten Carbide:	94%	(+/- 0.25%)
Nickel:	6%	(+/- 0.25%)

DESCRIPTION: Ni6 TUNGSTEN CARBIDE

Hardness Hv30	1450-1550
Density	14.8 -15 gm/cc
Ultimate Compressive Strength	680,000 psi
Ultimate Tensile Strength	210,000 psi
Modulus of Elasticity	94 x 10^6 psi

MATERIAL SPECIFICATION: Ni10 NICKEL BASED T.C.

Chemical Composition (by weight)

Tungsten Carbide:	90%	(+/- 0.25%)
Nickle:	10%	(+/- 0.25%)

DESCRIPTION: Ni10 TUNGSTEN CARBIDE

Hardness Hv30	1300-1400
Density	14.4-14.6 gm/cc
Ultimate Compressive Strength	> 600,000 psi
Ultimate Tensile Strength	> 200,000 psi
Modulus of Elasticity	99.8 x 10^6 psi

Fine grained Tungsten Carbide powder is both more expensive to purchase and difficult to process. However, it produces the finest, most uniform, grain structure and best quality Tungsten Carbide.

This is governed by and microscopically inspected to ISO 4505:1978, whereby minute pores up to 10 micron (A), 10-25 micron (B) and free carbon inclusions (C) are classified on a scale of 1 to 8.

Vulcan have set exceptional standards for this quality in our T.C production and we routinely produce to A02, B02, C02 standard.

FACE COMBINATION CODES

CODE	MATERIAL
A	Antimony Impregnated Carbon Seal Face vs. Ceramic Seat
AD	Antimony Impregnated Carbon Seal Face vs. Silicon Carbide Seat
AH	Antimony Impregnated Carbon Seal Face vs. Tungsten Carbide Seat
AP	Stainless Steel Seal Face vs. Antimony Impregnated Carbon Seat
AQ	Antimony Impregnated Carbon Seal Face vs. Stainless Steel Seat
AS	Antimony Impregnated Carbon Seal Face vs. Sintered Silicon Carbide Seat
B	Ceramic Seal Face vs. Carbon Seat
C	Carbon Seal Face vs. Ceramic Seat
CB	Carbon Seal Face vs. Bronze (Lead Brass) Seat
D	Carbon Seal Face vs. Silicon Carbide Seat
E	Carbon Seal Face vs. Tungsten Carbide Seat
F	Carbon Seal Face vs. Ni-Resist Seat
G	Silicon Carbide Seal Face vs. Ceramic Seat
H	Tungsten Carbide Seal Face vs. Tungsten Carbide Seat
HA	Tungsten Carbide Seal Face vs. Antimony Impregnated Carbon Seat
I	Silicon Carbide Seal Face vs. Tungsten Carbide Seat
J	Tungsten Carbide Seal Face vs. Silicon Carbide Seat
K	Ni-Resist Seal Face vs. Carbon Seat
L	Ni-Resist Seal Face vs. Antimony Impregnated Carbon Seat
M	Chrome Dioxide coated Stainless Steel Seal Face vs. Carbon Seat
N	Antimony Impregnated Carbon Seal Face vs. Ni-resist Seat
O	Carbon Seal Face vs. Chrome Dioxide coated Stainless Steel Seat
P	Stainless Steel Seal Face vs. Carbon Seat
PS	Stainless Steel Seal Face vs. Silicon Carbide Seat
Q	Carbon Seal Face vs. Stainless Steel Seat
QS	Carbon Seal Face vs. Chrome Steel Seat
R	Sintered Silicon Carbide Seal Face vs. Sintered Silicon Carbide Seat
S	Silicon Carbide Seal Face vs Silicon Carbide Seat
SA	Sintered Silicon Carbide Seal Face vs. Antimony Impregnated Carbon Seat
SG	Sintered Silicon Carbide Seal Face vs. Ceramic Seat
SS	Sintered Silicon Carbide Seal Face vs. Silicon Carbide Seat
ST	Sintered Silicon Carbide Seal Face vs. Tungsten Carbide Seat
T	Silicon Carbide Seal Face vs. Carbon Seat
TA	Silicon Carbide Seal Face vs. Antimony Impregnated Carbon Seat
U	Tungsten Carbide Seal Face vs. Carbon Seat
UA	Tungsten Carbide Seal Face vs. Antimony Impregnated Carbon Seat
W	Double Seal Face combination:- Car vs. SiC Inboard, S/S vs. Car Outboard
WC	Double Seal Face combination:- SiC vs. SiC Inboard, S/S vs. Car Outboard
WS	Double Seal Face combination:- SiC vs. SiC Inboard, CrOx vs. Car Outboard
X	No Sealing Faces Fitted
Y	Double Seal Face combination:- Car vs. SiC Inboard, SiC vs. Car Outboard
YC	Double Seal Face combination:- Car vs. SiC Inboard, Car vs. SiC Outboard
Z	Double Seal Face combination:- SiC vs. SiC Inboard, SiC vs. Car Outboard
ZC	Double Seal Face combination:- SiC vs. SiC Inboard, Car vs. Ceramic Outboard
ZH	Double Seal Face combination:- T.C vs. T.C Inboard, T.C vs. T.C Outboard
ZS	Double Seal Face combination:- SiC vs. SiC Inboard, SiC vs. SiC Outboard
ZU	Double Seal Face combination:- T.C vs. T.C Inboard, Car. vs. Ceramic Outboard

VULCAN SEAL CODING SYSTEM

Example Code;	V3	0250.	12.	L.N.P.	SEAL
Code Section:	A	B	C	D	E

Note:
Seal coding systems are necessarily complex and sometimes difficult to follow. If in doubt, please ask.

Examples are;

V3 0317.20.N.C = 1.1/4" Type 20 Seal and Seat, Nitrile, Carbon, Ceramic, Tubed

V4 0381.20.N.C.SEAL = 1.1/2" Type 20 Seal Only, Nitrile, Carbon, Boxed

Section A =
This is always a two digit code, which relates to the product packaging. If you wish to specify, please use V3 for Individual packaging in tubes and V4 for Bulk-packed in stores shelf sized boxes.

Section B =
Shaft size code in millimetres converted to a standard four digit code. For example;
1.000" = 25.4mm = 0254, 2.875" = 73.0mm = 0730
20mm = 0200, 48mm = 0480 etc.
For stepped shaft balanced seals assemblies, you should specify the seal shaft size.

Section C =
The seal Type as shown in this brochure and company technical data sheets. As can be seen, this varies from one to four digits, with sometimes a prefix or suffix letter. For example, Types 8, 18, 192, 1609, 1688L and A4.

Section D =
For uni-directional seals, the first letter will be L. or R. referring to left-hand or right-hand spring and direction of shaft rotation. For bi-directional seals, this letter is omitted.
Next comes one or two letters which specify the elastomers or gaskets fitted, as shown on the "Elastomer Codes" table (on elastomers page). The final one or two letters set the face materials, as per the "Face Combination Codes" table (on face materials page) or "Seal/Seat Only" table below.
A full stop is used to differentiate between one sub-section and the next. For example; .A.H. alone refers to Aflas® elastomers and T.C. seal and seat face materials. Whereas .HA. Proceeded by a secondary seal material code, say N, = N.HA. will be T.C. vs Antimony Carbon faces with Nitrile elastomers.

Section E =
This suffix section is only used for part assemblies or components. Thus it is left blank for a complete seal and seat. This suffix is used internally on component production drawings, stock bins, inspection sheets etc. Since we do not normally offer to sell components, the only two suffix codes in common external use are .seal and .stat for a seal or a seat assembly only.

Metallurgy
Standard metallurgy for each seal is stated on VES Material Specification Document Ref. Section 1.5. If you require a different grade of, for example, 316 stainless steel on any seal, please add the prefix "W-" to the part code and specify your requirements.

Note; If a seal is etch marked, the code has a prefixed of 'E' & suffix of your account code.

SEAL / SEAT ONLY FACE CODES

SEAL ONLY

CODE	MATERIAL
A	Antimony Impregnated Carbon Seal Face
C	Carbon Seal Face
B	Ceramic Seal Face
M	Chrome Dioxide Coated Stainless Steel Seal Face
K	Ni-Resist Seal Face
S	Silicon Carbide Seal Face
R	Sintered Silicon Carbide Seal Face
P	Stainless Steel Seal Face
H	Tungsten Carbide Seal Face

SEAT ONLY

CODE	MATERIAL
L	Antimony Impregnated Seat Face
P	Carbon Seat Face
C	Ceramic Seat Face
O	Chrome Dioxide Coated Stainless Steel Seat Face
F	Ni-Resist Seat Face
S	Silicon Carbide Seat Face
R	Sintered Silicon Carbide Seat Face
Q	Stainless Steel Seat Face
H	Tungsten Carbide Seat Face

KEY CONVERSION FACTORS

Temperature: °F = (1.8 x °C) + 32°
Common examples within brochure
-40°C = -40°F, 160°C = 320°F
180°C = 356°F, 200°C = 392°F
230°C = 446°F

KEY CONVERSION FACTORS

Pressure: 1psi = 0.06895 bar = 0.0703 kg/cm2
Speed: 1m/s = 39.25 Inches per sec
Size: 1 Inch = 25.4mm

These factors convert the figures used on each seal and seat data page.
For a comprehensive Seal Engineering Conversion Factor List, please contact our Technical Department.

FACE pV VALUES AND CHARTS

The Quality of Vulcan's face materials can be further enhanced by selecting optimum face combinations for the nature of the fluid being pumped and the seal application conditions. Seal face pV Values effectively set the limits of a seal face combination's pressure and circumferential face speed abilities, but also greatly affect the performance and life of the seal, in many demanding applications, within the seal's ultimate limits. Seal pV Charts have been created in each section of this brochure. These charts can be used to establish the guidance theoretical maximum pressure value for standard material face combinations, for all standard seal Types. The table below is to be used in conjunction with the pV charts, where you should apply the relevant multiplying factors from the table, to arrive at the seal's maximum pressure rating. See "How To Determine The Maximum Operating Pressure" below for examples

Application Conditions Table

Factor	Selection Criteria	Multiplier Factor
Speed	Below 1450 rpm	x 1.10
	1450 to 1750 rpm	x 1.00
	Above 1750 rpm	x 0.80
Temperature	Below 70°C	x 1.00
	Between 71°C and 120°C	x 0.85
	Between 121°C and 175°C	x 0.75
	Over 176°C	x 0.60
Product Fluid	Lubricating fluids.	x 1.00
	Aqueous solutions/ water	x 0.85

How To Determine The Maximum Operating Pressure.

Examples:	1	2
Seal Type:	2.000" Type 20	25mm Type 24
Face Combination:	Carbon/Ceramic	Sic/Sic
Speed:	1450 rpm	1800 rpm
Temperature:	50°C	30°C
Product Fluid:	Water	Water

Obtain the nominal pressure rating from the Seal Type pV chart (Parallel Spring Type) where the shaft size intersects with the material combination line. For a 2.000" Type 20 in Carbon/Ceramic this equals 10.5 bar and 12 bar for a 25mm Type 24 in SIC/SIC.

Then apply the multiplying factors from the table to obtain the final approximated guidance maximum pressure value.

1. 2.000" Type 20 = 10.5 bar x 1.0 x 1.0 x 0.85 = 8.9 bar.
2. 25mm Type 24 = 12 bar x 0.8 x 1.0 x 0.85 = 8.1 bar.

The uppermost pressure (bar g) figure on each pV chart is our recommended maximum pressure for that particular design/type of mechanical seal. We have, therefore, not continued the face combination pV lines above this recommended top limit, even though extrapolation of the lines show that the face combinations can frequently handle higher pressures. We don't recommend use of a seal above the conservative maximum recommended pressure, for the seal design.

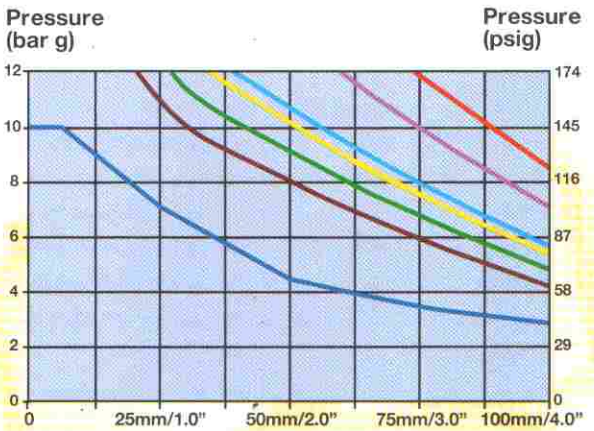
Thus to calculate the pressure rating where the lines are off the chart, find out your multiplier factor from the "Application Conditions Table." Then just extrapolate the line to your shaft size line and see what that would then approximately be, after the multiplier.

In most cases, except close to where the line goes off the graph and as well where the multiplier is less than one, the face pV rating will be above the maximum recommended pressure and thus our recommendation is this maximum recommended pressure. This is based upon conservative seal design considerations not face pV value limits. See example below:-

50mm Type 19 Seal Carbon vs SIC. 1500 RPM, water, ambient temperature.

Extrapolated line indicates 14.5/15 Bar g pressure x 1.0x1.0x0.85 = 12.3 to 12.7 Bar g pressure. Vulcan recommend 12 Bar maximum pressure for this seal/application, based upon the recommended maximum pressure for this design/type of seal.

FOR EXAMPLE; VULCAN PARALLEL SPRING DIAPHRAGM TYPE SEALS PV CHART



- Carbon/Ceramic
- Carbon/SIC
- Carbon/TC
- SC/TC
- SC/SC
- TC/TC
- Carbon/SS (Ni-Resist)

Notes :
1. Type A1-A5 multiply by factor 1.1.

For information on how to utilise this pV chart please refer to the above advice

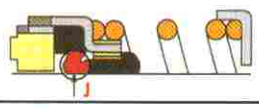
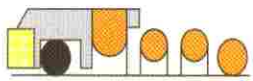
Note.
Our policy is one of continuous technical and efficiency improvement. As such, all specifications may be subject to change without prior notice. Please note that due to the many application variants affecting seal performance, these charts are for guidance only. Theoretical pV values are based on a seal life of 9000hours and were calculated from Vulcan's (and available published) technical knowledge and judgment.

PRINCIPAL METHODS OF SHAFT SEALING

PRODUCT INFORMATION

The Vulcan "Single Spring" Seal Range is divided into four main methods of shaft sealing, namely; Rubber Diaphragm, Rubber Bellows, 'O'-Ring Mounted and PTFE Wedge seals. These single spring mechanical seals have been designed to service the World pump market and are totally interchangeable, with all other manufacturer's equivalent seals, without any modification to the existing seal housings and gland plates. Such is the variety available from Vulcan, we can offer to replace any single spring seal and seat, practically always straight from stock.

Typical designs of each of the main shaft seal groups are;

RUBBER DIAPHRAGM	
RUBBER BELLOWS	
'O'-RING MOUNTED	
PTFE WEDGE	

DIAPHRAGM SEALING OPERATION

The line drawing above shows the standard section of a Vulcan rubber diaphragm seal. The shaft seal is provided by the rubber diaphragm which is squeezed onto the shaft by the drive ring. Once fitted, the rubber diaphragm will grip the shaft giving a strong static seal and very positive drive, via the drive ring, to the seal face.

As there is no relative movement between the shaft and the rubber diaphragm, shaft fretting, wear and hang-up hysteresis are eliminated and the seal can immediately accommodate some shaft run-out and misalignment. Shaft axial movement and the movement required during the working life of the seal is handled by the elastomer rubber flexing at its junction point (J on dia.). The seal head automatically adjusts to compensate for face misalignment caused by shaft end float/pump body misalignment.

The spring force and the seal pumping pressure force maintain the faces in full contact whilst the rubber diaphragm acts as a bellows providing sustained flexibility. Positive drive of the seal face is transmitted via the drive ring and retaining housing and not via the spring, which merely provides some closing force to the seal faces. These seals can therefore be used to seal shafts rotating in either direction and in vacuum applications.

RUBBER BELLOWS SEALING OPERATION

Vulcan elastomeric bellows seals are of compact design with a sealing action that provides many benefits. The bellow's high strength and flexibility is the key to the very reliable performance of this type of seal as it readily accommodates misalignment, end-float and seal face wear.

The convoluted bellows profile makes these seals ideal for media prone to clogging or for hygienic applications. Designed for confined spaces and limited gland depths, Vulcan rubber bellows seals are bi-directional in operation and provide secure bellows sealing for longer life in a wide range of applications.

'O'-RING MOUNTED SEALING OPERATION

Our conical spring, 'O'-Ring mounted, mechanical seals have been designed by Vulcan to have a small cross-section and a complete recessed 'O'-Ring housing. A narrow seal head width allows the seals to easily fit confined DIN 24960 (EN12756) housings, whilst also providing the benefits of reduced face surface running speed with increased circulation around the seal faces.

Seal loading is provided by conical springs or wave springs, with conical springs being the most common.

Seal drive is provided by the conical spring tightly gripping the shaft at its base. Stock seals are supplied as standard with right-hand drive springs for clockwise shafts. Left-hand springs for anti-clockwise shaft rotation should be specified on order.

Utilisation of wave spring technology in Vulcan seals allows the design of extremely compact seals, in both the axial and radial directions. Wave springs provide equal loading and deflection at the fraction of the free height when compared to helical springs, making them suitable for limited spaces.

Other main advantages for mechanical seal use are their insensitivity to contaminates, whilst providing straightforward fitting. These main characteristics make wave spring seals ideal for food, chemical and restricted fitting applications which are prone to clogging.

Our resilient 'O'-Ring mounted seal designs are technically efficient (readily accommodating misalignment and vibration) and are highly versatile. Vulcan offer a wide range of face material combinations and spring/seat sizes to suit most applications. Our design standard of a narrow cross-section head with full recessed 'O'-Ring groove, combined with alternative seal face materials, maximises seal performance and prolongs seal life.

PTFE WEDGE SEALING OPERATION

The chemically resistant PTFE component is spring loaded, to force the flexible angular lip of the wedge, into tight contact with the shaft. The same spring force impacts a sufficient load to the rotary face to create a suitable seal interface with a varied choice of standard stationary seats. The features associated with the wedge seal design make these seals ideally suited for chemical process pumps and many other aggressive applications.

VULCAN
MECHANICAL SEALS

SERVICE CAPABILITIES

The limits of pressure, temperature and speed are dependant upon the materials specified for the rotary seals and seats, as well as the nature of the media to be sealed. The maximum capabilities of each seal type are shown on the individual data sheets.

Changes in single spring seal operating capabilities are partially a factor of each seal design but are mainly influenced by selection of elastomer type and seal face materials.

Elastomer selection primarily sets temperature and chemical resistance;

Material	Standard Recommendation	Temperature Range
Medium Nitrile	For general duties	–30 to +120 deg. C
Ethylene Propylene	For general duties especially hot water	–40 to +140 deg. C
Viton®	For general chemical applications	–30 to +230 deg. C
Aflas®	For enhanced chemical and temperature capacity	–50 to +250 deg. C
Neoprene	For refrigeration applications	–50 to +100 deg. C
FEP/PFA	For near universal chemical resistance	–60 to +205/260 deg. C
Kalrez®	For absolute chemical and temperature capability	–50 to +310 deg. C

Differing face material combinations affect seal capability, performance and life. Their pV (pressure x velocity) value largely determines the suitability of material combinations of seal faces and specifically the amount of heat generated at the faces. The ability of the face material to resist wear increases the life of the seal particularly in abrasive applications.

Vulcan offer face combinations, from carbon, solid ceramic and stainless steel materials, as standard. We recommend fine-grained, reaction-bonded silicon carbide as ***the*** superior "hard face" material, to be used for both faces for maximum wear resistance, or to run against carbon for ultimate pV capability.

IMPORTANT NOTE

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.

All specifications, dimensions and data may change without notice. You should confirm any necessary detail with our technical specialists or distributors.

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

Vulcan Engineering Limited accept no claim(s) for legal action rising as a result of the information contained in this document, and shall not be liable for the misuse of the full, or any part of the document, over and above its intended use for information on Vulcan products only.

Seat Selection

Correct seat selection lays the foundation for maximising seal performance. Preferred seat types are shown with each seal. However, Vulcan offer any seat design to be used with any seal, thereby giving a maximum range of possible combinations.

Seat housings, for all Vulcan seats, are recommended to have a machined lead in of 1.5 to 2.0 mm at 20 to 30 degrees angle.

Principle Advantages of Single Spring Mechanical Seals

Single Spring – gives superior axial and angular flexibility. The seal's design compensates for misalignment and machinery tolerances.

Non-clogging – large single spring, plus free-movement of the elastomer rubber shaft seal, combats seal failure through build up of solid material.

Self-adjusting – the flexible moving rubber shaft seals accommodate shaft end float and take up wear.

Minimal Wear – strong static seal to the shaft minimises shaft fretting.

Versatile – Compact in design and simple to fit. Standard designs and sizes for all common imperial, metric and DIN 24960 (EN12756) housings are standard.

Extremely cost effective – low capital cost, proven reliability of design, easy to fit and accommodating in use, excellent seal performance and ex-stock service on a complete range of seal types, materials and sizes, make Vulcan single spring seals ***the*** choice for the majority of applications.

Vulcan Quality Assurance

Our "Single Spring" Seal programme is designed to be totally responsive to all customer requirements. A vast array of types, sizes and materials are held in computer automated stock to enable same day despatch. The seals have been designed for maximum technical efficiency and ease of use. All Vulcan seals and components are manufactured in our own state of the art factories which are approved to ISO 9001.

All components are inspected before supply. Vulcan Engineering Limited work to established Quality Control Procedures and the company system in our Sheffield headquarters, is approved to ISO9001.2000. Vulcan operate a company T.Q.M. Programme to constantly monitor and improve performance.

Our policy of total customer service is further enhanced by the widest range and largest stock of seals in the market, plus an extensive network of distributors.

We reserve the right to change specifications without notice.

BRAND NAMES ®

All brand names and product names used in this catalogue are trade names, service marks, trade marks or registered trade marks of their respective owners.

All products are manufactured to Vulcan drawings. Use of other brand names is for informational purposes only.

Vulcan Conical Spring Type Seals

Introduction

The Conical Spring Type Seals offered by Vulcan are an extremely popular seal. These robust, technically proficient, seals are designed to suit DIN and common, standard housing dimensions.

Applications

The proven efficient design and wide choice of 'O'-Ring and face materials enable these seals to be utilised in a large variety of applications.
Suited for pumps, mixers, agitators, compressors and other rotary shaft equipment.

Standard Vulcan Conical Spring Types

Type 8, Type 8DIN and Type 82

Inserted rotary faced, 'O'-Ring mounted, conical spring seals, to suit standard common or DIN fitting dimensions. The Type 82 is a balanced version of Type 8 DIN, suitable for stepped shafts.

Type 8B

'O'-Ring mounted, conical spring seals seal of similar design to the standard Type 8 but with a solid stainless steel head and carbon stationary.

Type 9 and Type 9L

Conical spring 'O'-Ring mounted seal, with a monolithic seal head and a choice of 8 standard or long DIN seat.

Type 12 and Type 12DIN

'O'-Ring mounted, conical spring seals, available with solid stainless head as standard, or inserted SIC/TC ring face. Suitable for standard or DIN housings.

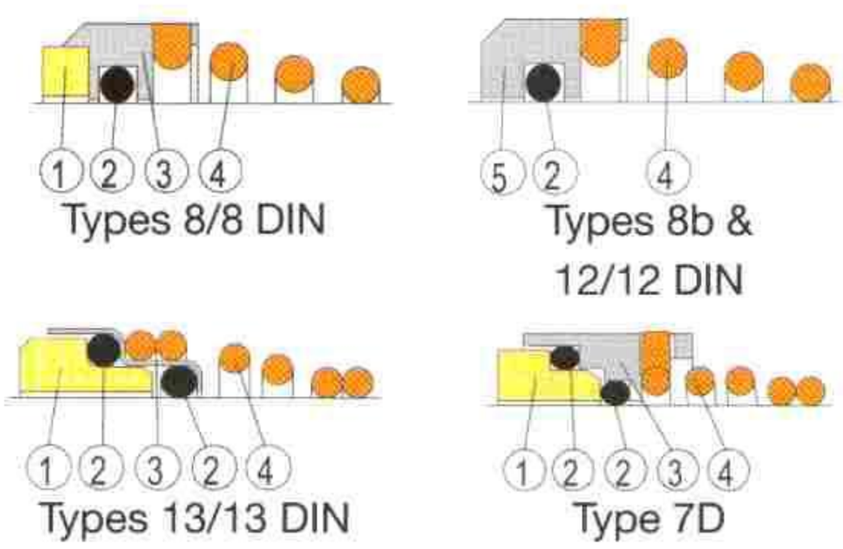
Type 13 and Type 13DIN

'O'-Ring mounted, conical spring seals with pressed in, 'O'-Ring mounted, rotary face, enabling face material interchangeability, to suit common standard or DIN dimensions.

Type 7D

As above Type 13 DIN but with a machined, rather than pressed seal head retainer. Designed to suit DIN 24960 (EN12756) standard.

STANDARD COMPONENTS.



No	Description	3	Retainer
1	Face Ring	4	Coil
2	'O'-Ring	5	Monolithic Face

Vulcan Design Advantages

Positive Drive

Seal is shaft driven, via the coil, providing a positive drive at its base and eliminating common drive pin failures.
Standard springs are right hand wound for clockwise shafts. Please specify left-hand coils for anti-clockwise shaft or "back to back" combinations. The spring coil end is turned upwards to protect the shaft from scoring.

Materials

Suitable for a large variety of applications, through a wide choice of 'O'-Ring and face materials.

Design

Single conical spring, stainless steel, head retainer provides a strong and effective seal, suitable for many duties, including clogging media and hygienic applications.

Self-Aligning

The combination of a resilient 'O'-Ring and single spring design results in a technically efficient and versatile design, that accommodates both misalignment and vibrations.

'O'-Ring Housing

The 'O'-Ring is held within a completely recessed groove providing performance benefits, compared to competitor designs that use a separate drive ring.

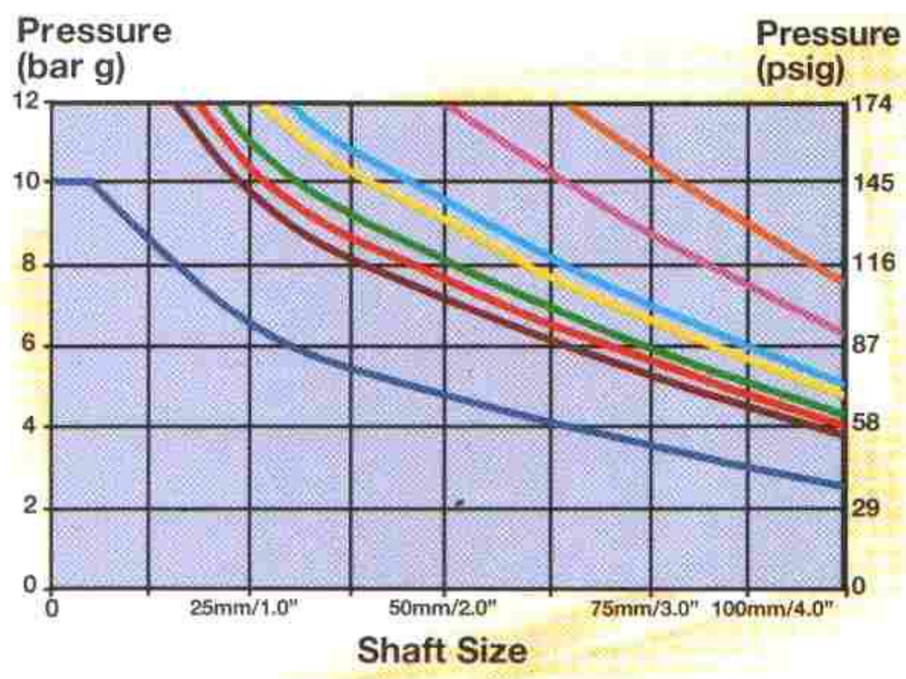
Customisable

Can be specially produced to any working length and seat housing dimensions.

Reliable

Robust, non-clogging, self-adjusting and durable giving highly effective performance.

VULCAN CONICAL SPRING TYPE SEALS PV CHART

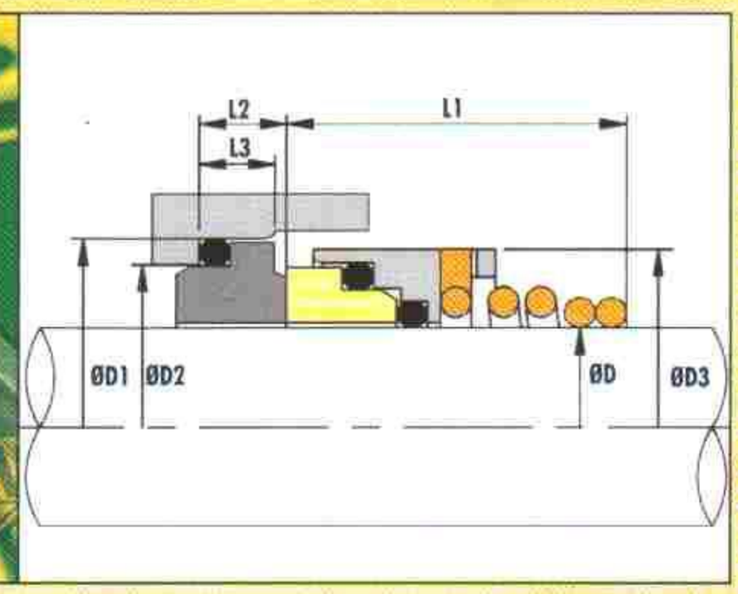


- Carbon/Ceramic
- Carbon/SIC
- Carbon/TC
- SC/TC
- SC/SC
- TC/TC
- Carbon/SS (Ni-Resist)
- Type 13 (Carbon/Ceramic)

Notes:
1.Type 82 multiply by factor 1.4

For information on how to utilise this pV chart please refer to the technical section.

TYPE 7D



Resilient, conical spring, 'O'-Ring mounted DIN standard seal. With the advantage of being able to replace the faces. The seal is very versatile and is suitable for a large variety of general and arduous duty applications, through a choice of face material combinations

VULCAN STANDARD SIZES

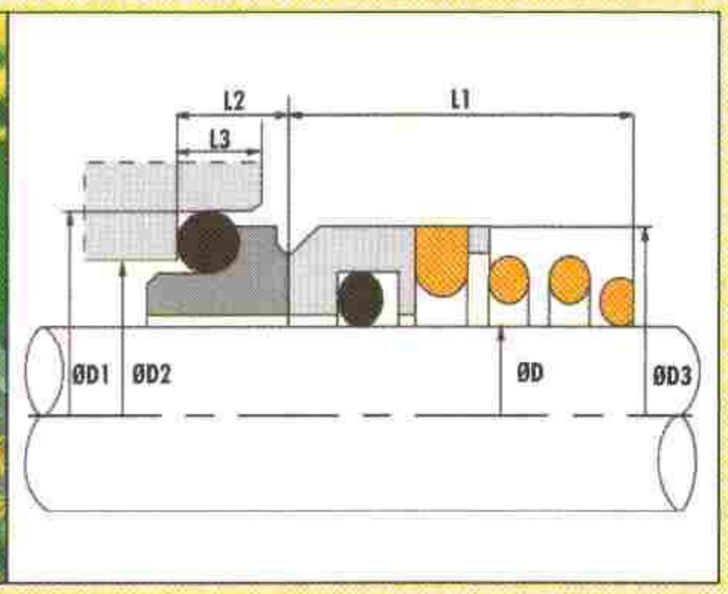
Metric Shaft Size D	Size Code	D1	D2	D3	L1	L2	L3
10	0100	21.00	17.00	19.00	15.00	7.00	4.00
12	0120	23.00	19.00	21.00	18.00	7.00	4.00
14	0140	25.00	21.00	23.00	22.00	7.00	4.00
16	0160	27.00	23.00	26.00	23.00	7.00	4.00
18	0180	33.00	27.00	29.00	24.00	10.00	5.00
20	0200	35.00	29.00	31.00	25.00	10.00	5.00
22	0220	37.00	31.00	33.00	25.00	10.00	5.00
24	0240	39.00	33.00	35.00	27.00	10.00	5.00
25	0250	40.00	34.00	36.00	27.00	10.00	5.00
28	0280	43.00	37.00	40.00	29.00	10.00	5.00
30	0300	45.00	39.00	43.00	30.00	10.00	5.00
32	0320	48.00	42.00	46.00	30.00	10.00	5.00
33	0330	48.00	42.00	46.00	39.00	10.00	5.00
35	0350	50.00	44.00	49.00	39.00	10.00	5.00
38	0380	56.00	49.00	53.00	42.00	13.00	6.00
40	0400	58.00	51.00	56.00	42.00	13.00	6.00
43	0430	61.00	54.00	59.00	47.00	13.00	6.00
45	0450	63.00	56.00	61.00	47.00	13.00	6.00
48	0480	66.00	59.00	64.00	47.00	13.00	6.00
50	0500	70.00	62.00	66.00	46.00	14.00	6.00
53	0530	73.00	65.00	69.00	56.00	14.00	6.00
55	0550	75.00	67.00	71.00	56.00	14.00	6.00
58	0580	78.00	70.00	76.00	56.00	14.00	6.00
60	0600	80.00	72.00	78.00	56.00	14.00	6.00
63	0630	83.00	75.00	81.00	56.00	14.00	6.00
65	0650	85.00	77.00	84.00	66.00	14.00	6.00
68	0680	90.00	81.00	88.00	64.00	16.00	7.00
70	0700	92.00	83.00	89.60	64.00	16.00	7.00
75	0750	97.00	88.00	98.00	64.00	16.00	7.00
80	0800	105.00	95.00	100.00	72.00	18.00	7.00
85	0850	110.00	100.00	107.50	72.00	18.00	7.00
90	0900	115.00	105.00	111.00	72.00	18.00	7.00
95	0950	120.00	110.00	119.00	72.00	18.00	7.00
100	1000	125.00	115.00	123.80	72.00	18.00	7.00

STANDARD STOCK FACE MATERIALS
Rotary Face: Ceramic, Silicon Carbide.
Seat: Carbon, Silicon Carbide.
OTHER FACE MATERIALS TO ORDER

Suggested Operating Limits

PRESSURE 170psi SPEED 15m/s
TEMPERATURE -40 +180°C
Dependent upon shaft diameter and speed + Temperature and media to be sealed

TYPE 8B



Conical spring, 'O'-Ring mounted seal and seat of similar design to the Type 8 but with a solid stainless seal head and 'O'-Ring mounted Carbon Seat. This standard face combination is suitable for general and medium duty applications.

VULCAN STANDARD SIZES

Metric Shaft Size D	Size Code	D1	D2	D3	L1	L2	L3
10	0100	19.20	15.50	19.00	15.50	7.10	5.00
12	0120	21.60	17.50	21.00	15.50	7.60	5.00
14	0140	24.60	20.50	23.00	15.50	7.60	5.00
15	0150	24.60	20.50	24.00	15.50	8.60	5.00
16	0160	28.00	22.00	26.00	17.50	9.00	6.50
18	0180	30.00	24.00	29.00	18.50	10.00	6.50
19	0190	31.00	25.00	31.00	20.00	9.00	6.50
20	0200	35.00	29.50	31.00	20.00	9.50	6.50
22	0220	35.00	29.50	33.00	21.50	9.50	6.50
24	0240	38.00	32.00	35.00	23.00	9.50	6.50
25	0250	38.00	32.00	36.00	24.50	9.50	6.50
26	0260	40.00	34.00	37.00	24.50	10.00	6.50
28	0280	42.00	36.00	40.00	24.50	11.00	6.50
30	0300	45.00	39.20	43.00	24.50	11.00	6.50
32	0320	48.00	42.20	46.00	28.00	11.00	6.50
35	0350	52.00	46.20	49.00	28.00	11.50	6.50
38	0380	55.00	49.20	53.00	31.00	11.50	6.50
40	0400	58.00	52.20	56.00	34.00	11.50	6.50
42	0420	62.00	53.30	59.00	35.00	14.30	8.00
43	0430	62.00	54.30	59.00	35.00	14.30	8.00
45	0450	64.00	55.30	61.00	36.50	14.30	8.00
48	0480	68.40	59.70	64.00	42.00	14.30	8.00
50	0500	69.30	60.80	66.00	43.00	14.30	8.00
55	0550	75.40	66.50	71.00	47.00	15.30	8.00
58	0580	78.40	69.50	76.00	50.00	15.30	8.00
60	0600	80.40	71.50	78.00	51.00	15.30	8.00
65	0650	85.40	76.50	84.00	52.00	15.30	8.00
68	0680	91.50	82.70	88.00	53.00	16.00	8.00
70	0700	92.00	83.00	90.00	54.00	15.30	8.00
75	0750	99.00	90.20	98.00	55.00	15.30	8.00
80	0800	104.00	95.20	100.00	58.00	16.30	8.00

Suggested Operating Limits

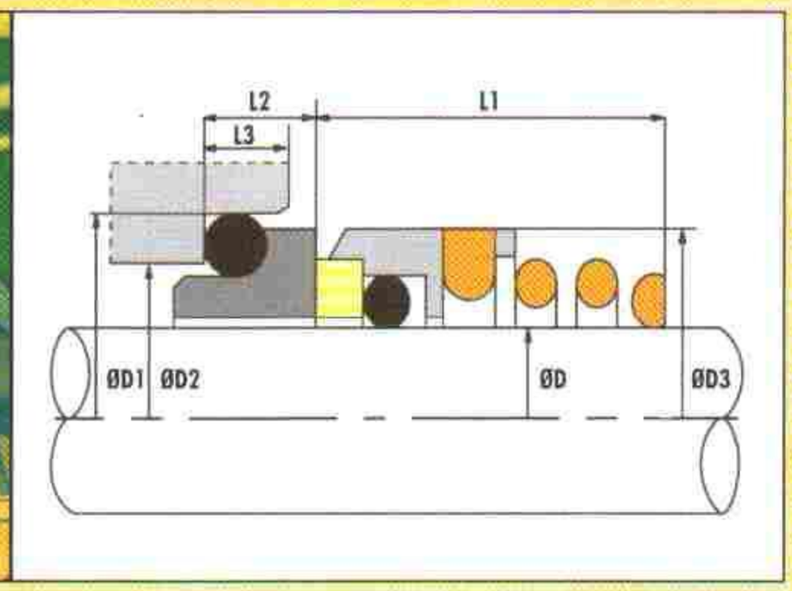
PRESSURE 160psi SPEED 15m/s

TEMPERATURE -40 +180°C

Dependent upon shaft diameter and speed + Temperature and media to be sealed

STANDARD STOCK FACE MATERIALS
Rotary Face: Stainless Steel.
Stat Ring: Carbon.
OTHER FACE MATERIALS TO ORDER

TYPE 8



Conical spring, 'O'-Ring mounted seal with a wide choice of elastometers and face materials. Suitable for a large variety of general duties and arduous duty applications, including those needing high pV value face combinations.

VULCAN STANDARD SIZES

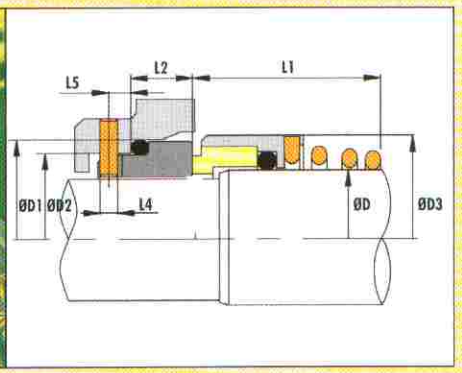
Metric Shaft Size D	Size Code	D1	D2	D3	L1	L2	L3
10	0100	19.20	15.50	19.00	15.50	6.60	5.00
12	0120	21.60	17.50	21.00	15.50	5.60	5.00
14	0140	24.60	20.50	23.00	15.50	5.60	5.00
15	0150	24.60	20.50	24.00	15.50	6.60	5.00
16	0160	28.00	22.00	26.00	17.50	7.50	6.50
18	0180	30.00	24.00	29.00	18.50	8.00	6.50
19	0190	31.00	25.00	31.00	20.00	7.50	6.50
20	0200	35.00	29.50	31.00	20.00	7.50	6.50
22	0220	35.00	29.50	33.00	21.50	7.50	6.50
24	0240	38.00	32.00	35.00	23.00	7.50	6.50
25	0250	38.00	32.00	36.00	24.50	7.50	6.50
26	0260	40.00	34.00	37.00	24.50	8.00	6.50
28	0280	42.00	36.00	40.00	24.50	9.00	6.50
30	0300	45.00	39.20	43.00	24.50	10.50	6.50
32	0320	48.00	42.20	46.00	28.00	10.50	6.50
35	0350	52.00	46.20	49.00	28.00	11.00	6.50
38	0380	55.00	49.20	53.00	31.00	10.30	6.50
40	0400	58.00	52.20	56.00	34.00	10.80	6.50
42	0420	62.00	53.30	59.00	35.00	12.00	8.00
43	0430	62.00	54.30	59.00	35.00	12.00	8.00
45	0450	64.00	55.30	61.00	36.50	11.60	8.00
48	0480	68.40	59.70	64.00	42.00	11.60	8.00
50	0500	69.30	60.80	66.00	43.00	11.60	8.00
55	0550	75.40	66.50	71.00	47.00	13.30	8.00
58	0580	78.40	69.50	76.00	50.00	13.30	8.00
60	0600	80.40	71.50	78.00	51.00	13.30	8.00
65	0650	85.40	76.50	84.00	52.00	13.00	8.00
68	0680	91.50	82.70	88.00	53.00	13.70	8.00
70	0700	92.00	83.00	90.00	54.00	13.00	8.00
75	0750	99.00	92.20	98.00	55.00	14.00	8.00
80	0800	104.00	95.20	100.00	58.00	15.00	8.00

STANDARD STOCK FACE MATERIALS
Rotary Face: Carbon, Silicon Carbide, Tungsten Carbide.
Stat Ring: Ceramic, Silicon Carbide, Tungsten Carbide.
OTHER FACE MATERIALS TO ORDER

Suggested Operating Limits

PRESSURE 180psi SPEED 15m/s
TEMPERATURE -40 +180°C
Dependent upon shaft diameter and speed + Temperature and media to be sealed

TYPE 82



Conical Spring, 'O'-Ring mounted, balanced DIN Standard seal for stepped shafts, with reduced shaft size Type 8 DIN Long seat. This balanced seal arrangement is suitable for a large variety of general and high duty applications, with a wide choice of face material and elastomer combinations.

VULCAN STANDARD SIZES

Metric Shaft Size D	Size Code	Seat Size	D1	D2	D3	L1	L2	L4	L5
14	0140	0100	21.00	17.00	23.00	25.50	10.00	3.00	5.00
16	0160	0120	23.00	19.00	26.00	26.50	10.00	3.00	5.00
18	0180	0140	25.00	21.00	29.00	29.50	10.00	3.00	5.00
20	0200	0160	27.00	23.00	31.00	31.00	10.00	3.00	5.00
22	0220	0180	33.00	27.00	33.00	32.50	11.50	3.00	5.00
24	0240	0200	35.00	29.00	35.00	32.50	11.50	3.00	5.00
26	0260	0220	37.00	31.00	36.00	32.50	11.50	3.00	5.00
28	0280	0240	39.00	33.00	40.00	32.50	11.50	3.00	5.00
30	0300	0250	40.00	34.00	43.00	33.50	11.50	3.00	5.00
33	0330	0280	43.00	37.00	46.00	35.50	11.50	3.00	5.00
35	0350	0300	45.00	39.00	49.00	35.50	11.50	3.00	5.00
38	0380	0330	48.00	42.00	53.00	39.50	11.50	3.00	5.00
40	0400	0350	50.00	44.00	56.00	43.50	11.50	3.00	5.00
43	0430	0380	56.00	49.00	59.00	46.00	14.00	4.00	5.00
45	0450	0400	58.00	51.00	61.00	48.00	14.00	4.00	5.00
48	0480	0430	61.00	54.00	64.00	51.00	14.00	4.00	5.00
50	0500	0450	63.00	56.00	66.00	55.00	14.00	4.00	5.00
53	0530	0480	66.00	59.00	69.00	55.00	14.00	4.00	5.00
55	0550	0500	70.00	62.00	71.00	58.00	15.00	4.00	5.00
58	0580	0530	73.00	65.00	76.00	60.00	15.00	4.00	5.00
60	0600	0550	75.00	67.00	78.00	60.00	15.00	4.00	5.00
63	0630	0580	78.00	70.00	81.00	60.00	15.00	4.00	5.00
65	0650	0600	80.00	72.00	84.00	60.00	15.00	4.00	5.00
68	0680	0630	83.00	75.00	88.00	60.00	15.00	4.00	5.00
70	0700	0650	85.00	77.00	90.00	61.00	15.00	4.00	5.00
75	0750	0700	92.00	83.00	98.00	63.00	18.00	4.00	5.00
80	0800	0750	97.00	88.00	100.00	68.00	18.00	4.00	5.00
85	0850	0800	105.00	95.00	107.50	68.00	18,20	4.00	5.00

Suggested Operating Limits

PRESSURE 200psi SPEED 20m/s

TEMPERATURE -40 +180°C

Dependent upon shaft diameter and speed + Temperature and media to be sealed

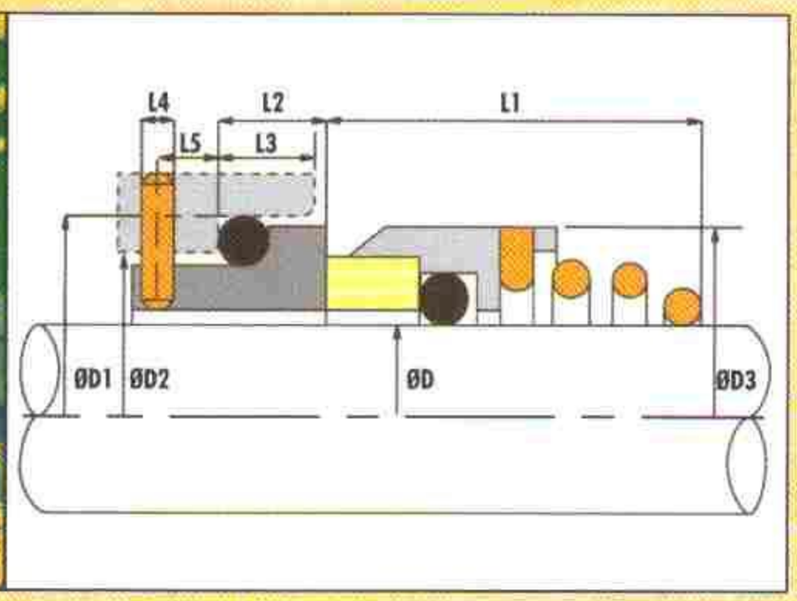
STANDARD STOCK FACE MATERIALS

Rotary Face: Carbon, Silicon Carbide, Tungsten Carbide.

Stat Ring: Ceramic, Silicon Carbide, Tungsten Carbide.

OTHER FACE MATERIALS TO ORDER

TYPE 8 DIN



Conical spring, 'O'-Ring mounted, DIN standard seal and DIN long seat with drive slot. Suitable for a large variety of general and high duty applications through a ready choice of face material and elastomer materials.

VULCAN STANDARD SIZES

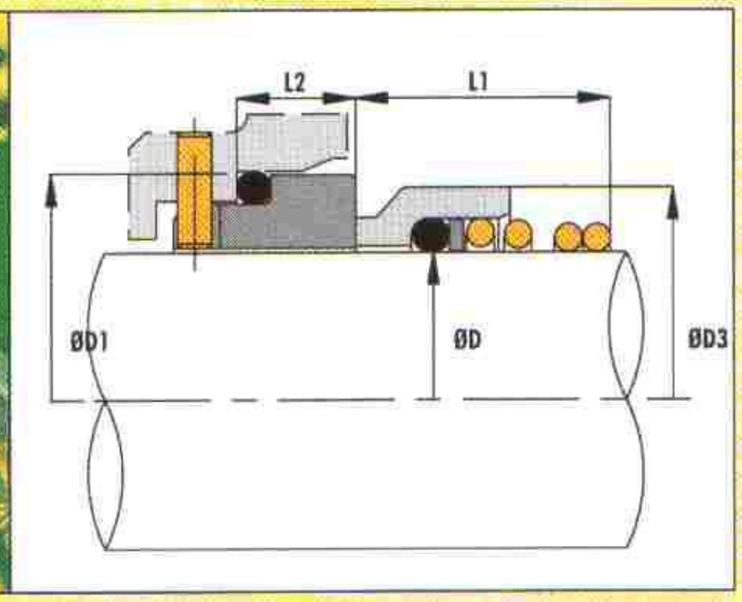
Metric Shaft Size D	Size Code	D1	D2	D3	L1	L2	L3	L4	L5
10	0100	21.00	17.00	19.00	15.50	10.00	5.50	3.00	5.00
12	0120	23.00	19.00	21.00	16.00	10.00	5.50	3.00	5.00
14	0140	25.00	21.00	23.00	16.50	10.00	5.50	3.00	5.00
16	0160	27.00	23.00	26.00	18.00	10.00	5.50	3.00	5.00
18	0180	33.00	27.00	29.00	19.50	11.50	7.00	3.00	5.00
20	0200	35.00	29.00	31.00	22.00	11.50	7.00	3.00	5.00
22	0220	37.00	31.00	33.00	21.50	11.50	7.00	3.00	5.00
24	0240	39.00	33.00	35.00	23.50	11.50	7.00	3.00	5.00
25	0250	40.00	34.00	36.00	26.50	11.50	7.00	3.00	5.00
28	0280	43.00	37.00	40.00	26.50	11.50	7.00	3.00	5.00
30	0300	45.00	39.00	43.00	26.50	11.50	7.00	3.00	5.00
32	0320	48.00	42.00	46.00	28.50	11.50	7.00	3.00	5.00
35	0350	50.00	44.00	49.00	28.50	11.50	7.00	3.00	5.00
38	0380	56.00	49.00	53.00	33.50	14.00	8.00	4.00	5.00
40	0400	58.00	51.00	56.00	36.00	14.00	8.00	4.00	5.00
43	0430	61.00	54.00	59.00	38.50	14.00	8.00	4.00	5.00
45	0450	63.00	56.00	61.00	39.50	14.00	8.00	4.00	5.00
48	0480	66.00	59.00	64.00	46.00	14.00	8.00	4.00	5.00
50	0500	70.00	62.00	66.00	45.00	15.00	8.50	4.00	5.00
53	0530	73.00	65.00	69.00	47.00	15.00	8.50	4.00	5.00
55	0550	75.00	67.00	71.00	49.00	15.00	8.50	4.00	5.00
58	0580	78.00	70.00	76.00	55.00	15.00	8.50	4.00	5.00
60	0600	80.00	72.00	78.00	55.00	15.00	8.50	4.00	5.00
65	0650	85.00	77.00	84.00	55.00	15.00	8.50	4.00	5.00
68	0680	90.00	81.00	88.00	55.00	18.00	9.50	4.00	5.00
70	0700	92.00	83.00	90.00	57.00	18.00	9.50	4.00	5.00
75	0750	97.00	88.00	98.00	62.00	18.00	9.50	4.00	5.00
80	0800	105.00	95.00	100.00	61.80	18.20	10.00	4.00	5.00

STANDARD STOCK FACE MATERIALS
Rotary Face: Carbon, Silicon Carbide, Tungsten Carbide.
Stat Ring: Ceramic, Carbon, Silicon Carbide, Tungsten Carbide.
OTHER FACE MATERIALS TO ORDER

Suggested Operating Limits

PRESSURE 180psi SPEED 15m/s
TEMPERATURE -40 +180°C
Dependent upon shaft diameter and speed + Temperature and media to be sealed

TYPE 9/9L



Conical spring, 'O'-Ring mounted seal, with a monolithic rotary face, available as Type 9L with Type 8 DIN Long or Type 9 with Type 19/8 'O'-Ring mounted seat. Also available with Type 8 DIN short 'O'-Ring mounted seat (see Vulcan seat page) as Type 9S

VULCAN STANDARD SIZES

Metric Shaft Size D	Size Code	D3	Type 9 without Slotted Seat			Type 9L With Slotted Seat		
			D1	L1	L2	D1	L1	L2
10	0100	20.00	19.20	15.90	6.60	21.00	17.50	10.00
12	0120	22.00	21.60	16.00	5.60	23.00	17.50	10.00
14	0140	25.00	24.60	16.00	5.60	25.00	17.50	10.00
15	0150	27.00	24.60	17.40	6.60	27.00	17.40	10.00
16	0160	27.00	28.00	19.00	7.50	27.00	19.50	10.00
18	0180	30.00	30.00	20.50	8.00	33.00	20.50	11.50
20	0200	32.00	35.00	22.00	7.50	35.00	22.00	11.50
22	0220	35.00	35.00	23.50	7.50	37.00	23.50	11.50
24	0240	38.00	38.00	25.00	7.50	39.00	25.00	11.50
25	0250	40.00	38.00	26.50	7.50	40.00	26.50	11.50
28	0280	43.00	42.00	26.50	9.00	43.00	26.50	11.50
30	0300	45.00	45.00	25.00	10.50	45.00	25.00	11.50
32	0320	47.00	48.00	28.50	10.50	48.00	28.50	11.50
35	0350	50.00	52.00	28.50	11.00	50.00	28.50	11.50
38	0380	56.00	55.00	32.00	10.30	56.00	32.00	14.00

Suggested Operating Limits

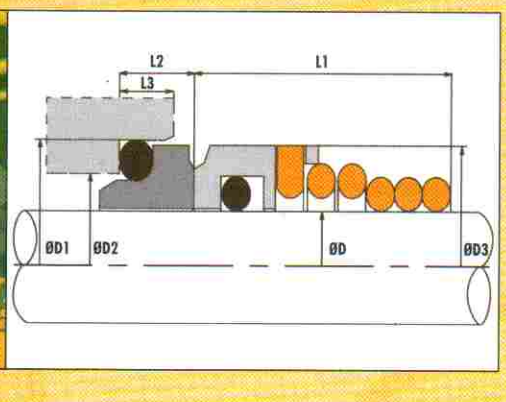
PRESSURE 160psi SPEED 15m/s

TEMPERATURE -40 +180°C

Dependent upon shaft diameter and speed + Temperature and media to be sealed

STANDARD STOCK FACE MATERIALS
Rotary Face: Carbon, Silicon Carbide.
Stat Ring: Carbon, Ceramic, Silicon Carbide.
OTHER FACE MATERIALS TO ORDER

TYPE 12 DIN



A range of highly proficient, widely utilised, 'O'-Ring mounted, conical spring seals with solid, stainless steel head and carbon seat. Available to suit DIN 24960 (EN12756) housings. Suitable for a wide variety of general and medium duties.

VULCAN STANDARD SIZES

Metric Shaft Size D	Size Code	D1	D2	D3	L1	L2	L3
10	0100	21.00	17.00	19.00	15.00	7.00	4.00
12	0120	23.00	19.00	21.00	18.00	7.00	4.00
14	0140	25.00	21.00	23.00	22.00	7.00	4.00
16	0160	27.00	23.00	26.00	23.00	7.00	4.00
18	0180	33.00	27.00	29.00	24.00	10.00	5.00
20	0200	35.00	29.00	31.00	25.00	10.00	5.00
22	0220	37.00	31.00	33.00	25.00	10.00	5.00
24	0240	39.00	33.00	35.00	27.00	10.00	5.00
25	0250	40.00	34.00	36.00	27.00	10.00	5.00
28	0280	43.00	37.00	40.00	29.00	10.00	5.00
30	0300	45.00	39.00	43.00	30.00	10.00	5.00
32	0320	48.00	42.00	46.00	30.00	10.00	5.00
33	0330	48.00	42.00	46.00	39.00	10.00	5.00
35	0350	50.00	44.00	49.00	39.00	10.00	5.00
38	0380	56.00	49.00	53.00	42.00	13.00	6.00
40	0400	58.00	51.00	56.00	42.00	13.00	6.00
43	0430	61.00	54.00	59.00	47.00	13.00	6.00
45	0450	63.00	56.00	61.00	47.00	13.00	6.00
48	0480	66.00	59.00	64.00	47.00	13.00	6.00
50	0500	70.00	62.00	66.00	46.00	14.00	6.00
53	0530	73.00	65.00	69.00	56.00	14.00	6.00
55	0550	75.00	67.00	71.00	56.00	14.00	6.00
58	0580	78.00	70.00	76.00	56.00	14.00	6.00
60	0600	80.00	72.00	78.00	56.00	14.00	6.00
63	0630	83.00	75.00	81.00	56.00	14.00	6.00
65	0650	85.00	77.00	84.00	66.00	14.00	6.00
68	0680	90.00	81.00	88.00	64.00	16.00	7.00
70	0700	92.00	83.00	89.60	64.00	16.00	7.00
75	0750	97.00	88.00	98.00	64.00	16.00	7.00
80	0800	105.00	95.00	100.00	72.00	18.00	7.00
85	0850	110.00	100.00	107.50	72.00	18.00	7.00
90	0900	115.00	105.00	111.00	72.00	18.00	7.00
95	0950	120.00	110.00	119.00	72.00	18.00	7.00
100	1000	125.00	115.00	123.80	72.00	18.00	7.00

STANDARD STOCK FACE MATERIALS
Rotary Face: Stainless Steel, Silicon Carbide.
Stat Ring: Carbon, Silicon Carbide.
OTHER FACE MATERIALS TO ORDER

Suggested Operating Limits

PRESSURE 160psi SPEED 15m/s
TEMPERATURE -40 +200°C
Dependent upon shaft diameter and speed + Temperature and media to be sealed

TYPE 12

A range of highly proficient, widely utilised, 'O'-Ring mounted, conical spring seals with solid, stainless steel head and carbon seat. To suit standard housings. Suitable for a wide variety of duties. For photo and line drawing see Type 12 DIN page (opposite)

VULCAN STANDARD SIZES

Metric Shaft Size D	Size Code	D1	D2	D3	L1	L2	L3
10	0100	18.10	14.00	19.00	15.00	5.50	4.00
11	0110	20.60	16.50	21.00	18.00	5.50	4.00
12	0120	20.60	16.50	21.00	18.00	5.50	4.00
13	0130	23.10	19.00	23.00	22.00	6.00	4.00
14	0140	23.10	19.00	23.00	22.00	6.00	4.00
15	0150	26.90	21.00	24.00	22.00	7.00	5.00
16	0160	26.90	21.00	26.00	23.00	7.00	5.00
17	0170	26.90	21.00	26.00	23.00	7.00	5.00
18	0180	30.90	25.00	29.00	24.00	8.00	5.00
19	0190	30.90	25.00	31.00	25.00	8.00	5.00
20	0200	30.90	25.00	31.00	25.00	8.00	5.00
21	0210	35.40	30.00	33.00	25.00	8.00	5.50
22	0220	35.40	30.00	33.00	25.00	8.00	5.50
23	0230	35.40	30.00	35.00	27.00	8.00	5.50
24	0240	35.40	30.00	35.00	27.00	8.00	5.50
25	0250	38.20	33.00	36.00	27.00	8.50	5.50
26	0260	38.20	33.00	36.00	27.00	8.50	5.50
27	0270	38.20	33.00	36.00	27.00	8.50	5.50
28	0280	43.30	38.00	40.00	29.00	9.00	5.50
29	0290	43.30	38.00	43.00	30.00	9.00	5.50
30	0300	43.30	38.00	43.00	30.00	9.00	5.50
31	0310	43.30	38.00	46.00	30.00	9.00	5.50
32	0320	43.30	38.00	46.00	30.00	9.00	5.50
33	0330	53.50	45.00	46.00	39.00	11.50	7.50
34	0340	53.50	45.00	49.00	39.00	11.50	7.50
35	0350	53.50	45.00	49.00	39.00	11.50	7.50
36	0360	53.50	45.00	49.00	39.00	11.50	7.50
37	0370	53.50	45.00	49.00	39.00	11.50	7.50
38	0380	60.50	52.00	53.00	39.00	11.50	7.50
39	0390	60.50	52.00	56.00	39.00	11.50	7.50
40	0400	60.50	52.00	56.00	39.00	11.50	7.50
41	0410	60.50	52.00	56.00	39.00	11.50	7.50
42	0420	60.50	52.00	59.00	39.00	11.50	7.50
43	0430	60.50	52.00	59.00	39.00	11.50	7.50
44	0440	65.50	57.00	61.00	41.00	11.50	7.50
45	0450	65.50	57.00	61.00	41.00	11.50	7.50
46	0460	65.50	57.00	61.00	41.00	11.50	7.50
47	0470	65.50	57.00	64.00	41.00	11.50	7.50
48	0480	65.50	57.00	64.00	41.00	11.50	7.50
49	0490	65.50	57.00	64.00	41.00	11.50	7.50
50	0500	72.50	64.00	66.00	45.00	11.50	7.50
55	0550	72.50	64.00	71.00	47.00	11.50	7.50
60	0600	79.30	72.00	78.00	49.00	11.50	7.50
65	0650	84.50	77.00	84.00	51.00	11.50	7.50
70	0700	89.50	82.00	89.60	51.00	11.50	7.50
75	0750	94.50	87.00	98.00	57.00	11.50	7.50
80	0800	99.50	92.00	100.00	59.00	11.50	7.50
85	0850	105.50	98.00	107.50	59.00	13.50	8.00
90	0900	111.50	105.00	111.00	62.00	13.50	8.00
95	0950	116.50	110.00	119.00	62.00	13.50	8.00
100	1000	119.50	114.00	123.80	75.00	13.50	8.00

Suggested Operating Limits

PRESSURE 160psi SPEED 15m/s

TEMPERATURE -40 +200°C

Dependent upon shaft diameter and speed + Temperature and media to be sealed

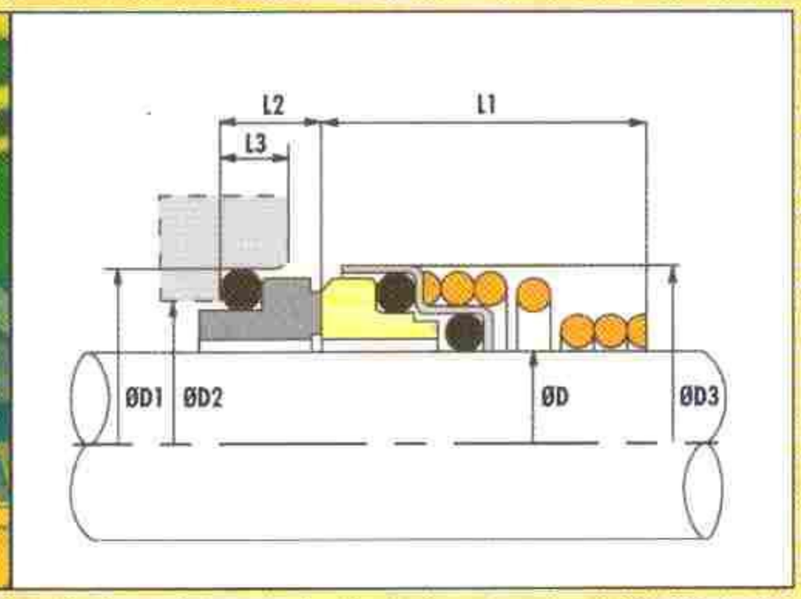
STANDARD STOCK FACE MATERIALS

Rotary Face: Stainless Steel, Silicon Carbide.

Stat Ring: Carbon, Silicon Carbide.

OTHER FACE MATERIALS TO ORDER

TYPE 13



'O'-Ring mounted, conical spring seal with pressed stainless seal head retainer and pressed carbon seat. Highly productionised seal capable of wide ranging service.
Seal and seat faces can be inter-changed with each other and can be easily replaced.

VULCAN STANDARD SIZES

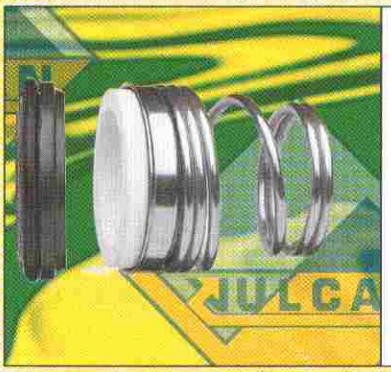
Metric Shaft Size D	Size Code	D1	D2	D3	L1	L2	L3
10	0100	18.10	14.00	19.50	15.00	5.50	4.00
11	0110	20.60	16.50	22.00	18.00	5.50	4.00
12	0120	20.60	16.50	22.00	18.00	5.50	4.00
13	0130	23.10	19.00	24.00	22.00	6.00	4.00
14	0140	23.10	19.00	24.00	22.00	6.00	4.00
15	0150	26.90	21.00	26.00	22.00	7.00	5.00
16	0160	26.90	21.00	26.00	23.00	7.00	5.00
17	0170	26.90	21.00	26.00	23.00	7.00	5.00
18	0180	30.90	25.00	32.00	24.00	8.00	5.00
19	0190	30.90	25.00	32.70	25.00	8.00	5.00
20	0200	30.90	25.00	32.70	25.00	8.00	5.00
21	0210	35.40	30.00	36.00	25.00	8.00	5.50
22	0220	35.40	30.00	36.00	25.00	8.00	5.50
23	0230	35.40	30.00	36.00	27.00	8.00	5.50
24	0240	35.40	30.00	37.40	27.00	8.00	5.50
25	0250	38.20	33.00	38.00	27.00	8.50	5.50
28	0280	43.30	38.00	42.00	29.00	9.00	5.50
29	0290	43.30	38.00	44.00	30.00	9.00	5.50
30	0300	43.30	38.00	44.00	30.00	9.00	5.50
32	0320	43.30	38.00	45.50	30.00	9.00	5.50
33	0330	53.50	45.00	46.50	39.00	11.50	7.50
35	0350	53.50	45.00	49.00	39.00	11.50	7.50
38	0380	60.50	52.00	56.00	39.00	11.50	7.50
40	0400	60.50	52.00	58.00	39.00	11.50	7.50

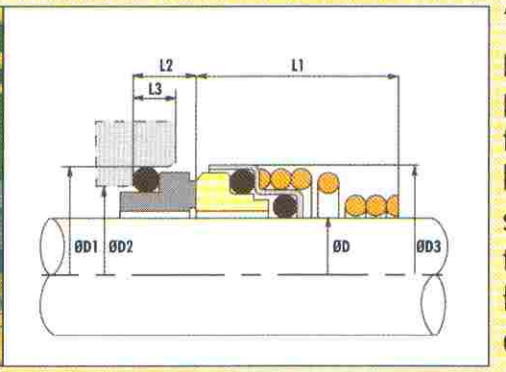
STANDARD STOCK FACE MATERIALS
Rotary Face: Ceramic, Silicon Carbide, Tungsten Carbide, Carbon.
Stat Ring: Carbon, Silicon Carbide, Tungsten Carbide, Ceramic.
OTHER FACE MATERIALS TO ORDER

Suggested Operating Limits

PRESSURE 160psi SPEED 15m/s
TEMPERATURE -40 +180°C
Dependent upon shaft diameter and speed + Temperature and media to be sealed

TYPE 13 DIN





'O'-Ring mounted, with pressed seal head and seat, plus conical spring, designed to fit DIN 24960 (EN12756) housings. Cost-effective seal suitable for many duties with the option to replace wear faces and 'O'-Rings during over-hauls.

VULCAN STANDARD SIZES

Metric Shaft Size D	Size Code	D1	D2	D3	L1	L2	L3
10	0100	21.00	17.00	19.50	15.00	7.00	5.50
12	0120	23.00	19.00	22.00	18.00	7.00	5.50
14	0140	25.00	21.00	24.00	22.00	7.00	5.50
16	0160	27.00	23.00	26.00	23.00	7.00	5.50
18	0180	33.00	27.00	32.00	24.00	10.00	7.00
20	0200	35.00	29.00	32.70	25.00	10.00	7.00
22	0220	37.00	31.00	36.00	25.00	10.00	7.00
24	0240	39.00	33.00	37.40	27.00	10.00	7.00
25	0250	40.00	34.00	38.00	27.00	10.00	7.00
28	0280	43.00	37.00	42.00	29.00	10.00	7.00
30	0300	45.00	39.00	44.00	30.00	10.00	7.00
32	0320	48.00	42.00	45.50	30.00	10.00	7.00
33	0330	48.00	42.00	46.50	39.00	10.00	7.00
35	0350	50.00	44.00	49.00	39.00	10.00	7.00
38	0380	56.00	49.00	56.00	42.00	13.00	8.00
40	0400	58.00	51.00	58.00	42.00	13.00	8.00

Suggested Operating Limits

PRESSURE 160psi SPEED 15m/s

TEMPERATURE -40 +180°C

Dependent upon shaft diameter and speed + Temperature and media to be sealed

STANDARD STOCK FACE MATERIALS

Rotary Face: Ceramic, Silicon Carbide, Tungsten Carbide.

Stat Ring: Carbon, Silicon Carbide, Tungsten Carbide.

OTHER FACE MATERIALS TO ORDER

Vulcan Elastomeric Bellows Type Seals

Section 4

Introduction

Vulcan offer an extensive range of technically efficient and highly versatile, elastomeric bellows seals, suitable for any application dimensions, via our comprehensive standard range or through special manufacture to individual requirements.

Applications

The Vulcan bellows seals designs are highly recommended for duties with media containing solids and for hygienic applications, due to their non-clogging, self adjusting and robust design. These very reliable seals are also customisable, as they can be specially produced to any working length and seat housing configuration.

Suited for pumps, mixers, agitators, compressors and other rotary shaft equipment.

Standard Vulcan Bellows Types

Type 14 Series

Universal compact DIN seals to suit three standard DIN working lengths.

Type 19 Series

Compact or extended working lengths, with a non DIN cross-section, for optimum flexibility and durability.

Types 1511/1522

Compact DIN profile seal Types to suit American standard working lengths. Types 1511 and 1522 are bellows equivalents to the Parallel Types 11 and 22 as well as Types A4 and A5.

Type 1520

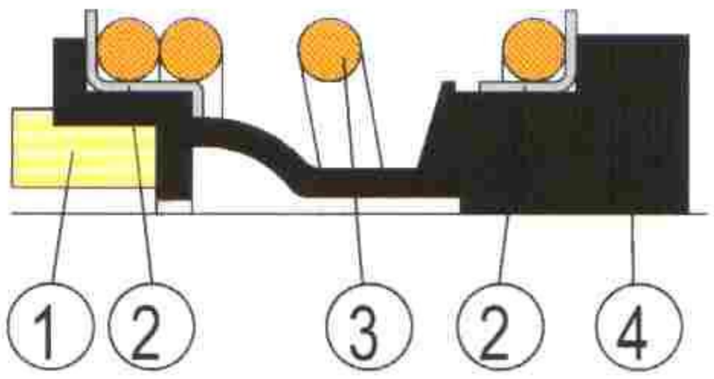
DIN profiled bellows seal to suit common international standard working length. Seal has same working length and seat as the Type 20, and Type A2 Parallel Seals.

Type 1724

Metal encased, rubber bellows seal to fit DIN profiles and DIN L1K. The Vulcan seal face is retained to avoid the most common cause of seal installation failure on competitor seal manufacture.

STANDARD COMPONENTS.

(All Types except Type 1724)



No	Description	No	Description
1	Face	3	Coil
2	Retaining Plates	4	Bellows

Vulcan Design Advantages

Range

Widest standard range of Bellows Seals, with more working lengths and seat choices and our compact DIN profile designs, than any other mechanical seal manufacturer.

Material Quality

Wide range of high quality elastomers and seal face materials readily available.

Design

An ingenious robust, non-fretting and non-clogging bellows design, capable of accommodating seal face wear, shaft misalignment and tolerances, due to Vulcan's attention to detail during the design process.
The rotary face is resiliently mounted with no bonded joints and therefore will not sustain wear nor damage when in contact with a hard face material, such as Silicon Carbide. The bellows have no moulded joints and are not subjected to torsional stresses.
These design features and our proven design face width and loading standards, provide increased seal performance, capability and life.

Retained Components

One sole unit, with no loose parts. The result is an easy fitting, bi-directional seal which is less prone to damage.

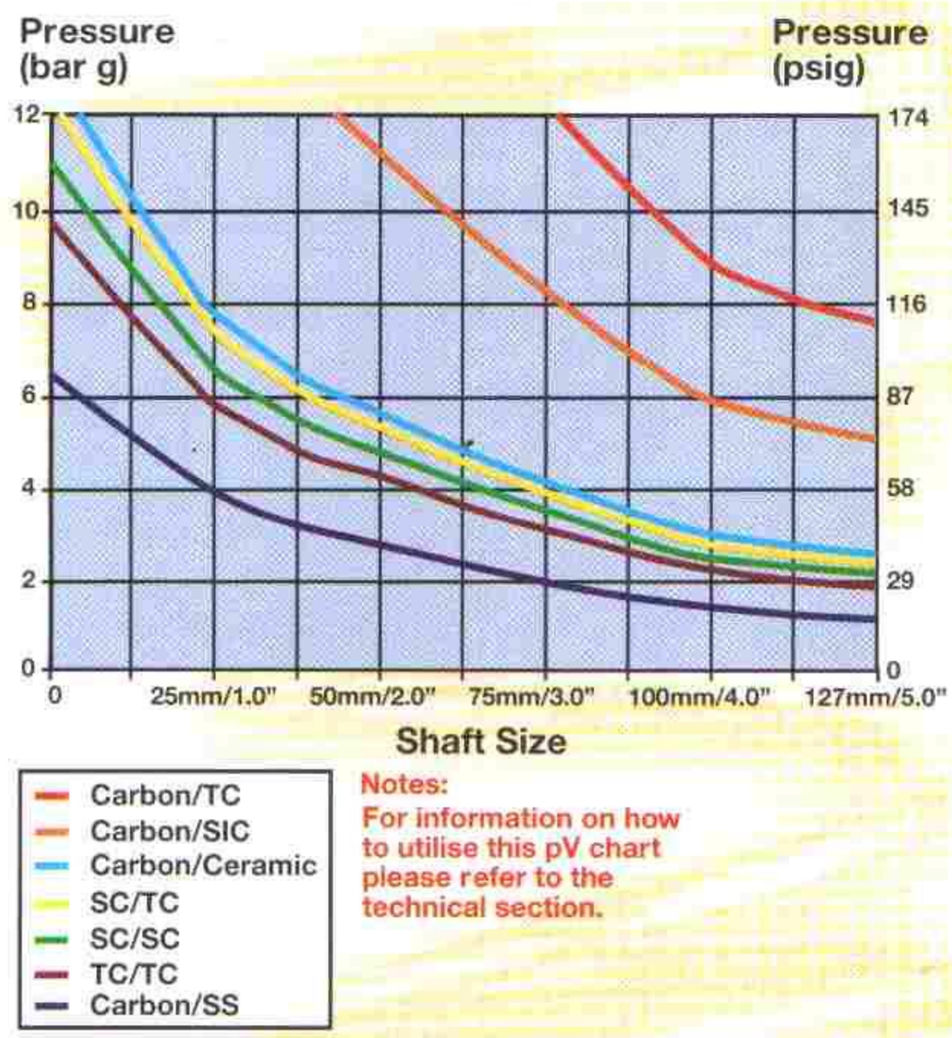
Designed for OEM's

The Type 14/15/17 Series have been designed as Vulcan's OEM range of seals and offer;
Better performance, capability and life compared to standard Parallel Spring Seals. Suitable for a wide variety of applications and media.
Customisable to any working length, seat housing dimensions, elastomer colours and name etc. Allowing a unique seal to be marketed by O.E.M's, as their own design, which won't be sold elsewhere.
Very cost competitive to produce, especially in larger sizes and hard faces.

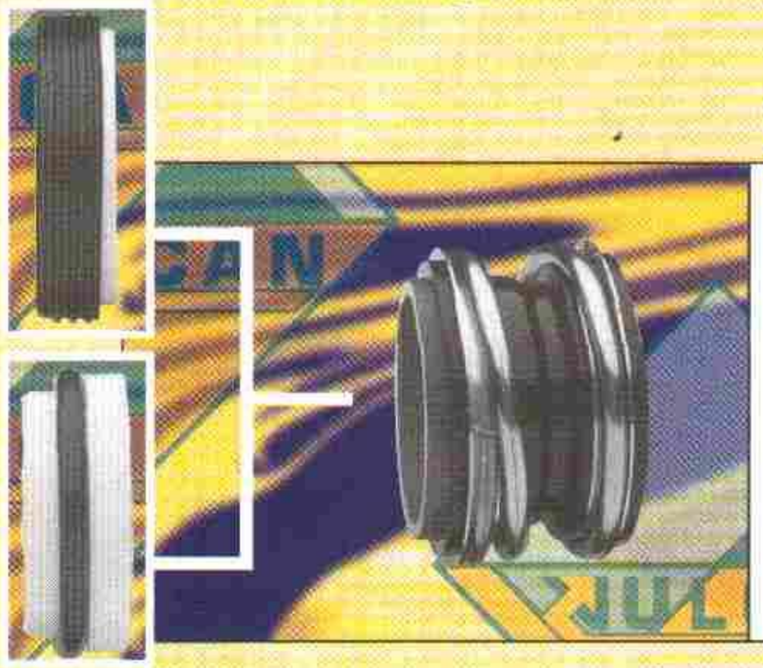
Reliability

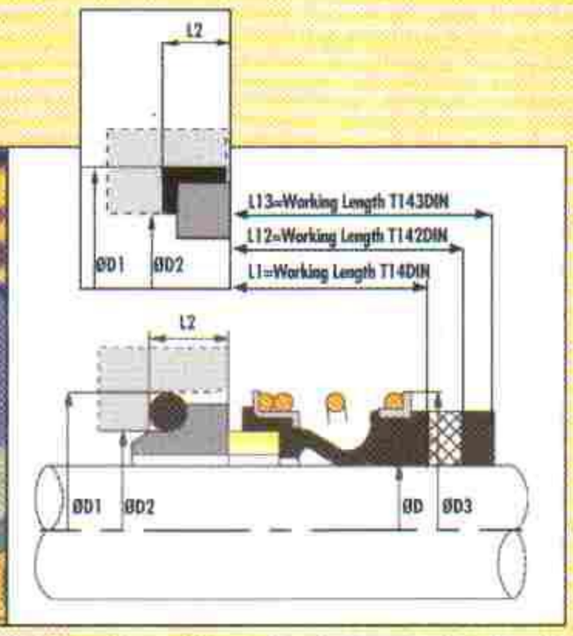
These are proven very effective designs, highly utilised in many applications. They give extremely reliable performance based upon the bellows' design, high strength and flexibility.
Vulcan's thorough Quality Control Systems ensure correct and reliable supply.

VULCAN BELLOWS TYPE SEALS PV CHART



TYPE 14 /TYPE 142 /TYPE 143





Universal compact DIN seal and seat with a choice of standard DIN working lengths. The robust, heavy duty bellows design provides excellent flexibility and durability.
The seal is supplied as standard with the Type 19B seat. Alternatively specify Type 14S, 142S or 143S for this seal to be supplied with a Type 8 DIN Short Seat.

VULCAN STANDARD SIZES

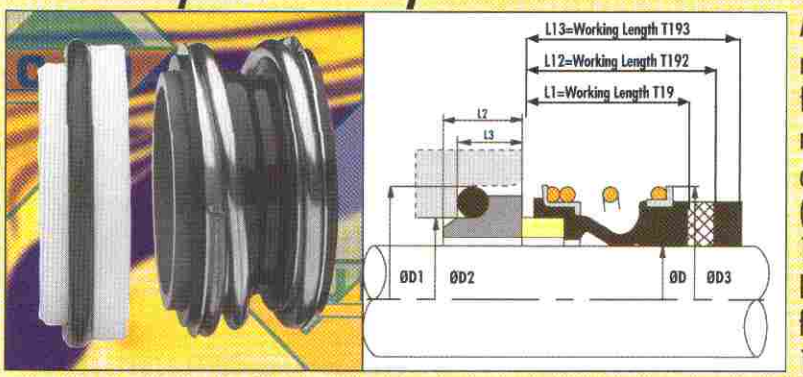
Metric Shaft Size D	Size Code	D1	D2	D3	L1	L12	L13	L2
10	0100	21.0	17.0	20.0	13.4	25.9	33.4	6.6
12	0120	23.0	19.0	22.0	14.4	25.9	33.4	6.6
14	0140	25.0	21.0	24.0	14.4	28.4	33.4	6.6
15	0150	27.0	23.0	25.0	14.4	28.4	33.4	6.6
16	0160	27.0	23.0	26.0	14.4	28.4	33.4	6.6
18	0180	33.0	27.0	32.0	18.5	30.0	37.5	7.5
20	0200	35.0	29.0	34.0	18.5	30.0	37.5	7.5
22	0220	37.0	31.0	36.0	18.5	30.0	37.5	7.5
24	0240	39.0	33.0	38.0	18.5	32.5	42.5	7.5
25	0250	40.0	34.0	39.0	18.5	32.5	42.5	7.5
28	0280	43.0	37.0	42.0	24.5	35.0	42.5	7.5
30	0300	45.0	39.0	44.0	25.5	35.0	42.5	7.5
32	0320	48.0	42.0	46.0	25.5	35.0	47.5	7.5
33	0330	48.0	42.0	47.0	25.5	35.0	47.5	7.5
35	0350	50.0	44.0	49.0	26.5	35.0	47.5	7.5
38	0380	56.0	49.0	54.0	29.0	36.0	46.0	9.0
40	0400	58.0	51.0	56.0	29.0	36.0	46.0	9.0
43	0430	61.0	54.0	59.0	29.0	36.0	51.0	9.0
45	0450	63.0	56.0	61.0	29.0	36.0	51.0	9.0
48	0480	66.0	59.0	64.0	31.0	36.0	51.0	9.0
50	0500	70.0	62.0	66.0	30.5	38.0	50.5	9.5
53	0530	73.0	65.0	69.0	29.0	36.5	59.0	11.0
55	0550	75.0	67.0	71.0	29.0	36.5	59.0	11.0
58	0580	78.0	70.0	78.0	32.0	41.5	59.0	11.0
60	0600	80.0	72.0	80.0	34.0	41.5	59.0	11.0
65	0650	85.0	77.0	85.0	34.0	41.5	69.0	11.0
68	0680	90.0	81.0	88.0	33.7	41.2	68.7	11.3
70	0700	92.0	83.0	90.0	33.7	48.7	68.7	11.3
75	0750	97.0	88.0	99.0	40.7	48.7	68.7	11.3
80	0800	105.0	95.0	104.0	40.5	48.0	78.0	12.0
85	0850	110.0	100.0	109.0	38.5	46.0	76.0	14.0
90	0900	115.0	105.0	114.0	38.5	51.0	76.0	14.0
95	0950	120.0	110.0	119.0	38.5	51.0	76.0	14.0
100	1000	125.0	115.0	124.0	38.5	51.0	76.0	14.0

STANDARD STOCK FACE MATERIALS
Rotary Face: Carbon, Silicon Carbide, Tungsten Carbide.
Stat Ring: Ceramic, Silicon Carbide, Tungsten Carbide.
OTHER FACE MATERIALS TO ORDER

Suggested Operating Limits

PRESSURE 170psi SPEED 15m/s
TEMPERATURE -40 +200°C
Dependent upon shaft diameter and speed + Temperature and media to be sealed

TYPE 19/TYPE 192/ TYPE 193



A robust rubber bellows seal, with a wide non-DIN cross section, for optimum flexibility and durability. Available with a non DIN seat (as shown) or a wide range of 'O'-Ring or Boot Mounted DIN seats (see Vulcan seats pages). Types 192 and 193 have an extended bellows to meet DIN L1K and L1N working lengths, when fitted with a Type 8 DIN Short 'O'-Ring or 19B boot mounted Seat.

VULCAN STANDARD SIZES

Metric Shaft Size D	Size Code	D1	D2	D3	L1	L12	L13	L2	L3
10	0100	19.2	15.5	20.0	14.5	25.9	33.4	9.0	6.6
12	0120	21.6	17.5	23.2	15.0	25.9	33.4	8.0	5.6
14	0140	24.6	20.5	27.1	17.0	28.4	33.4	8.0	5.6
15	0150	24.6	20.5	28.0	17.0	28.4	33.4	9.0	6.6
16	0160	28.0	22.0	27.1	17.0	28.4	33.4	10.0	7.5
18	0180	30.0	24.0	31.0	19.5	30.0	37.5	10.5	8.0
20	0200	35.0	29.5	36.0	21.5	30.0	37.5	10.0	7.5
22	0220	35.0	29.5	36.0	21.5	30.0	37.5	10.0	7.5
24	0240	38.0	32.0	40.5	22.5	32.5	42.5	10.0	7.5
25	0250	40.0	32.0	41.0	23.0	32.5	42.5	10.0	7.5
28	0280	42.0	36.0	47.0	26.5	35.0	42.5	11.5	9.0
30	0300	45.0	39.2	47.0	26.5	35.0	42.5	13.0	10.5
32	0320	48.0	44.2	51.0	27.5	35.0	47.5	13.0	10.5
33	0330	50.0	42.2	51.0	27.5	35.0	47.5	13.5	11.0
35	0350	52.0	46.2	55.0	28.5	35.0	47.5	13.5	11.0
38	0380	55.0	49.2	57.3	30.0	36.0	46.0	13.0	10.3
40	0400	58.0	52.2	60.0	30.0	36.0	46.0	13.5	10.8
43	0430	62.0	53.3	62.2	30.0	36.0	51.0	14.5	12.0
45	0450	64.0	55.3	64.3	30.0	36.0	51.0	14.5	11.6
48	0480	68.4	59.7	69.0	30.5	36.0	51.0	14.5	11.6
50	0500	69.3	60.8	70.2	30.5	38.0	50.5	14.5	11.6
53	0530	72.3	63.8	76.0	33.0	36.5	59.0	15.0	12.3
55	0550	75.4	66.5	78.0	35.0	36.5	59.0	16.0	13.3
58	0580	78.4	69.5	82.0	37.0	41.5	59.0	16.0	13.3
60	0600	80.4	71.5	85.0	38.0	41.5	59.0	16.0	13.3
65	0650	85.4	76.5	90.0	40.0	41.5	69.0	16.0	13.0
68	0680	91.5	82.7	94.0	40.0	41.5	68.7	16.0	13.7
70	0700	92.0	83.0	97.0	40.0	48.7	68.7	16.0	13.0
75	0750	99.0	90.2	102.0	40.0	48.0	68.7	17.0	14.0
80	0800	104.0	95.2	106.5	40.0	48.0	78.0	18.0	15.0
85	0850	109.0	100.2	117.0	41.0	46.0	76.0	18.0	14.8
90	0900	114.0	105.2	126.0	45.0	51.0	76.0	18.0	14.8
95	0950	120.3	111.6	130.0	46.0	51.0	76.0	19.0	15.8
100	1000	123.3	114.5	130.0	47.0	51.0	76.0	19.0	15.8

Suggested Operating Limits

PRESSURE 200psi SPEED 20m/s

TEMPERATURE -40 +200°C

Dependent upon shaft diameter and speed + Temperature and media to be sealed

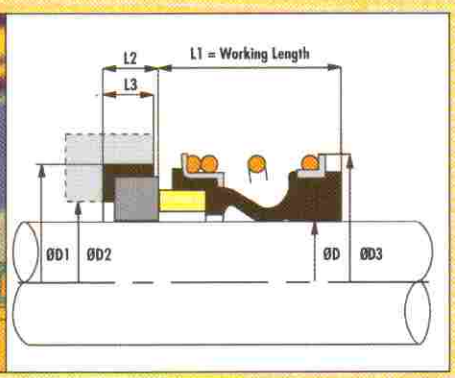
STANDARD STOCK FACE MATERIALS

Rotary Face: Carbon, Silicon Carbide, Tungsten Carbide.

Stat Ring: Ceramic, Silicon Carbide, Tungsten Carbide.

OTHER FACE MATERIALS TO ORDER

TYPE 1520



Metric DIN profile seal and a standard seat with working length to suit a common International standard. Seal has same working length and the same seat as our Type 20, and is suitable for general duties.

VULCAN STANDARD SIZES

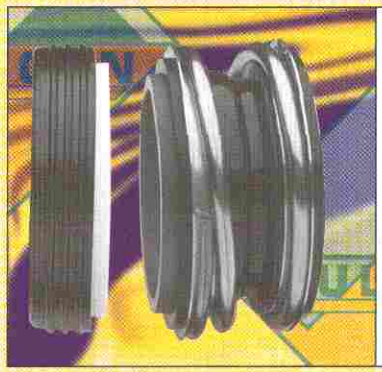
Metric Shaft Size D	Size Code	D1	D2	D3	L1	L2	L3
10	0100	24.60	16.00	20.00	25.40	8.74	7.47
12	0120	27.79	19.05	22.00	25.40	8.74	7.47
13	0130	27.79	19.05	22.00	25.40	8.74	7.47
14	0140	30.95	22.23	24.00	25.40	10.32	8.97
15	0150	30.95	22.23	25.00	25.40	10.32	8.97
16	0160	30.95	22.23	26.00	25.40	10.32	8.97
18	0180	34.15	25.40	32.00	25.40	10.32	8.97
19	0190	34.15	25.40	32.00	25.40	10.32	8.97
20	0200	35.70	26.99	34.00	25.40	10.32	8.97
22	0220	37.30	28.58	36.00	25.40	10.32	8.97
24	0240	40.50	31.75	38.00	25.40	10.32	8.97
25	0250	40.50	31.75	39.00	25.40	10.32	8.97
28	0280	47.63	35.72	42.00	33.34	11.99	10.46
30	0300	50.80	38.89	44.00	33.34	11.99	10.46
32	0320	50.80	38.89	46.00	33.34	11.99	10.46
33	0330	53.98	42.07	47.00	33.34	11.99	10.46
34	0340	53.98	42.07	49.00	33.34	11.99	10.46
35	0350	53.98	42.07	49.00	33.34	11.99	10.46
38	0381	57.15	45.24	54.00	33.34	11.99	10.46
40	0400	60.35	48.82	56.00	33.34	11.99	10.46
42	0420	63.50	51.59	59.00	40.48	11.99	10.46
43	0430	63.50	51.59	59.00	40.48	11.99	10.46
44	0440	63.50	51.59	61.00	40.48	11.99	10.46
45	0450	63.50	51.59	61.00	40.48	11.99	10.46
48	0480	66.70	54.75	64.00	40.48	11.99	10.46
50	0500	69.85	58.00	66.00	40.48	13.50	11.96
53	0530	73.05	62.00	69.00	41.00	13.50	11.96
55	0550	76.20	65.00	71.00	41.00	13.50	11.96
58	0580	79.40	68.00	78.00	41.00	13.50	11.96
60	0600	79.40	68.00	80.00	41.00	13.50	11.96
63	0630	82.55	71.20	83.00	41.00	13.50	11.96
65	0650	92.10	78.35	85.00	49.00	15.90	14.50
70	0700	95.25	81.10	90.00	49.00	15.90	14.50
73	0730	98.45	84.50	96.00	49.00	15.90	14.50
75	0750	101.65	88.10	99.00	49.00	15.90	14.50
80	0800	114.30	97.00	104.00	56.00	20.00	18.50
85	0850	117.50	100.00	109.00	56.00	20.00	18.50
90	0900	123.85	107.00	114.00	59.00	20.00	18.50
95	0950	127.00	110.00	119.00	59.00	20.00	18.50
100	1000	133.35	116.00	124.00	62.00	20.00	18.50

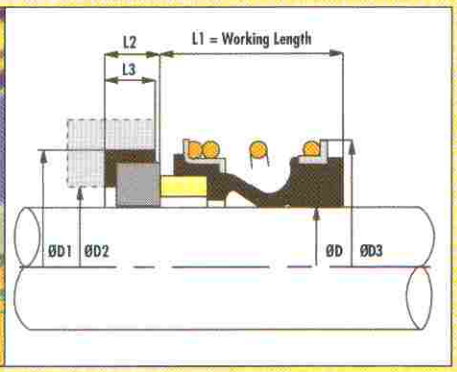
STANDARD STOCK FACE MATERIALS
Rotary Face: Carbon, Silicon Carbide, Tungsten Carbide.
Stat Ring: Ceramic, Silicon Carbide, Tungsten Carbide.
OTHER FACE MATERIALS TO ORDER

Suggested Operating Limits

PRESSURE 170psi SPEED 15m/s
TEMPERATURE -40 +200°C
Dependent upon shaft diameter and speed + Temperature and media to be sealed

TYPE 1520





Imperial DIN profile seal and a standard seat, with working length to suit a common International standard. Seal has same working length and the same seat as our Type 20, and is suitable for general duties.

VULCAN STANDARD SIZES

Inch Shaft Size D	Size Code	D1	D2	D3	L1	L2	L3
0.375	0095	24.60	16.00	20.00	25.40	8.74	7.47
0.500	0127	27.79	19.05	22.00	25.40	8.74	7.47
0.625	0158	30.95	22.23	26.00	25.40	10.32	8.97
0.750	0191	34.15	25.40	32.00	25.40	10.32	8.97
0.875	0222	37.30	28.58	36.00	25.40	10.32	8.97
1.000	0254	40.50	31.75	39.00	25.40	10.32	8.97
1.125	0286	47.63	35.72	42.00	33.34	11.99	10.46
1.250	0317	50.80	38.89	46.00	33.34	11.99	10.46
1.375	0349	53.98	42.07	49.00	33.34	11.99	10.46
1.500	0381	57.15	45.24	54.00	33.34	11.99	10.46
1.625	0412	60.35	48.42	56.00	33.34	11.99	10.46
1.750	0444	63.50	51.59	61.00	40.48	11.99	10.46
1.875	0476	66.70	54.75	64.00	40.48	11.99	10.46
2.000	0508	69.85	58.00	66.00	40.48	13.50	11.96
2.125	0539	73.05	62.00	69.00	41.00	13.50	11.96
2.250	0571	76.20	65.00	78.00	41.00	13.50	11.96
2.375	0603	79.40	68.00	80.00	41.00	13.50	11.96
2.500	0635	82.55	71.20	83.00	41.00	13.50	11.96
2.625	0666	92.10	78.35	85.00	49.00	15.90	14.50
2.750	0698	95.25	81.10	90.00	49.00	15.90	14.50
2.875	0730	98.45	84.50	96.00	49.00	15.90	14.50
3.000	0762	101.65	88.10	99.00	49.00	15.90	14.50
3.125	0794	111.15	93.68	104.00	56.00	20.00	18.50
3.250	0826	114.30	96.85	104.00	56.00	20.00	18.50
3.375	0857	117.50	100.00	109.00	56.00	20.00	18.50
3.500	0889	120.65	103.18	114.00	56.00	20.00	18.50
3.625	0921	123.85	106.35	114.00	59.00	20.00	18.50
3.750	0953	127.00	109.52	119.00	59.00	20.00	18.50
3.875	0984	130.20	112.65	122.00	62.00	20.00	18.50
4.000	1016	133.35	115.88	124.00	62.00	20.00	18.50

Suggested Operating Limits

PRESSURE 170psi SPEED 15m/s

TEMPERATURE -40 +200°C

Dependent upon shaft diameter and speed + Temperature and media to be sealed

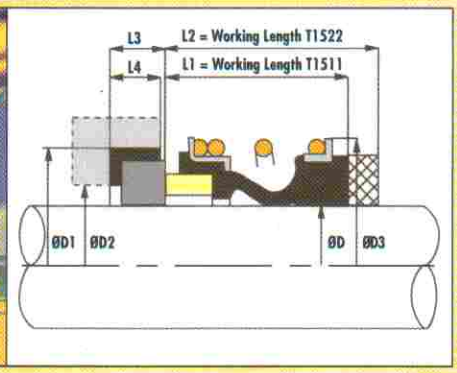
STANDARD STOCK FACE MATERIALS

Rotary Face: Carbon, Silicon Carbide, Tungsten Carbide.

Stat Ring: Ceramic, Silicon Carbide, Tungsten Carbide.

OTHER FACE MATERIALS TO ORDER

TYPE 1511/TYPE 1522



DIN profile seal and a standard seat, with a choice of working lengths to suit common American standards. Seal has same working length and the same seat as our Type 11 or Type 22, and is suitable for general duties.

VULCAN STANDARD SIZES

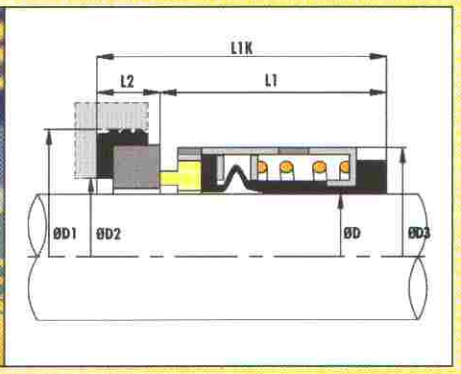
Shaft Size DØ			Shaft Size DØ			D1		D2		D3		L1		L2		L3		L4	
Inch	Metric	Code Size	Metric	Inch	Code Size	Metric	Inch	Metric	Inch	Metric	Inch	Metric	Inch	Metric	Inch	Metric	Inch	Metric	Inch
0.500	12.70	0127	12	0.472	0120	25.40	1.000	19.05	0.750	22.00	0.866	20.62	0.812	31.75	1.250	7.93	0.312	6.35	0.250
-	-	-	14	0.551	0140	31.75	1.250	23.80	0.937	24.00	0.945	22.22	0.875	34.93	1.375	10.28	0.405	8.71	0.343
0.625	15.88	0158	16	0.630	0160	31.75	1.250	23.80	0.937	26.00	1.024	22.22	0.875	34.93	1.375	10.28	0.405	8.71	0.343
0.750	19.05	0191	18	0.709	0180	34.93	1.375	26.98	1.062	32.00	1.260	22.22	0.875	34.93	1.375	10.28	0.405	8.71	0.343
-	-	-	20	0.787	0200	38.10	1.500	30.15	1.187	34.00	1.339	23.80	0.937	36.50	1.437	10.28	0.405	8.71	0.343
0.875	22.23	0222	22	0.866	0220	38.10	1.500	30.15	1.187	36.00	1.417	23.80	0.937	36.50	1.437	10.28	0.405	8.71	0.343
-	-	-	24	0.945	0240	41.28	1.625	33.32	1.312	38.00	1.496	25.40	1.000	41.28	1.625	11.10	0.437	9.53	0.375
1.000	25.40	0254	25	0.984	0250	41.28	1.625	33.32	1.312	39.00	1.535	25.40	1.000	41.28	1.625	11.10	0.437	9.53	0.375
1.125	28.58	0286	28	1.102	0280	44.44	1.750	36.50	1.437	42.00	1.654	26.97	1.062	42.85	1.687	11.10	0.437	9.53	0.375
-	-	-	30	1.181	0300	47.63	1.875	37.90	1.492	44.00	1.732	26.97	1.062	42.85	1.687	11.10	0.437	9.53	0.375
1.250	31.75	0317	32	1.260	0320	47.63	1.875	37.90	1.492	46.00	1.811	26.97	1.062	42.85	1.687	11.10	0.437	9.53	0.375
-	-	-	33	1.299	0330	50.80	2.000	42.84	1.687	47.00	1.850	28.58	1.125	42.85	1.687	11.10	0.437	9.53	0.375
1.375	34.93	0349	35	1.378	0350	50.80	2.000	42.84	1.687	49.00	1.929	28.58	1.125	42.85	1.687	11.10	0.437	9.53	0.375
1.500	38.10	0381	38	1.496	0380	53.98	2.125	46.05	1.813	54.00	2.126	28.58	1.125	42.85	1.687	11.10	0.437	9.53	0.375
1.625	41.28	0412	40	1.575	0400	60.33	2.375	50.80	2.000	56.00	2.205	34.93	1.375	50.80	2.000	12.70	0.500	11.10	0.437
-	-	-	43	1.693	0430	63.50	2.500	53.97	2.125	59.00	2.323	34.93	1.375	50.80	2.000	12.70	0.500	11.10	0.437
1.750	44.45	0444	44	1.732	0440	63.50	2.500	53.97	2.125	61.00	2.402	34.93	1.375	50.80	2.000	12.70	0.500	11.10	0.437
1.875	47.63	0476	45	1.772	0450	66.68	2.625	57.15	2.250	61.00	2.402	38.10	1.500	53.98	2.125	12.70	0.500	11.10	0.437
-	-	-	48	1.890	0480	69.85	2.750	60.32	2.375	64.00	2.520	38.10	1.500	53.98	2.125	12.70	0.500	11.10	0.437
2.000	50.80	0508	50	1.969	0500	69.85	2.750	60.32	2.375	66.00	2.598	38.10	1.500	53.98	2.125	12.70	0.500	11.10	0.437
2.125	53.98	0539	53	2.087	0530	76.20	3.000	60.32	2.375	69.00	2.717	42.88	1.688	60.32	2.375	14.28	0.562	12.70	0.500
2.250	57.15	0571	55	2.165	0550	79.38	3.125	61.90	2.437	78.00	3.071	42.88	1.688	60.32	2.375	14.28	0.562	12.70	0.500
-	-	-	58	2.283	0580	82.55	3.250	67.39	2.653	78.00	3.071	46.02	1.812	63.50	2.500	14.28	0.562	12.70	0.500
2.375	60.33	0603	60	2.362	0600	82.55	3.250	67.39	2.653	80.00	3.150	46.02	1.812	63.50	2.500	14.28	0.562	12.70	0.500
2.500	63.50	0635	63	2.480	0630	85.73	3.375	68.25	2.687	83.00	3.268	46.02	1.812	63.50	2.500	14.28	0.562	12.70	0.500
2.625	66.68	0666	65	2.559	0650	85.73	3.375	71.24	2.805	85.00	3.346	49.20	1.937	69.85	2.750	15.90	0.626	14.50	0.571
-	-	-	68	2.677	0680	88.90	3.500	74.60	2.937	88.00	3.465	49.20	1.937	69.85	2.750	15.90	0.626	14.50	0.571
2.750	69.85	0698	70	2.756	0700	88.90	3.500	74.60	2.937	90.00	3.543	49.20	1.937	69.85	2.750	15.90	0.626	14.50	0.571
2.875	73.03	0730	73	2.874	0730	95.25	3.750	77.77	3.062	96.00	3.780	52.37	2.062	73.03	2.875	15.90	0.626	14.50	0.571
3.000	76.20	0762	75	2.953	0750	98.43	3.875	80.95	3.187	99.00	3.898	52.37	2.062	73.03	2.875	15.90	0.626	14.50	0.571

STANDARD STOCK FACE MATERIALS
Rotary Face: Carbon, Silicon Carbide, Tungsten Carbide.
Stat Ring: Ceramic, Silicon Carbide, Tungsten Carbide.
OTHER FACE MATERIALS TO ORDER

Suggested Operating Limits

PRESSURE 170psi SPEED 15m/s
TEMPERATURE -40 +200°C
Dependent upon shaft diameter and speed + Temperature and media to be sealed

TYPE 1724



High performance, wide duty, full convolution rubber bellows seal inside a stainless steel housing. Type 1724 features a non-clogging spring and self alignment capability, and is offered with a choice of Type 24 boot mounted or 'O'-Ring Short or Long DIN seats

VULCAN STANDARD SIZES

Metric Shaft Size D	Size Code	D1	D2	D3	L1	L2	L1K
14	0140	25.00	21.00	24.00	26.40	8.60	35.00
16	0160	27.00	23.00	26.00	26.40	8.60	35.00
18	0180	33.00	27.00	32.00	27.50	10.00	37.50
20	0200	35.00	29.00	34.00	27.50	10.00	37.50
22	0220	37.00	31.00	36.00	27.50	10.00	37.50
24	0240	39.00	33.00	38.00	30.00	10.00	40.00
25	0250	40.00	34.00	39.00	30.00	10.00	40.00
28	0280	43.00	37.00	42.00	32.50	10.00	42.50
30	0300	45.00	39.00	44.00	32.50	10.00	42.50
32	0320	48.00	42.00	46.00	32.50	10.00	42.50
33	0330	48.00	42.00	47.00	32.50	10.00	42.50
35	0350	50.00	44.00	49.00	32.50	10.00	42.50
38	0380	56.00	49.00	54.00	34.00	11.00	45.00
40	0400	58.00	51.00	56.00	34.00	11.00	45.00
43	0430	61.00	54.00	59.00	34.00	11.00	45.00
45	0450	63.00	56.00	61.00	34.00	11.00	45.00
48	0480	66.00	59.00	64.00	34.00	11.00	45.00
50	0500	70.00	62.00	66.00	34.50	13.00	47.50
53	0530	73.00	65.00	69.00	34.50	13.00	47.50
55	0550	75.00	67.00	71.00	34.50	13.00	47.50
58	0580	78.00	70.00	78.00	39.50	13.00	52.50
60	0600	80.00	72.00	80.00	39.50	13.00	52.50
63	0630	83.00	75.00	83.00	39.50	13.00	52.50
65	0650	85.00	77.00	85.00	39.50	13.00	52.50
68	0680	90.00	81.00	88.00	37.20	15.30	52.50
70	0700	92.00	83.00	89.00	44.70	15.30	60.00
75	0750	97.00	88.00	96.00	44.70	15.30	60.00
80	0800	105.00	95.00	104.00	44.30	15.70	60.00
85	0850	110.00	100.00	108.00	44.30	15.70	60.00
90	0900	115.00	105.00	114.00	49.30	15.70	65.00
95	0950	120.00	110.00	118.00	49.30	15.70	65.00
100	1000	125.00	115.00	124.00	49.30	15.70	65.00

Suggested Operating Limits

PRESSURE 260psi SPEED 18m/s

TEMPERATURE -40 +200°C

Dependent upon shaft diameter and speed + Temperature and media to be sealed

STANDARD STOCK FACE MATERIALS

Rotary Face: Carbon, Silicon Carbide, Tungsten Carbide.

Stat Ring: Ceramic, Silicon Carbide, Tungsten Carbide.

OTHER FACE MATERIALS TO ORDER

Vulcan Parallel Spring Diaphragm Type Seals

Introduction

Vulcan's Parallel Spring Type Seals are highly proficient and widely utilised, covering all standard pump shaft, working length and housing size ranges.

Applications

The parallel spring family range are ideal for a wide spectrum of application conditions, ranging from general water to food processing, petrochemical and other demanding applications.

The seals are highly effective and widely utilised in pumps, mixers, agitators, compressors and other rotary shaft equipment.

Standard Vulcan Parallel Types

Types 10 and 20

Parallel spring, rubber diaphragm seal to common industry standard dimensions. Usually fitted with boot mounted seats, or specify Type 21 'O'-Ring mounted seat.

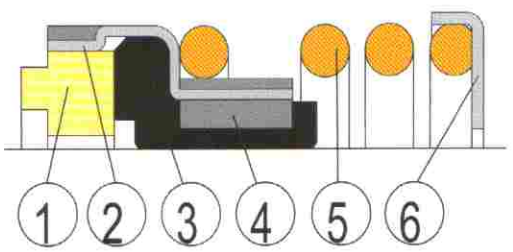
Types 11 and 22

As above, to American standard dimensions, fitted with boot mounted seats or alternatively, specify Type 31 'O'-Ring mounted seat.

Type 24

As above to DIN 24960 (EN12756) dimension, fitted with boot mounted seat, specify Type 24S if a Type 24 DINS seat is required and Type 24L for the seal to be fitted with a Type 24 DINL seat.

STANDARD COMPONENTS



No	Description
1	Seal Face
2	Retainer
3	Diaphragm
4	Drive Ring
5	Spring
6	Base Plate

Vulcan Design Advantages

Accommodating

The seal head automatically adjusts to accommodate misalignment and seal face wear, through the design and flexibility of the rubber diaphragm.

Improved

Vulcan's attention to detail and modern in-house design and manufacturing facilities, have enabled Vulcan to create Parallel Spring Seals, with additional improvements to the original designs, whilst still maintaining the main design features, such as self aligning, non fretting/clogging and vacuum application suitability. These improvements result in a superior Vulcan Mechanical Seal, to both the original replacement seal and their other direct market copies.

Retained Components

Faces and base plates are retained by adhesive and by mating components, respectively, making handling and fitting easier and more secure.

Customisable

The technically efficient and highly versatile, parallel spring, seal design can be readily customised to suit individual requirements; where a standard seal cannot be utilised.

Vulcan can assist in the design of special production runs to fully satisfy customer requirements.

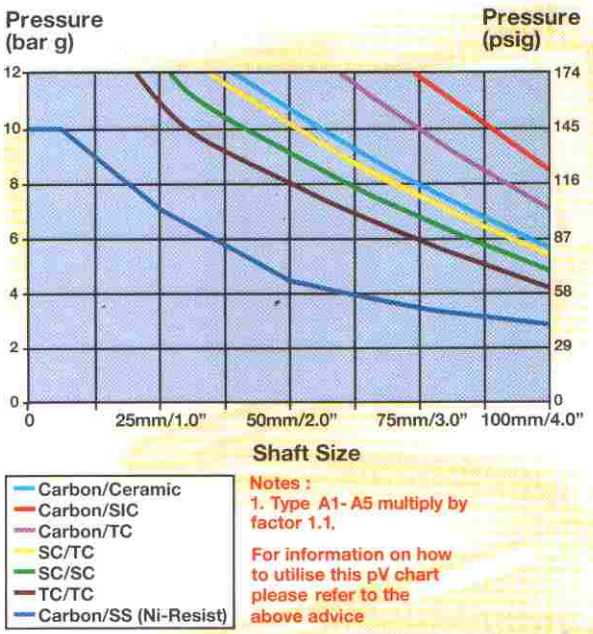
Material Quality

A wide selection of high quality face materials and elastomers are readily available as standard.

Reliability

The resulting Vulcan Quality Seal and the high strength and flexibility of the diaphragm, provide a very reliable and accommodating mechanical seal design.

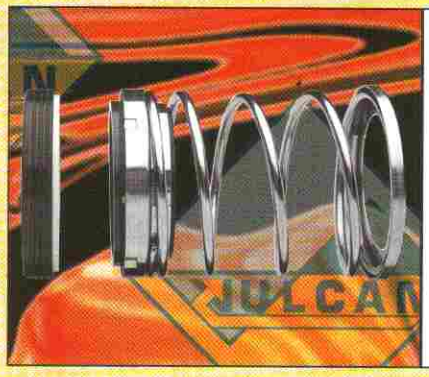
VULCAN PARALLEL SPRING DIAPHRAGM TYPE SEALS PV CHART

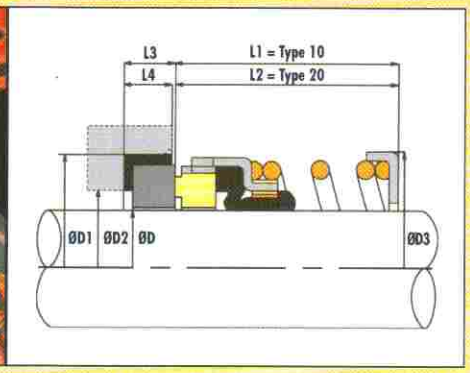


Notes :
1. Type A1- A5 multiply by factor 1.1.

For information on how to utilise this pV chart please refer to the above advice

TYPE 10/TYPE 20





Metric shaft size resilient, single spring, rubber diaphragm seal with boot mounted seat as standard. A widely specified and utilised seal Type, capable of long service life.

VULCAN STANDARD SIZES

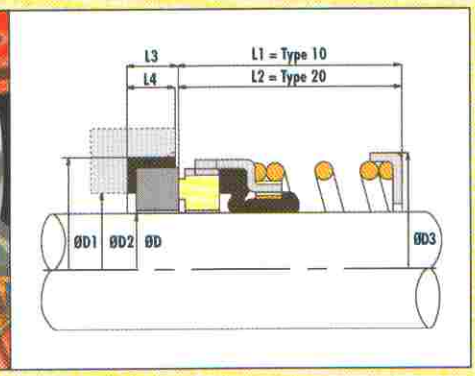
Metric Shaft Size D	Size Code	D1	D2	D3	L1	L2	L3	L4
10	0100	24.60	16.00	22.95	43.65	25.40	8.74	7.47
12	0120	27.79	19.05	23.90	43.65	25.40	8.74	7.47
13	0130	27.79	19.05	23.90	43.65	25.40	8.74	7.47
14	0140	30.95	22.23	26.70	43.65	25.40	10.32	8.97
15	0150	30.95	22.23	26.70	43.65	25.40	10.32	8.97
16	0160	30.95	22.23	26.70	43.65	25.40	10.32	8.97
18	0180	34.15	25.40	31.10	43.65	25.40	10.32	8.97
19	0190	34.15	25.40	31.10	43.65	25.40	10.32	8.97
20	0200	35.70	26.99	33.40	43.65	25.40	10.32	8.97
22	0220	37.30	28.58	33.40	43.65	25.40	10.32	8.97
24	0240	40.50	31.75	39.20	43.65	25.40	10.32	8.97
25	0250	40.50	31.75	39.20	43.65	25.40	10.32	8.97
28	0280	47.63	35.72	46.30	60.33	33.34	11.99	10.46
30	0300	50.80	38.89	49.40	60.33	33.34	11.99	10.46
32	0320	50.80	38.89	49.40	60.33	33.34	11.99	10.46
33	0330	53.98	42.07	52.60	60.33	33.34	11.99	10.46
34	0340	53.98	42.07	52.60	60.33	33.34	11.99	10.46
35	0350	53.98	42.07	52.60	60.33	33.34	11.99	10.46
38	0381	57.15	45.24	55.80	60.33	33.34	11.99	10.46
40	0400	60.35	48.82	59.20	60.33	33.34	11.99	10.46
42	0420	63.50	51.59	66.00	70.64	40.48	11.99	10.46
43	0430	63.50	51.59	66.00	70.64	40.48	11.99	10.46
44	0440	63.50	51.59	66.00	70.64	40.48	11.99	10.46
45	0450	63.50	51.59	66.00	70.64	40.48	11.99	10.46
48	0480	66.70	54.75	66.60	70.64	40.48	11.99	10.46
50	0500	69.85	58.00	71.65	70.64	40.48	13.50	11.96
53	0530	73.05	62.00	73.30	71.00	41.00	13.50	11.96
55	0550	76.20	65.00	78.40	71.00	41.00	13.50	11.96
58	0580	79.40	68.00	82.00	71.00	41.00	13.50	11.96
60	0600	79.40	68.00	82.00	71.00	41.00	13.50	11.96
63	0630	82.55	71.20	84.90	71.00	41.00	13.50	11.96
65	0650	92.10	78.35	88.40	70.00	49.00	15.90	14.50
70	0700	95.25	81.10	92.60	70.00	49.00	15.90	14.50
73	0730	98.45	84.50	94.85	73.00	49.00	15.90	14.50
75	0750	101.65	88.10	102.70	73.00	49.00	15.90	14.50
80	0800	114.30	97.00	104.00	79.00	56.00	20.00	18.50
85	0850	117.50	100.00	108.00	79.00	56.00	20.00	18.50
90	0900	123.85	107.00	112.00	83.00	59.00	20.00	18.50
95	0950	127.00	110.00	119.00	83.00	59.00	20.00	18.50
100	1000	133.35	116.00	124.00	86.00	62.00	20.00	18.50

STANDARD STOCK FACE MATERIALS
Rotary Face: Carbon, Silicon Carbide, Tungsten Carbide.
Stat Ring: Ceramic, Silicon Carbide, Tungsten Carbide.
OTHER FACE MATERIALS TO ORDER

Suggested Operating Limits

PRESSURE 180psi SPEED 15m/s
TEMPERATURE -40 +200°C
Dependent upon shaft diameter and speed + Temperature and media to be sealed

TYPE 10/TYPE 20



Imperial shaft size rubber diaphragm seal with parallel single spring and boot mounted seat as standard. The most common, imperial shaft, single spring design, suitable for use in many applications.

VULCAN STANDARD SIZES

Shaft Size DØ			D1		D2		D3		L1		L2		L3		L4	
Inch	Metric	Code Size	Metric	Inch	Metric	Inch	Metric	Inch	Metric	Inch	Metric	Inch	Metric	Inch	Metric	Inch
0.375	9.53	0095	24.60	0.969	16.00	0.630	22.95	0.904	43.65	1.719	25.40	1.000	8.74	0.344	7.47	0.294
0.500	12.70	0127	27.79	1.094	19.05	0.750	23.90	0.941	43.65	1.719	25.40	1.000	8.74	0.344	7.47	0.294
0.625	15.88	0158	30.95	1.219	22.23	0.875	26.70	1.051	43.65	1.719	25.40	1.000	10.32	0.406	8.97	0.353
0.750	19.05	0191	34.15	1.344	25.40	1.000	31.10	1.224	43.65	1.719	25.40	1.000	10.32	0.406	8.97	0.353
0.875	22.23	0222	37.30	1.469	28.58	1.125	33.40	1.315	43.65	1.719	25.40	1.000	10.32	0.406	8.97	0.353
1.000	25.40	0254	40.50	1.594	31.75	1.250	43.20	1.701	43.65	1.719	25.40	1.000	10.32	0.406	8.97	0.353
1.125	28.58	0286	47.63	1.875	35.72	1.406	46.30	1.823	60.33	2.375	33.34	1.313	11.99	0.472	10.46	0.412
1.250	31.75	0317	50.80	2.000	38.89	1.531	49.40	1.945	60.33	2.375	33.34	1.313	11.99	0.472	10.46	0.412
1.375	34.93	0349	53.98	2.125	42.07	1.656	52.60	2.071	60.33	2.375	33.34	1.313	11.99	0.472	10.46	0.412
1.500	38.10	0381	57.15	2.250	45.24	1.781	55.80	2.197	60.33	2.375	33.34	1.313	11.99	0.472	10.46	0.412
1.625	41.28	0412	60.35	2.376	48.42	1.906	59.20	2.331	60.33	2.375	33.34	1.313	11.99	0.472	10.46	0.412
1.750	44.45	0444	63.50	2.500	51.59	2.031	66.00	2.598	70.64	2.781	40.48	1.594	11.99	0.472	10.46	0.412
1.875	47.63	0476	66.70	2.626	54.75	2.156	66.60	2.622	70.64	2.781	40.48	1.594	11.99	0.472	10.46	0.412
2.000	50.80	0508	69.85	2.750	58.00	2.283	73.00	2.874	70.64	2.781	40.48	1.594	13.50	0.531	11.96	0.471
2.125	53.98	0539	73.05	2.876	62.00	2.441	73.30	2.886	71.00	2.795	41.00	1.614	13.50	0.531	11.96	0.471
2.250	57.15	0571	76.20	3.000	65.00	2.559	78.40	3.087	71.00	2.795	41.00	1.614	13.50	0.531	11.96	0.471
2.375	60.33	0603	79.40	3.126	68.00	2.677	82.00	3.228	71.00	2.795	41.00	1.614	13.50	0.531	11.96	0.471
2.500	63.50	0635	82.55	3.250	71.20	2.803	84.90	3.343	71.00	2.795	41.00	1.614	13.50	0.531	11.96	0.471
2.625	66.68	0666	92.10	3.626	78.35	3.085	88.40	3.480	70.00	2.756	49.00	1.929	15.90	0.626	14.50	0.571
2.750	69.85	0698	95.25	3.750	81.10	3.193	92.60	3.646	70.00	2.756	49.00	1.929	15.90	0.626	14.50	0.571
2.875	73.03	0730	98.45	3.876	84.50	3.327	94.85	3.734	73.00	2.874	49.00	1.929	15.90	0.626	14.50	0.571
3.000	76.20	0762	101.65	4.002	88.10	3.469	102.70	4.043	73.00	2.874	49.00	1.929	15.90	0.626	14.50	0.571
3.125	79.38	0794	111.15	4.376	93.68	3.688	104.00	4.094	79.00	3.110	56.00	2.205	20.00	0.787	18.50	0.728
3.250	82.55	0826	114.30	4.500	96.85	3.813	104.00	4.094	79.00	3.110	56.00	2.205	20.00	0.787	18.50	0.728
3.375	85.73	0857	117.50	4.626	100.00	3.937	108.00	4.252	79.00	3.110	56.00	2.205	20.00	0.787	18.50	0.728
3.500	88.90	0889	120.65	4.750	103.18	4.062	112.00	4.409	79.00	3.110	56.00	2.205	20.00	0.787	18.50	0.728
3.625	92.08	0921	123.85	4.876	106.35	4.187	114.00	4.488	83.00	3.268	59.00	2.323	20.00	0.787	18.50	0.728
3.750	95.25	0953	127.00	5.000	109.52	4.312	119.00	4.685	83.00	3.268	59.00	2.323	20.00	0.787	18.50	0.728
3.875	98.43	0984	130.20	5.126	112.65	4.435	121.00	4.764	86.00	3.386	62.00	2.441	20.00	0.787	18.50	0.728
4.000	101.60	1016	133.35	5.250	115.88	4.562	124.00	4.882	86.00	3.386	62.00	2.441	20.00	0.787	18.50	0.728

Suggested Operating Limits

PRESSURE 180psi SPEED 15m/s

TEMPERATURE -40 +200°C

Dependent upon shaft diameter and speed + Temperature and media to be sealed

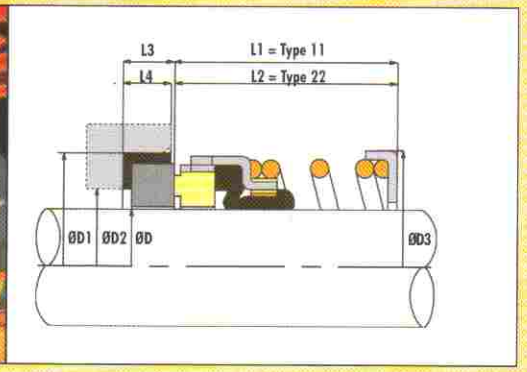
STANDARD STOCK FACE MATERIALS

Rotary Face: Carbon, Silicon Carbide, Tungsten Carbide

Stat Ring: Ceramic, Silicon Carbide, Tungsten Carbide

OTHER FACE MATERIALS TO ORDER

TYPE 11/TYPE 22



Single spring, rubber diaphragm seal, designed for different sized seat housings and seal working lengths to the Types 10/20. The imperial sizes are most commonly found on American equipment.

VULCAN STANDARD SIZES

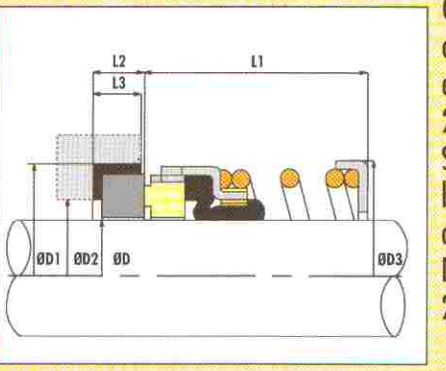
Shaft Size DØ			Shaft Size DØ			D1		D2		D3		L1		L2		L3		L4	
Inch	Metric	Code Size	Metric	Inch	Code Size	Metric	Inch	Metric	Inch	Metric	Inch	Metric	Inch	Metric	Inch	Metric	Inch	Metric	Inch
0.500	12.70	0127	12	0.472	0120	25.40	1.000	19.05	0.750	22.00	0.866	20.62	0.812	31.75	1.250	7.93	0.312	6.35	0.250
-	-	-	14	0.551	0140	31.75	1.250	23.80	0.937	24.00	0.945	22.22	0.875	34.93	1.375	10.28	0.405	8.71	0.343
0.625	15.88	0158	16	0.630	0160	31.75	1.250	23.80	0.937	26.00	1.024	22.22	0.875	34.93	1.375	10.28	0.405	8.71	0.343
0.750	19.05	0191	18	0.709	0180	34.93	1.375	26.98	1.062	32.00	1.260	22.22	0.875	34.93	1.375	10.28	0.405	8.71	0.343
-	-	-	20	0.787	0200	38.10	1.500	30.15	1.187	34.00	1.339	23.80	0.937	36.50	1.437	10.28	0.405	8.71	0.343
0.875	22.23	0222	22	0.866	0220	38.10	1.500	30.15	1.187	36.00	1.417	23.80	0.937	36.50	1.437	10.28	0.405	8.71	0.343
-	-	-	24	0.945	0240	41.28	1.625	33.32	1.312	38.00	1.496	25.40	1.000	41.28	1.625	11.10	0.437	9.53	0.375
1.000	25.40	0254	25	0.984	0250	41.28	1.625	33.32	1.312	39.00	1.535	25.40	1.000	41.28	1.625	11.10	0.437	9.53	0.375
1.125	28.58	0286	28	1.102	0280	44.44	1.750	36.50	1.437	42.00	1.654	26.97	1.062	42.85	1.687	11.10	0.437	9.53	0.375
-	-	-	30	1.181	0300	47.63	1.875	37.90	1.492	44.00	1.732	26.97	1.062	42.85	1.687	11.10	0.437	9.53	0.375
1.250	31.75	0317	32	1.260	0320	47.63	1.875	37.90	1.492	46.00	1.811	26.97	1.062	42.85	1.687	11.10	0.437	9.53	0.375
-	-	-	33	1.299	0330	50.80	2.000	42.84	1.687	47.00	1.850	28.58	1.125	42.85	1.687	11.10	0.437	9.53	0.375
1.375	34.93	0349	35	1.378	0350	50.80	2.000	42.84	1.687	49.00	1.929	28.58	1.125	42.85	1.687	11.10	0.437	9.53	0.375
1.500	38.10	0381	38	1.496	0380	53.98	2.125	46.05	1.813	54.00	2.126	28.58	1.125	42.85	1.687	11.10	0.437	9.53	0.375
1.625	41.28	0412	40	1.575	0400	60.33	2.375	50.80	2.000	56.00	2.205	34.93	1.375	50.80	2.000	12.70	0.500	11.10	0.437
-	-	-	43	1.693	0430	63.50	2.500	53.97	2.125	59.00	2.323	34.93	1.375	50.80	2.000	12.70	0.500	11.10	0.437
1.750	44.45	0444	44	1.732	0440	63.50	2.500	53.97	2.125	61.00	2.402	34.93	1.375	50.80	2.000	12.70	0.500	11.10	0.437
1.875	47.63	0476	45	1.772	0450	66.68	2.625	57.15	2.250	61.00	2.402	38.10	1.500	53.98	2.125	12.70	0.500	11.10	0.437
-	-	-	48	1.890	0480	69.85	2.750	60.32	2.375	64.00	2.520	38.10	1.500	53.98	2.125	12.70	0.500	11.10	0.437
2.000	50.80	0508	50	1.969	0500	69.85	2.750	60.32	2.375	66.00	2.598	38.10	1.500	53.98	2.125	12.70	0.500	11.10	0.437
2.125	53.98	0539	53	2.087	0530	76.20	3.000	60.32	2.375	69.00	2.717	42.88	1.688	60.32	2.375	14.28	0.562	12.70	0.500
2.250	57.15	0571	55	2.165	0550	79.38	3.125	61.90	2.437	78.00	3.071	42.88	1.688	60.32	2.375	14.28	0.562	12.70	0.500
-	-	-	58	2.283	0580	82.55	3.250	67.39	2.653	78.00	3.071	46.02	1.812	63.50	2.500	14.28	0.562	12.70	0.500
2.375	60.33	0603	60	2.362	0600	82.55	3.250	67.39	2.653	80.00	3.150	46.02	1.812	63.50	2.500	14.28	0.562	12.70	0.500
2.500	63.50	0635	63	2.480	0630	85.73	3.375	68.25	2.687	83.00	3.268	46.02	1.812	63.50	2.500	14.28	0.562	12.70	0.500
2.625	66.68	0666	65	2.559	0650	85.73	3.375	71.24	2.805	85.00	3.346	49.20	1.937	69.85	2.750	15.90	0.626	14.50	0.571
-	-	-	68	2.677	0680	88.90	3.500	74.60	2.937	88.00	3.465	49.20	1.937	69.85	2.750	15.90	0.626	14.50	0.571
2.750	69.85	0698	70	2.756	0700	88.90	3.500	74.60	2.937	90.00	3.543	49.20	1.937	69.85	2.750	15.90	0.626	14.50	0.571
2.875	73.03	0730	73	2.874	0730	95.25	3.750	77.77	3.062	96.00	3.780	52.37	2.062	73.03	2.875	15.90	0.626	14.50	0.571
3.000	76.20	0762	75	2.953	0750	98.43	3.875	80.95	3.187	99.00	3.898	52.37	2.062	73.03	2.875	15.90	0.626	14.50	0.571

STANDARD STOCK FACE MATERIALS
Rotary Face: Carbon, Silicon Carbide, Tungsten Carbide.
Stat Ring: Ceramic, Silicon Carbide, Tungsten Carbide.
OTHER FACE MATERIALS TO ORDER

Suggested Operating Limits

PRESSURE 180psi SPEED 15m/s
TEMPERATURE -40 +200°C
Dependent upon shaft diameter and speed + Temperature and media to be sealed

TYPE 24



Compact single spring, rubber diaphragm seal specifically designed to comply with DIN 24960 (EN12756) housings. Shown with boot mounted seat, but is also often specified with a Type 24 'O'-Ring mounted DIN Long or Short seat (Types 24L or 24S respectively)

VULCAN STANDARD SIZES

Metric Shaft Size D	Size Code	D1	D2	D3	L1	L2	L3
12	0120	23.00	19.00	21.70	23.90	8.60	5.50
14	0140	25.00	21.00	23.90	26.40	8.60	5.50
16	0160	27.00	23.00	26.70	26.40	8.60	5.50
18	0180	33.00	27.00	30.40	27.50	10.00	7.00
20	0200	35.00	29.00	33.40	27.50	10.00	7.00
22	0220	37.00	31.00	33.40	27.50	10.00	7.00
24	0240	39.00	33.00	38.00	30.00	10.00	7.00
25	0250	40.00	34.00	39.30	30.00	10.00	7.00
28	0280	43.00	37.00	42.00	32.50	10.00	7.00
30	0300	45.00	39.00	43.95	32.50	10.00	7.00
32	0320	48.00	42.00	45.80	32.50	10.00	7.00
33	0330	48.00	42.00	45.80	32.50	10.00	7.00
35	0350	50.00	44.00	49.00	32.50	10.00	7.00
38	0380	56.00	49.00	52.80	34.00	11.00	8.00
40	0400	58.00	51.00	55.80	34.00	11.00	8.00
43	0430	61.00	54.00	58.80	34.00	11.00	8.00
45	0450	63.00	56.00	61.00	34.00	11.00	8.00
48	0480	66.00	59.00	64.00	34.00	11.00	8.00
50	0500	70.00	62.00	66.00	34.50	13.00	8.50
53	0530	73.00	65.00	70.65	34.50	13.00	8.50
55	0550	75.00	67.00	71.65	34.50	13.00	8.50
58	0580	78.00	70.00	78.40	39.50	13.00	8.50
60	0600	80.00	72.00	78.40	39.50	13.00	8.50
63	0630	83.00	75.00	81.50	39.50	13.00	8.50
65	0650	85.00	77.00	84.30	39.50	13.00	8.50
68	0680	90.00	81.00	89.65	37.20	15.30	9.50
70	0700	92.00	83.00	89.65	37.20	15.30	9.50
75	0750	97.00	88.00	96.80	44.70	15.30	9.50
80	0800	105.00	95.00	104.00	44.30	15.70	10.00
85	0850	110.00	100.00	107.95	44.30	15.70	10.00
90	0900	115.00	105.00	111.10	49.30	15.70	10.00
95	0950	120.00	110.00	119.00	49.30	15.70	10.00
100	1000	125.00	115.00	124.00	49.30	15.70	10.00

Suggested Operating Limits

PRESSURE 180psi SPEED 15m/s

TEMPERATURE -40 +200°C

Dependent upon shaft diameter and speed + Temperature and media to be sealed

STANDARD STOCK FACE MATERIALS

Rotary Face: Carbon, Silicon Carbide, Tungsten Carbide.

Stat Ring: Ceramic, Silicon Carbide, Tungsten Carbide.

OTHER FACE MATERIALS TO ORDER

Vulcan Balanced Diaphragm Type Seals

Introduction

The A1 to A5 range are elastomeric bellows, bi-directional, parallel spring mechanical seals, offering superior design and performance compared to market alternatives. This has been achieved by superior face materials and innovative (patent pending) design features. These seals are supplied with a boot mounted seat as standard and can also be supplied with an 'O'-Ring mounted alternative, if required.

Applications

These seals are suitable for pumps, mixers, compressors and other rotary equipment. They are often used for a diverse range of applications including; water, petrochemical, chemical, food processing, refrigeration and other arduous duties.

STANDARD VULCAN PARALLEL TYPES

Type A1

The A1 is a flexible seal, suitable for the narrower seal housing, due to the compact radial cross-sectional design and suits common European seal housing standards. The Type A1 has a long working length and is fitted with a seal head retainer backing plate

Type A2

The A2 Type coil fits over the seal head, reducing the overall working length, making this seal suitable for short gland depth applications, to common European seal housing standards.

Type A3

A thin, radial, cross sectioned, Type A4 variant designed to suit common American seal housing standards.

Type A4

As per the Type A2 seal but designed to suit common American standards, working length and seat housing dimensions.

Type A5

Spring profile as per the Type A1 seal but designed to suit common American standards and supplied without the seal head retainer backing plate, utilised on the Type A1.

VULCAN DESIGN ADVANTAGES

Mechanical Drive

The mechanical drive mechanism of the AX range incorporates a patent pending design. This innovative solution eliminates the problem of seal failure, due to excessive wear by the thin metal drive components cutting a groove into the retainer, common to competitors' seals.

The drive area has been increased by over 250%, to greatly reduce the contact drive pressure and consequent wear. The unique seal head design also retains the drive ring by a locking mechanism. This results in security and ease of assembly, due to the unitised design of the cartridge rotary unit.

Balanced

The Vulcan AX range seals are specially balanced to a recognised industry standard, to reduce heat and friction at the seal interface. This allows for higher operating parameters to be achieved and prolongs seal life.
Many competitor's seals are not truly balanced throughout the range and therefore do not offer the full benefits of a balanced seal.

Bellows Disk

The Vulcan AX seal family includes a bellows disk, as a standard design feature. This component provides radial support to the bellows, ensuring no bellows/shaft contact, which could result in seal wear and possible hang-up. This component is routinely omitted in the Crane ® USA designs but is included on UK/European Type 1A and 2. Without the disk, the bellows ID's are very close to the shaft and can be problematic, due to bellows extrusion and shaft contact/stiction.

Bellows Design

The flexible bellows compensates for primary seal face wear and machinery misalignment, such as shaft end float.
The Vulcan AX bellows contains an additional drive ring supporting lip, to ensure that the drive ring is held in a positive position, away from the bellows. This feature is not included in many alternative designs, which can result in possible bellows interference, affecting seal performance.

Seal Face Retaining

The Vulcan seal face is retained by inert grease and NOT glue. Some seal suppliers chose to utilise glue which can create a leakage path, and on chemical attack, the glue can migrate into seal components and product.

Seal Type	Crane® Equivalent
A1	1A (UK / EUROPEAN)
A2	Type 2 (UK / EUROPEAN)
A3	N/A
A4	Type 2 (US DIMENSIONS)
A5	Type 1 (US DIMENSIONS)

Base Plate Retaining

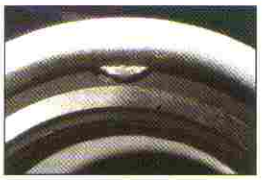
Vulcan A1 to A5 seal types retain the base plates on the coil as standard, providing support during seal fitting.

Seal Face Drive

Vulcan's designs include improved seal face/retainer engagement. The seal face slot is designed to achieve a positive drive from the retainer crimps and to eliminate chipping of the face.

It can be demonstrated, from the seal comparison diagram below, that the Vulcan seal has a superior drive location area and doesn't drive at the weakest point, as per the standard competitors design; which will be prone to chipping.

VULCAN TYPE A4



COMMON COMPETITOR

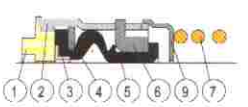
Mechanical Face Loading

Face loading on the Vulcan Ax seal ranges has been designed to enhance seal life, whilst not affecting performance capabilities.
The linear progressive, Vulcan design, utilises proven values within the seal industry, which will result in less heat generation, less power consumption, less wear and therefore, increased seal performance, capability and life.
Common competitor designs have wide variances in face loading, between shaft sizes.

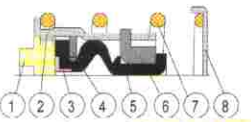
Material Quality and Reliability

A wide selection of first-class face materials and elastomers are readily available as standard. These ensure excellent performance and have been verified through extensive testing.

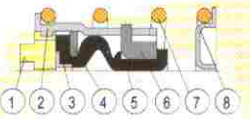
Standard Components



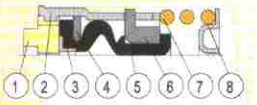
Type A1



Type A2 &4



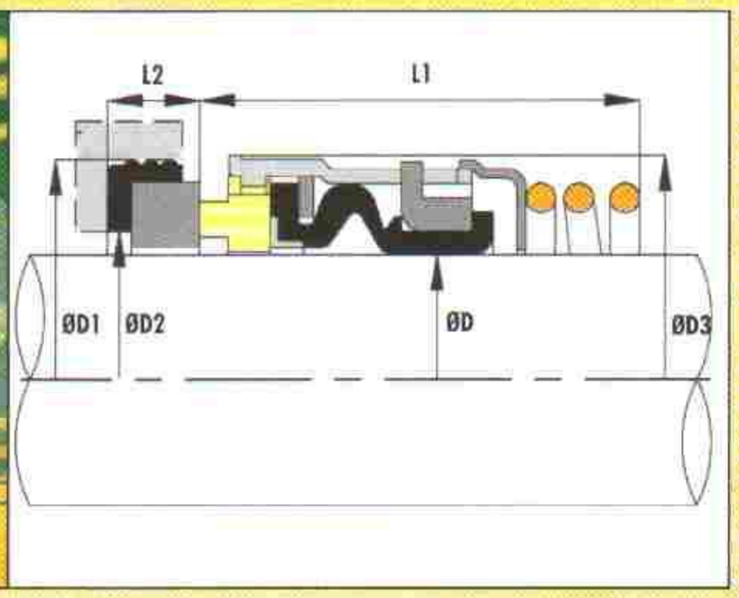
Type A3



Type A5

No	Description
1	Face
2	Retainer
3	Bellows Disk
4	Plate
5	Bellows
6	Drive Ring
7	Coil
8	Backing Plate
9	Sleeve

TYPE A1



Robust, long working length, highly accommodating and reliable, rubber diaphragm balanced seal, which provides enhanced seal capability, performance and life. Improved design features further enhance this popular seal. Suitable for common UK and Euro housing dimensions.

VULCAN STANDARD SIZES

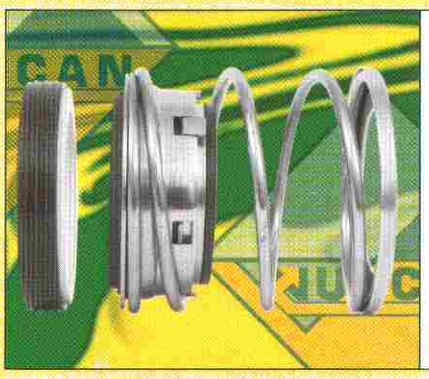
Shaft Size DØ			Shaft Size DØ			D1		D2		D3		L1		L2	
Inch	Metric	Size Code	Metric	Inch	Size Code	Metric	Inch	Metric	Inch	Metric	Inch	Metric	Inch	Metric	Inch
0.500	12.70	0127	12	0.472	0120	27.79	1.094	19.05	0.750	23.80	0.937	44.00	1.732	8.74	0.344
-	-	-	14	0.551	0140	30.95	1.219	22.23	0.875	27.76	1.093	44.00	1.732	10.32	0.406
0.625	15.88	0158	16	0.630	0160	30.95	1.219	22.23	0.875	27.76	1.093	44.00	1.732	10.32	0.406
0.750	19.05	0191	18	0.709	0180	34.15	1.344	25.40	1.000	30.94	1.218	44.00	1.732	10.32	0.406
-	-	-	20	0.787	0200	35.70	1.406	26.99	1.063	33.00	1.299	44.00	1.732	10.32	0.406
0.875	22.23	0222	22	0.866	0220	37.30	1.469	28.58	1.125	34.11	1.343	44.00	1.732	10.32	0.406
-	-	-	24	0.945	0240	40.50	1.594	31.75	1.250	38.10	1.500	44.00	1.732	10.32	0.406
1.000	25.40	0254	25	0.984	0250	40.50	1.594	31.75	1.250	38.10	1.500	44.00	1.732	10.32	0.406
1.125	28.58	0286	28	1.102	0280	47.63	1.875	35.72	1.406	41.28	1.625	60.00	2.362	11.99	0.472
-	-	-	30	1.181	0300	50.80	2.000	38.89	1.531	46.02	1.812	60.00	2.362	11.99	0.472
1.250	31.75	0317	32	1.260	0320	50.80	2.000	38.89	1.531	46.02	1.812	60.00	2.362	11.99	0.472
-	-	-	33	1.299	0330	53.98	2.125	42.07	1.656	47.63	1.875	60.00	2.362	11.99	0.472
1.375	34.93	0349	35	1.378	0350	53.98	2.125	42.07	1.656	47.63	1.875	60.00	2.362	11.99	0.472
1.500	38.10	0381	38	1.496	0380	57.15	2.250	45.24	1.781	50.80	2.000	60.00	2.362	11.99	0.472
1.625	41.28	0412	40	1.575	0400	60.35	2.376	48.82	1.922	57.15	2.250	60.00	2.362	11.99	0.472
-	-	-	43	1.693	0430	63.50	2.500	51.59	2.031	62.50	2.461	71.00	2.795	11.99	0.472
1.750	44.45	0444	45	1.772	0450	63.50	2.500	51.59	2.031	62.50	2.461	71.00	2.795	11.99	0.472
1.875	47.63	0476	48	1.890	0480	66.70	2.626	54.75	2.156	65.50	2.579	71.00	2.795	11.99	0.472
2.000	50.80	0508	50	1.969	0500	69.85	2.750	58.00	2.283	66.68	2.626	71.00	2.795	13.50	0.531
2.125	53.98	0539	53	2.087	0530	73.05	2.876	62.00	2.441	71.42	2.812	71.00	2.795	13.50	0.531
2.250	57.15	0571	55	2.165	0550	76.20	3.000	65.00	2.559	74.60	2.937	71.00	2.795	13.50	0.531
2.375	60.33	0603	60	2.362	0600	79.40	3.126	68.00	2.677	77.77	3.062	71.00	2.795	13.50	0.531
2.500	63.50	0635	63	2.480	0630	82.55	3.250	71.20	2.803	80.95	3.187	71.00	2.795	13.50	0.531
2.625	66.68	0666	65	2.559	0650	92.10	3.626	78.35	3.085	85.73	3.375	71.00	2.795	15.90	0.626
2.750	69.85	0698	70	2.756	0700	95.25	3.750	81.10	3.193	88.90	3.500	70.00	2.756	15.90	0.626
2.875	73.03	0730	73	2.874	0730	98.45	3.876	84.50	3.327	92.08	3.625	73.00	2.874	15.90	0.626
3.000	76.20	0762	75	2.953	0750	101.65	4.002	88.10	3.469	95.25	3.750	73.00	2.874	15.90	0.626

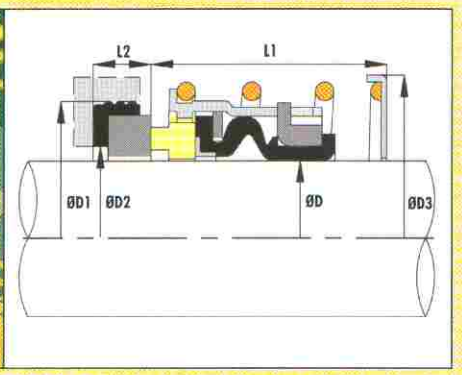
STANDARD STOCK FACE MATERIALS
Rotary Face: Carbon, Silicon Carbide, Tungsten Carbide.
Stat Ring: Ceramic, Silicon Carbide, Tungsten Carbide.
OTHER FACE MATERIALS TO ORDER

Suggested Operating Limits

PRESSURE 220psi SPEED 18m/s
TEMPERATURE -40 +200°C
Dependent upon shaft diameter and speed + Temperature and media to be sealed

TYPE A2





Robust, short working length highly accommodating and reliable, rubber diaphragm balanced seal which provides enhanced seal capability, performance and life. Improved design features further enhance this popular seal. Suitable for common UK and Euro housing and working length dimensions.

VULCAN STANDARD SIZES

Shaft Size DØ			Shaft Size DØ			D1		D2		D3		L1		L2	
Inch	Metric	Size Code	Metric	Inch	Size Code	Metric	Inch	Metric	Inch	Metric	Inch	Metric	Inch	Metric	Inch
-	-	-	12	0.472	0120	27.79	1.094	19.05	0.750	31.50	1.240	25.00	0.984	8.74	0.344
0.500	12.70	0127	13	0.512	0130	27.79	1.094	19.05	0.750	31.50	1.240	25.00	0.984	8.74	0.344
-	-	-	14	0.551	0140	30.95	1.219	22.23	0.875	35.00	1.378	25.00	0.984	10.32	0.406
-	-	-	15	0.591	0150	30.95	1.219	22.23	0.875	35.00	1.378	25.00	0.984	10.32	0.406
0.625	15.88	0158	16	0.630	0160	30.95	1.219	22.23	0.875	35.00	1.378	25.00	0.984	10.32	0.406
0.750	19.05	0191	18	0.709	0180	34.15	1.344	25.40	1.000	38.00	1.496	25.00	0.984	10.32	0.406
-	-	-	20	0.787	0200	35.70	1.406	26.99	1.063	42.50	1.673	25.00	0.984	10.32	0.406
0.875	22.23	0222	22	0.866	0220	37.30	1.469	28.58	1.125	41.00	1.614	25.00	0.984	10.32	0.406
-	-	-	24	0.945	0240	40.50	1.594	31.75	1.250	47.00	1.850	25.00	0.984	10.32	0.406
1.000	25.40	0254	25	0.984	0250	40.50	1.594	31.75	1.250	47.00	1.850	25.00	0.984	10.32	0.406
1.125	28.58	0286	28	1.102	0280	47.63	1.875	35.72	1.406	50.50	1.988	33.00	1.299	11.99	0.472
-	-	-	30	1.181	0300	50.80	2.000	38.89	1.531	54.50	2.146	33.00	1.299	11.99	0.472
1.250	31.75	0317	32	1.260	0320	50.80	2.000	38.89	1.531	54.50	2.146	33.00	1.299	11.99	0.472
-	-	-	33	1.299	0330	53.98	2.125	42.07	1.656	59.00	2.323	33.00	1.299	11.99	0.472
1.375	34.93	0349	35	1.378	0350	53.98	2.125	42.07	1.656	59.00	2.323	33.00	1.299	11.99	0.472
1.500	38.10	0381	38	1.496	0380	57.15	2.250	45.24	1.781	63.00	2.480	33.00	1.299	11.99	0.472
1.625	41.28	0412	40	1.575	0400	60.35	2.376	48.82	1.922	70.00	2.756	33.00	1.299	11.99	0.472
-	-	-	43	1.693	0430	63.50	2.500	51.59	2.031	73.50	2.894	41.00	1.614	11.99	0.472
1.750	44.45	0444	45	1.772	0450	63.50	2.500	51.59	2.031	73.50	2.894	41.00	1.614	11.99	0.472
1.875	47.63	0476	48	1.890	0480	66.70	2.626	54.75	2.156	76.50	3.012	41.00	1.614	11.99	0.472
2.000	50.80	0508	50	1.969	0500	69.85	2.750	58.00	2.283	79.50	3.130	41.00	1.614	13.50	0.531
2.125	53.98	0539	53	2.087	0530	73.05	2.876	62.00	2.441	84.00	3.307	41.00	1.614	13.50	0.531
2.250	57.15	0571	55	2.165	0550	76.20	3.000	65.00	2.559	88.00	3.465	41.00	1.614	13.50	0.531
2.375	60.33	0603	60	2.362	0600	79.40	3.126	68.00	2.677	91.00	3.583	41.00	1.614	13.50	0.531
2.500	63.50	0635	63	2.480	0630	82.55	3.250	71.20	2.803	94.50	3.720	41.00	1.614	13.50	0.531
2.625	66.68	0666	65	2.559	0650	92.10	3.626	78.35	3.085	99.50	3.917	49.00	1.929	15.90	0.626
2.750	69.85	0698	70	2.756	0700	95.25	3.750	81.10	3.193	102.50	4.035	49.00	1.929	15.90	0.626
2.875	73.03	0730	73	2.874	0730	98.45	3.876	84.50	3.327	106.50	4.193	52.00	2.047	15.90	0.626
3.000	76.20	0762	75	2.953	0750	101.65	4.002	88.10	3.469	110.00	4.331	52.00	2.047	15.90	0.626

Suggested Operating Limits

PRESSURE 220psi SPEED 18m/s

TEMPERATURE -40 +200°C

Dependent upon shaft diameter and speed + Temperature and media to be sealed

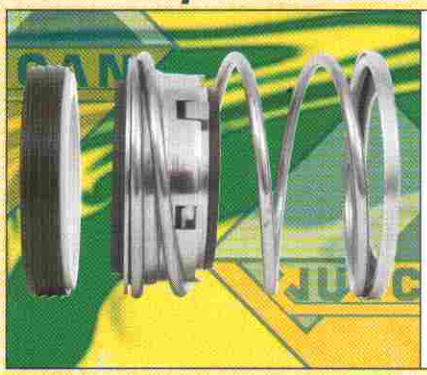
STANDARD STOCK FACE MATERIALS

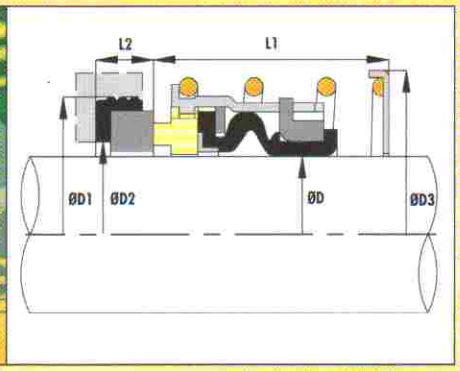
Rotary Face: Carbon, Silicon Carbide, Tungsten Carbide.

Stat Ring: Ceramic, Silicon Carbide, Tungsten Carbide.

OTHER FACE MATERIALS TO ORDER

TYPE A3/ TYPE A4





Robust, short working length highly accommodating and reliable rubber diaphragm balanced seal, which provides enhanced seal capability, performance and life. Improved design features further enhance this popular seal. Suitable for common US standard housing and working length dimensions.

VULCAN STANDARD SIZES

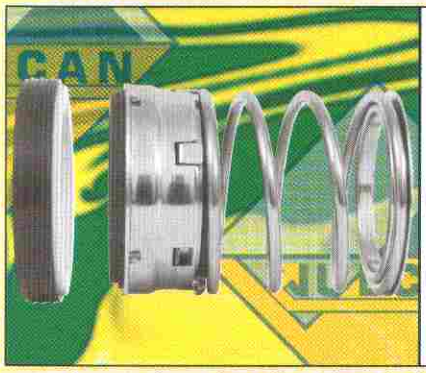
Shaft Size DØ			Shaft Size DØ			D1		D2		Type A4 D3		A3 Thin Profile D3		L1		L2	
Inch	Metric	Size Code	Metric	Inch	Size Code	Metric	Inch	Metric	Inch	Metric	Inch	Metric	Inch	Metric	Inch	Metric	Inch
0.500	12.70	0127	12	0.472	0120	25.40	1.000	19.05	0.750	30.14	1.187	28.58	1.125	20.64	0.813	7.93	0.312
-	-	-	14	0.551	0140	31.75	1.250	23.80	0.937	33.32	1.312	30.30	1.193	22.23	0.875	10.28	0.405
0.625	15.88	0158	16	0.630	0160	31.75	1.250	23.80	0.937	33.32	1.312	31.75	1.250	22.23	0.875	10.28	0.405
0.750	19.05	0191	18	0.709	0180	34.93	1.375	26.98	1.062	36.50	1.437	34.93	1.375	22.23	0.875	10.28	0.405
-	-	-	20	0.787	0200	38.10	1.500	30.15	1.187	39.67	1.562	36.95	1.455	23.80	0.937	10.28	0.405
0.875	22.23	0222	22	0.866	0222	38.10	1.500	30.15	1.187	39.67	1.562	38.10	1.500	23.80	0.937	10.28	0.405
-	-	-	24	0.945	0240	41.28	1.625	33.32	1.312	45.50	1.791	42.65	1.679	25.40	1.000	11.10	0.437
1.000	25.40	0254	25	0.984	0250	41.28	1.625	33.32	1.312	45.50	1.791	43.69	1.720	25.40	1.000	11.10	0.437
1.125	28.58	0286	28	1.102	0280	44.44	1.750	36.50	1.437	48.50	1.909	46.86	1.845	26.97	1.062	11.10	0.437
-	-	-	30	1.181	0300	47.63	1.875	37.90	1.492	52.37	2.062	48.80	1.921	26.97	1.062	11.10	0.437
1.250	31.75	0317	32	1.260	0320	47.63	1.875	37.90	1.492	52.37	2.062	51.21	2.016	26.97	1.062	11.10	0.437
-	-	-	33	1.299	0330	50.80	2.000	42.84	1.687	56.00	2.205	52.50	2.067	28.58	1.125	11.10	0.437
1.375	34.93	0349	35	1.378	0350	50.80	2.000	42.84	1.687	56.00	2.205	54.38	2.141	28.58	1.125	11.10	0.437
1.500	38.10	0381	38	1.496	0380	53.98	2.125	46.05	1.813	59.20	2.331	57.55	2.266	28.58	1.125	11.10	0.437
1.625	41.28	0412	40	1.575	0400	60.33	2.375	50.80	2.000	67.00	2.638	64.95	2.557	34.93	1.375	12.70	0.500
-	-	-	43	1.693	0430	63.50	2.500	53.97	2.125	69.85	2.750	66.30	2.610	34.93	1.375	12.70	0.500
1.750	44.45	0444	45	1.772	0450	63.50	2.500	53.97	2.125	69.85	2.750	68.12	2.682	34.93	1.375	12.70	0.500
1.875	47.63	0476	-	-	-	66.68	2.625	57.15	2.250	73.03	2.875	71.17	2.802	38.10	1.500	12.70	0.500
-	-	-	48	1.890	0480	69.85	2.750	57.15	2.250	73.03	2.875	71.17	2.802	38.10	1.500	12.70	0.500
2.000	50.80	0508	50	1.969	0500	69.85	2.750	60.32	2.375	76.20	3.000	74.47	2.932	38.10	1.500	12.70	0.500
2.125	53.98	0539	53	2.087	0530	76.20	3.000	60.32	2.375	82.55	3.250	80.72	3.178	42.85	1.687	14.28	0.562
2.250	57.15	0571	55	2.165	0550	79.38	3.125	61.90	2.437	85.73	3.375	83.90	3.303	42.85	1.687	14.28	0.562
2.375	60.33	0603	60	2.362	0600	82.55	3.250	67.39	2.653	88.90	3.500	87.07	3.428	46.02	1.812	14.28	0.562
2.500	63.50	0635	63	2.480	0630	85.73	3.375	68.25	2.687	92.08	3.625	90.25	3.553	46.02	1.812	14.28	0.562
2.625	66.68	0666	65	2.559	0650	85.73	3.375	71.24	2.805	98.43	3.875	96.42	3.796	49.20	1.937	15.90	0.626
2.750	69.85	0698	70	2.756	0700	88.90	3.500	74.60	2.937	101.60	4.000	99.60	3.921	49.20	1.937	15.90	0.626
2.875	73.03	0730	73	2.874	0730	95.25	3.750	77.77	3.062	104.78	4.125	102.77	4.046	52.37	2.062	15.90	0.626
3.000	76.20	0762	75	2.953	0750	98.43	3.875	80.95	3.187	107.95	4.250	105.94	4.171	52.37	2.062	15.90	0.626

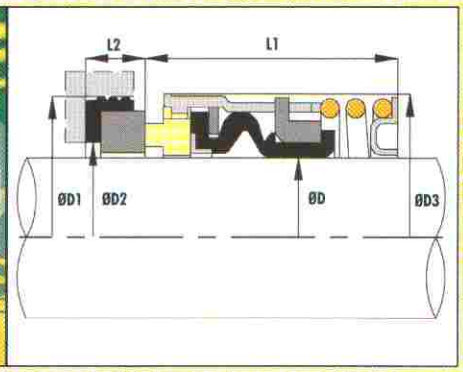
STANDARD STOCK FACE MATERIALS
Rotary Face: Carbon, Silicon Carbide, Tungsten Carbide.
Stat Ring: Ceramic, Silicon Carbide, Tungsten Carbide.
OTHER FACE MATERIALS TO ORDER

Suggested Operating Limits

PRESSURE 220psi SPEED 18m/s
TEMPERATURE -40 +200°C
Dependent upon shaft diameter and speed + Temperature and media to be sealed

TYPE A5





Robust, long working length highly accommodating and reliable rubber diaphragm balanced seal, which provides enhanced seal capability, performance and life. Improved design features further enhance this popular seal. Suitable for common US standard housing and working length dimensions.

VULCAN STANDARD SIZES

Shaft Size DØ			Shaft Size DØ			D1		D2		D3		L1		L2	
Inch	Metric	Size Code	Metric	Inch	Size Code	Metric	Inch	Metric	Inch	Metric	Inch	Metric	Inch	Metric	Inch
0.500	12.70	0127	12	0.472	0120	25.40	1.000	19.05	0.750	23.80	0.937	30.16	1.187	7.93	0.312
-	-	-	14	0.551	0140	31.75	1.250	23.80	0.937	27.76	1.093	33.32	1.312	10.28	0.405
0.625	15.88	0158	16	0.630	0160	31.75	1.250	23.80	0.937	27.76	1.093	33.32	1.312	10.28	0.405
0.750	19.05	0191	18	0.709	0180	34.93	1.375	26.98	1.062	30.94	1.218	33.32	1.312	10.28	0.405
-	-	-	20	0.787	0200	38.10	1.500	30.15	1.187	34.11	1.343	34.93	1.375	10.28	0.405
0.875	22.23	0222	22	0.866	0220	38.10	1.500	30.15	1.187	34.11	1.343	34.93	1.375	10.28	0.405
-	-	-	24	0.945	0240	41.28	1.625	33.32	1.312	38.10	1.500	39.67	1.562	11.10	0.437
1.000	25.40	0254	25	0.984	0250	41.28	1.625	33.32	1.312	38.10	1.500	39.67	1.562	11.10	0.437
1.125	28.58	0286	28	1.102	0280	44.44	1.750	36.50	1.437	41.28	1.625	41.28	1.625	11.10	0.437
-	-	-	30	1.181	0300	47.63	1.875	37.90	1.492	46.02	1.812	41.28	1.625	11.10	0.437
1.250	31.75	0317	32	1.260	0320	47.63	1.875	37.90	1.492	46.02	1.812	41.28	1.625	11.10	0.437
-	-	-	33	1.299	0330	50.80	2.000	42.84	1.687	48.68	1.917	42.85	1.687	11.10	0.437
1.375	34.93	0349	35	1.378	0350	50.80	2.000	42.84	1.687	48.68	1.917	42.85	1.687	11.10	0.437
1.500	38.10	0381	38	1.496	0380	53.98	2.125	46.05	1.813	51.85	2.041	42.85	1.687	11.10	0.437
1.625	41.28	0412	40	1.575	0400	60.38	2.377	50.80	2.000	58.10	2.287	50.80	2.000	12.70	0.500
-	-	-	43	1.693	0430	63.50	2.500	53.97	2.125	61.27	2.412	50.80	2.000	12.70	0.500
1.750	44.45	0444	45	1.772	0450	63.50	2.500	53.97	2.125	61.27	2.412	50.80	2.000	12.70	0.500
1.875	47.63	0476	-	-	-	66.68	2.625	57.15	2.250	64.44	2.537	53.98	2.125	12.70	0.500
-	-	-	48	1.890	0480	69.85	2.750	60.32	2.375	67.21	2.646	53.98	2.125	12.70	0.500
2.000	50.80	0508	50	1.969	0500	69.85	2.750	60.32	2.375	67.21	2.646	53.98	2.125	12.70	0.500
2.125	53.98	0539	53	2.087	0530	76.20	3.000	60.32	2.375	72.02	2.835	60.33	2.375	14.28	0.562
2.250	57.15	0571	55	2.165	0550	79.38	3.125	61.90	2.437	75.30	2.965	60.33	2.375	14.28	0.562
2.375	60.33	0603	60	2.362	0600	82.55	3.250	67.39	2.653	78.30	3.083	63.50	2.500	14.28	0.562
2.500	63.50	0635	63	2.480	0630	85.73	3.375	68.25	2.687	81.54	3.210	63.50	2.500	14.28	0.562
2.625	66.68	0666	65	2.559	0650	85.73	3.375	71.24	2.805	86.22	3.394	69.85	2.750	15.90	0.626
2.750	69.85	0698	70	2.756	0700	88.90	3.500	74.60	2.937	89.40	3.520	73.03	2.875	15.90	0.626
2.875	73.03	0730	73	2.874	0730	95.25	3.750	77.77	3.062	92.57	3.644	73.03	2.875	15.90	0.626
3.000	76.20	0762	75	2.953	0750	98.43	3.875	80.95	3.187	95.75	3.770	73.03	2.875	15.90	0.626

Suggested Operating Limits

PRESSURE 220psi SPEED 18m/s

TEMPERATURE -40 +200°C

Dependent upon shaft diameter and speed + Temperature and media to be sealed

STANDARD STOCK FACE MATERIALS

Rotary Face: Carbon, Silicon Carbide, Tungsten Carbide.

Stat Ring: Ceramic, Silicon Carbide, Tungsten Carbide.

OTHER FACE MATERIALS TO ORDER

Vulcan Parallel Spring 'O'-Ring Mounted Seals

Section 7

Introduction

The Vulcan Type 9X mechanical seals are robust, general purpose, parallel spring, pusher type seals, designed to suit standard metric and imperial housing dimensions, that are commonly found mainly in the marine and textile industries.

These are a direct replacement for John Crane® Flexibox® Types R00, R10, R20 and R30 series, together with Pillar® US1, US2 and US3 series (CGU).

Applications

The Type 9X seal ranges are mainly used in marine pump applications, but are designed to satisfy the sealing requirements of rotating shaft equipment for a wide variety of applications, including; marine, textile, pulp and paper, refrigeration compressors, waste treatment etc.

Standard Vulcan Types

Types 95, 96 and 97

These are the standard series 9x range, supplied with either solid or inserted rotary face, in a wide variety of face and elastomer materials.

All types provide a positive drive to the rotary face, by a heavy duty spring, which is supplied either with left or right-hand wound springs, depending on whether clockwise or anti-clockwise shaft direction.

Three versions are available and vary only by the method of providing the drive to the rotary seal face.

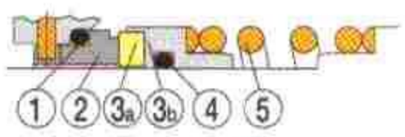
- Type 95 - Drives directly from shaft.
- Type 96 - Type 95 components with the addition of a split ring and washer for simple shaft abutment.
- Type 97 - Type 95 components with addition of a grub screwed drive collar.

Type 98

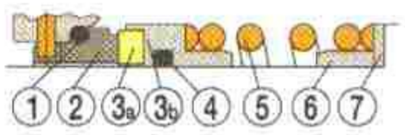
Heavy duty, single spring, pusher type seal, supplied with either solid or inserted rotary face, in a wide variety of face and elastomer materials. Seal is driven by a grubbed screwed collar, similar to the Type 97.

The Type 98 design is unique compared to Type 95, 96 and 97, as it designed to suit different housing sizes and is supplied with a double 'O'-Ring stationary seat, as standard.

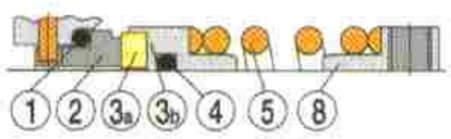
STANDARD COMPONENTS



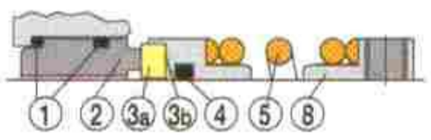
Type 95



Type 96



Type 97



Type 98

NO	Description		
1	Stationary 'O'-Ring	4	Rotary 'O'-Ring
2	Stationary Seat	5	Coil
3a	Rotary Face	6	Split Ring
3b	Seal Head Retainer	7	Washer
		8	Drive Collar with Grub screws

Vulcan Design Advantages

Material Quality

All 9x Types are available from stock, with a wide range of face and stationary materials, including Tungsten Carbide, Silicon Carbide or Ceramic inserted rotary faces, Chrome Dioxide coated Stainless Steel rotary faces, and Carbon, Tungsten Carbide or Silicon Carbide stationaries.

Design

The Vulcan 9X seal ranges can either be supplied with solid rotary faces or inserted hard faces, with improved tracking capabilities to many competitors' equivalents.

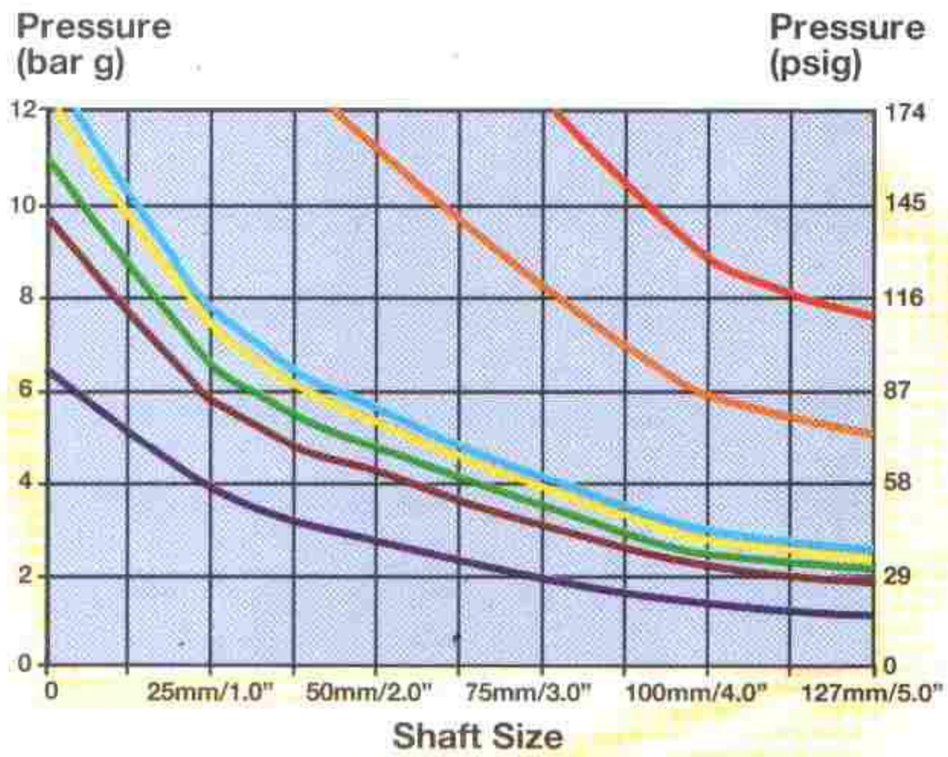
Seal face loading has been designed to ensure optimum seal performance and therefore longer seal life.
Some main competitors seals do not have a linear progression of increasing spring force with shaft size nor optimum closing forces.

Superior Face Combinations

As is evidenced from the pV Chart below and from any Seal Technical literature, the competitor norms of Stainless Steel vs Carbon or Ceramic vs Carbon faces, as standard on their seals, have, substantially lower capability, performance and life in comparison to Vulcans preferred face combination of Carbon vs Silicon Carbide.

This Carbon vs SIC face combination is offered as the standard by Vulcan, at no extra price, to give the very best quality and performance. Why compromise on quality or accept a higher price for the best seal face combination, for standard, common Marine and Textile duties?

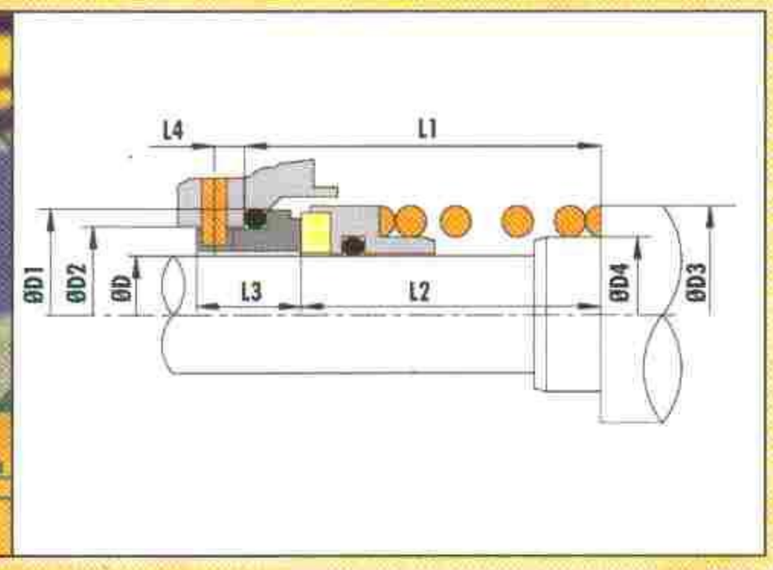
VULCAN PARALLEL SPRING 'O'-RING MOUNTED TYPE SEALS PV CHART



- Carbon/TC
- Carbon/SIC
- Carbon/Ceramic
- SC/TC
- SC/SC
- TC/TC
- Carbon/SS

Notes:
For information on how to utilise this pV chart please refer to the technical section.

TYPE 95/95N



Robust, general purpose, unbalanced pusher Type seal capable of many shaft-sealing duties. The Type 95 drives directly from the shaft, and is also available with a short, non-pinned seat as Type 95N, see column L31 for revised seat length. Seal illustrated shows a Stainless Steel rotary face.

VULCAN STANDARD SIZES

Shaft Size DØ			Shaft Size DØ			D1		D2		D3		D4		L1		L2		L3		L31		L4	
Inch	Metric	Code Size	Metric	Inch	Code Size	Metric	Inch	Metric	Inch	Metric	Inch	Metric	Inch	Metric	Inch	Metric	Inch	Metric	Inch	Metric	Inch	Metric	Inch
0.625	15.88	0158	-	-	-	28.57	1.125	24.31	0.957	29.00	1.142	19.05	0.750	33.50	1.319	24.50	0.965	15.00	0.591	11.50	0.453	4.00	0.157
0.750	19.05	0191	-	-	-	31.75	1.250	27.48	1.082	32.50	1.280	22.22	0.875	33.50	1.319	24.50	0.965	15.00	0.591	11.50	0.453	4.00	0.157
-	-	-	20	0.787	0200	33.32	1.312	29.06	1.144	34.50	1.358	24.00	0.945	36.50	1.437	27.50	1.083	15.00	0.591	11.50	0.453	4.00	0.157
0.875	22.23	0222	-	-	-	34.93	1.375	30.66	1.207	34.93	1.375	25.40	1.000	35.00	1.378	26.00	1.024	15.00	0.591	11.50	0.453	4.00	0.157
-	-	-	25	0.984	0250	39.85	1.569	33.84	1.332	38.10	1.500	28.57	1.125	40.00	1.575	30.00	1.181	16.00	0.630	11.50	0.453	4.00	0.157
1.000	25.40	0254	-	-	-	39.85	1.569	33.84	1.332	38.10	1.500	28.57	1.125	40.00	1.575	30.00	1.181	16.00	0.630	11.50	0.453	4.00	0.157
1.125	28.58	0286	28	1.102	0286	43.05	1.695	37.01	1.457	42.60	1.677	31.75	1.250	41.50	1.634	31.50	1.240	16.00	0.630	11.50	0.453	4.00	0.157
-	-	-	30	1.181	0300	44.63	1.757	38.61	1.520	45.50	1.791	33.32	1.312	41.50	1.634	31.50	1.240	16.00	0.630	11.50	0.453	4.00	0.157
1.250	31.75	0317	32	1.260	0317	46.32	1.824	40.28	1.586	46.20	1.819	34.92	1.375	44.50	1.752	34.50	1.358	16.00	0.630	11.50	0.453	4.00	0.157
1.375	34.93	0349	35	1.378	0349	49.48	1.948	43.46	1.711	49.50	1.949	38.10	1.500	47.50	1.870	37.50	1.476	16.00	0.630	11.50	0.453	4.00	0.157
1.500	38.10	0381	38	1.496	0381	52.56	2.069	46.63	1.836	52.50	2.067	42.88	1.688	47.50	1.870	37.50	1.476	16.00	0.630	11.50	0.453	4.00	0.157
-	-	-	40	1.575	0400	54.25	2.136	48.13	1.895	55.00	2.165	44.45	1.750	47.50	1.870	37.50	1.476	16.00	0.630	11.50	0.453	4.00	0.157
1.625	41.28	0412	42	1.654	0412	55.83	2.198	49.81	1.961	55.50	2.185	46.02	1.812	47.50	1.870	37.50	1.476	16.00	0.630	11.50	0.453	4.00	0.157
1.750	44.45	0444	45	1.772	0444	59.02	2.324	52.98	2.086	59.20	2.331	49.20	1.937	47.50	1.870	37.50	1.476	16.00	0.630	11.50	0.453	4.00	0.157
1.875	47.63	0476	48	1.890	0476	63.68	2.507	57.66	2.270	61.91	2.437	52.37	2.062	52.50	2.067	42.50	1.673	18.00	0.709	11.50	0.453	5.00	0.197
-	-	-	50	1.969	0500	65.37	2.574	59.33	2.336	66.00	2.598	53.97	2.125	55.50	2.185	45.50	1.791	18.00	0.709	11.50	0.453	5.00	0.197
2.000	50.80	0508	-	-	-	66.85	2.632	60.83	2.395	66.68	2.625	55.57	2.188	55.50	2.185	45.50	1.791	18.00	0.709	11.50	0.453	5.00	0.197
2.125	53.98	0539	55	2.165	0539	70.03	2.757	64.01	2.520	70.20	2.764	58.72	2.312	57.00	2.244	47.00	1.850	18.00	0.709	n/a	n/a	5.00	0.197
2.250	57.15	0571	-	-	-	73.20	2.882	67.18	2.645	73.02	2.875	61.90	2.437	57.00	2.244	47.00	1.850	18.00	0.709	n/a	n/a	5.00	0.197
-	-	-	58	2.283	0580	79.50	3.129	68.86	2.711	74.00	2.913	63.50	2.500	57.00	2.244	47.00	1.850	18.00	0.709	n/a	n/a	5.00	0.197
-	-	-	60	2.362	0600	76.38	3.007	70.36	2.770	77.00	3.031	65.07	2.562	60.50	2.382	50.50	1.988	18.00	0.709	n/a	n/a	5.00	0.197
2.375	60.33	0603	-	-	-	76.38	3.007	70.36	2.770	76.20	3.000	65.07	2.562	60.50	2.382	50.50	1.988	18.00	0.709	n/a	n/a	5.00	0.197
2.500	63.50	0635	-	-	-	79.56	3.132	73.53	2.895	79.38	3.125	68.28	2.688	60.50	2.382	50.50	1.988	18.00	0.709	n/a	n/a	5.00	0.197
-	-	-	65	2.559	0650	81.23	3.198	75.21	2.961	82.00	3.228	69.85	2.750	63.50	2.500	53.50	2.106	18.00	0.709	n/a	n/a	5.00	0.197
2.625	66.68	0666	-	-	-	82.73	3.257	76.71	3.020	82.55	3.250	71.42	2.812	63.50	2.500	53.50	2.106	18.00	0.709	n/a	n/a	5.00	0.197
2.750	69.85	0698	70	2.756	0698	85.90	3.382	79.88	3.145	86.20	3.394	74.60	2.937	63.50	2.500	53.50	2.106	18.00	0.709	n/a	n/a	5.00	0.197
2.875	73.03	0730	73	2.874	0730	89.08	3.507	83.06	3.270	90.00	3.543	77.77	3.062	66.50	2.618	56.50	2.224	18.00	0.709	n/a	n/a	5.00	0.197
-	-	-	75	2.953	0750	90.77	3.574	84.73	3.336	91.50	3.602	79.37	3.125	66.50	2.618	56.60	2.228	18.00	0.709	n/a	n/a	5.00	0.197
3.000	76.20	0762	-	-	-	95.43	3.757	89.41	3.520	95.25	3.750	80.97	3.188	73.00	2.874	63.00	2.480	18.00	0.709	n/a	n/a	5.00	0.197
-	-	-	80	3.150	0800	100.29	3.948	94.26	3.711	99.50	3.917	85.73	3.375	73.00	2.874	63.00	2.480	18.00	0.709	n/a	n/a	5.00	0.197
3.250	82.55	0825	-	-	-	101.78	4.007	95.76	3.770	101.60	4.000	87.30	3.437	73.00	2.874	63.00	2.480	18.00	0.709	n/a	n/a	5.00	0.197
-	-	-	85	3.346	0850	104.77	4.125	98.93	3.895	105.50	4.154	90.00	3.543	73.00	2.874	63.00	2.480	18.00	0.709	n/a	n/a	5.00	0.197
3.500	88.90	0889	-	-	-	108.13	4.257	102.11	4.020	107.95	4.250	93.67	3.688	73.00	2.874	63.00	2.480	18.00	0.709	n/a	n/a	5.00	0.197
-	-	-	90	3.543	0900	109.82	4.324	103.78	4.086	110.50	4.350	95.25	3.750	78.00	3.071	68.00	2.677	18.00	0.709	n/a	n/a	5.00	0.197
-	-	-	95	3.740	0950	114.30	4.500	108.46	4.270	115.50	4.547	100.00	3.937	78.00	3.071	68.00	2.677	18.00	0.709	n/a	n/a	5.00	0.197
-	-	-	100	3.937	1000	119.33	4.698	113.31	4.461	120.00	4.724	104.77	4.125	78.00	3.071	68.00	2.677	18.00	0.709	n/a	n/a	5.00	0.197
4.000	101.60	1016	-	-	-	124.00	4.882	117.98	4.645	124.50	4.902	107.95	4.250	82.50	3.248	72.50	2.854	18.00	0.709	n/a	n/a	5.00	0.197
4.125	104.78	1047	105	4.134	1047	127.00	5.000	121.16	4.770	128.00	5.039	111.00	4.370	82.50	3.248	72.50	2.854	18.00	0.709	n/a	n/a	5.00	0.197
-	-	-	110	4.331	1100	131.77	5.188	126.01	4.961	133.00	5.236	116.00	4.567	82.50	3.248	72.50	2.854	18.00	0.709	n/a	n/a	5.00	0.197
4.500	114.30	1143	115	4.528	1143	136.52	5.375	130.68	5.145	137.50	5.413	121.00	4.764	82.50	3.248	72.50	2.854	18.00	0.709	n/a	n/a	5.00	0.197
-	-	-	120	4.724	1200	142.87	5.625	137.03	5.395	144.00	5.669	126.00	4.961	89.00	3.504	79.00	3.110	18.00	0.709	n/a	n/a	5.00	0.197

STANDARD STOCK FACE MATERIALS

Rotary Face: Silicon Carbide, Tungsten Carbide, Ceramic, Stainless Steel, Chrome Oxide coated Stainless Steel. Stat Ring: Carbon, Silicon Carbide, Tungsten Carbide.

OTHER FACE MATERIALS TO ORDER

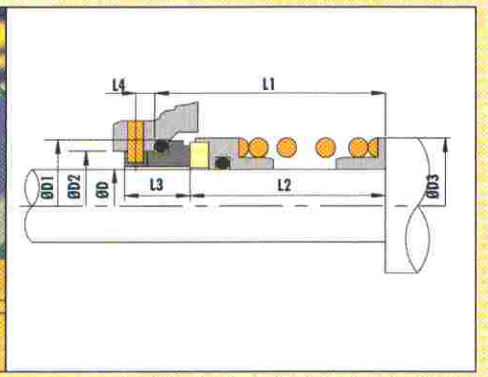
Suggested Operating Limits

PRESSURE 170psi SPEED 20m/s

TEMPERATURE -50 +180°C

Dependent upon shaft diameter and speed + Temperature and media to be sealed

TYPE 96



Robust, general purpose, unbalanced pusher Type seal capable of many shaft-sealing duties. The Type 96 drives from the shaft via the split ring, inserted in the coil tail. Also available with a short, non-pinned seat as Type 96N, see column L31 on the Type 95 page for revised seat length. Seal illustrated shows a Silicon Carbide rotary face.

VULCAN STANDARD SIZES

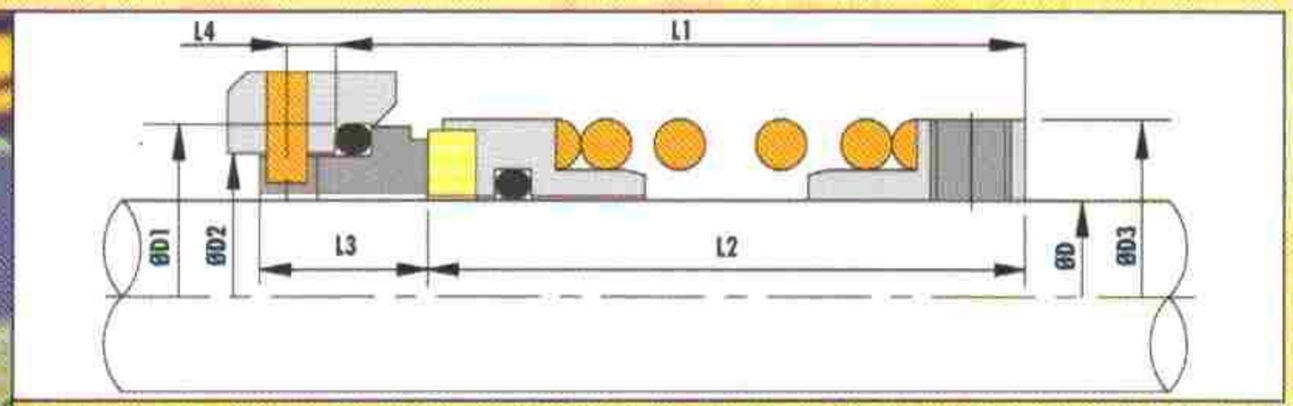
Shaft Size DØ			Shaft Size DØ			D1		D2		D3		L1		L2		L3		L4	
Inch	Metric	Code Size	Metric	Inch	Code Size	Metric	Inch	Metric	Inch	Metric	Inch	Metric	Inch	Metric	Inch	Metric	Inch	Metric	Inch
0.625	15.88	0158	16	0.630	0160	28.57	1.125	24.31	0.957	29.00	1.142	35.00	1.378	26.00	1.024	15.00	0.591	4.00	0.157
0.750	19.05	0191	18	0.709	0180	31.75	1.250	27.48	1.082	32.50	1.280	35.00	1.378	26.00	1.024	15.00	0.591	4.00	0.157
-	-	-	20	0.787	0200	33.32	1.312	29.06	1.144	34.50	1.358	38.00	1.496	29.00	1.142	15.00	0.591	4.00	0.157
0.875	22.23	0222	22	0.866	0220	34.93	1.375	30.66	1.207	34.93	1.375	36.50	1.437	27.50	1.083	15.00	0.591	4.00	0.157
1.000	25.40	0254	25	0.984	0250	39.85	1.569	33.84	1.332	38.10	1.500	41.50	1.634	31.50	1.240	16.00	0.630	4.00	0.157
1.125	28.58	0286	28	1.102	0280	43.05	1.695	37.01	1.457	42.86	1.687	43.00	1.693	33.00	1.299	16.00	0.630	4.00	0.157
-	-	-	30	1.181	0300	44.63	1.757	38.61	1.520	43.50	1.713	43.00	1.693	33.00	1.299	16.00	0.630	4.00	0.157
1.250	31.75	0317	32	1.260	0320	46.32	1.824	40.28	1.586	47.00	1.850	46.00	1.811	36.00	1.417	16.00	0.630	4.00	0.157
1.375	34.93	0349	35	1.378	0350	49.48	1.948	43.46	1.711	50.00	1.969	49.00	1.929	39.00	1.535	16.00	0.630	4.00	0.157
1.500	38.10	0381	38	1.496	0380	52.56	2.069	46.63	1.836	53.00	2.087	49.00	1.929	39.00	1.535	16.00	0.630	4.00	0.157
-	-	-	40	1.575	0400	54.25	2.136	48.13	1.895	55.00	2.165	49.00	1.929	39.00	1.535	16.00	0.630	4.00	0.157
1.625	41.28	0412	42	1.654	0420	55.83	2.198	49.81	1.961	55.50	2.185	49.00	1.929	39.00	1.535	16.00	0.630	4.00	0.157
1.750	44.45	0444	45	1.772	0450	59.02	2.324	52.98	2.086	60.00	2.362	49.00	1.929	39.00	1.535	16.00	0.630	4.00	0.157
1.875	47.63	0476	48	1.890	0480	63.68	2.507	57.66	2.270	61.91	2.437	54.00	2.126	44.00	1.732	18.00	0.709	5.00	0.197
-	-	-	50	1.969	0500	65.37	2.574	59.33	2.336	66.00	2.598	57.00	2.244	47.00	1.850	18.00	0.709	5.00	0.197
2.000	50.80	0508	-	-	-	66.85	2.632	60.83	2.395	66.68	2.625	57.00	2.244	47.00	1.850	18.00	0.709	5.00	0.197
2.125	53.98	0539	55	2.165	0550	70.03	2.757	64.01	2.520	71.00	2.795	58.50	2.303	48.50	1.909	18.00	0.709	5.00	0.197
2.250	57.15	0571	-	-	-	73.20	2.882	67.18	2.645	73.02	2.875	58.50	2.303	48.50	1.909	18.00	0.709	5.00	0.197
2.375	60.33	0603	60	2.362	0600	76.38	3.007	70.36	2.770	77.00	3.031	62.00	2.441	52.00	2.047	18.00	0.709	5.00	0.197
2.500	63.50	0635	-	-	-	79.56	3.132	73.53	2.895	79.38	3.125	62.00	2.441	52.00	2.047	18.00	0.709	5.00	0.197
-	-	-	65	2.559	0650	81.23	3.198	75.21	2.961	82.00	3.228	65.00	2.559	55.00	2.165	18.00	0.709	5.00	0.197
2.625	66.68	0666	-	-	-	82.73	3.257	76.71	3.020	82.55	3.250	65.00	2.559	55.00	2.165	18.00	0.709	5.00	0.197
2.750	69.85	0698	70	2.756	0700	85.90	3.382	79.88	3.145	87.00	3.425	65.00	2.559	55.00	2.165	18.00	0.709	5.00	0.197
2.875	73.03	0730	73	2.874	0730	89.08	3.507	83.06	3.270	90.00	3.543	70.00	2.756	60.00	2.362	18.00	0.709	5.00	0.197
-	-	-	75	2.953	0750	90.77	3.574	84.73	3.336	91.50	3.602	70.00	2.756	60.00	2.362	18.00	0.709	5.00	0.197
3.000	76.20	0762	-	-	-	95.43	3.757	89.41	3.520	95.25	3.750	76.00	2.992	66.00	2.598	18.00	0.709	5.00	0.197
-	-	-	80	3.150	0800	100.29	3.948	94.26	3.711	99.50	3.917	76.00	2.992	66.00	2.598	18.00	0.709	5.00	0.197
3.250	82.55	0826	-	-	-	101.78	4.007	95.76	3.770	101.60	4.000	76.00	2.992	66.00	2.598	18.00	0.709	5.00	0.197
-	-	-	85	3.346	0850	104.77	4.125	98.93	3.895	105.50	4.154	76.00	2.992	66.00	2.598	18.00	0.709	5.00	0.197
3.500	88.90	0889	-	-	-	108.13	4.257	102.11	4.020	107.95	4.250	76.00	2.992	66.00	2.598	18.00	0.709	5.00	0.197
-	-	-	90	3.543	0900	109.82	4.324	103.78	4.086	110.50	4.350	81.00	3.189	71.00	2.795	18.00	0.709	5.00	0.197
-	-	-	95	3.740	0950	114.30	4.500	108.46	4.270	115.50	4.547	81.00	3.189	71.00	2.795	18.00	0.709	5.00	0.197
-	-	-	100	3.937	1000	119.33	4.698	113.31	4.461	120.00	4.724	81.00	3.189	71.00	2.795	18.00	0.709	5.00	0.197
4.000	101.60	1016	-	-	-	124.00	4.882	117.98	4.645	124.50	4.902	85.50	3.366	75.50	2.972	18.00	0.709	5.00	0.197
4.125	104.78	1047	105	4.134	1050	127.00	5.000	121.16	4.770	128.00	5.039	85.50	3.366	75.50	2.972	18.00	0.709	5.00	0.197
-	-	-	110	4.331	1100	131.77	5.188	126.01	4.961	133.00	5.236	85.50	3.366	75.50	2.972	18.00	0.709	5.00	0.197
4.500	114.30	1143	115	4.528	1150	136.52	5.375	130.68	5.145	137.50	5.413	85.50	3.366	75.50	2.972	18.00	0.709	5.00	0.197
-	-	-	120	4.724	1200	142.87	5.625	137.03	5.395	144.00	5.669	92.00	3.622	82.00	3.228	18.00	0.709	5.00	0.197

STANDARD STOCK FACE MATERIALS
Rotary Face: Silicon Carbide, Tungsten Carbide, Ceramic, Stainless Steel, Chrome Oxide coated Stainless Steel. Stat Ring: Carbon, Silicon Carbide, Tungsten Carbide.
OTHER FACE MATERIALS TO ORDER

Suggested Operating Limits

PRESSURE 170psi SPEED 20m/s
TEMPERATURE -50 +180°C
Dependent upon shaft diameter and speed + Temperature and media to be sealed

TYPE 97



Robust, general purpose, unbalanced pusher Type seal, capable of many shaft-sealing duties. The Type 97 drives from the shaft via the drive collar with grub screws inserted in the coil tail. Type 97 is also available with a short, non-pinned seat as Type 97N, see column L31 on the Type 95 page for revised seat length.

VULCAN STANDARD SIZES

Shaft Size DØ			Shaft Size DØ			D1		D2		D3		L1		L2		L3		L4	
Inch	Metric	Code Size	Metric	Inch	Code Size	Metric	Inch	Metric	Inch	Metric	Inch	Metric	Inch	Metric	Inch	Metric	Inch	Metric	Inch
0.625	15.80	0158	16	0.630	0160	28.57	1.125	24.31	0.957	29.00	1.142	41.50	1.634	32.50	1.280	15.00	0.591	4.00	0.157
0.750	19.10	0191	18	0.709	0180	31.75	1.250	27.48	1.082	32.50	1.280	41.50	1.634	32.50	1.280	15.00	0.591	4.00	0.157
-	-	-	20	0.787	0200	33.32	1.312	29.06	1.144	34.50	1.358	44.50	1.752	35.50	1.398	15.00	0.591	4.00	0.157
0.875	22.20	0222	22	0.866	0220	34.93	1.375	30.66	1.207	34.93	1.375	44.50	1.752	35.50	1.398	15.00	0.591	4.00	0.157
1.000	25.40	0254	25	0.984	0250	39.85	1.569	33.84	1.332	38.10	1.500	49.00	1.929	39.00	1.535	16.00	0.630	4.00	0.157
1.125	28.60	0286	28	1.102	0280	43.05	1.695	37.01	1.457	42.86	1.687	51.00	2.008	41.00	1.614	16.00	0.630	4.00	0.157
-	-	-	30	1.181	0300	44.63	1.757	38.61	1.520	45.50	1.791	51.00	2.008	41.00	1.614	16.00	0.630	4.00	0.157
1.250	31.70	0317	32	1.260	0320	46.32	1.824	40.28	1.586	47.00	1.850	54.00	2.126	44.00	1.732	16.00	0.630	4.00	0.157
1.375	34.90	0349	35	1.378	0350	49.48	1.948	43.46	1.711	50.00	1.969	57.00	2.244	47.00	1.850	16.00	0.630	4.00	0.157
1.500	38.10	0381	38	1.496	0380	52.56	2.069	46.63	1.836	53.00	2.087	57.00	2.244	47.00	1.850	16.00	0.630	4.00	0.157
-	-	-	40	1.575	0400	54.25	2.136	48.13	1.895	55.00	2.165	57.00	2.244	47.00	1.850	16.00	0.630	4.00	0.157
1.625	41.20	0412	42	1.654	0420	55.83	2.198	49.81	1.961	55.50	2.185	57.00	2.244	47.00	1.850	16.00	0.630	4.00	0.157
1.750	44.40	0444	45	1.772	0450	59.02	2.324	52.98	2.086	60.00	2.362	57.00	2.244	47.00	1.850	16.00	0.630	4.00	0.157
1.875	47.60	0476	48	1.890	0480	63.68	2.507	57.66	2.270	61.91	2.437	65.00	2.559	55.00	2.165	18.00	0.709	5.00	0.197
-	-	-	50	1.969	0500	65.37	2.574	59.33	2.336	66.00	2.598	68.50	2.697	58.50	2.303	18.00	0.709	5.00	0.197
2.000	50.80	0508	-	-	-	66.85	2.632	60.83	2.395	66.68	2.625	68.50	2.697	58.50	2.303	18.00	0.709	5.00	0.197
2.125	53.90	0539	55	2.165	0550	70.03	2.757	64.01	2.520	71.00	2.795	70.00	2.756	60.00	2.362	18.00	0.709	5.00	0.197
2.250	57.10	0571	-	-	-	73.20	2.882	67.18	2.645	73.02	2.875	70.00	2.756	60.00	2.362	18.00	0.709	5.00	0.197
2.375	60.30	0603	60	2.362	0600	76.38	3.007	70.36	2.770	77.00	3.031	73.00	2.874	63.00	2.480	18.00	0.709	5.00	0.197
2.500	63.50	0635	-	-	-	79.56	3.132	73.56	2.896	79.38	3.125	73.00	2.874	63.00	2.480	18.00	0.709	5.00	0.197
-	-	-	65	2.559	0650	81.23	3.198	75.21	2.961	82.00	3.228	76.00	2.992	66.00	2.598	18.00	0.709	5.00	0.197
2.625	66.60	0666	-	-	-	82.73	3.257	76.71	3.020	82.55	3.250	76.00	2.992	66.00	2.598	18.00	0.709	5.00	0.197
2.750	69.80	0698	70	2.756	0700	85.90	3.382	79.88	3.145	87.00	3.425	76.00	2.992	66.00	2.598	18.00	0.709	5.00	0.197
2.875	73.00	0730	73	2.874	0730	89.08	3.507	83.06	3.270	90.00	3.543	81.00	3.189	71.00	2.795	18.00	0.709	5.00	0.197
-	-	-	75	2.953	0750	90.77	3.574	84.73	3.336	91.50	3.602	81.00	3.189	71.00	2.795	18.00	0.709	5.00	0.197
3.000	76.20	0762	-	-	-	95.43	3.757	89.41	3.520	95.25	3.750	87.50	3.445	77.50	3.051	18.00	0.709	5.00	0.197
-	-	-	80	3.150	0800	100.29	3.948	94.26	3.711	99.50	3.917	87.50	3.445	77.50	3.051	18.00	0.709	5.00	0.197
3.250	82.60	0826	-	-	-	101.78	4.007	95.76	3.770	101.60	4.000	87.50	3.445	77.50	3.051	18.00	0.709	5.00	0.197
-	-	-	85	3.346	0850	104.77	4.125	98.93	3.895	105.50	4.154	87.50	3.445	77.50	3.051	18.00	0.709	5.00	0.197
3.500	88.90	0889	-	-	-	108.13	4.257	102.11	4.020	107.95	4.250	87.50	3.445	77.50	3.051	18.00	0.709	5.00	0.197
-	-	-	90	3.543	0900	109.82	4.324	103.78	4.086	110.50	4.350	92.00	3.622	82.00	3.228	18.00	0.709	5.00	0.197
-	-	-	95	3.740	0950	114.30	4.500	108.46	4.270	115.50	4.547	92.00	3.622	82.00	3.228	18.00	0.709	5.00	0.197
-	-	-	100	3.937	1000	119.33	4.698	113.31	4.461	120.00	4.724	92.00	3.622	82.00	3.228	18.00	0.709	5.00	0.197
4.000	101.60	1016	-	-	-	124.00	4.882	117.98	4.645	124.50	4.902	98.50	3.878	88.50	3.484	18.00	0.709	5.00	0.197
4.125	104.70	1047	105	4.134	1050	127.00	5.000	121.16	4.770	128.00	5.039	98.50	3.878	88.50	3.484	18.00	0.709	5.00	0.197
-	-	-	110	4.331	1100	131.77	5.188	126.01	4.961	133.00	5.236	98.50	3.878	88.50	3.484	18.00	0.709	5.00	0.197
4.500	114.30	1143	115	4.528	1150	136.52	5.375	130.68	5.145	137.50	5.413	98.50	3.878	88.50	3.484	18.00	0.709	5.00	0.197
-	-	-	120	4.724	1200	142.87	5.625	137.03	5.395	144.00	5.669	105.00	4.134	95.00	3.740	18.00	0.709	5.00	0.197

Suggested Operating Limits

PRESSURE 170psi SPEED 20m/s

TEMPERATURE -50 +180°C

Dependent upon shaft diameter and speed + Temperature and media to be sealed

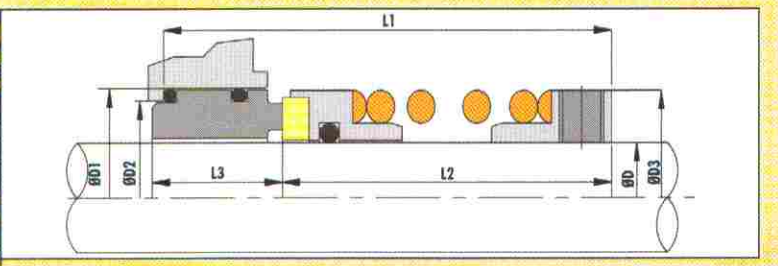
STANDARD STOCK FACE MATERIALS

Rotary Face: Silicon Carbide, Tungsten Carbide, Ceramic, Stainless Steel, Chrome Oxide coated Stainless Steel.

Stat Ring: Carbon, Silicon Carbide, Tungsten Carbide.

OTHER FACE MATERIALS TO ORDER

TYPE 98



Robust ,'O'-Ring mounted, unbalanced, metric shaft, parallel spring seal, as per Type 97, but with the addition of a double 'O'-Ring mounted Stationary Seat.
Most commonly found in marine and textile dyeing applications.

VULCAN STANDARD SIZES

Metric Shaft Size D	Size Code	D1	D2	D3	L1	L2	L3
20	0200	37.00	31.00	34.50	61.00	38.00	24.00
22	0220	39.00	33.00	34.93	61.00	38.00	24.00
25	0250	40.00	34.00	38.10	61.00	38.00	24.00
28	0280	44.00	38.00	42.00	63.00	40.00	24.00
30	0300	47.00	41.00	43.50	64.00	40.00	26.00
32	0320	48.00	42.00	47.00	64.00	40.00	26.00
35	0350	51.00	45.00	50.00	64.00	40.00	26.00
38	0380	54.00	48.00	53.00	69.00	45.00	26.00
40	0400	57.00	51.00	55.00	69.00	45.00	26.00
42	0420	60.50	54.50	55.50	74.00	50.00	26.00
45	0450	61.00	55.00	60.00	74.00	50.00	26.00
48	0480	64.00	58.00	62.00	79.00	55.00	26.00
50	0500	67.00	61.00	66.00	79.00	55.00	26.00
52	0520	70.00	64.00	68.00	82.00	58.00	26.00
55	0550	73.00	67.00	71.00	82.00	58.00	26.00
58	0580	76.00	70.00	74.00	82.00	58.00	26.00
60	0600	80.00	74.00	77.00	86.00	60.00	28.00
62	0620	83.00	77.00	78.00	86.00	60.00	28.00
65	0650	86.00	80.00	82.00	88.00	62.00	28.00
68	0680	89.00	83.00	84.00	88.00	62.00	28.00
70	0700	89.00	83.00	87.00	91.00	65.00	28.00
75	0750	95.00	89.00	91.50	91.00	65.00	28.00
80	0800	99.00	93.00	99.50	96.00	70.00	28.00
85	0850	105.00	99.00	105.50	96.00	70.00	28.00
90	0900	111.00	105.00	110.50	96.00	70.00	28.00
95	0950	114.00	108.00	115.50	101.00	75.00	28.00
100	1000	118.00	112.00	120.00	101.00	75.00	28.00
105	1050	132.00	126.00	128.00	103.00	75.00	30.00
110	1100	137.00	131.00	133.00	108.00	80.00	30.00
115	1150	140.00	134.00	137.50	108.00	80.00	30.00
120	1200	147.00	141.00	144.00	113.00	85.00	30.00
130	1300	156.00	150.00	154.00	113.00	85.00	30.00

Suggested Operating Limits

PRESSURE 170psi SPEED 20m/s
TEMPERATURE -50 +180°C
Dependent upon shaft diameter and speed + Temperature and media to be sealed

STANDARD STOCK FACE-MATERIALS
Rotary Face: Silicon Carbide, Tungsten Carbide, Ceramic, Stainless Steel, Chrome Oxide coated Stainless Steel.
Stat Ring: Carbon, Silicon Carbide, Tungsten Carbide.
OTHER FACE MATERIALS TO ORDER

Vulcan P.T.F.E. Wedge Type Seals

Section 8

Introduction

Vulcan's extensive 16XX range of Multi-Sprung Seals are commonly specified for arduous applications, such as corrosive process fluids or demanding operating parameters.

The standard designs are available with a chemically resistant PTFE wedge component, which is spring loaded to force the flexible angular lip of the wedge into tight contact with the shaft. The same spring force impacts a sufficient load to the rotary face to create a suitable seal interface with a varied choice of standard stationary seats, most commonly our Type 25 V Seat.

Balanced face designs are also available for higher duty applications. 'O'-Ring variants, of both balanced and non-balanced Types, are available as standard.

All the seal faces and wedges interchange with most common competitor designs by fitting into their retainers.

Applications

The 16XX family range are ideally suited for corrosive duties and are commonly utilised in the chemical industry, due to the inertness and sealing nature of the wedge design.

These seals are also very suitable for a wide spectrum of application conditions. Their operating suitability range is enhanced by the 'O'-Ring alternative design and the wide range of available elastomers.

Standard Vulcan 16XX Types

1609 Series

Standard multi-sprung, grub screwed seal, available in a wide variety of face and secondary seal, materials and designs.

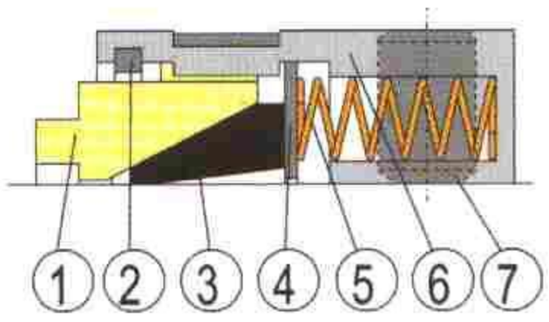
1659 Series

As above, but compact design complies to DIN 24960 (EN12756) and ISO 3069 standards.

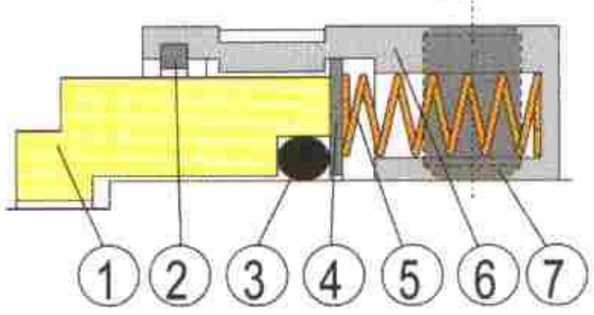
1645 Series

Thin profiled, multi-sprung, grub screwed seal, conforming to ANSI B73 for American standard equipment.

STANDARD COMPONENTS



Standard Wedge Type



Balanced O-ring Type

No	Description		
1	Face	4	Plate
2	Circlip	5	Coils
3	Wedge/O-ring	6	Retainer
		7	Grub Screws

Vulcan Design Advantages

Range

A comprehensive range of these common chemical industry seals are available, from Vulcan, as standard.

Materials

Grade M825 Triple Phenolic Resin Impregnated Carbon has been adopted by Vulcan, as our standard for the 16XX range, in order to offer direct face material equivalence, as well as the ability to swap faces into our most common competitors seals.

316 stainless steel is standard throughout all metal components in the 16XX seal ranges, improving chemical resistance capabilities. Please refer to our data-sheets for all materials alternatives, such as; Hastelloy® Metal parts, Glass Filled P.T.F.E. Wedges or faces and 'O'-Ring material options.

Improved Design

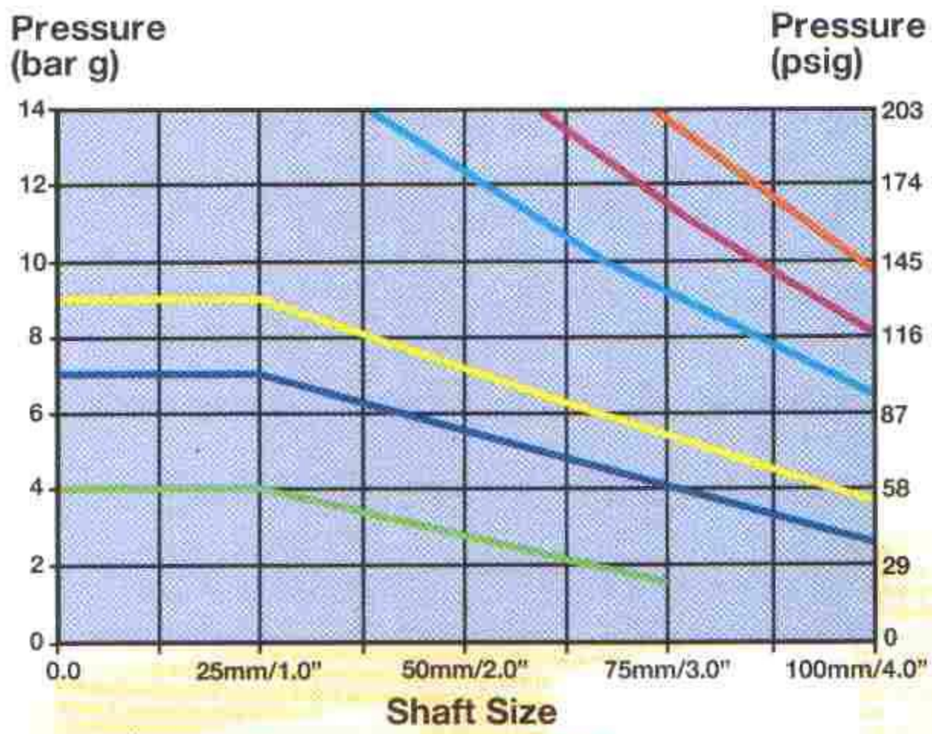
The Vulcan 16XX range are superior performance seals, specifically designed to incorporate a number of improvements, compared to the original seal design and other direct copies.

- No awkward setting pieces - The 16XX designs have eliminated the setting clips, making the seals easier and more reliable to fit.
- Improved face loading values - Vulcan's 16XX proven face loading designs are superior to competitor designs with higher loading values, which are detrimental to seal performance and life.

Reliability

These are proven, very effective designs, highly utilised in many applications. They give extremely reliable performance based upon Vulcan's design improvements and the quality materials utilised.

VULCAN PTFE WEDGE TYPE SEALS PV CHART

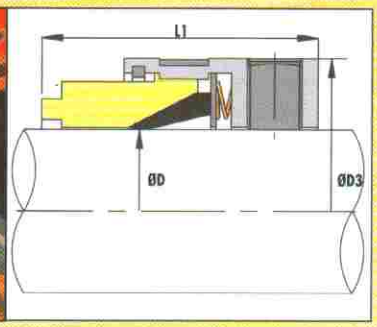


Notes:
1. Type 1609B/1609BS/1659B 1659BS/1645B/1645BS multiply by factor 1.4

For information on how to utilise this pV chart please refer to the technical section.

Seal Type	Metric Sizes	Imperial Sizes	DIN/ISO Standard	ANSI Standard	Balanced	Wedge Type	O-Ring	Crane @ Equivalent Type No.
1609	✓	✓	-	-	-	✓	-	109/9/909
1609B		✓	-	-	✓	✓	-	109B/9B
1609S	✓	✓	-	-	-	-	✓	8-1/8
1609BS		✓	-	-	✓	-	✓	8B1/8B
1659	✓	-	✓	-	-	✓	-	59U
1659B	✓	-	✓	-	✓	✓	-	59B
1659S	✓	-	✓	-	-	-	✓	58U
1659BS	✓	-	✓	-	✓	-	✓	58B
1645	-	✓	-	✓	-	✓	-	9T
1645B	-	✓	-	✓	✓	✓	-	9BT
1645S	-	✓	-	✓	-	-	✓	8-1T
1645BS	-	✓	-	✓	✓	-	✓	8B1T

TYPE 1609/1609S



Multiple Spring seal with a highly effective design, commonly used in chemical and petro-chemical duties. These seals are frequently fitted with the Type 25 seat.
Standard Type 1609 incorporates a PTFE Wedge secondary seal, with the alternative 'O'-Ring Type as 1609S.

VULCAN STANDARD SIZES

Shaft Size DØ Inch	Shaft Size DØ Metric	Code Size	Shaft Size DØ Metric	Shaft Size DØ Inch	Code Size	D1 Metric	D1 Inch	L1 Metric	L1 Inch
0.625	15.88	0158	-	-	-	30.70	1.209	19.00	0.748
0.750	19.05	0191	-	-	-	34.70	1.366	22.20	0.874
-	-	-	20	0.787	0200	35.70	1.406	24.00	0.945
-	-	-	22	0.866	0220	37.00	1.457	24.00	0.945
0.875	22.23	0222	-	-	-	38.00	1.496	23.80	0.937
-	-	-	24	0.945	0240	39.50	1.555	25.00	0.984
-	-	-	25	0.984	0250	40.50	1.594	25.00	0.984
1.000	25.40	0254	-	-	-	40.50	1.594	25.40	1.000
-	-	-	28	1.102	0280	44.00	1.732	27.00	1.063
1.125	28.58	0286	-	-	-	43.50	1.713	27.00	1.063
-	-	-	30	1.181	0300	47.00	1.850	27.00	1.063
1.250	31.75	0317	-	-	-	48.30	1.902	27.00	1.063
-	-	-	32	1.260	0320	50.20	1.976	29.00	1.142
1.375	34.93	0349	-	-	-	52.00	2.047	28.60	1.126
-	-	-	35	1.378	0350	52.00	2.047	29.00	1.142
-	-	-	38	1.496	0380	55.60	2.189	29.00	1.142
1.500	38.10	0381	-	-	-	55.60	2.189	28.60	1.126
-	-	-	40	1.575	0400	59.70	2.350	35.00	1.378
1.625	41.28	0412	-	-	-	61.00	2.402	35.00	1.378
1.750	44.45	0444	-	-	-	64.30	2.531	35.00	1.378
-	-	-	45	1.772	0450	64.90	2.555	35.00	1.378
1.875	47.63	0476	-	-	-	65.10	2.563	35.00	1.378
-	-	-	48	1.890	0480	65.10	2.563	35.00	1.378
-	-	-	50	1.969	0500	69.70	2.744	35.00	1.378
2.000	50.80	0508	-	-	-	70.70	2.783	35.00	1.378
2.125	53.98	0539	-	-	-	77.00	3.031	43.00	1.693

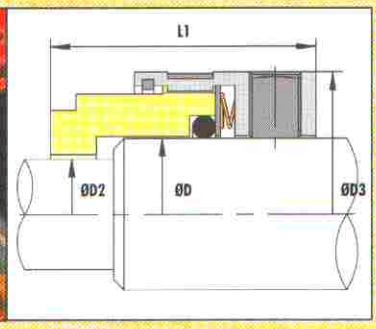
Shaft Size DØ Inch	Shaft Size DØ Metric	Code Size	Shaft Size DØ Metric	Shaft Size DØ Inch	Code Size	D1 Metric	D1 Inch	L1 Metric	L1 Inch
-	-	-	55	2.165	0550	78.00	3.071	43.00	1.693
2.250	57.10	0571	-	-	-	79.90	3.146	43.00	1.693
2.375	60.30	0603	60	2.362	0600	83.10	3.272	43.00	1.693
2.500	63.50	0635	-	-	-	86.60	3.409	43.00	1.693
-	-	-	65	2.559	0650	88.20	3.472	43.00	1.693
2.625	66.60	0666	-	-	-	89.60	3.528	43.00	1.693
2.750	69.80	0698	-	-	-	92.80	3.654	43.00	1.693
-	-	-	70	2.756	0700	92.80	3.654	43.00	1.693
2.875	73.00	0730	73	2.874	0730	95.50	3.760	43.00	1.693
-	-	-	75	2.953	0750	96.20	3.787	43.00	1.693
3.000	76.20	0762	-	-	-	97.70	3.846	43.00	1.693
3.125	79.40	0794	-	-	-	100.50	3.957	43.00	1.693
-	-	-	80	3.150	0800	101.00	3.976	43.00	1.693
3.250	82.50	0825	-	-	-	105.30	4.146	43.00	1.693
-	-	-	85	3.346	0850	107.50	4.232	43.00	1.693
3.375	85.70	0857	-	-	-	108.30	4.264	43.00	1.693
3.500	88.90	0889	-	-	-	111.50	4.390	43.00	1.693
-	90.00	0900	90	3.543	0900	112.50	4.429	43.00	1.693
3.625	92.10	0921	-	-	-	114.90	4.524	43.00	1.693
-	-	-	95	3.740	0950	117.50	4.626	43.00	1.693
3.750	95.30	0953	-	-	-	118.00	4.646	43.00	1.693
3.875	98.40	0984	-	-	-	121.20	4.772	43.00	1.693
-	-	-	100	3.937	1000	122.50	4.823	43.00	1.693
4.000	101.60	1016	-	-	-	124.60	4.906	43.00	1.693
5.000	127.00	1270	-	-	-	159.00	6.260	51.00	2.008
5.500	139.70	1397	-	-	-	172.00	6.772	51.00	2.008

STANDARD STOCK FACE MATERIALS
Rotary Face: Carbon.
OTHER FACE MATERIALS TO ORDER

Suggested Operating Limits

PRESSURE 240psi SPEED 25m/s
TEMPERATURE -100 +200°C
Dependent upon shaft diameter and speed + Temperature and media to be sealed

TYPE 1609B/1609BS



Multiple Spring, stepped shaft, balanced seal, alternative to the Type 1609/1609S. Standard Type 1609B utilises a PTFE wedge shaft seal, or specify Type 1609BS for the 'O'-Ring version. Commonly fitted with the next shaft size down Type 25 seat.

VULCAN STANDARD SIZES

Shaft Size DØ		Code	D2		D3		L1	
Inch	Metric	Size	Metric	Inch	Metric	Inch	Metric	Inch
0.625	15.88	0158	12.70	0.500	30.70	1.209	27.00	1.063
0.750	19.05	0191	15.80	0.622	34.70	1.366	30.00	1.181
0.875	22.23	0222	19.10	0.752	38.00	1.496	32.00	1.260
1.000	25.40	0254	22.20	0.874	40.50	1.594	33.00	1.299
1.125	28.58	0286	25.40	1.000	43.50	1.713	35.00	1.378
1.250	31.75	0317	28.60	1.126	48.30	1.902	35.00	1.378
1.375	34.93	0349	28.60	1.126	52.00	2.047	37.00	1.457
1.500	38.10	0381	31.80	1.252	55.60	2.189	37.00	1.457
1.625	41.28	0412	34.90	1.374	61.00	2.402	45.00	1.772
1.750	44.45	0444	38.10	1.500	64.30	2.531	45.00	1.772
1.875	47.63	0476	41.30	1.626	65.10	2.563	45.00	1.772
2.000	50.80	0508	44.50	1.752	70.70	2.783	45.00	1.772
2.125	53.98	0539	47.60	1.874	77.00	3.031	52.00	2.047
2.250	57.15	0571	50.80	2.000	79.90	3.146	52.00	2.047
2.375	60.33	0603	54.00	2.126	83.10	3.272	52.00	2.047
2.500	63.50	0635	57.20	2.252	86.60	3.409	52.00	2.047
2.625	66.68	0666	60.30	2.374	89.60	3.528	52.00	2.047
2.750	69.85	0698	63.50	2.500	92.80	3.654	52.00	2.047
2.875	73.03	0730	66.70	2.626	95.50	3.760	52.00	2.047
3.000	76.20	0762	69.90	2.752	97.70	3.846	52.00	2.047
3.125	79.38	0794	73.00	2.874	100.50	3.957	52.00	2.047
3.250	82.55	0825	76.20	3.000	105.30	4.146	52.00	2.047
3.375	85.73	0857	79.40	3.126	108.30	4.264	52.00	2.047
3.500	88.90	0889	82.60	3.252	111.50	4.390	52.00	2.047
3.625	92.08	0921	85.70	3.374	114.90	4.524	52.00	2.047
3.750	95.25	0953	88.90	3.500	118.00	4.646	52.00	2.047
3.875	98.43	0984	92.10	3.626	121.20	4.772	52.00	2.047
4.000	101.60	1016	95.30	3.752	124.60	4.906	52.00	2.047

Suggested Operating Limits

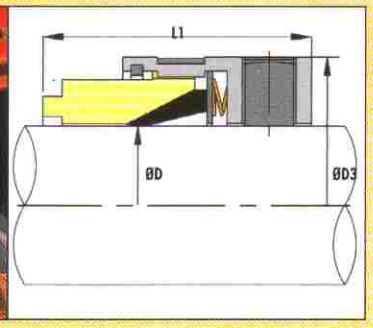
PRESSURE 320psi SPEED 25m/s

TEMPERATURE -100 +200°C

Dependent upon shaft diameter and speed + Temperature and media to be sealed

STANDARD STOCK FACE MATERIALS
Rotary Face: Carbon.
OTHER FACE MATERIALS TO ORDER

TYPE 1645/1645S



Narrow profile, multiple-spring seal, designed for common American installation dimensions, in chemical process industry equipment. Complies with ANSI B73-1974 centrifugal pump standard. Standard Type 1645 utilises a PTFE Wedge secondary seal and Type 1645S uses an 'O'-Ring. Commonly fitted with Vulcan Type 25 seat.

VULCAN STANDARD SIZES

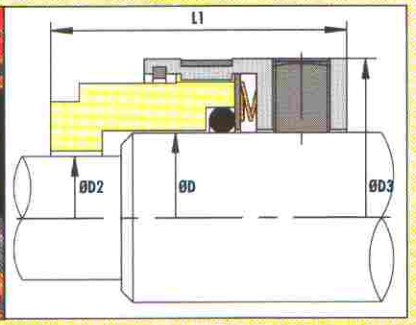
Shaft Size DØ		Code	D3		L1	
Inch	Metric	Size	Metric	Inch	Metric	Inch
0.500	12.70	0127	23.80	0.937	23.80	0.937
0.625	15.88	0158	27.00	1.063	23.80	0.937
0.750	19.05	0191	30.20	1.189	23.80	0.937
0.875	22.23	0222	33.40	1.315	23.80	0.937
1.000	25.40	0254	36.50	1.437	25.40	1.000
1.125	28.58	0286	39.70	1.563	25.40	1.000
1.250	31.75	0317	42.90	1.689	25.40	1.000
1.375	34.93	0349	49.30	1.941	34.90	1.374
1.437	36.50	0365	49.30	1.941	28.60	1.126
1.500	38.10	0381	49.30	1.941	28.60	1.126
1.625	41.28	0412	57.20	2.252	29.40	1.157
1.750	44.45	0444	58.80	2.315	34.90	1.374
1.875	47.63	0476	63.50	2.500	34.90	1.374
2.000	50.80	0508	66.70	2.626	34.90	1.374
2.125	53.98	0539	71.50	2.815	42.80	1.685
2.250	57.15	0571	72.30	2.846	34.90	1.374
2.375	60.33	0603	76.20	3.000	42.80	1.685
2.500	63.50	0635	79.40	3.126	34.90	1.374
2.625	66.68	0666	82.60	3.252	42.80	1.685
2.750	69.85	0698	85.70	3.374	42.80	1.685
2.875	73.03	0730	88.90	3.500	42.80	1.685
3.000	76.20	0762	92.10	3.626	42.80	1.685
3.125	79.38	0794	95.30	3.752	42.80	1.685
3.250	82.55	0826	98.40	3.874	42.80	1.685
3.375	85.73	0857	101.60	4.000	42.80	1.685
3.500	88.90	0889	104.80	4.126	42.80	1.685
3.625	92.08	0921	108.00	4.252	42.80	1.685
3.750	95.25	0953	111.10	4.374	42.80	1.685
3.875	98.43	0984	114.30	4.500	42.80	1.685
4.000	101.60	1016	117.50	4.626	42.80	1.685

STANDARD STOCK FACE MATERIALS
Rotary Face: Carbon.
OTHER FACE MATERIALS TO ORDER

Suggested Operating Limits

PRESSURE 240psi SPEED 25m/s
TEMPERATURE -100 +200°C
Dependent upon shaft diameter and speed + Temperature and media to be sealed

TYPE 1645B/1645BS



Multiple-Spring, stepped shaft, balanced seal to common American Installation dimensions.
Standard Type 1645B incorporates a PTFE Wedge secondary seal with Type 1645BS being the 'O'-Ring variant. Commonly fitted with the next shaft size down Type 25 seat.

VULCAN STANDARD SIZES

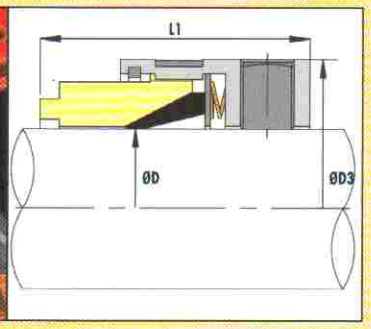
Shaft Size DØ		Code	D2		D3		L1	
Inch	Metric	Size	Metric	Inch	Metric	Inch	Metric	Inch
0.750	19.05	0191	15.80	0.622	30.20	1.189	31.70	1.248
0.875	22.23	0222	19.10	0.752	33.40	1.315	31.70	1.248
1.000	25.40	0254	22.20	0.874	37.50	1.476	33.30	1.311
1.125	28.58	0286	25.40	1.000	40.70	1.602	34.90	1.374
1.250	31.75	0317	28.60	1.126	43.90	1.728	34.90	1.374
1.375	34.93	0349	28.60	1.126	49.30	1.941	42.80	1.685
1.500	38.10	0381	31.70	1.248	49.30	1.941	36.40	1.433
1.625	41.28	0412	34.90	1.374	57.20	2.252	40.40	1.591
1.750	44.45	0444	38.10	1.500	58.80	2.315	44.40	1.748
1.875	47.63	0476	41.20	1.622	63.50	2.500	44.40	1.748
2.000	50.80	0508	44.40	1.748	66.70	2.626	44.40	1.748
2.125	53.98	0539	47.60	1.874	71.50	2.815	52.30	2.059
2.250	57.15	0571	50.80	2.000	72.30	2.846	44.40	1.748
2.375	60.33	0603	53.90	2.122	76.20	3.000	52.30	2.059
2.500	63.50	0635	57.10	2.248	79.40	3.126	44.40	1.748
2.625	66.68	0666	60.30	2.374	82.60	3.252	52.30	2.059
2.750	69.85	0698	63.50	2.500	85.70	3.374	52.30	2.059
2.875	73.03	0730	66.60	2.622	88.90	3.500	52.30	2.059
3.000	76.20	0762	69.80	2.748	92.10	3.626	52.30	2.059
3.125	79.38	0794	73.00	2.874	95.30	3.752	52.30	2.059
3.250	82.55	0826	76.20	3.000	98.40	3.874	52.30	2.059
3.375	85.73	0857	79.30	3.122	101.60	4.000	52.30	2.059
3.500	88.90	0889	82.50	3.248	104.80	4.126	52.30	2.059
3.625	92.08	0921	85.70	3.374	108.00	4.252	52.30	2.059
3.750	95.25	0953	88.90	3.500	111.10	4.374	52.30	2.059
3.875	98.43	0984	92.00	3.622	114.30	4.500	52.30	2.059
4.000	101.60	1016	95.20	3.748	117.50	4.626	52.30	2.059

Suggested Operating Limits

PRESSURE 320psi SPEED 25m/s
TEMPERATURE -100 +200°C
Dependent upon shaft diameter and speed + Temperature and media to be sealed

STANDARD STOCK FACE MATERIALS
Rotary Face: Carbon.
OTHER FACE MATERIALS TO ORDER

TYPE 1659/1659S



Narrow profile, multiple spring seal with a highly efficient design, frequently specified in chemical process industry pumps.
Use Type 1659 with a PTFE Wedge or Type 1659S for 'O'-Ring variant.
Commonly fitted with Vulcan Type 24 DIN Long or Type 24 DIN Short Stats.

VULCAN STANDARD SIZES

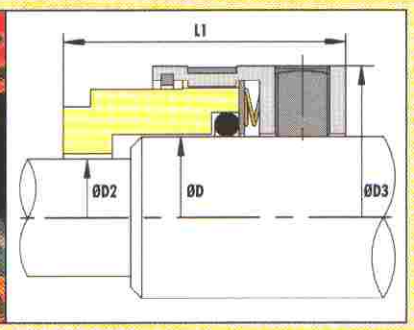
Metric Shaft Size D	Size Code	D3	L1
16	0160	26.00	23.00
18	0180	32.20	24.00
20	0200	34.20	24.00
22	0220	36.50	24.00
24	0240	38.60	26.70
25	0250	40.00	27.00
28	0280	43.00	30.00
30	0300	45.00	30.50
32	0320	47.10	30.50
33	0330	48.20	30.50
35	0350	50.00	30.50
38	0380	54.00	32.00
40	0400	56.00	32.00
43	0430	59.00	32.00
45	0450	61.00	32.00
48	0480	64.00	32.00
50	0500	66.30	34.00
53	0530	68.70	34.00
55	0550	70.80	34.00
58	0580	78.00	39.00
60	0600	79.80	39.00
63	0630	82.80	39.00
65	0650	85.50	39.00
68	0680	87.80	39.00
70	0700	90.00	45.50
75	0750	95.20	45.50
80	0800	103.80	45.00
85	0850	109.10	45.00
90	0900	113.80	50.00
95	0950	118.50	50.00
100	1000	123.50	50.00

STANDARD STOCK FACE MATERIALS
Rotary Face: Carbon.
OTHER FACE MATERIALS TO ORDER

Suggested Operating Limits

PRESSURE 240psi SPEED 25m/s
TEMPERATURE -100 +200°C
Dependent upon shaft diameter and speed + Temperature and media to be sealed

TYPE 1659B/1659BS



Multiple-Spring, stepped shaft, balanced seal. Standard Type 1659B incorporates a PTFE Wedge shaft seal, or specify Type 1659BS for the 'O'-Ring version.
Commonly supplied with a suitable smaller shaft size Type 24 DIN Long or Type 24 DIN Short Seat.

VULCAN STANDARD SIZES

Metric Shaft Size D	Size Code	D2	D3	L1
18	0180	14.00	32.20	30.50
20	0200	16.00	34.20	30.50
22	0220	18.00	36.50	31.50
24	0240	20.00	38.60	31.50
28	0280	24.00	43.00	34.20
30	0300	25.00	45.00	34.50
33	0330	28.00	48.20	37.50
35	0350	30.00	50.00	38.00
38	0380	33.00	54.00	38.00
40	0400	35.00	56.00	38.00
43	0430	38.00	59.00	39.50
45	0450	40.00	61.00	39.50
48	0480	43.00	64.00	39.50
50	0500	45.00	66.30	39.50
53	0530	48.00	68.70	39.50
55	0550	50.00	70.80	44.00
58	0580	53.00	78.00	44.00
60	0600	55.00	79.80	44.00
63	0630	58.00	82.80	49.00
65	0650	60.00	85.50	49.00
68	0680	63.00	87.80	49.00
70	0700	65.00	90.00	49.00
75	0750	70.00	95.50	55.50
80	0800	75.00	103.80	55.50
85	0850	80.00	109.10	55.00
90	0900	85.00	113.80	60.00
95	0950	90.00	118.50	60.00
100	1000	95.00	123.50	60.00

Suggested Operating Limits

PRESSURE 320psi SPEED 25m/s
TEMPERATURE -100 +200°C
Dependent upon shaft diameter and speed + Temperature and media to be sealed

STANDARD STOCK FACE MATERIALS
Rotary Face: Carbon.
OTHER FACE MATERIALS TO ORDER

Vulcan Wave Spring Type Seals

Introduction

The Vulcan Wave Spring Range of Bi-Directional mechanical seals offer proven design and wave spring technology, in a multitude of material combinations, with superior designs but at very competitive pricing.

Applications

The 1688 and 1682 ranges were specifically designed for rotary lobe pumps, whose principle application is normally for liquids of high viscosity. These are commonly found in the food, dairy, brewery and pharmaceutical industries. Their compact design makes these seals an excellent choice for confined stuffing boxes areas or even external mounted applications

The 1677 Seal Type is designed as a high quality, general purpose seal, suitable for many sealing application requirements, including chemical duties.

Standard Vulcan Wave Spring Types

Types 1688

The robust wave spring seal is ideally suited for standard, rotary lobe pump, stuffing boxes, of compact design. The seal is positively driven by grub screws and supplied from Vulcan with monolithic hard face materials as our standard.

Type 1688L

As above but supplied with a Type 24 DINL pinned stat, to suit DIN standard housing dimensions.

Type 1682

A wave spring seal to suit standard rotary lobe pumps. The Type 1682 is similar in design to the Type 1688 but is driven directly from the grub screws.

Type 1677

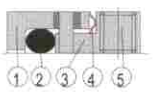
The Type 1677 is a positively, bi-direction driven wave spring seal, utilising crest to crest wave spring technology, offering excellent axial movement capabilities. The seal is radially compacted and designed to suit DIN 24960 (EN12756).

The design of this seal head, enables easy replacement of a wide range of high quality materials and elastomers, supplied as standard.

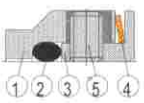
Type 1678

Designed as per the Type 1677 but with a stepped face, to provide a balanced seal for stepped shafts.

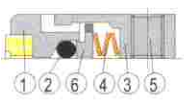
STANDARD COMPONENTS



Type 1688 series



Type 1682



Type 1677

No	Description	No	Description
1	Face	4	Wave Spring
2	O-Ring	5	Grub Screw
3	Sleeve/Retainer	6	Backing Plate

Vulcan Design Advantages

Type 168X Superior Design

Types 1688, 1688L and 1682 are supplied with monolithic rotary heads, in both standard and hard face alternatives, to improve the seal operating performance in viscous fluids. This is achieved by eliminating the possibility of spinning and damage common to inserted face designs. Competitors inserted T.C/Sic seal face rings are prone to spinning, particularly in the viscous or coagulating fluids, which are common to rotary lobe pump applications.

Common, popular sizes of Type 168x seals are fitted with our special, split Sinusoidal Wave-Springs. These split wave-springs offer a more consistent and accurate spring rate than traditional wave-springs.

The Sinusoidal waves offer a larger and more even contact and the split over-lap minimises the working stresses which frequently result in fracture, buckling or hang-up with a stamped, non-split, wave-spring.

Type 167X Superior Design

These seals utilise a double wave-spring . If the seal manufacturer's design solution is to use two wave-springs welded together, then this creates a weak spot, prone to both mechanical failure and corrosive attack.

Vulcan Type 167X seals incorporate a one-piece designed, crest to crest wave spring, removing the possibility of corrosion to weld spots.
This removes the most common seal failure mode on such seals.

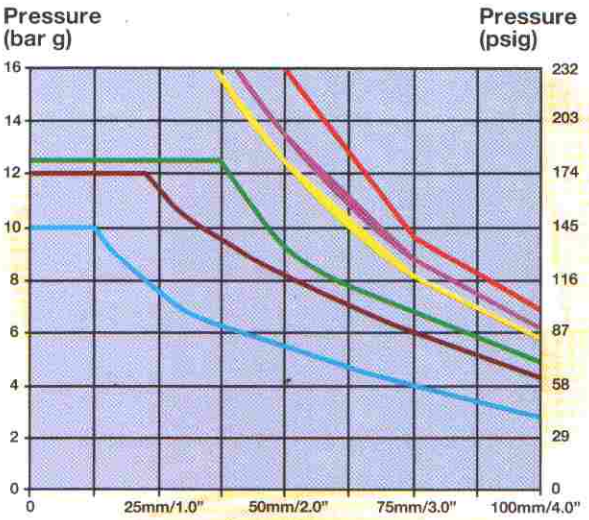
The seals contain an energised rotary 'O'-Ring, reducing shaft fretting and ensuring positive shaft sealing. Our design has a chamfer at the front wall of the 'O'-Ring groove and a dynamic ring backing plate constantly energising and pressing the 'O'-Ring forward and down onto the shaft. This overcomes 'O'-Ring hang-up on the shaft, the second common ultimate seal failure mode found on other manufacturer's designs.

Compact Seal

The uniform wave spring forces, provide excellent axial movement capabilities, compared to conventional mechanical seals.

Use of a wave-spring allows the seal design to be very compact, giving an assured seal for short, confined glands.

VULCAN WAVE SPRING TYPE SEALS PV CHART

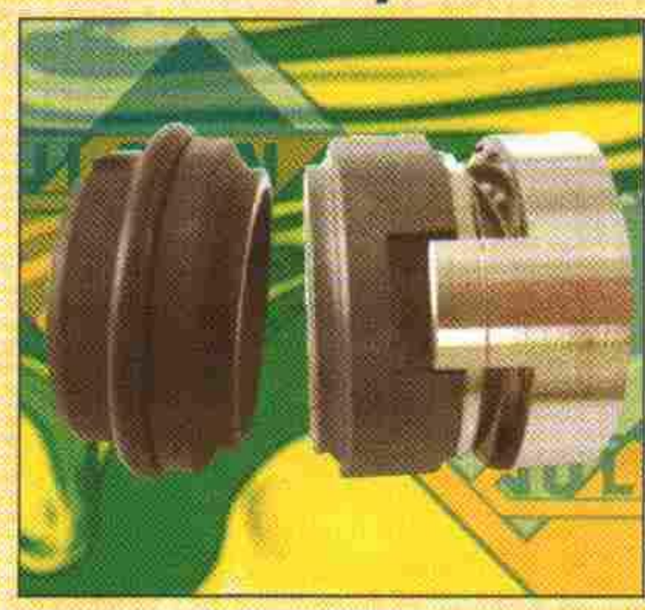


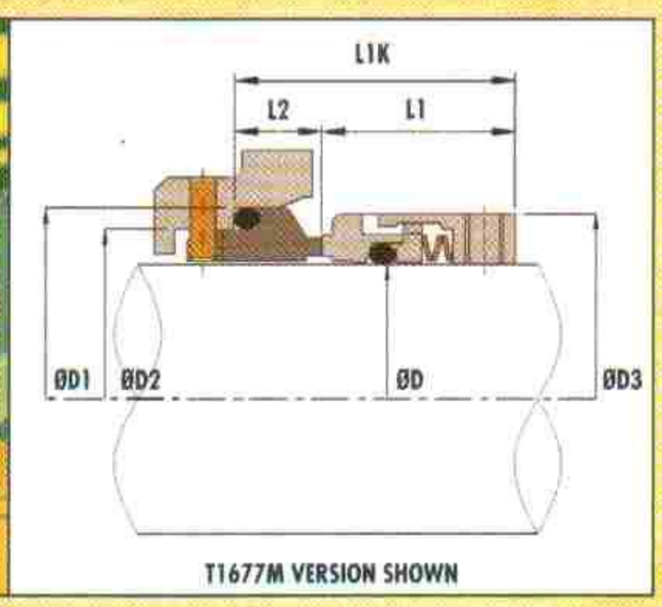
- Carbon/TC
- SC/SC
- TC/TC
- Carbon/SS
- Type 1677-Carbon/SIC
- Type 1677-SIC/SIC

Notes:
1. Type 1678 multiply 1677 charts by factor 1.2.
2. Do not use Type 1688 series seals above 12 bar.

For information on how to utilise this pV chart please refer to the technical section.

TYPE 1677/1677M





Note: As standard Vulcan stocks this seal as the type 1677M. If inserted face are required, please ask for Type 1677 Specifically.

Wave-spring ,'O'-Ring mounted seal commonly utilised in the European chemical process industries. Manufactured to suit DIN 24960 (EN12756) dimensions. Supplied as Type 1677 with an inserted face or increasingly as Type 1677M, with a Monolithic face design for exceptional performance. Type 8 Din Long Seat shown is standard, with other variants available.

VULCAN STANDARD SIZES

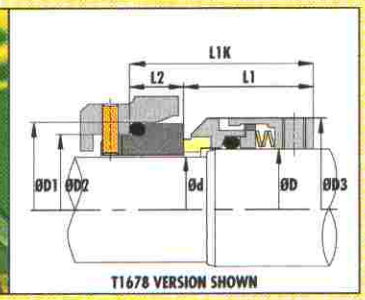
Metric Shaft Size D	Size Code	D1	D2	D3	L1	L2	L1K
14	0140	25.00	21.00	24.00	25.00	10.00	35.00
16	0160	27.00	23.00	26.00	25.00	10.00	35.00
18	0180	33.00	27.00	32.00	26.00	11.50	37.50
20	0200	35.00	29.00	34.00	26.00	11.50	37.50
22	0220	37.00	31.00	36.00	26.00	11.50	37.50
24	0240	39.00	33.00	38.00	28.50	11.50	40.00
25	0250	40.00	34.00	39.00	28.50	11.50	40.00
28	0280	43.00	37.00	42.00	31.00	11.50	42.50
30	0300	45.00	39.00	44.00	31.00	11.50	42.50
32	0320	48.00	42.00	46.00	31.00	11.50	42.50
33	0330	48.00	42.00	47.00	31.00	11.50	42.50
35	0350	50.00	44.00	49.00	31.00	11.50	42.50
38	0380	56.00	49.00	54.00	31.00	14.00	45.00
40	0400	58.00	51.00	56.00	31.00	14.00	45.00
43	0430	61.00	54.00	59.00	31.00	14.00	45.00
45	0450	63.00	56.00	61.00	31.00	14.00	45.00
48	0480	66.00	59.00	64.00	31.00	14.00	45.00
50	0500	70.00	62.00	66.00	32.50	15.00	47.50
53	0530	73.00	65.00	69.00	32.50	15.00	47.50
55	0550	75.00	67.00	71.00	32.50	15.00	47.50
58	0580	78.00	70.00	78.00	37.50	15.00	52.50
60	0600	80.00	72.00	80.00	37.50	15.00	52.50
63	0630	83.00	75.00	83.00	37.50	15.00	52.50
65	0650	85.00	77.00	85.00	37.50	15.00	52.50
68	0680	90.00	81.00	88.00	34.50	18.00	52.50
70	0700	92.00	83.00	90.00	42.00	18.00	60.00
75	0750	97.00	88.00	99.00	42.00	18.00	60.00
80	0800	105.00	95.00	104.00	41.80	18.20	60.00
85	0850	110.00	100.00	109.00	41.80	18.20	60.00
90	0900	115.00	105.00	114.00	46.80	18.20	65.00
95	0950	120.00	110.00	119.00	47.80	17.20	65.00
100	1000	125.00	115.00	124.00	47.80	17.20	65.00

STANDARD STOCK FACE MATERIALS
Rotary Face: Sintered Silicon Carbide.
Stat Ring: Sintered Silicon Carbide, Carbon.
OTHER FACE MATERIALS TO ORDER

Suggested Operating Limits

PRESSURE 250psi SPEED 15m/s
TEMPERATURE -40 +200°C
Dependent upon shaft diameter and speed + Temperature and media to be sealed

TYPE 1678/1678M



T1678 VERSION SHOWN

Stepped shaft balanced seal, otherwise similar to our Types 1677M/1677. All our 1677/8 versions are energised by a special continuous wave spring with no weld spots. Supplied as Monolithic version 1678M, as standard. The inserted version is also available to production order.

VULCAN STANDARD SIZES

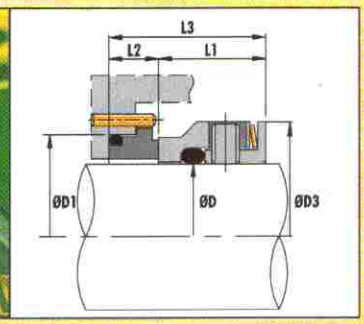
Metric Shaft Size D	Size Code	Stat Size d	D1	D2	D3	L1	L2	L1K
18	0180	14	25.0	21.0	32.0	32.5	10.0	42.5
20	0200	16	27.0	23.0	34.0	32.5	10.0	42.5
22	0220	18	33.0	27.0	36.0	33.5	11.5	45.0
24	0240	20	35.0	29.0	38.0	33.5	11.5	45.0
28	0280	24	39.0	33.0	42.0	36.0	11.5	47.5
30	0300	25	40.0	34.0	44.0	36.0	11.5	47.5
33	0330	28	43.0	37.0	47.0	38.5	11.5	50.0
35	0350	30	45.0	39.0	49.0	38.5	11.5	50.0
38	0380	33	48.0	42.0	54.0	38.5	11.5	50.0
40	0400	35	50.0	44.0	56.0	38.5	11.5	50.0
43	0430	38	56.0	49.0	59.0	38.5	14.0	52.5
45	0450	40	58.0	51.0	61.0	38.5	14.0	52.5
50	0500	45	63.0	56.0	66.0	38.5	14.0	52.5
53	0530	48	66.0	59.0	69.0	38.5	14.0	52.5
55	0550	50	70.0	62.0	71.0	42.5	15.0	57.5
60	0600	55	75.0	67.0	80.0	42.5	15.0	57.5

Suggested Operating Limits

PRESSURE 280psi SPEED 20m/s
TEMPERATURE -40 +200°C
Dependent upon shaft diameter and speed + Temperature and media to be sealed

STANDARD STOCK FACE MATERIALS
Rotary Face: Sintered Silicon Carbide.
Stat Ring: Sintered Silicon Carbide, Carbon.
OTHER FACE MATERIALS TO ORDER

TYPE 1682



Rotary based, bi-directional, wave-spring seal to suit standard rotary lobe SSP® pumps. The Type 1682 is driven directly from the grub-screws.
Most commonly found in the food, brewing and dairy industries.

VULCAN STANDARD SIZES

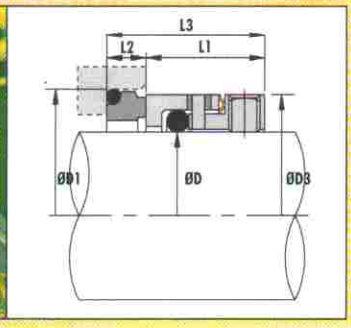
Metric Shaft Size D	Size Code	D1	D3	L1	L2	L3
20	0200	30.00	32.40	20.00	10.50	30.50
30	0300	41.30	44.00	21.40	11.10	32.50
35	0350	46.95	50.80	22.00	12.00	34.00
45	0450	58.26	62.40	22.90	12.60	35.50
55	0550	69.55	76.00	29.30	13.20	42.50
75	0750	92.15	99.20	31.10	14.40	45.50

STANDARD STOCK FACE MATERIALS
Rotary Face: Stainless Steel, Tungsten Carbide.
Stat Ring: Carbon, Tungsten Carbide.
OTHER FACE MATERIALS TO ORDER

Suggested Operating Limits

PRESSURE 180psi SPEED 15m/s
TEMPERATURE -40 +200°C
Dependent upon shaft diameter and speed + Temperature and media to be sealed

TYPE 1688



Wave spring mechanical seal with thin cross section and short working length. Most commonly used on rotary lobe pumps, found extensively in the food, process, dairy and brewery industries. Popular, common sizes are fitted with Vulcan's Sinusoidal Split Wave-Springs.

VULCAN STANDARD SIZES

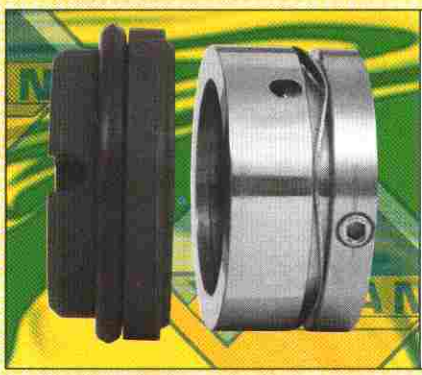
Inch Shaft Size D	Size Code	Metric Shaft Size D	Size Code	D1	D3	L1	L2	L3
0.625	0158	16	0160	28.50	27.00	19.10	6.30	25.40
0.750	0191			31.70	30.00	19.10	6.30	25.40
		24	0240	35.40	34.10	19.10	7.60	26.70
		28	0280	42.00	39.00	19.10	7.60	26.70
1.125	0286			41.20	39.50	19.10	7.60	26.70
		30	0300	42.70	41.00	19.10	7.60	26.70
1.250	0317			44.40	42.40	19.10	7.60	26.70
		32	0320	44.40	42.40	19.10	7.60	26.70
1.375	0349	35	0350	47.60	45.50	19.10	7.60	26.70
1.500	0381	38	0380	53.90	51.80	21.10	8.10	29.20
1.750	0444			60.30	58.20	21.10	8.10	29.20
1.875	0476			63.50	61.40	21.10	8.10	29.20
		50	0500	63.90	61.90	21.10	8.10	29.20
2.000	0508			66.60	64.60	22.10	9.60	31.70
2.125	0539			73.00	71.00	22.10	9.60	31.70
		54	0540	73.90	71.00	22.10	9.60	31.70
2.150	0546	55	0550	75.00	72.00	22.10	9.60	31.70
		63	0630	83.00	79.30	25.80	9.10	34.90
2.500	0635			88.90	79.30	25.80	9.10	34.90
2.750	0698			95.20	90.80	25.80	9.10	34.90
2.875	0730	73	0730	98.40	94.00	25.80	9.10	34.90
		75	0750	100.40	96.00	25.80	9.10	34.90
3.000	0762			101.60	96.90	25.80	9.10	34.90
		80	0800	104.00	101.00	25.80	9.10	34.90
		95	0950	125.00	116.00	25.80	9.10	34.90
		100	1000	130.00	121.00	25.80	9.10	34.90

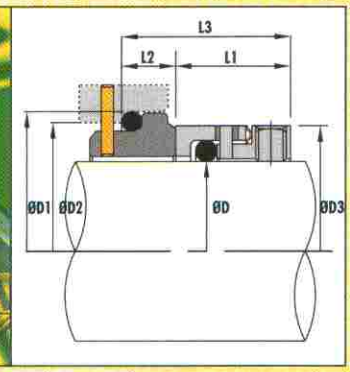
STANDARD STOCK FACE MATERIALS
Rotary Face: Stainless Steel or Tungsten Carbide.
Stat Ring: Carbon, Silicon Carbide or Tungsten Carbide.
OTHER FACE MATERIALS TO ORDER

Suggested Operating Limits

PRESSURE 150psi SPEED 15m/s
TEMPERATURE -40 +200°C
Dependent upon shaft diameter and speed + Temperature and media to be sealed

TYPE 1688L





Rotary based wave sprung mechanical seal with thin cross section and short working length, supplied as standard with Vulcan Type 24 DIN Long seat. Most commonly used on rotary lobe pumps found extensively in the food, process, dairy and brewery industries. Popular, common sizes are fitted with Vulcan's Sinusoidal Split Wave-Springs.

VULCAN STANDARD SIZES

Inch Shaft Size D	Size Code	D1	D2	D3	L1	L2	L3	Slot width	Slot Depth
16	0160	27.00	23.00	27.00	19.10	8.60	27.70	4.00	5.00
20	0200	35.00	29.00	31.20	19.10	10.00	29.10	5.00	5.50
22	0220	37.00	31.00	33.00	19.10	10.00	29.10	5.00	5.50
24	0240	39.00	33.00	34.10	19.10	10.00	29.10	5.00	5.50
25	0250	40.00	34.00	36.00	19.10	10.00	29.10	5.00	5.50
28	0280	43.00	37.00	39.00	19.10	10.00	29.10	5.00	5.50
30	0300	45.00	39.00	41.00	19.10	10.00	29.10	5.00	5.50
32	0320	48.00	42.00	42.40	19.10	10.00	29.10	5.00	5.50
33	0330	48.00	42.00	44.00	19.10	10.00	29.10	5.00	5.50
35	0350	50.00	44.00	45.50	19.10	10.00	29.10	5.00	5.50
38	0380	56.00	49.00	51.80	21.10	11.00	32.10	5.00	5.50
40	0400	58.00	51.00	53.80	21.10	11.00	32.10	5.00	5.50
43	0430	61.00	54.00	56.80	21.10	11.00	32.10	5.00	5.50
45	0450	63.00	56.00	58.20	21.10	11.00	32.10	5.00	5.50
48	0480	66.00	59.00	61.40	21.10	11.00	32.10	5.00	5.50
50	0500	70.00	62.00	61.90	21.10	13.00	34.10	5.00	5.50
55	0550	75.00	67.00	72.00	22.10	13.00	35.10	5.00	5.50
60	0600	80.00	72.00	77.00	25.80	13.00	38.80	5.00	5.50
63	0630	83.00	75.00	79.30	25.80	13.00	38.80	5.00	5.50
65	0650	85.00	77.00	82.30	25.80	13.00	38.80	5.00	5.50
70	0700	92.00	83.00	87.00	25.80	15.30	41.10	5.00	5.50
75	0750	97.00	88.00	96.00	25.80	15.30	41.10	5.00	5.50
80	0800	105.00	95.00	101.00	25.80	15.70	41.50	5.00	5.50
85	0850	110.00	100.00	106.00	25.80	15.70	41.50	5.00	5.50
90	0900	115.00	105.00	111.00	25.80	15.70	41.50	5.00	5.50
95	0950	120.00	110.00	116.00	25.80	15.70	41.50	5.00	5.50
100	1000	125.00	115.00	121.00	25.80	15.70	41.50	5.00	5.50

Suggested Operating Limits

PRESSURE 150psi SPEED 15m/s

TEMPERATURE -40 +200°C

Dependent upon shaft diameter and speed + Temperature and media to be sealed

STANDARD STOCK FACE MATERIALS

Rotary Face: Stainless Steel or Tungsten Carbide.

Stat Ring: Carbon, Silicon Carbide or Tungsten Carbide.

OTHER FACE MATERIALS TO ORDER

Vulcan Water Pump Type Seals

section 10

Introduction

Vulcan supply a substantial range of cost effective and reliable water pump seals, that are commonly utilised in high volume commercial, domestic and industrial water systems.

These seal types generally serve applications such as swimming pools, spa pools, shower pumps, central heating systems, irrigation and light fluid duties.

Standard Vulcan Water Type Seals

Types 60 and 65

Sleeve mounted, rubber bellows seals of compact unitised design. Suitable for small shaft diameter, general low pressure applications.

These rubber driven, rotary seal types are easily fitted and mass produced, under Vulcan's stringent quality procedures.

Type 70 and 75

Stationary based, unitised rubber bellows seals, utilised in high volume, small shaft diameter applications. These seals are successfully used in engine coolant pumps, as well as many other general water applications, proving the reliability of the seal design and construction.

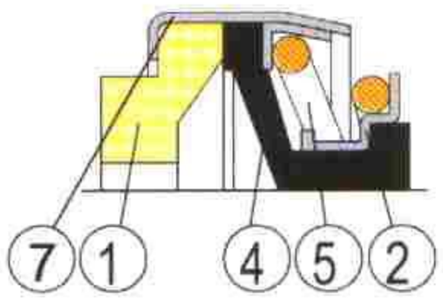
The adequate shaft clearance enables one size to be used on a number of shaft sizes, whilst being stationary seal based increases rotational speed capabilities.

Type 18

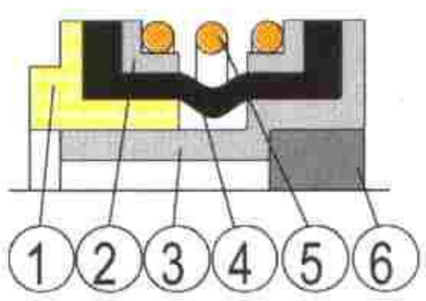
Enclosed rubber bellows seal, with short axial fitting length, ideal for equipment where space is restricted.

In addition to the standard carbon face, Vulcan also offer hard face alternatives for the more demanding applications. The seal is also fitted with an internal plug as standard to aid assembly.

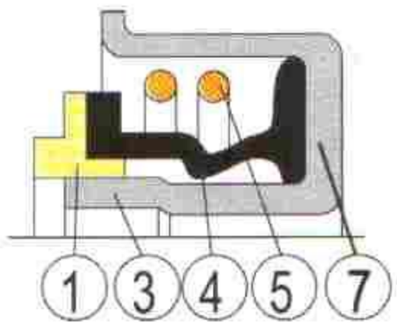
STANDARD COMPONENTS



Type 18



Type 60/65



Type 70/75

No	Description	4	Bellows
1	Face	5	Coil
2	Retaining Plates	6	Drive Ring
3	Sleeve	7	Retainer

Swimming Pool Seals

With over fifteen years extensive specific experience, Vulcan are leading manufacturers of seals for the International Swimming Pool Industry. We have a comprehensive range of seal assemblies and designs, backed by an ex-stock service.

Vulcan seal and seat face materials, as standard, are superior to industry norms. Exact designs, excellent materials, a wide stock range and the ability to manufacture to any industry design or requirement, complement the Vulcan Swimming Pool Seal Range.

Vulcan Design Advantages

Material Quality

Wide range of high quality elastomers and seal face materials readily available. Superior seal material selection especially Ceramic purity and Carbon quality increases reliability, capability, performance and life.

Design

The Vulcan Water Pump seals are high quality, bi-directional, seal designs containing positively designed, material benefits and features.

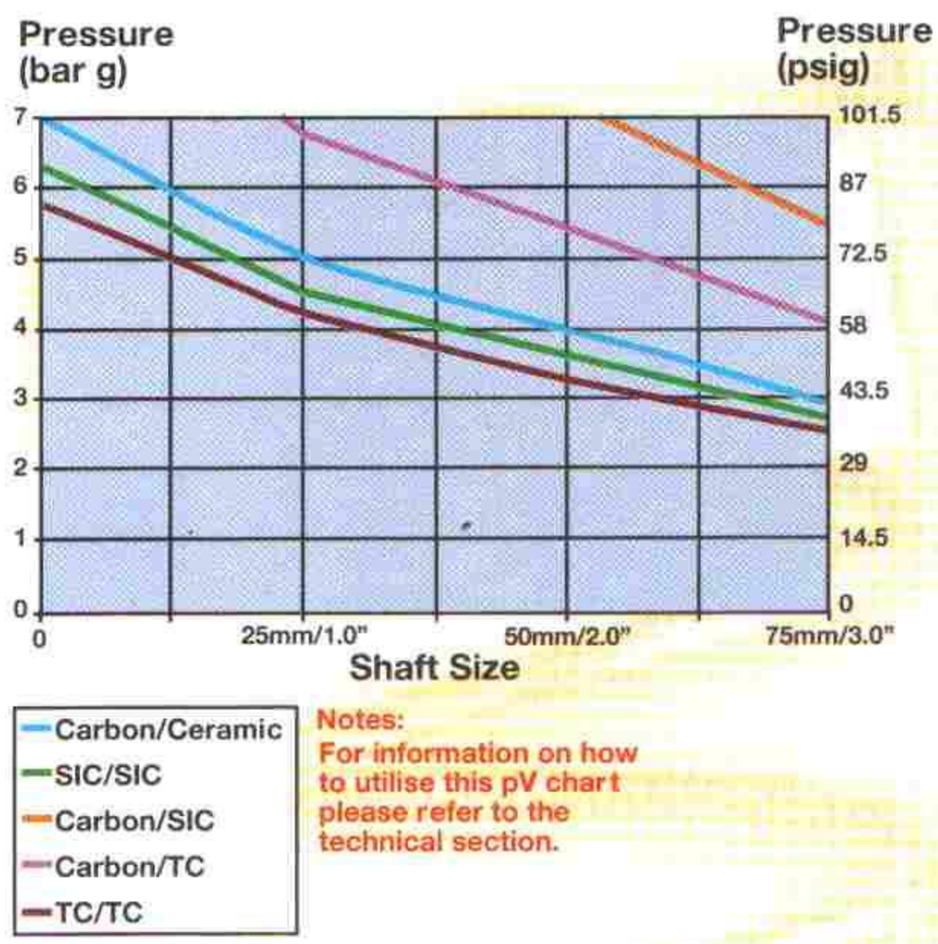
For instance, Vulcan Type 18;

- The Type 18 is supplied with a fitting plug, as standard, which provides support when fitting these seals.
- The Type 18 is of robust bellows design, compared to some competitors' equivalents, which are prone to falling apart on assembly.
- Type 18 is designed to eliminate bellows wear during operation, which can be a fault in competitors designs.
- The Type 18 is fitted with our M106K + Carbon and 99.5% Pure Ceramic.

Cost Effective

These proven, mass produced seals, with their additional benefits and superior material quality, result in an exceptional, cost effective choice of seal.

VULCAN WATER PUMP TYPE



Notes:
For information on how to utilise this pV chart please refer to the technical section.

VULCAN SEALS TO SUIT SWIMMING POOL AND SPA PUMP APPLICATIONS

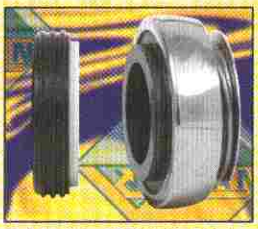
With over fifteen years specific experience, Vulcan are leading manufacturers of seals for the International Swimming Pools Industry. We have a comprehensive range of seal assemblies and designs, backed by an ex-stock service.

Water is a poor lubricant and this in combination with frequent high shaft speeds, possible dry running and the chemicals utilised in pool systems, creates demanding environments for mechanical seal faces. Vulcan seal and seat face materials, as standard, are superior to industry norms. Please see our Face Material Section. In addition, we have specialist Carbon Grades available to exceed the requirements of particularly difficult applications and duties.

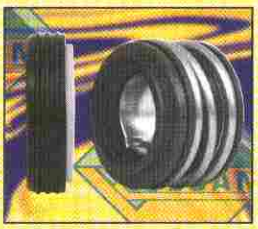
Exact designs, excellent materials, a wide stock range and the ability to manufacture to any industry design or requirement further enhance the Vulcan Swimming Pool range.

For American products® 397102, G. G. Industries 1000®, Premier® 31-813 & P19-0, Swim-Rite®, Waterway® & Wet Institute® Models.

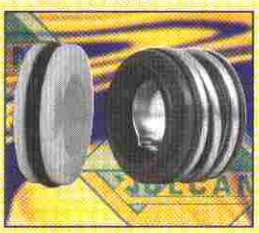
For Calpeda® pumps



For Doll®, Hydronaut® 100, Kripsol® Ondina, Polaris® XNF7M & Structural® 100



For Hayward® Cup Mount, Jacuzzi® 10.486.10.487, Showertux® 0755L, Vico® & Premier®



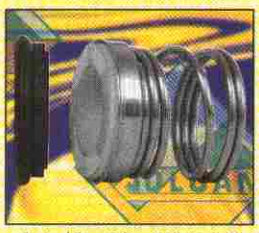
For Sta-Rite® 5P2R

VULCAN STANDARD SEALS OFFERED FOR OEM PUMP REFERENCES

American Products® 395005
American Products® 397102
Ampro® 304
Aqua Flo® RS1000SS
Aqua Flo® 92500150
Arneson® Poolsweep A-8
Astral® Flipper (pre 1986)
Astral® Flipper (post 1986)
Astral® Sprint
Astral® 4HP
Badu® (Speck®) 20mm
Calpeda® M203.04.05
Calpeda® 50-12H 12D
Calpeda® 65-16F
Calpeda® 65-16E
Calpeda® 65-16C
Certikin® Mini pump 0.5-1.0hp
Certikin® FD pumps SPBP002 seal
Challenger® 5/8"
Doll® Models 15mm Shaft
Doughboy® 306-1002 & 306-1005
Doughboy® 1128-1006 & 306-1007
Espa® Models, 3/4" Shaft
Espa® Squipper 80
Eurostar®
Fluvo® 21147
G. G. Industries® 1000
Hayward® (Cup Mount)
Hayward® SP1250 XZ2
Hayward® SP16007 ('O'-Ring Mount)
Hydra-Bath® Models
Hydronaut® (Structural®) 100
ITT® Gemini
ITT® Marlow 25353
ITT® Marlow / Argonaut 38592

VULCAN STANDARD SEALS OFFERED FOR OEM PUMP REFERENCES

Jacuzzi® 10.1203
Jacuzzi® 10.478.10.506
Jacuzzi® 10.486.10.487
Kripsol® Ondina 0.5-1.0hp
Kripsol® 4.5-5.5hp
Lee Howl® 4270 3-5.5hp
Lee Howl® 4277/4778
Lee Howl® 4275 0.5-10.0hp
Lowara® CEA 70/3-5
Lowara® CEA 70/3-5 AV
Lowara® CM70 Pool Sweep
Modern® 1.5-4.0
Modern® 10-12.5
Modern® 5.5
Modern® 7.5
Pacific Fabrications® 35-002-354894
Polaris® XNF7M
Premier® 31-812
Premier® 31-813 & P19-0
Purex Aquatron® P28322
Showertux® 0755L
Sta-Rite® 5P2R U109-93 & U109-6A
Sta-Rite® 5P4R 9372 SS
Sta-Rite® U109-136 SS (old type)
Sta-Rite® U109-170
Sta-Rite® U109-47
Sta-Rite® U109-220
Sta-Rite® U9358-SS
Swim-Quip® 37407-0009
Swim-Rite® 60-828-813
Structural® (Hydronaut®) 100
Stuart Turner® XB90
Vico® Models, 3/4" Shaft
Waterway® Models 5/8" Shaft
Wet Institute® 1000



For Astral Flipper® (post 1986) & Sprint®

For Lee Howl® 4277/78

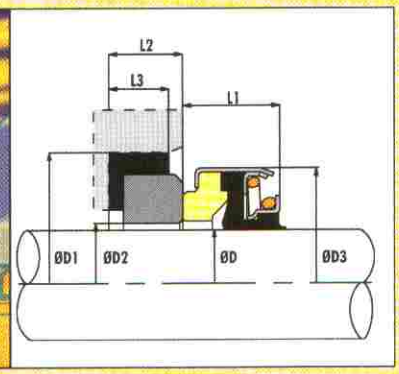
For Modern®

For Showertux® 0755L

For Sta-Rite® U109-220

For Sta-Rite® U109-136 SS

TYPE 18



Compact, enclosed rubber bellows seal with a wide stationary seat.
Very short working length makes the Type 18 ideal for equipment where space for a seal is restricted. Seal is supplied with a top hat retainer (remove upon installation)

VULCAN STANDARD SIZES

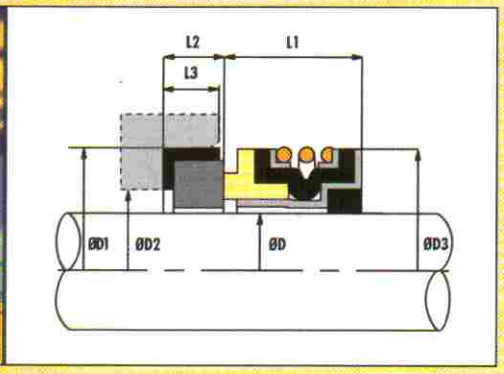
Metric Shaft Size D	Size Code	D1	D2	D3	L1	L2	L3
8	0080	26.00	12.00	24.00	11.00	8.00	6.00
10	0100	26.00	12.00	24.00	11.00	8.00	6.00
11	0110	26.00	13.00	24.00	11.00	8.00	6.00
12	0120	26.00	14.00	24.00	11.00	8.00	6.00
12	0120.B	26.00	13.00	24.00	13.00	8.00	6.00
12	0120.C	35.00	16.00	32.00	13.00	8.00	6.00
13	0130	26.00	14.00	24.00	13.00	8.00	6.00
14	0140	35.00	17.00	32.00	13.00	8.00	6.00
15	0150	38.00	18.00	35.00	13.00	8.00	6.00
16	0160	38.00	18.00	35.00	13.00	8.00	6.00
16	0160.B	42.00	21.00	39.00	13.00	8.00	6.00
17	0170	42.00	21.00	39.00	13.00	8.00	6.00
18	0180	42.00	21.00	39.00	13.00	8.00	6.00
19	0190	42.00	21.00	39.00	13.00	8.00	6.00
20	0200	42.00	21.00	39.00	13.00	8.00	6.00
20	0200.B	45.00	23.00	42.00	13.00	10.00	8.00
22	0220	45.00	23.00	42.00	13.00	10.00	8.00
23	0230	50.00	27.00	47.00	14.00	10.00	8.00
24	0240	50.00	27.00	47.00	14.00	10.00	8.00
25	0250	50.00	27.00	47.00	14.00	10.00	8.00
28	0280	57.00	31.00	54.00	15.00	10.00	8.00
30	0300	57.00	31.00	54.00	15.00	10.00	8.00
32	0320	57.00	34.00	54.00	15.00	10.00	8.00
35	0350	63.00	37.00	60.00	16.00	10.00	8.00
38	0380	68.00	42.00	65.00	17.00	12.00	9.00
40	0400	68.00	42.00	65.00	17.00	12.00	9.00
45	0450	73.00	47.00	70.00	20.00	12.00	9.00
50	0500	88.00	52.00	85.00	23.00	15.00	12.00
60	0600	110.00	67.00	105.00	30.00	15.00	12.00
65	0650	110.00	67.00	105.00	30.00	15.00	12.00
70	0700	110.00	72.00	105.00	32.00	15.00	12.00

Suggested Operating Limits

PRESSURE 120psi SPEED 10m/s
TEMPERATURE -20 +160°C
Dependent upon shaft diameter and speed + Temperature and media to be sealed

STANDARD STOCK FACE MATERIALS
Rotary Face: Carbon, Silicon Carbide, Tungsten Carbide.
Stat Ring: Ceramic, Silicon Carbide, Tungsten Carbide.
N.B. Sic or T.C. stocked in certain common sizes only.
OTHER FACE MATERIALS TO ORDER

TYPE 60

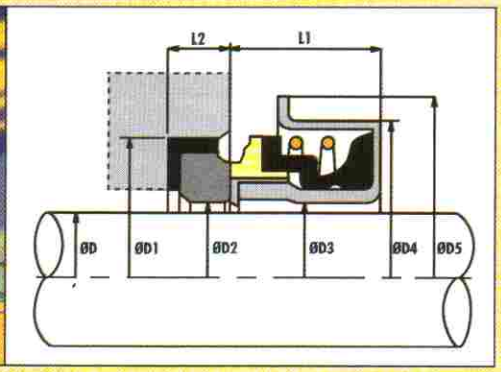


Sleeve mounted, rubber bellows seal with shaft drive ring. Mass produced and easily fitted for low pressure, general applications on small diameter shafts.

VULCAN STANDARD SIZES

Shaft Size DØ			D1		D2		D3		L1		L2		L3	
Inch	Metric	Size Code	Metric	Inch	Metric	Inch	Metric	Inch	Metric	Inch	Metric	Inch	Metric	Inch
0.375	9.53	0095	22.22	0.875	14.30	0.563	23.80	0.937	16.02	0.631	6.20	0.244	4.76	0.187
0.500	12.70	0127	25.40	1.000	17.45	0.687	26.97	1.062	16.60	0.654	6.20	0.244	4.76	0.187
0.625	15.88	0158	31.75	1.250	20.63	0.812	30.94	1.218	18.71	0.737	10.29	0.405	8.71	0.343
0.750	19.05	0191	34.93	1.375	23.80	0.937	34.11	1.343	18.71	0.737	10.29	0.405	8.71	0.343
1.000	25.40	0254	41.28	1.625	30.15	1.187	42.85	1.687	20.63	0.812	11.10	0.437	9.53	0.375

TYPE 70



Coolant pump seal primarily utilised in combustion engine water pumps. The clearance of the seal and seat above the shaft allows one size to be used on several shaft diameters.

VULCAN STANDARD SIZES

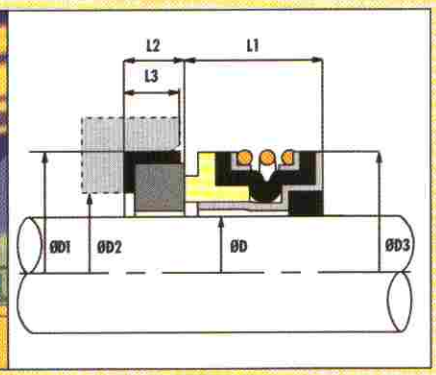
Shaft Size DØ			D1		D2		D3		D4		D5		L1		L2	
Inch	Metric	Size Code	Metric	Inch	Metric	Inch	Metric	Inch	Metric	Inch	Metric	Inch	Metric	Inch	Metric	Inch
0.512	13.00	0127	25.00	0.984	14.00	0.551	14.20	0.559	28.55	1.124	31.70	1.248	13.20	0.520	5.00	0.197
0.669	17.00	0158	31.00	1.220	18.00	0.709	18.20	0.717	36.45	1.435	41.30	1.626	14.80	0.583	5.00	0.197
0.787	20.00	0191	35.00	1.378	21.00	0.827	21.40	0.843	40.00	1.575	43.70	1.720	15.50	0.610	5.00	0.197
1.181	30.00	0286	48.00	1.890	32.00	1.260	31.00	1.220	52.00	2.047	57.00	2.244	19.00	0.748	8.00	0.315

STANDARD STOCK FACE MATERIALS
Rotary Face: Carbon.
Stat Ring: Ceramic (Silicon Carbide, Tungsten Carbide also available).
OTHER FACE MATERIALS TO ORDER

Suggested Operating Limits

PRESSURE 120psi SPEED 10m/s
TEMPERATURE -40 +200°C
Dependent upon shaft diameter and speed + Temperature and media to be sealed

TYPE 65

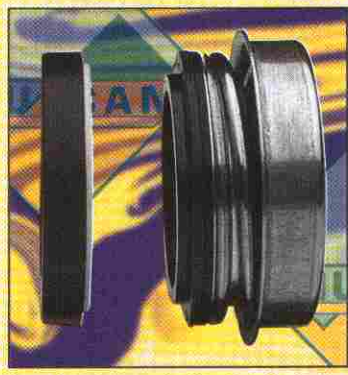


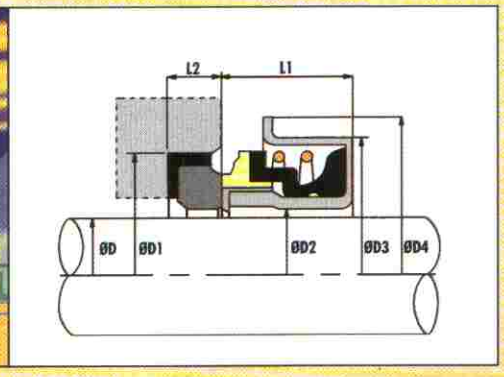
Sleeve mounted, rubber bellows seal, with dimensions to equate to the common American seal standard. Mass produced and easily fitted for low pressure, general applications on small shaft diameters.

VULCAN STANDARD SIZES

Shaft Size DØ			D1		D2		D3		L1		L2		L3	
Inch	Metric	Size Code	Metric	Inch	Metric	Inch	Metric	Inch	Metric	Inch	Metric	Inch	Metric	Inch
0.375	9.53	0095	25.40	1.000	14.30	0.563	26.97	1.062	16.66	0.656	7.92	0.312	6.35	0.250
0.500	12.70	0127	25.40	1.000	17.45	0.687	26.97	1.062	16.66	0.656	7.92	0.312	6.35	0.250
0.625	15.88	0158	31.75	1.250	20.63	0.812	30.94	1.218	18.24	0.718	10.31	0.406	8.71	0.343
0.750	19.05	0191	34.93	1.375	23.80	0.937	34.11	1.343	18.24	0.718	10.31	0.406	8.71	0.343
1.000	25.40	0254	41.28	1.625	30.15	1.187	42.85	1.687	20.62	0.812	11.10	0.437	9.53	0.375

TYPE 75





Coolant pump seal primarily utilised in combustion engine water pumps, with dimensions to equate to the common American seal standard.

VULCAN STANDARD SIZES

Shaft Size DØ			D1		D2		D3		D4		L1		L2	
Inch	Metric	Size Code	Metric	Inch	Metric	Inch	Metric	Inch	Metric	Inch	Metric	Inch	Metric	Inch
0.500	12.70	0127	25.40	1.000	14.20	0.559	28.55	1.124	31.70	1.248	13.79	0.543	7.93	0.312
0.625	15.88	0158	31.75	1.250	18.20	0.717	36.45	1.435	41.30	1.626	15.36	0.605	10.31	0.406
0.750	19.05	0191	34.93	1.375	21.40	0.843	40.00	1.575	43.70	1.720	15.36	0.605	10.31	0.406

Suggested Operating Limits

PRESSURE 120psi SPEED 10m/s

TEMPERATURE -40 +200°C

Dependent upon shaft diameter and speed + Temperature and media to be sealed

STANDARD STOCK FACE MATERIALS
Rotary Face: Carbon.
Stat Ring: Ceramic (Silicon Carbide, Tungsten Carbide also available).
OTHER FACE MATERIALS TO ORDER

Vulcan Direct Replacement Seals For Common O.E.M Pumps

11
a

VULCAN O.E.M. SEALS

In addition to our standard range of stock seal types, Vulcan also manufacture and stock many thousands of individual seal designs for specific pumps and applications.

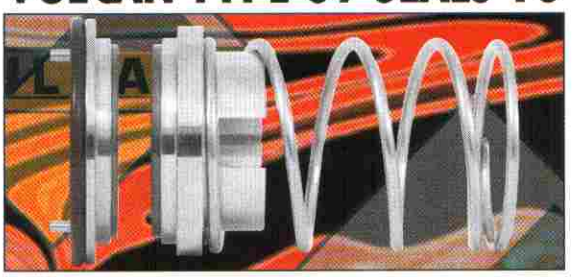
We are leading providers of seals for O.E.M. Equipment due to the following principal advantages;

- Ability to design and manufacture, almost any, seal to customer requirements.
- In-house production of practically all materials, components and the tools/moulds for the same.
- Vertically integrated, in-house design, production and quality control, allows small runs and fast turn-round.
- A Can-Do Philosophy linked to a commercial readiness to produce specials.
- Agreements to produce a specific design/detail, that are not made available for sale to anybody else.
- The best Range, Quality, Service and Price available from any one manufacturer.

Selected examples of pump marques that Vulcan have stock seals for are listed below. Some of the most common, stocked, special designs are illustrated, in further detail, in this and the next section.

A.B.S.®	D.A.B.®	Hamworthy.®	I.T.T. Marlow.®	Pacific Fabrications.®	Thune-Eureka.®
A.P.V.®	Doughboy.®	Holden & Brooke.®	Ibex.®	Pullen.®	Tri-Clover.®
Alfa Laval.®	Duveljarr.®	Hydra Bath.®	Inoxpa.®	S.S.P.®	Tuchenhagen.®
Allweiler.®	E.M.U.®	Hidrostal.®	Iron.®	Scanpump.®	Tuthill.®
Armstrong.®	Ebara.®	I.T.T. Bell & Gossett.®	Jacuzzi.®	Sihi.®	Varley.®
Beresford.®	Flygt.®	I.T.T. Gemini.®	Johnson.®	Silverstone.®	Viking.®
Biral.®	Fristam.®	I.T.T. Goulds.®	K.S.B.®	Sta-Rite Industries.®	Wade.®
Calpeda.®	Girdlestone.®	I.T.T. Jabsco.®	Lee Howl.®	Svanehoj.®	Weir.®
Crane.®	Grindex.®	I.T.T. Lowara.®	Mission.®	Swimmey.®	Worthington-Deepwell.®

VULCAN TYPE 89 SEALS TO SUIT VIKING® PUMPS



VULCAN STANDARD SIZES

Shaft Size DØ Inch	Metric	Size Code	Rotary O.D. Metric	Inch	Seat O.D. Metric	Inch	Pin P.C.D. Metric	Inch	Seat W/L Metric	Inch
1.125	28.58	0286	47.20	1.858	50.30	1.980	34.87	1.373	9.40	0.370
1.437	36.50	0365	56.50	2.224	58.00	2.283	43.73	1.722	9.40	0.370

Vulcan produce and stock a range of seals to suit several Viking® pumps, including the Positive Displacement and Rotary Lobe pumps. The Vulcan Type 89 is a specific design to replace the original seals found in the popular Viking® 4225 pump range, and has the double-pinned seat required for the housings on this pump type. Seals are available from stock with inserted silicon carbide faces on both the rotary and stationary. Fitted with Viton® 'O'-Rings. Other 'O'-Ring and face materials are available, if specified at time of order.

VULCAN CODES

Where XXXX is stated in the code, replace with appropriate shaft size code. Available with Viton® 'O'-Rings as standard, if E.P. or Nitrile is required, replace the V character in the code with E or N.

XXXX.89.V.S. Type 89 complete seal, with inserted silicon carbide rotary face vs. silicon carbide inserted stationary face, Viton® 'O'-Rings.

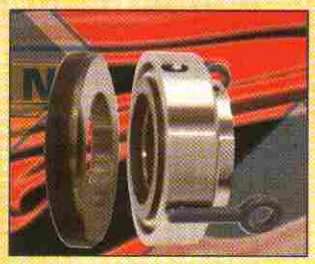
XXXX.89.V.H. Type 89 complete seal, with inserted tungsten carbide rotary face vs. tungsten carbide inserted stationary face, Viton® 'O'-Rings.

TYPE 06 RANGE TO SUIT FLYGT® PUMP APPLICATIONS

The Vulcan range of Type 06 seals are designed as superior replacement seals for Flygt® and Grindex® submersible pumps and mixers, with no pump modifications necessary. The Type 06 designs require no additional fitting tool and most types have pre-set working lengths, operated by removable setting clips for easy installation.

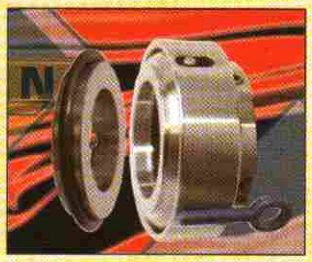
All Vulcan Type 06 seals are supplied fitted with Nitrile elastomers and Carbon vs. T.C or SIC faces for Upper Seals as well as Viton® elastomers and T.C vs. T.C or SIC vs. SIC faces for Lower Seals. The Stock Codes listed below are for a complete seal and seat.

Vulcan also stock complete kits of sealing parts for Flygt® pumps. These repair kits include the relevant Vulcan Type 06 seals, 'O'-rings, bearings, lip seals, cable seals and other consumable items required during pump refurbishment. The contents of each kit is dependent on pump model; the Vulcan code is constructed from the shaft size of the Upper seal, and the Flygt® pump model preceded by a "V", and the suffix ".KIT". e.g. To order Vulcan repair kit for pump model "2102-40", use Vulcan code "0220.V2102-040.KIT".



XXXX.06.LIP

0220.06C.U.N.E



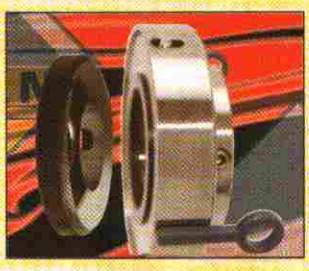
0200.06G.U.N.E

Flygt® Pump Model	Shaft Size Stock Code	Lip Wear Ring Code (If Fitted)	Vulcan Upper Seal Stock Code	Vulcan Lower Seal Stock Code
600	60mm	0600.06.LIP	0600.06Q.U.N.E.	0600.06Q.L.V.H.
605, 615, 665, 670, 680	90-80mm		0900.06S.U.N.H.	0800.06S.L.V.H.
705, 715, 720, 721, 735, 745, 760, 765, 770, 775	90-80mm or 90-120mm		0900.06S.U.N.H.	0800.06S.L.V.H. or 1200.06T.L.V.H.
820, 840, 841, 860, 880, 881, 900	90-80mm or 90-120mm		0900.06S.U.N.H.	0800.06S.L.V.H. or 1200.06T.L.V.H.
2004, 2008, 2012, 2016	15mm		0150.06D.N.Z.	No Lower Seal fitted.
2024	20mm		0200.06A.U.N.E.	0200.06A.L.V.H.
2050, 2052	15mm		0150.06D.N.Z.	No Lower Seal fitted.
2060	20mm		0200.06G.U.N.E.	0200.06G.L.V.H.
2066	20mm		0200.06A.U.N.E.	0200.06A.L.V.H.
2070	22mm		0220.06E.U.N.E.	0220.06E.L.V.H.
2071	22mm		0220.06E.U.N.E.	0220.06F.L.V.H.
2075	20mm		0200.06A.U.N.E.	0200.06A.L.V.H.
2082, 2090, 2125, 2140	28mm		0280.06I.U.N.E.	0280.06I.L.V.H.
2084, 2135	35mm		0350.06K.U.N.E.	0350.06L.L.V.H.
2101	20mm		0200.06A.U.N.E.	0200.06A.L.V.H.
2102-40	22mm		0220.06E.U.N.E.	0220.06E.L.V.H.
2151-10	35mm	0350.06.LIP	0350.06K.U.N.E.	0350.06K.L.V.H.
2151-11, 2151-50	35mm		0350.06K.U.N.E.	0350.06L.L.V.H.
2201-10	45-35mm		0450.06O.U.N.E.	0350.06K.L.V.H.
2201-320, 2201-430, 2201-480, 2201-590, 2201-690	45mm		0450.06N.U.N.E.	0350.06N.L.V.H.
2201-11HT or MT	45mm	0450.06.LIP	0450.06O.U.N.E.	0350.06N.L.V.H.
2201-11LT	45mm		0450.06O.U.N.E.	0450.06O.L.V.H.
2250, 2290	60mm		0600.06P.U.N.E.	0600.06P.L.V.H.
2400	60mm	0600.06.LIP	0600.06R.U.N.E.	0600.06R.L.V.H.
3041-281	20mm		0200.06G.U.N.E.	0200.06G.L.V.H.
3057	20mm		0200.06G.U.N.E.	0200.06H.L.V.H.
3057-180, 3060	20mm		0200.06G.U.N.E.	0200.06G.L.V.H.
3065	20mm		0200.06A.L.V.E.	0200.06A.L.V.H.
3067-170, 3067-250, 3068	20mm		0200.06G.U.N.E.	0200.06G.L.V.H.
3080	20mm		0200.06A.U.N.E.	0200.06A.L.V.H.
3082	22mm		0220.06E.U.N.E.	0220.06E.L.V.H.

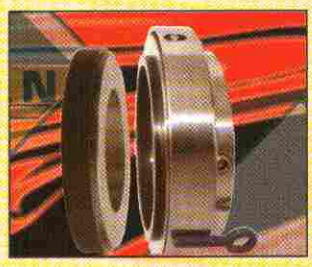
Where pumps are fitted with stepped shafts, the first size is always the shaft size at the upper seal point.

TYPE 06 RANGE TO SUIT FLYGT® PUMP APPLICATIONS

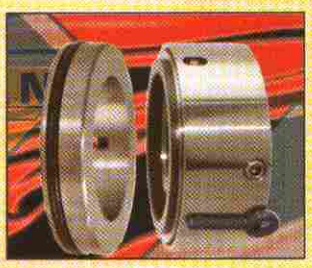
- Robust, superior mechanical seal designs, with stainless steel parts and monolithic carbide faces, provide higher seal capability, performance, reliability and life.
- No plastic working seal parts, brazed nor inserted faces, wave-springs etc; all of which are prone to wear and failure, particularly in such arduous applications.
- Highly successful, proven designs, with over a decade of service, have now been even further developed with the enhancements of improved setting clips, change to cup-ended grub-screws mounted at 90 degrees to the shaft and with the option of SIC faces.
- The Vulcan Type 06 Flygt Seal® improvements reduces costs of purchase and installation and most especially, by increased reliability and service life.



0200.06H.L.V.H



0250.06J.L.V.H

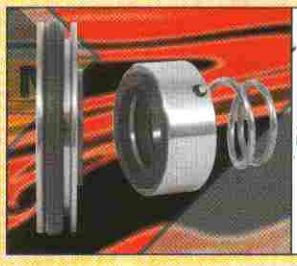


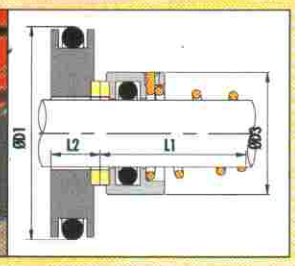
0350.06L.L.V.H

Flygt® Pump Model	Shaft Size Stock Code	Lip Wear Ring Code (If Fitted)	Vulcan Upper Seal Stock Code	Vulcan Lower Seal Stock Code
3085-91, 3085-120, 3085-170, 3085-171, 3085-181, 3085-280, 3082-290, 3085-890	20mm		0200.06G.U.N.E.	0200.06G.L.V.H.
3101	28mm		0280.06B.U.N.E.	0280.06B.L.V.H.
3102	25mm		0250.06J.U.N.E.	0250.06J.L.V.H.
3126-90, 3126-180	35mm	0350.06.LIP	0350.06K.U.N.E.	0350.06K.L.V.H.
3126-91, 3126-280, 3126-290	35mm		0350.06K.U.N.E.	0350.06M.L.V.H.
3126-181, 3127	35mm		0350.06M.U.N.E.	0350.06M.L.V.H.
3140, 3152	45mm	0450.06.LIP	0450.06O.U.N.E.	0450.06O.L.V.H.
3170, 3201	60mm	0600.06.LIP	0600.06Q.U.N.E.	0600.06Q.L.V.H.
3200	60mm		0600.06P.U.N.E.	0600.06P.L.V.H.
3230, 3300-91, 3300-181, 3300-280, 3300-980, 3305	90mm		0900.06S.U.N.H.	0800.06S.L.V.H.
3310, 3311, 3312, 3350, 3351	90-120mm		0900.06S.U.N.H.	1200.06T.L.V.H.
3355, 3356, 3357	90mm		0900.06S.U.N.H.	0800.06S.L.V.H.
3500, 3501, 3530, 3531, 3600, 3601, 3602	90-120mm		0900.06S.U.N.H.	1200.06T.L.V.H.
4351, 4352, 4400	20mm		0200.06G.U.N.E.	0200.06H.L.V.H.
4410, 4430	60mm	0600.06.LIP	No Upper Seal	0600.06Q.L.V.H.
4440, 5530	35mm		0350.06M.U.N.E.	0350.06M.L.V.H.
4650, 4660	45mm	0450.06.LIP	0450.06O.U.N.E.	0450.06O.L.V.H.
4670, 4680, 7045	60mm	0600.06.LIP	0600.06Q.U.N.E.	0600.06Q.L.V.H.
7050, 7051, 7055, 7060, 7061, 7076, 7556	90mm		0900.06S.U.N.H.	0800.06S.L.V.H.
7080, 7115	90-80mm or 90-120mm		0900.06S.U.N.H.	0800.06S.L.V.H. or 1200.06T.L.V.H.
7570, 7585	90-120mm		0900.06S.U.N.H.	1200.06T.L.V.H.
Grindex® Major, Master, Matador, Midi, Minette, Salvador	25-24mm		0250.06Z.U.N.E.	0240.06Z.L.V.H.
Grindex® Maxi	45mm		0450.06O.U.N.E.	0450.06N.L.V.H.
Ready® models 4, 8, 12, & 16	15mm		0150.06D.N.Z.	No Lower Seal fitted.
Ready® 24	20mm		0200.06A.U.N.E.	0200.06A.L.V.H.
Ready® 90	28mm		0280.06I.U.N.E.	0280.06I.L.V.H.
Steady® 7	20mm		0200.06G.U.N.E.	0200.06G.L.V.H.

Where pumps are fitted with stepped shafts, the first size is always the shaft size at the upper seal point.

VULCAN TYPE 8W TO SUIT ALLWEILER® SPF10 AND SPF20 PUMPS.





Vulcan produce and stock seals to suit the Allweiler® SPF10 and SPF20 pumps. Seals have tapered right-hand springs with inserted carbon or tungsten carbide faces vs. inserted silicon or tungsten carbide stationaries. Viton® 'O'-Rings are supplied as standard, if you require another elastomer please specify at time of order.

VULCAN STANDARD SIZES

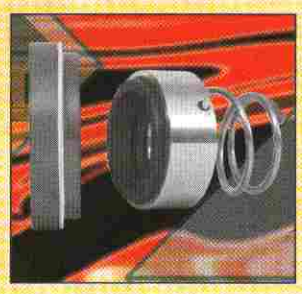
Shaft Size	D1	D3	L1	L2
15	38.00	24.00	15.00	8.00
20	45.00	31.00	19.50	8.50

VULCAN CODES

If E.P. or Nitrile is required, replace the V character in the code with an E or N. Where xxxx appears in the code, please replace with 0150 for SPF10, and 0200 for SPF20 pumps.

xxxx.8W.V.D. Type 8W, with carbon faced rotary and inserted silicon seat
xxxx.8W.V.H. Type 8W, with tungsten carbide faces to rotary and seat

VULCAN TYPE 95 AND 8X TO SUIT HAMWORTHY® PUMPS.

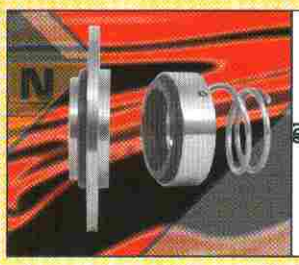


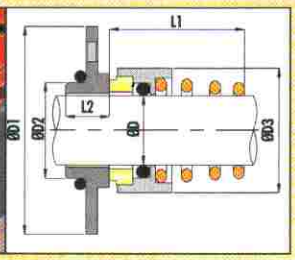
Vulcan manufacture a complete range of standard and special Type 95 and Type 97 seals to suit Hamworthy® pumps; please contact us with the pump or seal part number.
Vulcan also produce a special seal to suit the Hamworthy® JOB 22 pump. Seals have tapered right-hand springs, with inserted carbon faces vs. monolithic silicon carbide, gasket mounted, seat. Viton® 'O'-Rings and P.T.F.E. gasket are supplied as standard, if you require another elastomer please specify at time of order.

VULCAN CODES

If E.P. or nitrile is required, replace the V character in the code with an E or N
0220.8X.V.D. Type 8X, with inserted carbon faced rotary, and monolithic silicon seat

VULCAN TYPE 8Y TO SUIT ANEMA® PUMPS.





Vulcan produce and stock seals to suit Anema® pumps. Available in 30mm and 35mm sizes, seals have tapered right-hand springs with inserted carbon faces vs. monolithic stainless steel plate seats. Nitrile 'O'-Rings are supplied as standard, if you require another elastomer please specify at time of order.

VULCAN STANDARD SIZES

Shaft Size D	D1	D2	D3	L1	L2
30	77.50	38.70	43.00	24.50	15.00
35	77.50	45.80	49.00	28.00	15.00

VULCAN CODES

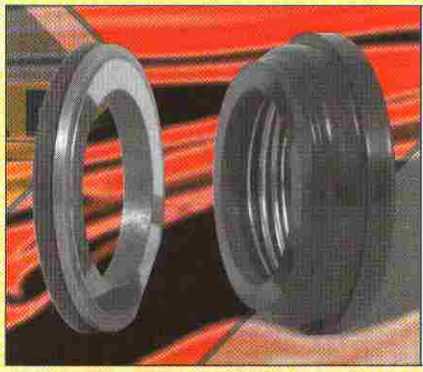
If E.P. or Viton® is required, replace the N character in the code with an E or V. Where xxxx appears in the code, please replace with 0300 or 0350 for 30 or 35mm shaft size.

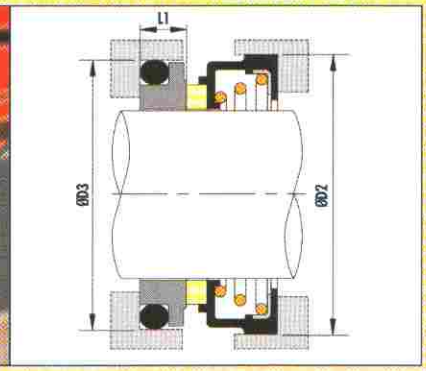
xxxx.8Y.N.Q. Type 8Y, with inserted carbon faced rotary and stainless steel seat

VULCAN TYPES 8, 8B AND 12 TO SUIT HILGE® PUMPS.

Vulcan produce a full range of seals to suit all common Hilge® pumps. Please contact us with your specific requirement, quoting the Hilge® code reference or ask for our code and price list. All Hilge® codes consist of a group of four digits beginning with 123x, followed by two digits which designate the shaft size, followed by three letters for the material code, and a final two digits for the coil style. An example code would be 1232-28-KIE-F3®.

VULCAN TYPE 28 SEALS TO SUIT HAIGH® MACERATORS.





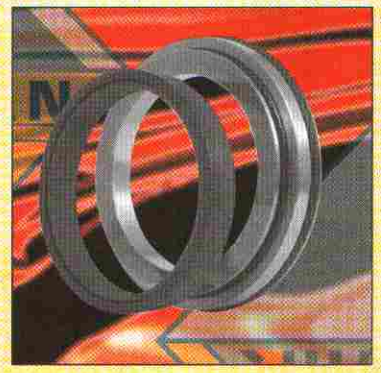
TYPE 28 STANDARD SIZES

Shaft Size D	D2	D3	L1
31.7	57.50	-	-
44.4	70.00	67.00	7.50

Vulcan produce and stock 1.1/4" rotaries, and 1.3/4" complete seals, to suit Haigh® macerators. Rotaries have carbon faces with Nitrile elastomers, complete seals have a Ni-Resist steel seat with Nitrile 'O'-Ring.

VULCAN CODES

0317.28.N.C.SEAL	1.1/4" Rotary seal only, with carbon face and Nitrile rubber bellows.
0444.28.N.C.SEAL	1.3/4" Rotary seal only, with carbon face and Nitrile rubber bellows.
0444.28.N.F.	1.3/4" Complete seal, with carbon face rotary vs. Ni-Resist seat

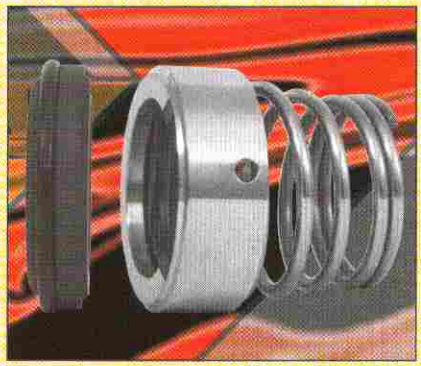


Vulcan Type 281

VULCAN TYPE 281 SEALS

Vulcan also offer a complete 53mm shaft seal to suit Imperial Machine Company® waste-disposal units, model numbers 1204 and 1604. Seals have stainless steel rotary faces vs. carbon seats, with Viton® elastomers. Please contact us for details.

VULCAN TYPE 121 TO SUIT SIHI® PUMPS.



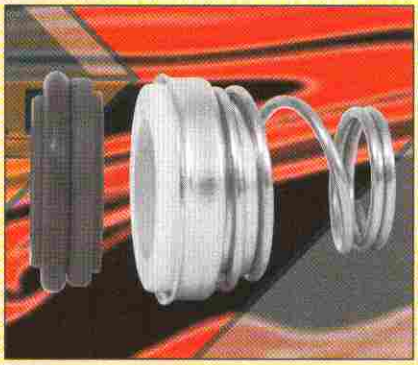
Vulcan produce and stock a modified 38mm Type 12 seal to suit the reduced housing size found on Sihi® pumps. Available from stock in the usual face and elastomer combinations for Type 12.

VULCAN CODES

If E.P. or Viton® is required, replace the N character in the code with an E or V.

0380.121.L.N.P.	38mm Type 121, left-hand coil with stainless rotary face, carbon seat
0380.121.R.N.P.	38mm Type 121, right-hand coil with stainless rotary face, carbon seat

VULCAN TYPE 13 SERIES TO SUIT LOWARA® PUMPS



Vulcan also produce and stock Type 131 seals to suit Lowara® CEA/A, BG/A, CO/A and HM/A pumps fitted with the new SM motor. They are modified Type 13 tapered right-hand spring seals, with Silicon or Tungsten Carbide faces vs. Silicon or Tungsten Carbide stationaries supplied with the usual choice of 'O'-Rings, please specify at time of order. Other face material combinations available to order.

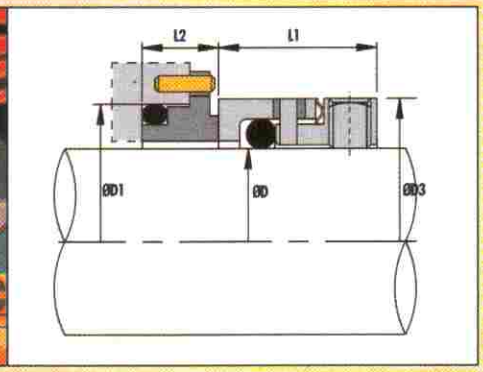
Practically all common Lowara® pumps can be fitted with a direct replacement Vulcan Type 13/13DIN seal or similar. Please contact us with the pump model number or sample seal.

VULCAN CODES

If E.P. or Nitrile is required, replace the V character in the code with an E or N.

0140.131.R.V.H.	Tungsten Carbide faced rotary vs. Tungsten Carbide seat
0140.131.R.V.I.	Silicon Carbide faced rotary vs. Tungsten Carbide seat
0140.131.R.V.B.	Ceramic faced rotary vs. carbon seat

TYPE 1688W



Vulcan manufacture seals to suit SR® Series Pumps from SSP®. Vulcan Type 1688W seal and seat assemblies are designed to fit the most popular rotary lobe pumps, without any modification. The monolithic Tungsten Carbide or Stainless Steel seal head avoids face spinning problems, associated with competitor designs in common lobe pump duties.

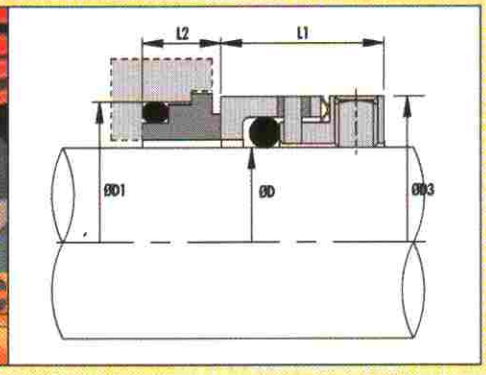
VULCAN STANDARD SIZES

OEM Pump Model	Metric Shaft Size D	Size Code	D1	D3	L1	L2
SR1	20	0200	30.00	31.00	19.10	10.70
SR2	30	0300	41.00	41.00	19.10	10.90
SR3	35	0350	47.00	45.50	19.10	12.20
SR4	45	0450	58.00	58.20	21.10	11.60
SR5	55	0550	70.00	72.00	22.10	13.00
SR6	75	0750	92.00	96.00	25.80	14.50

We also make seals to suit the SSP® AP(GP),SRU, ND and NDM Pumps.

Common, popular sizes of Type 1688x seals are fitted with our special, split Sinusoidal Wave-Springs.

TYPE 1688Y



Vulcan seals to suit Johnson® Positive Displacement Pumps Vulcan Type 1688Y seal and seat suit Johnson® positive displacement pumps, in all standard shaft sizes. Again the monolithic seal head provides seal capability, performance and increased life benefits.

VULCAN STANDARD SIZES

OEM Pump Model	Metric Shaft Size D	Size Code	D1	D3	L1	L2
PD10	30	0300	40.00	41.00	19.10	9.30
PD20	35	0350	44.50	45.50	21.10	9.20
PD30	50	0500	62.00	61.90	21.10	10.40
PD40	70	0700	85.00	88.90	25.80	14.10
PD50	80	0800	95.00	101.00	25.80	16.20

We also produce the Type 1650 seal to suit OL1,2 and 3 pumps, in 24, 38 and 53mm sizes respectively, as well as other Johnson pumps.

Suggested Operating Limits

PRESSURE 150psi SPEED 15m/s

TEMPERATURE -40 +200°C

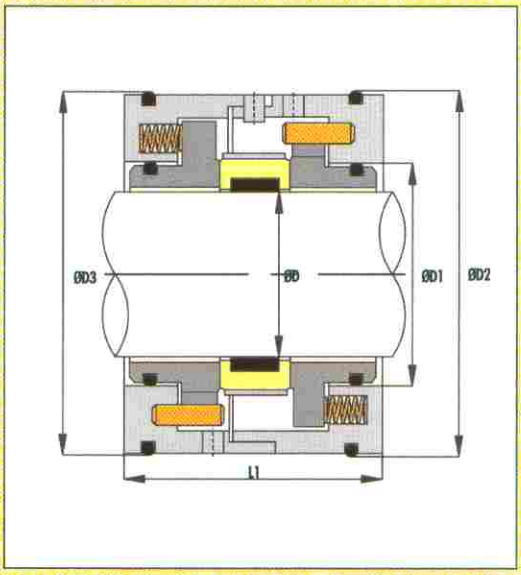
Dependent upon shaft diameter and speed + Temperature and media to be sealed

STANDARD STOCK FACE MATERIALS
Rotary Face: Stainless Steel, Tungsten Carbide.
Stat Ring: Carbon, Tungsten Carbide.
OTHER FACE MATERIALS TO ORDER

VULCAN SEALS TO SUIT E.M.U.® PUMPS AND MIXERS.

Vulcan offer a range of seals to suit both EMU® Pump and Mixers applications, including the enclosed block seals.

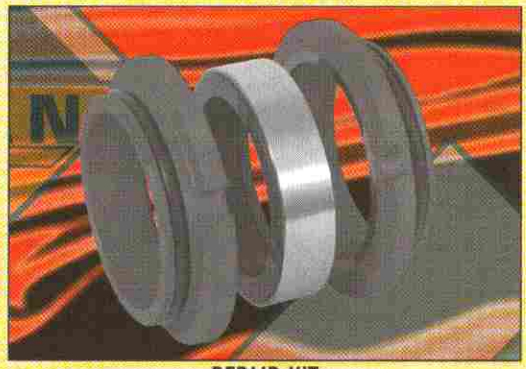
TYPE 1640



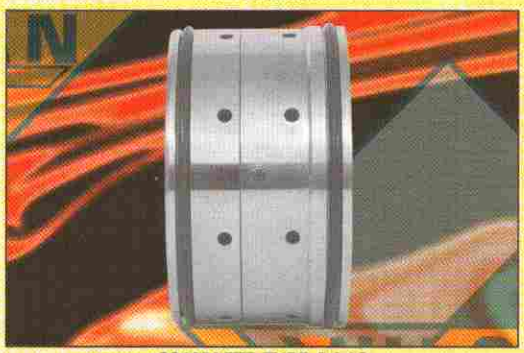
Available in either repair kit form, or as a complete mechanical seal assembly, fitted within the stainless steel outer collet.
The Vulcan Type 1640 is a direct replacement for the E.B.S. Seal fitted to the most common EMU® Pumps.
Repair kits comprise of all wear parts being; two stationaries with 'O'-Rings, central rotary with elastomer diaphragm, anti-rotation pins and springs for stationaries and retaining pins for the collets.

VULCAN STANDARD SIZES

Metric Shaft Size D	Size Code	D1	D2	D3	L1
35.00	0350	47.00	72.00	72.00	47.00
50.00	0500	63.00	90.00	92.00	52.00
75.00	0750	95.00	128.00	130.00	75.00



REPAIR KIT



COMPLETE TYPE 1640

VULCAN CODES

All Type 1640 seals are supplied as standard with Viton® Elastomers.
Where xxxx is stated in the code add the appropriate shaft size code.

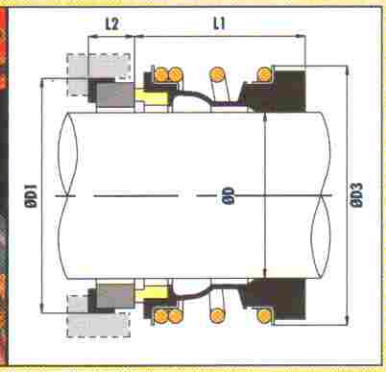
xxxx.1640.V.ZS.	Complete Type 1640 with Silicon Carbide Faces.
xxxx.1640.V.ZH.	Complete Type 1640 with Tungsten Carbide Faces
xxxx.1640.V.ZS.KIT	Repair kit with Silicon Carbide Faces.
xxxx.1640.V.ZH.KIT	Repair kit with Tungsten Carbide Faces.

STANDARD STOCK FACE MATERIALS
Rotary Face: Silicon Carbide, Tungsten Carbide.
Stat Ring: Silicon Carbide, Tungsten Carbide.
OTHER FACE MATERIALS TO ORDER

Suggested Operating Limits

PRESSURE 180psi SPEED 20m/s
TEMPERATURE -40 +200°C
Dependent upon shaft diameter and speed + Temperature and media to be sealed

VULCAN TYPE 192K SEALS TO SUIT KSB® PUMPS



Vulcan produce and stock a range of elastomer bellows seals to suit the most common types of standard KSB® pumps. Available from stock with carbon or silicon carbide rotary faces with silicon carbide seats, in the three standard elastomers.

VULCAN STANDARD SIZES

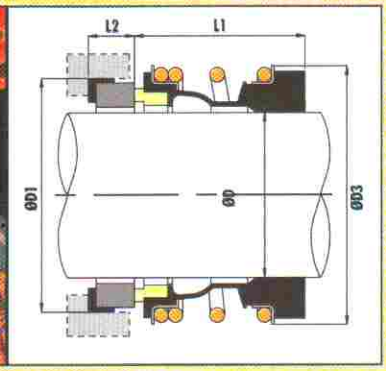
Size Code	Metric Shaft Size D	D1	D3	L1	L2
0100	10	19.60	20.00	26.00	6.60
0150	15	25.00	25.00	28.40	6.60
0160	16	27.00	26.00	22.20	8.60
0220	22	37.00	36.00	25.50	12.10
0280	28	43.00	47.00	36.50	14.40
0380	38	56.00	58.00	42.00	13.20
0480	48	66.00	69.00	50.50	9.60

VULCAN CODING

Where XXXX is stated in the code, add the appropriate size code.
If E.P. or Viton® is required, replace the N character in the code with an E or V.
If carbon vs. silicon carbide faces are required, replace the S character in the code with a D.

XXXX.192K.N.S. Complete seal, with silicon carbide rotary face vs. silicon carbide boot seat.

VULCAN TYPE 197 SEALS TO SUIT KSB® PUMPS



Vulcan produce a range of elastomer bellows seals to replace the "SU" range of KSB® seals. Available to order with carbon or silicon carbide rotary faces with silicon carbide seats, in the three standard elastomers.

VULCAN STANDARD SIZES

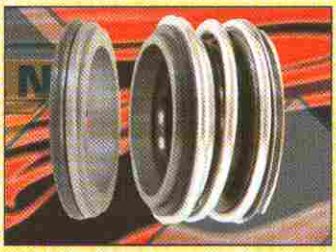
Shaft Size DØ	Size Code	D1	D2	L1	L2	OEM Seal Code
10mm	0100	21.00	22.00	14.40	6.60	SU 010
15mm	0150	24.00	28.00	17.00	7.00	SU 015
28mm	0280	35.50	47.00	26.50	9.00	SU 028
30mm	0300	37.00	48.00	26.50	10.50	SU 030
33mm	0330	38.50	51.00	27.50	11.00	SU 033
43mm	0430	42.00	63.00	30.00	12.00	SU 043
48mm	0480	42.00	69.00	30.50	11.50	SU 048
75mm	0750	54.00	102.00	40.00	14.00	SU 075
90mm	0900	60.00	123.00	45.00	15.00	SU 090

VULCAN CODING

Where XXXX is stated in the code, add the appropriate size code.
If Nitrile or E.P. is required, replace the V character in the code with an N or E.
If carbon vs. silicon carbide faces are required, replace the S character in the code with a D.

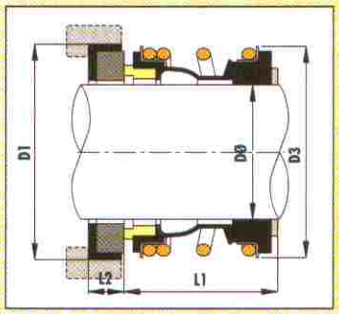
XXXX.197.V.S.

VULCAN TYPE 195 SEALS FOR ABS® PUMPS



Vulcan produce a range of elastomer bellows seals to replace the bellows lower seals found in common ABS® submersible pumps. Available from stock in silicon carbide rotary faces with silicon carbide seats, in the same style as the OEM seals. Unless stated, all sizes are supplied complete with the necessary back washer to separate the bellows from shaft circlip.

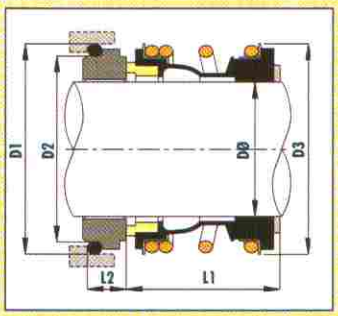
STYLE A - WITH BOOT MOUNTED SEATS - SILICON CARBIDE VS SILICON CARBIDE



Shaft Size DØ	Size Code	D1	D3	L1	L2	OEM Part No.
20mm*	0200	35.00	29.50	21.50	7.50	11110001
25mm	0250	40.50	41.00	22.50	8.50	11110095
30mm	0300	50.80	47.00	23.50	9.10	11110096
40mm*	0400	58.00	60.00	30.00	9.00	11110144
45mm	0450	65.50	65.00	32.00	12.00	11110093, 11110109
55mm	0550	76.20	78.00	35.00	15.50	11110135, 11110136
80mm	0800	104.00	108.00	40.00	15.00	11110051

NB* = 20mm & 40mm SIZES ARE CODED AS STANDARD VULCAN TYPE 19B. NOT SUPPLIED WITH WASHER AS IT IS NOT REQUIRED.

STYLE B - WITH O-RING MOUNTED BEZEL SEATS - SILICON CARBIDE vs. SILICON CARBIDE



Shaft Size DØ	Size Code	D1	D2	D3	L1	L2	OEM Part No.
40mm	0400	58.00	52.00	60.00	27.50	10.50	11110055
48mm	0480	67.00	59.00	69.00	31.50	13.00	11110003
65mm	0650	86.00	77.00	90.00	39.00	12.00	11110050
90mm	0900	114.00	105.20	126.00	45.00	13.30	11110052
100mm	1000	123.30	114.50	131.00	45.70	14.00	11110053

NB - OLDER PART NUMBERS CAN ALSO HAVE ONLY 7 DIGITS, WITH A MIDDLE ZERO MISSING.

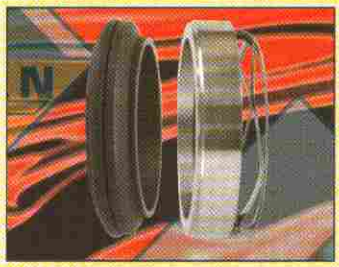
VULCAN CODING

Where XXXX is stated in the code, add the appropriate size code.

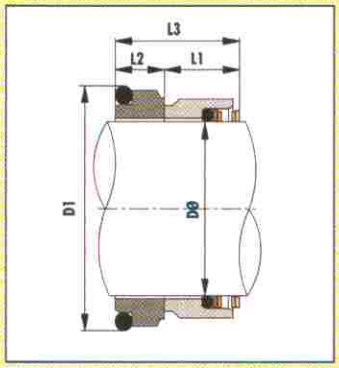
If Viton® is required, replace the N character in the code with a V. If carbon vs. silicon carbide faces are required, replace the S character in the code with a D.

XXXX.195.N.S. Complete seal, with silicon carbide rotary face vs. silicon carbide.

VULCAN TYPE 1632 SEALS FOR ABS® PUMPS



Vulcan produce a range of 'O'-ring mounted wave-spring seals to replace the upper seals found in common ABS® submersible pumps. Common sizes available from stock with stainless steel rotary faces with carbon seats, in the same style as the OEM seals.



Shaft Size DØ	Size Code	D1	L1	L2	L3	OEM Part No.
20mm	USE VULCAN SEAL CODE 0200.A18.N.Q.					11100066
45mm	0450	65.00	15.60	14.50	30.10	-
48mm	0480	67.00	15.60	14.50	30.10	11100048, 11100058
65mm	0650	86.00	17.80	15.30	33.10	11100059
80mm	0800	104.00	19.50	16.30	35.80	11100053
90mm	0900	114.00	19.50	16.30	35.80	11100055

NB - OLDER PART NUMBERS CAN ALSO HAVE ONLY 7 DIGITS, WITH A MIDDLE ZERO MISSING.

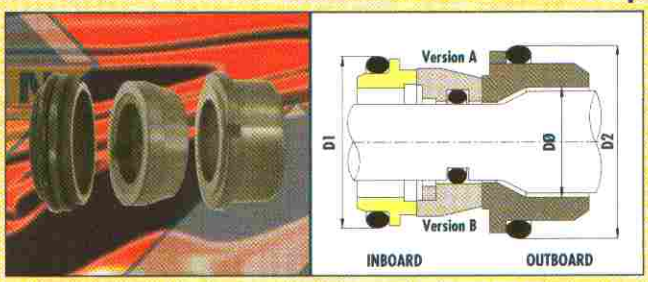
VULCAN CODING

Where XXXX is stated in the code, add the appropriate size code.

If Viton® is required, replace the N character in the code with a V.

XXXX.1632.N.P. Complete seal, with stainless steel rotary face vs. carbon 'O'-ring seat.

TYPE 86 Seals to suit Sarlin® (Grundfos®) Pumps



The Vulcan Type 86 is an 'O'-ring mounted seal face kit to suit Sarlin® pumps fitted with single seals with three-faces. Available from stock with silicon carbide inboard seat, carbon outboard seat, and silicon carbide central rotary faces, with Viton® 'O'-rings.

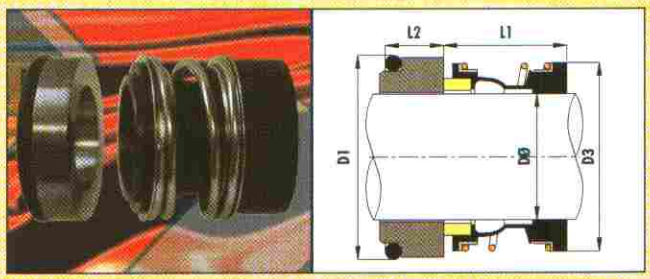
Shaft Size DØ	Size Code	D1	D2	Version
16mm	0160	35.00	28.00	A
24mm	0240	45.00	48.00	A
30mm	0300	45.00	48.00	B
38mm	0380	56.00	53.50	A

VULCAN CODING

Where XXXX is stated in the code, add the appropriate size code.
If nitrile is required, replace the V character in the code with an N.

XXXX.86.V.ZS. Complete seal, with silicon carbide inboard seat, silicon carbide central rotary face vs. carbon outboard seat.

TYPE 192G Seals to suit Grundfos® Pumps



Vulcan manufacture and stock an elastomer bellows seal that is designed to replace the Grundfos seal styles "A-", "B-" & "C-" with a single superior performing and easier to instal seal design. Available from stock in carbon vs. tungsten carbide, or tungsten carbide vs. tungsten carbide, in E.P. or Viton® elastomers.

Shaft Size DØ	Size Code	D1	D3	L1	L2
12mm	0120	23.00	24.00	25.90	15.00
16mm	0160	27.00	28.00	28.40	12.30
22mm	0220	37.00	36.50	30.00	11.10
33mm	0330	48.00	51.00	35.00	7.50

VULCAN CODING

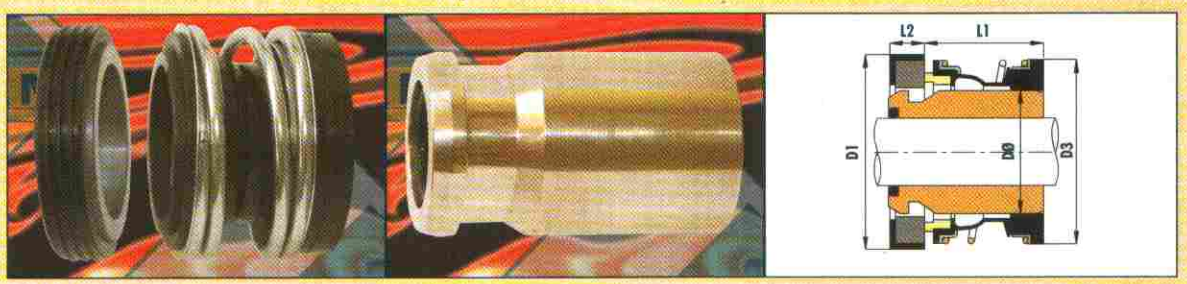
Where XXXX is stated in the code, add the appropriate size code.
If E.P. is required, replace the V character in the code with an E.

XXXX.192G.V.E. Complete seal, with carbon rotary face vs. tungsten carbide 'O'-ring seat.

XXXX.192G.V.H. Complete seal, with tungsten carbide rotary face vs. tungsten carbide 'O'-ring seat.

Vulcan offers a range of further seal types to suit Grundfos® pumps. The Vulcan Type 953 and 954 replace the "H-Type" and "E-Type" respectively. To replace the "D-Type" the Vulcan Type 40L can be utilised, and the Vulcan Type 19 series will replace the "G-Type". Please enquire for more detailed information regarding Vulcan replacement seals for Grundfos® pumps, seal part number or repair kit numbers.

TYPE 191 Seals to suit Wilo® Pumps



Vulcan manufactures and stocks two sizes of Type 191 elastomer bellows seals to suit common Wilo® heating pumps. Available from stock in carbon vs. silicon carbide with E.P. elastomers. Seals are also available with brass shaft sleeves. Other shaft sizes such as 14mm, 17mm and 22mm are available, please enquire for details.

Shaft Size DØ	Size Code	D1	D3	L1	L2
32mm	0320	50.80	51.00	33.34	12.00
55mm	0550	76.20	78.00	41.00	12.00

VULCAN CODING

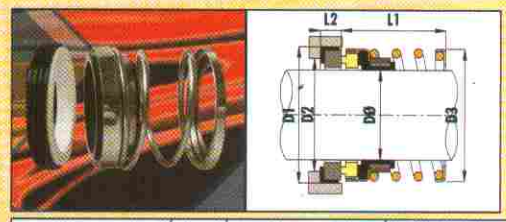
Where XXXX is stated in the code, add the appropriate size code.

XXX.191.E.D. Complete seal, with carbon rotary face vs. silicon carbide boat seat.

XXXX.191.E.D.KIT Complete seal and gasket kit, including brass sleeve.

XXXX.191.SLEE Brass shaft sleeve and shaft 'O'-ring only.

TYPE 11, 1511, 194 and 41 Seals for Hidrostal® Pumps

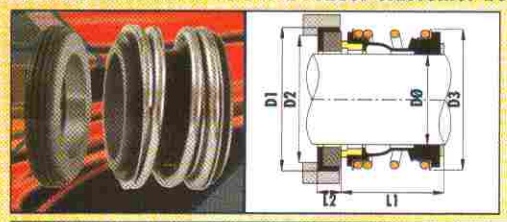


Vulcan standard Type 11 diaphragm seals and 1511 elastomer bellows seals to replace the "C-" & "V-" seals in Hidrostal® pumps. Available from stock with carbon or silicon carbide rotary faces and ceramic or silicon carbide seats.

Shaft Size DØ		Size	D1		D2		D3		L1		L2		OEM SEAL
Inch	Metric	Code	Metric	Inch	Metric	Inch	Metric	Inch	Metric	Inch	Metric	Inch	CODE
0.875	22.23	0222	38.10	1.500	30.15	1.187	33.40	1.315	23.80	0.937	10.28	0.405	C 0.6 , V 0.6
1.125	28.58	0286	44.44	1.750	36.50	1.437	46.30	1.823	26.97	1.062	11.10	0.437	C 1.1 , V 1.1
1.375	34.93	0349	50.80	2.000	42.84	1.687	52.60	2.071	28.58	1.125	11.10	0.437	C 1.3
1.500	38.10	0381	53.98	2.125	46.05	1.813	55.80	2.197	28.58	1.125	11.10	0.437	C 1.5
2.000	50.80	0508	69.85	2.750	60.32	2.375	73.00	2.874	38.10	1.500	12.70	0.500	C 2.0
2.500	63.50	0635	85.73	3.375	68.25	2.687	84.90	3.343	46.02	1.812	14.28	0.562	C 2.5
3.000	76.20	0762	98.43	3.875	80.95	3.187	102.70	4.043	52.37	2.062	15.90	0.626	C 3.0

Working dimensions for Type 11 and 1511 are identical and the seals are thus interchangeable.

THE VULCAN TYPE 194 is a robust elastomer bellows seal to replace the "G-" seals found in Hidrostal® pumps

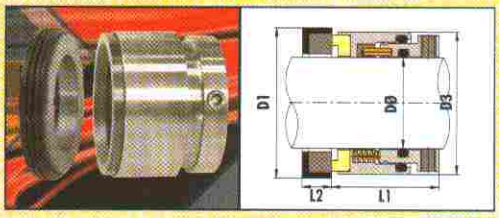


Available with silicon carbide rotary faces and silicon carbide boot seats. Size codes marked with "*" are supplied complete with the necessary back washer to separate the bellows from shaft circlip.

Shaft Size DØ		Size	D1		D2		D3		L1		L2		OEM SEAL
Inch	Metric	Code	Metric	Inch	Metric	Inch	Metric	Inch	Metric	Inch	Metric	Inch	CODE
0.625	15.88	0158*	30.14	1.187	22.23	0.875	28.00	1.102	22.22	0.875	10.28	0.405	G 016 , M 0.6
0.787	20.00	0200	38.10	1.500	26.90	1.059	36.00	1.417	30.00	1.181	10.00	0.394	G 020
0.787	20.00	M0200	38.10	1.500	26.90	1.059	36.00	1.417	21.50	0.846	10.00	0.394	M 020, G 020KZ
1.125	28.58	0286	44.44	1.750	36.50	1.437	47.00	1.850	26.97	1.062	11.10	0.437	G 1.1
1.500	38.10	0381	53.98	2.125	46.05	1.813	58.00	2.283	28.58	1.125	11.10	0.437	G 1.5
2.000	50.80	0508	69.85	2.750	60.32	2.375	71.00	2.795	38.10	1.500	12.70	0.500	G 2.0
2.500	63.50	0635	85.73	3.375	68.25	2.687	90.00	3.543	46.02	1.812	14.28	0.562	G 2.5
3.000	76.20	0762	98.43	3.875	80.95	3.187	102.00	4.016	52.37	2.062	15.90	0.626	G 3.0
3.740	95.00	0950	123.85	4.876	106.00	4.173	131.00	5.157	60.30	2.374	19.10	0.752	G 095
3.937	100.00	1000	123.85	4.876	106.00	4.173	131.00	5.157	60.30	2.374	19.10	0.752	G 100

NB: OEM SEAL CODE G 020K can be replaced by Vulcan standard code 0200.19B.V.S.

THE VULCAN TYPE 41



The Vulcan Type 41 is a unitised, highly robust, balanced multi-spring design seal, to provide an alternative lower seal. With the springs protected from the media, to prevent seal damage and clogging, that often leads to premature seal failure.

Shaft Size DØ		Size	D1		D3		L1		L2		OEM SEAL
Inch	Metric	Code	Metric	Inch	Metric	Inch	Metric	Inch	Metric	Inch	CODE
1.125	28.58	0286	44.44	1.750	44.00	1.732	30.00	1.181	8.10	0.319	G 1.1
1.500	38.10	0381	53.98	2.125	54.80	2.157	31.60	1.244	8.10	0.319	G 1.5
2.000	50.80	0508	69.85	2.750	67.60	2.661	38.10	1.500	12.70	0.500	G 2.0 , X 2.0T
2.500	63.50	0635	85.73	3.375	78.30	3.082	46.20	1.812	14.28	0.562	G 2.5 , X 2.5
3.000	76.20	0762	98.43	3.875	93.70	3.689	52.40	2.063	15.90	0.626	G 3.0 , X 3.0
3.740	95.00	0950	123.85	4.876	128.00	5.039	62.90	2.477	16.50	0.649	G 095 , X 095
3.937	100.00	1000	123.85	4.876	128.00	5.039	62.90	2.477	16.50	0.649	G 100 , X 100
4.528	115.00	1150	142.88	5.625	144.50	5.689	48.30	1.902	12.50	0.492	X 115 , N 115
4.724	120.00	1200	142.88	5.625	144.50	5.689	48.30	1.902	12.50	0.492	X 120 , N 120

Seal sizes upto and including 3.000" utilise boot-mounted seats. Sizes over 3.000" utilise 'O'-ring mounted seats.

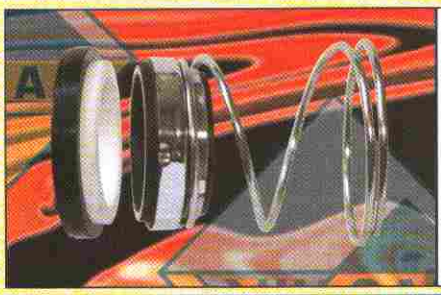
VULCAN CODING

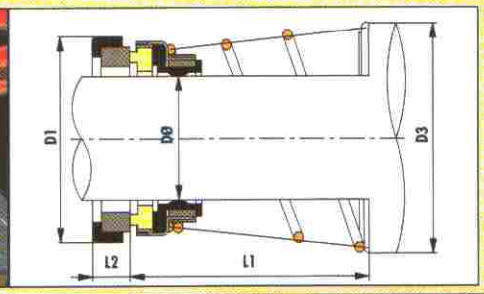
Where XXXX is stated in the code, add the appropriate size code. If nitrile is required, replace the V character in the code with an N

XXXX.11.N.C.	Complete Seal, carbon rotary face vs. ceramic boot seat
XXXX.1511.N.C.	Complete Seal, carbon rotary face vs. ceramic boot seat
XXXX.194.V.S.	Complete Seal, silicon carbide rotary face vs. silicon carbide boot seat
XXXX.41.V.S	Complete Seal, silicon carbide rotary face vs. silicon carbide boot seat

VULCAN TYPE 277 & 278 MECHANICAL SEALS FOR THUNE-EUREKA® PUMPS

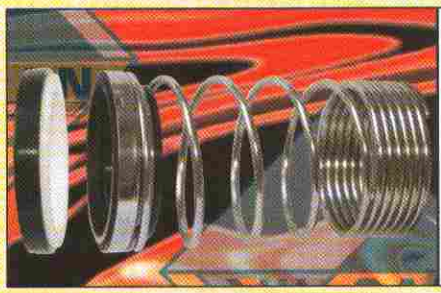
Vulcan manufacture and stock the Type 277 and 278 diaphragm bellows seal ranges to suit the unique dimensions required in the "CG-series" range of pumps. The Type 277 has reverse-tapered coils, while the Type 278 has distinctive lengthened parallel coils.

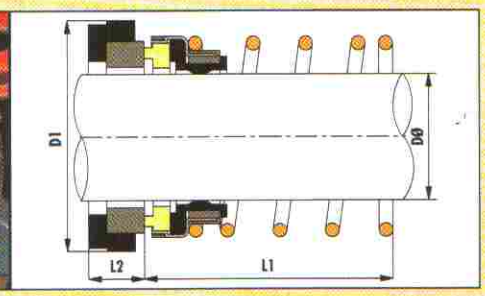




Common sizes are available from stock in carbon vs. ceramic, with nitrile elastomers. Other material combinations available to order.

Shaft Size DØ	Size Code	D1	D2	L1	L2	OEM Pump Code
29.00	0290	47.63	46.00	32.00	11.99	CGA
35.00	0350	53.98	53.00	31.50	11.99	CGB
41.00	0410	60.35	59.30	32.50	11.99	CGC
48.00	0480	66.70	66.00	38.50	11.99	CGD
54.00	0540	73.05	70.00	41.00	13.50	CGE





Shaft Size DØ		Size Code	D1		D3		D4	
Inch	Metric		Metric	Inch	Metric	Inch	Metric	Inch
1.875	47.60	0476	66.70	2.626	79.40	3.126	11.99	0.472
2.375	60.33	0603	79.40	3.126	82.60	3.252	13.50	0.531

VULCAN SEALS TO SUIT IMO® PUMPS

Vulcan manufacture and stock a complete range of standard seals to suit IMO® pumps; please contact us with the complete pump model reference or seal part number. Vulcan have also designed a special Type 1689 & 1690 seal to suit the ACE025, ACE032 and ACE038 generation three pumps fitted with the three-part seals.

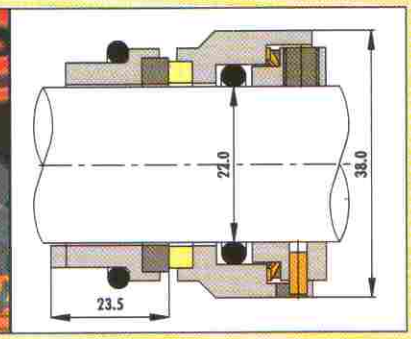


Photo illustrates Type 1690, Type 1689 has straight outer rotary profile.

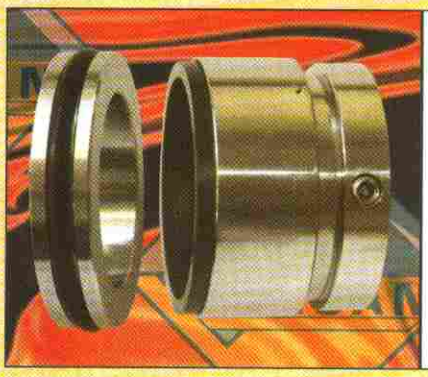
The Vulcan seal fits in exactly the same space as the original seal, but follows standard Vulcan design practice and offers a superior performing, easier to install mechanical seal.

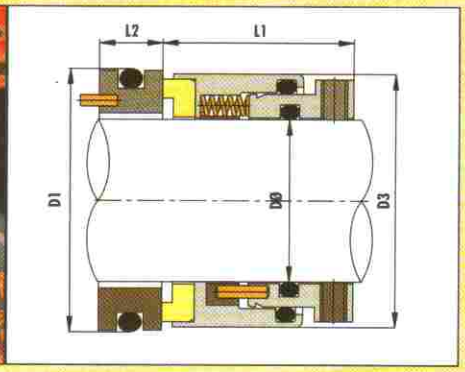
VULCAN CODING

If nitrile is required, replace the V character in the code with an N

XXXX.277.N.C.	Complete seal, with carbon rotary face vs. ceramic boot seat.
XXXX.278.N.C.	Complete seal, with carbon rotary face vs. ceramic boot seat.
0220.1689.V.S.	Complete seal, with silicon carbide rotary face vs. silicon carbide 'O'-ring seat.
0220.1690.V.S.	Complete seal, with silicon carbide rotary face vs. silicon carbide 'O'-ring seat.

TYPE 40 BALANCED INTERNAL SEALS





Vulcan's Type 40 is a multiple-spring, 'O'-ring mounted, set-screw driven, non-clogging, balanced mechanical seal. The balanced design, protected springs and dynamic 'O'-ring enable use in demanding applications. Available with a wide variety of seats, Types 40H (UK) & 40J (USA housing dimensions) are illustrated here.

VULCAN STANDARD SIZES: IMPERIAL SHAFTS

Shaft Size DØ		Size Code	D3		D4		L1		D1 40H Seat		L2 40H Seat		D1 40J Seat		L2 40J Seat	
Metric	Inch		Metric	Inch	Metric	Inch	Metric	Inch	Metric	Inch	Metric	Inch	Metric	Inch	Metric	Inch
19.05	0.750	0191	33.50	1.319	35.00	1.378	30.00	1.181	34.15	1.344	10.30	0.406	34.93	1.375	10.30	0.406
22.23	0.875	0222	36.50	1.437	38.00	1.496	30.00	1.181	37.30	1.469	10.30	0.406	38.10	1.500	10.30	0.406
25.40	1.000	0254	39.60	1.559	41.30	1.626	30.00	1.181	40.50	1.594	10.30	0.406	41.28	1.625	11.10	0.437
28.58	1.125	0286	43.00	1.693	44.50	1.752	32.50	1.280	47.63	1.875	11.90	0.469	44.44	1.750	11.10	0.437
31.75	1.250	0317	46.10	1.815	48.00	1.890	32.50	1.280	50.80	2.000	11.90	0.469	47.63	1.875	11.10	0.437
34.93	1.375	0349	49.00	1.929	51.00	2.008	32.50	1.280	53.98	2.125	11.90	0.469	50.80	2.000	11.10	0.437
38.10	1.500	0381	53.00	2.087	54.00	2.126	34.00	1.339	57.15	2.250	11.90	0.469	53.98	2.125	11.10	0.437
41.28	1.625	0412	56.00	2.205	58.00	2.283	34.00	1.339	60.35	2.376	11.90	0.469	60.33	2.375	12.70	0.500
44.45	1.750	0444	59.20	2.331	62.50	2.461	34.00	1.339	63.50	2.500	11.90	0.469	63.50	2.500	12.70	0.500
47.63	1.875	0476	62.40	2.457	63.50	2.500	34.00	1.339	66.70	2.626	11.90	0.469	66.68	2.625	12.70	0.500
50.80	2.000	0508	65.60	2.583	67.60	2.661	34.50	1.358	69.85	2.750	13.50	0.531	69.85	2.750	12.70	0.500
53.98	2.125	0539	68.80	2.709	70.80	2.787	34.50	1.358	73.05	2.876	13.50	0.531	76.20	3.000	14.30	0.563
57.15	2.250	0571	71.90	2.831	73.90	2.909	34.50	1.358	76.20	3.000	13.50	0.531	79.30	3.122	14.30	0.563
60.33	2.375	0603	75.20	2.961	77.20	3.039	34.50	1.358	79.40	3.126	13.50	0.531	82.55	3.250	14.30	0.563
63.50	2.500	0635	78.30	3.083	80.30	3.161	34.50	1.358	82.55	3.250	13.50	0.531	85.73	3.375	14.30	0.563
66.68	2.625	0666	84.20	3.315	88.20	3:472	36.00	1.417	92.10	3.626	15.90	0.626	85.73	3.375	15.90	0.626
69.85	2.750	0698	87.40	3.441	91.40	3.598	36.00	1.417	95.25	3.750	15.90	0.626	88.90	3.500	15.90	0.626
73.03	2.875	0730	90.60	3.567	94.60	3.724	36.00	1.417	98.45	3.876	15.90	0.626	95.25	3.750	15.90	0.626
76.20	3.000	0762	93.70	3.689	95.50	3.760	36.00	1.417	101.65	4.002	15.90	0.626	98.43	3.875	15.90	0.626
79.38	3.125	0793	97.00	3.819	99.00	3.898	36.00	1.417	111.15	4.376	19.90	0.783	101.60	4.000	19.88	0.783
82.55	3.250	0825	100.00	3.937	102.00	4.016	36.00	1.417	114.30	4.500	19.90	0.783	104.78	4.125	19.88	0.783
85.73	3.375	0857	103.30	4.067	105.30	4.146	36.00	1.417	117.50	4.626	19.90	0.783	107.95	4.250	19.88	0.783
88.90	3.500	0889	106.40	4.189	108.50	4.272	36.00	1.417	120.65	4.750	19.90	0.783	111.13	4.375	19.88	0.783
92.08	3.625	0920	109.60	4.315	111.50	4.390	36.00	1.417	123.85	4.876	19.90	0.783	114.30	4.500	19.88	0.783
95.30	3.750	0953	112.80	4.441	115.00	4.528	36.50	1.437	127.00	5.000	19.90	0.783	117.48	4.625	19.88	0.783
98.00	3.875	0984	116.00	4.567	118.00	4.646	36.50	1.437	130.20	5.126	19.90	0.783	120.65	4.750	19.88	0.783
101.60	4.000	1016	119.20	4.693	121.50	4.783	36.50	1.437	133.35	5.250	19.90	0.783	123.83	4.875	19.88	0.783

STANDARD STOCK FACE MATERIALS

Rotary Face: Carbon, Silicon Carbide, Tungsten Carbide

Static Face : Stainless Steel, Ni-resist, Ceramic, Silicon Carbide, Tungsten Carbide

OTHER FACE MATERIALS TO ORDER

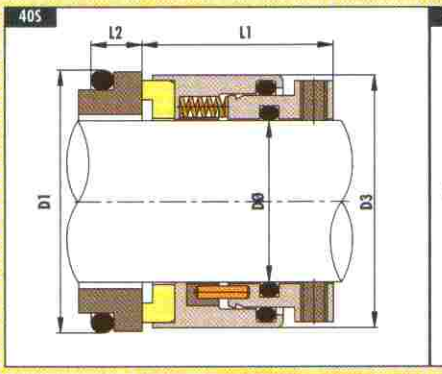
Suggested Operating Limits

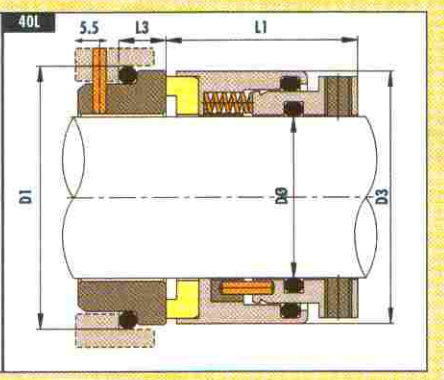
PRESSURE 350psi SPEED 25m/s

TEMPERATURE -30 +200°C

Dependent upon shaft diameter and speed + Temperature and media to be sealed

TYPE 40 BALANCED INTERNAL SEALS





Vulcan's Type 40 is a multiple-spring, 'O'-ring mounted, set-screw driven, non-clogging, balanced mechanical seal. The balanced design, protected springs and dynamic 'O'-ring enable use in demanding applications. Available with a wide variety of seats, Types 40S & 40L are illustrated here.

VULCAN STANDARD SIZES: METRIC SHAFTS

Shaft Size DØ		Size Code	D1		D3		D4		L1		L2		L3		Slot Width	
Metric	Inch		Metric	Inch	Metric	Inch	Metric	Inch	Metric	Inch	Metric	Inch	Metric	Inch	Metric	Inch
18.00	0.709	0180	33.00	1.299	32.50	1.280	34.00	1.339	30.00	1.181	11.50	0.453	10.00	0.394	5.00	0.197
19.00	0.748	0190	35.00	1.378	33.50	1.319	35.00	1.378	30.00	1.181	11.50	0.453	10.00	0.394	5.00	0.197
20.00	0.787	0200	35.00	1.378	34.50	1.358	36.00	1.417	30.00	1.181	11.50	0.453	10.00	0.394	5.00	0.197
22.00	0.866	0220	37.00	1.457	36.50	1.437	38.00	1.496	30.00	1.181	11.50	0.453	10.00	0.394	5.00	0.197
24.00	0.945	0240	39.00	1.535	38.50	1.516	40.00	1.575	30.00	1.181	11.50	0.453	10.00	0.394	5.00	0.197
25.00	0.984	0250	40.00	1.575	39.50	1.555	41.00	1.614	30.00	1.181	11.50	0.453	10.00	0.394	5.00	0.197
28.00	1.102	0280	43.00	1.693	42.50	1.673	44.00	1.732	32.50	1.280	11.50	0.453	10.00	0.394	5.00	0.197
30.00	1.181	0300	45.00	1.772	44.50	1.752	46.00	1.811	32.50	1.280	11.50	0.453	10.00	0.394	5.00	0.197
32.00	1.260	0320	48.00	1.890	46.00	1.811	48.00	1.890	32.50	1.280	11.50	0.453	10.00	0.394	5.00	0.197
33.00	1.299	0330	48.00	1.890	47.00	1.850	49.00	1.929	32.50	1.280	11.50	0.453	10.00	0.394	5.00	0.197
35.00	1.378	0350	50.00	1.969	49.30	1.941	51.00	2.008	32.50	1.280	11.50	0.453	10.00	0.394	5.00	0.197
38.00	1.496	0380	56.00	2.205	52.80	2.079	54.80	2.157	34.00	1.339	12.50	0.492	11.00	0.433	5.00	0.197
40.00	1.575	0400	58.00	2.283	56.00	2.205	58.00	2.283	34.00	1.339	12.50	0.492	11.00	0.433	5.00	0.197
42.00	1.654	0420	61.00	2.402	56.00	2.205	58.00	2.283	34.00	1.339	12.50	0.492	11.00	0.433	5.00	0.197
43.00	1.693	0430	61.00	2.402	59.00	2.323	61.00	2.402	34.00	1.339	12.50	0.492	11.00	0.433	5.00	0.197
44.00	1.732	0440	63.00	2.480	59.00	2.323	61.00	2.402	34.00	1.339	12.50	0.492	11.00	0.433	5.00	0.197
45.00	1.772	0450	63.00	2.480	59.00	2.323	61.00	2.402	34.00	1.339	12.50	0.492	11.00	0.433	5.00	0.197
48.00	1.890	0480	66.00	2.598	62.40	2.457	64.40	2.535	34.00	1.339	12.50	0.492	11.00	0.433	5.00	0.197
50.00	1.969	0500	70.00	2.756	65.60	2.583	67.60	2.661	34.50	1.358	14.50	0.571	13.00	0.512	5.00	0.197
53.00	2.087	0530	73.00	2.874	68.80	2.709	70.80	2.787	34.50	1.358	14.50	0.571	13.00	0.512	5.00	0.197
55.00	2.165	0550	75.00	2.953	70.80	2.787	73.00	2.874	34.50	1.358	14.50	0.571	13.00	0.512	5.00	0.197
58.00	2.283	0580	78.00	3.071	75.20	2.961	77.20	3.039	34.50	1.358	14.50	0.571	13.00	0.512	5.00	0.197
60.00	2.362	0600	80.00	3.150	75.20	2.961	77.20	3.039	34.50	1.358	14.50	0.571	13.00	0.512	5.00	0.197
63.00	2.480	0630	83.00	3.268	78.30	3.083	80.30	3.161	34.50	1.358	14.50	0.571	13.00	0.512	5.00	0.197
65.00	2.559	0650	85.00	3.346	84.20	3.315	88.20	3.472	36.50	1.437	14.50	0.571	13.00	0.512	5.00	0.197
68.00	2.677	0680	90.00	3.543	85.50	3.366	88.20	3.472	36.50	1.437	16.50	0.650	15.30	0.602	5.00	0.197
70.00	2.756	0700	92.00	3.622	87.50	3.445	91.40	3.598	36.50	1.437	16.50	0.650	15.30	0.602	5.00	0.197
75.00	2.953	0750	97.00	3.819	92.70	3.650	97.70	3.846	36.50	1.437	16.50	0.650	15.30	0.602	5.00	0.197
80.00	3.150	0800	105.00	4.134	100.00	3.937	104.00	4.094	36.50	1.437	17.50	0.689	15.70	0.618	5.00	0.197
85.00	3.346	0850	110.00	4.331	103.00	4.055	107.30	4.224	36.50	1.437	17.50	0.689	15.70	0.618	5.00	0.197
90.00	3.543	0900	115.00	4.528	109.60	4.315	113.60	4.472	36.50	1.437	17.50	0.689	15.70	0.618	5.00	0.197
95.00	3.740	0950	120.00	4.724	112.80	4.441	114.00	4.488	36.50	1.437	17.50	0.689	15.70	0.618	5.00	0.197
100.00	3.937	1000	125.00	4.921	117.50	4.626	119.00	4.685	36.50	1.437	17.50	0.689	15.70	0.618	5.00	0.197

Suggested Operating Limits

PRESSURE 350psi SPEED 25m/s

TEMPERATURE -30 +200°C

Dependent upon shaft diameter and speed + Temperature and media to be sealed

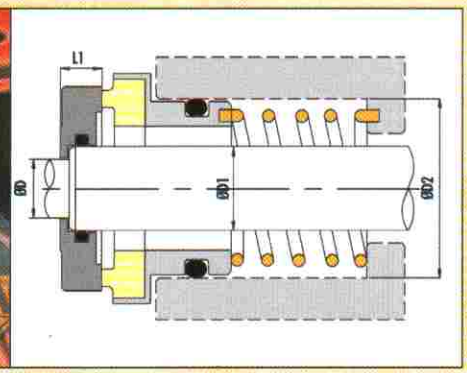
STANDARD STOCK FACE MATERIALS

Rotary Face: Carbon, Silicon Carbide, Tungsten Carbide

Static Face: Ceramic, Silicon carbide, Tungsten Carbide

OTHER FACE MATERIALS TO ORDER

VULCAN TYPE 94 STATIONARY SEALS TO SUIT TUCHENHAGEN® PUMPS



Vulcan produce and stock a complete range of balanced seals to suit the Tuchenhagen® A and Z series pumps, seal types F1 to F5. Available with inserted carbon face seal heads, and inserted silicon carbide, or chrome dioxide coated stainless steel rotary counterfaces. E.P. 'O'-Rings are fitted as standard. If Nitrile or Viton® is required, please specify this at time of order.

VULCAN STANDARD SIZES

Metric Shaft size D	Size Code	D1	D2	L1
12	0120	16.0	30.0	7.0
18	0180	24.0	50.0	11.0
21	0210	25.0	50.0	11.0
28	0280	35.0	50.0	11.0
40	0400	50.0	64.0	14.0

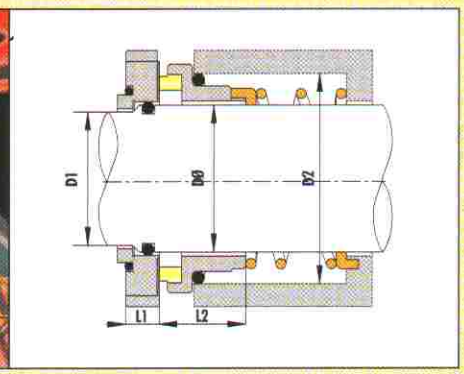
VULCAN CODING.

NB:- Shaft size is measured from the minimum ID of the rotary counterface. If Nitrile or Viton® is required, replace the E character in the code with an N or V. Where xxxx is stated in the code, add the relevant size code according to the dimension table.

xxxx.94.E.D. — Type 94 seal, with carbon faced head, and inserted silicon carbide counterface

xxxx.94.E.O. — Type 94 seal, with carbon faced head, and chrome dioxide coated counterface

VULCAN TYPE B94 STATIONARY SEALS TO SUIT TUCHENHAGEN® PUMPS



Modified vulcan type 94 seals with turning vanes cut into the OD of the Rotary faces to agitate pumping media.
Standard materials are solid steel rotary rings with inserted carbon faced Sprung statics. E.P. 'O'-Rings are fitted as standard. If Nitrile or Viton® is required, please specify this at time of order. All sizes are supplied complete with both running faces and stationary coil.

VULCAN STANDARD SIZES

Metric Shaft size D	Size Code	D1	D2	L1	L2	OEM Pump Code
21.00	0210	18.00	40.00	10.00	28.00	VP 7.5
30.00	0300	22.00	55.00	11.00	30.00	VP 15
35.00	0350	30.00	55.00	11.00	30.00	VP 37

VULCAN CODING.

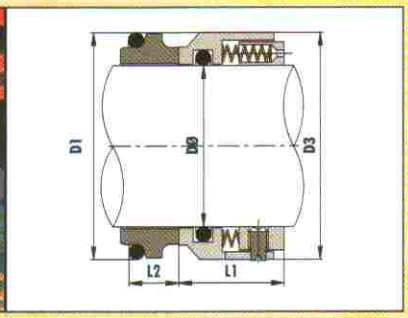
Where XXXX is stated in the code, add the appropriate size code. If Viton® is required, replace the E character in the code with a V.

XXXX.B94.E.P. — Complete seal, with Stainless steel rotary face vs. inserted carbon face sprung stationary.

VULCAN SEALS TO SUIT SARLIN® (GRUNDFOS®) PUMPS

Vulcan manufacture and stock a range of replacements seals to suit all seal types found in common Sarlin® designed pumps.

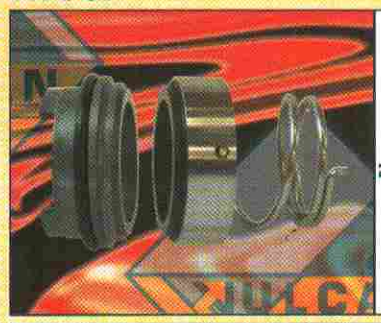
TYPE 1615

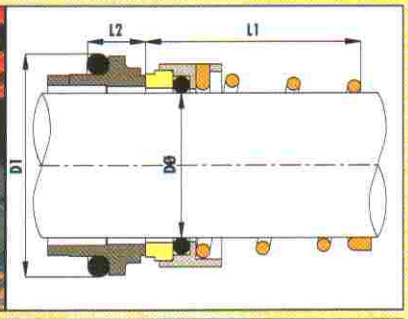


The Vulcan Type 1615 is an 'O'-ring mounted multi-spring seal to replace the upper seals found in older models of Sarlin® pumps. Available from stock with stainless steel rotary faces vs. antimony carbon seats, with Viton® 'O'-rings.

Shaft Size DØ	Size Code	D1	D2	L1	L2
30mm	0300	45.00	45.50	28.00	10.50
38mm	0380	56.00	55.00	31.00	14.00
50mm	0580	70.00	70.50	32.50	15.00

TYPE 81

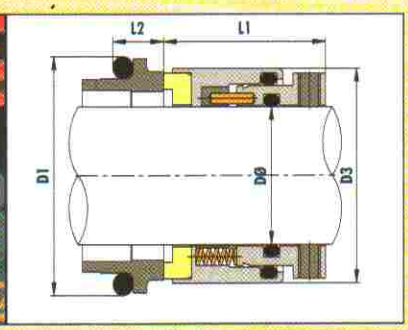




The Vulcan Type 81 is an 'O'-ring mounted tapered-spring seal to replace the lower seals with the distinctive design seats. Available from stock with silicon carbide rotary faces vs. silicon carbide seats, with Viton® 'O'-rings.

Shaft Size DØ	Size Code	D1	L1	L2
25mm	0250	38	26.5	10
32mm	0320	48	28.5	11
38mm	0380	55	33.5	11.5

TYPE 40S and 42



The Vulcan Types 40S and 42 are 'O'-ring mounted, hydraulically-balanced multi-spring seals to replace the upper and lower seals found in more recent designs of Sarlin® pumps.

Shaft Size DØ	Size Code	D1	D2	L1	L2	Seal Style
32.00	0320	48.0	46.0	38.0	11.0	42 LOWER SEAL
38.00	0380	56.0	52.8	38.0	11.5	42 LOWER SEAL
38.00	0380	56.0	52.8	34.0	11.0	40S UPPER SEAL
50.00	0500	70.0	65.6	34.5	9.5	40S UPPER SEAL
65.00	0650	85.0	84.2	36.0	11.0	40S UPPER SEAL
65.00	0650	85.0	84.2	65.5	11.5	42 LOWER SEAL

VULCAN CODING

Where XXXX is stated in the code, add the appropriate size code. If nitrile is required, replace the V character in the code with an N.

XXXX.1615.V.AP.	Complete seal, with stainless steel rotary face vs. antimony carbon seat.
XXXX.81.R.V.S.	Complete seal, with silicon carbide rotary face vs. silicon carbide seat.
XXXX.81.R.V.S.STAT	Stationary seat only, silicon carbide with Viton® 'O'-ring
XXXX.40S.V.D.	Complete upper seal, with carbon rotary face vs. silicon carbide seat.
XXXX.42.V.S.	Complete upper seal, with silicon carbide rotary face vs. silicon carbide seat

VULCAN MECHANICAL SEALS TO SUIT REFRIGERATION OEM APPLICATIONS

Vulcan have extensive sealing experience within the refrigeration industry, and have developed a comprehensive range of seals, fitted with the specific elastomers required to suit the exacting, cryogenic duties and refrigerants commonly found . As there are a wide range of compressor models, and generally each compressor has model specific seal arrangements, Vulcan have developed many seal designs to suit these compressor applications. Furthermore these seals can be fitted without amendment to the existing housings. Our exact designs, excellent materials, wide stock range and the ability to manufacture to any industry design or requirement, complement the Vulcan Refrigeration Seal range.


J & E Hall® V92


Howden® WRV205


Howden® WRV255 Mk 1


Sabroe® TCM028

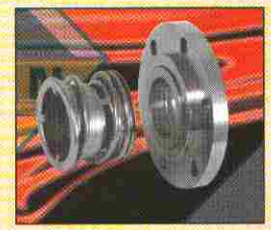
VULCAN SEALS OFFERED FOR OEM COMPRESSOR MODELS

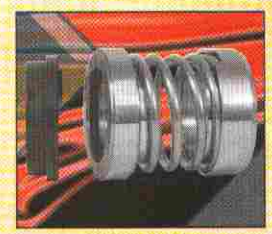
Bitzer® 4H, 6F & 6G
Bock AM & BFO Ranges
Bock F, FK & FKX Ranges
Carrier® 05K
Carrier® 05G
Carrier® 05H
Copeland® 2CC, 4CC & 6CC
Copeland® 8CC
Dunham Bush® Big 4
Frick® RWB-11-100
Frick® RWB-11-222E
Frick® RWB-11-222H
Gram® HC & HL Ranges
Grasso® RC9, non-bellows
Grasso® RC11, non-bellows
J & E Hall® 3/6CP
J & E Hall® HS18-20 screw
J & E Hall® HS20-20 screw
J & E Hall® HS20-31 screw
J & E Hall® HS21-20 screw
J & E Hall® V54 6-cyl (1.1/2" Shaft)
J & E Hall® V54 8-cyl (1.3/4" Shaft)
J & E Hall® V92 and variants
J & E Hall® V127 Mk 1-5
J & E Hall® V127 Mk 6
J & E Hall® V178
Howden® WGRB204
Howden® WRV163 & XRV163
Howden® WRV204 Mk4
Howden® WRV204 Mk5
Howden® WRV204 Mk6
Howden® XRV204

VULCAN SEALS OFFERED FOR OEM COMPRESSOR MODELS

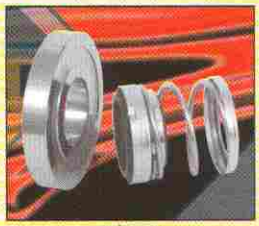
Howden® WRV205
Howden® WRV255 Mk1 to 4F
Howden® WRV255 Mk5
Howden® WRV321
Lightfoot® VQ8
Lightfoot® VT5
Lightfoot® VT6
Lightfoot® A.F36 Mk 3A
Lightfoot® A.F50 & A.F54
Sabroe® 128, non-bellows
Sabroe® 163, non-bellows
Sabroe® PKO
Sabroe® VMY Ranges
Sabroe® TSMC108 to 165
Sabroe® CM018
Sabroe® TCM024, 026 & 028
Sabroe® SMC100 to 104
Sabroe® TSMC108 to 165
Sabroe® HPC
Stal® S50 series
Stal® S70 series
Stal® P24
Stal® P28
Stal® U series
Thermo King® D214
Thermo King® 426 & 430
Thermo King® X426
Thermo King® X430
Thermo King® 426, X426 for R134A and R404A refrigerant gases
Witt® GP42 refrigeration pump
Witt® GP51 refrigeration pump


Copeland® 4CC

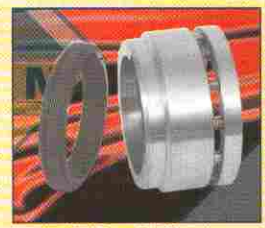

Carrier® 05G


J & E Hall® V54


Sabroe® CM018


Stal® P24


J & E Hall® HS18-20


Grasso® RC9


Sabroe® TSMC108

Vulcan Direct Replacement Seals For Food, Beverage And Dairy Industries

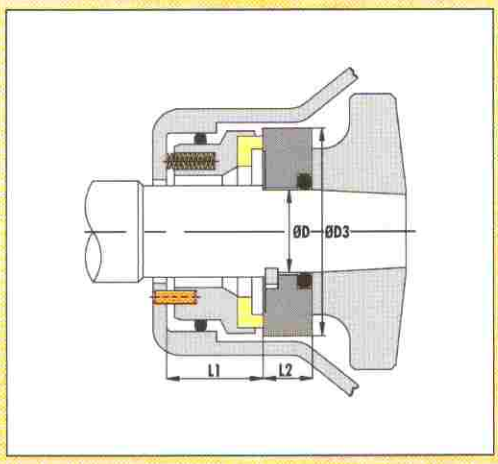
Vulcan offer the widest range of direct replacement seals to suit the most common and widely utilised pumps in the food process, beverage and dairy industries. All seals are manufactured to the highest standards using the highest quality materials and can be fitted to pumps without modification.

Within this range, Vulcan now manufacture a range of seals specified to be compliant with FDA and European Regulations. For more information, please refer to our 'Technical and Material Standards' in Section 2 of this catalogue.

VULCAN TYPE 50/1683 SEALS TO SUIT INOXPA® PROLAC AND SLR PUMPS

Vulcan offer a range of seals to suit both single and double seal arrangements for Inoxpa Prolac® and SLR® Pumps.
Both single and double types of seal are of a unique design to directly replace the original seals, without any modifications to these pumps.

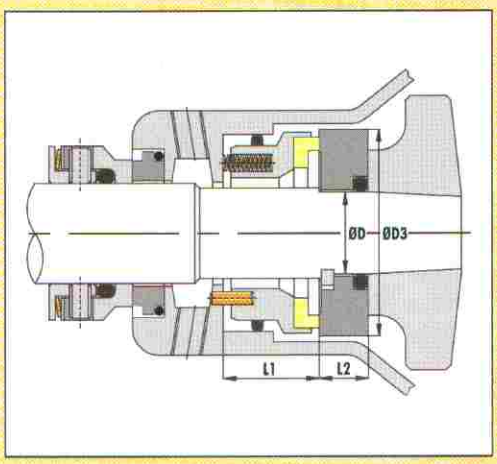
TYPE 50



A unique design of multi-spring seal, where the sprung component behaves as the stationary. Suits all Inoxpa Prolac® applications where the single, uncooled mechanical seal is required. This seal is also utilised as the internal seal in double, cooled seal arrangements.

VULCAN CODES

All Type 50 and 1683 seals are supplied as standard with Viton® 'O'-rings, if other materials are required please advise at the time of order.
Where xxxx is stated in the code, add the appropriate shaft size. If EP or Nitrile is required, replace the V in the code with an E or N respectively.
xxxx.50.V.P. Type 50, with stainless steel rotary and inserted Carbon faced multi-spring stationary.
xxxx.50.V.S. Type 50, with monolithic Silicon Carbide rotary and inserted Silicon Carbide multi-spring faced stationary.
xxxx.1683.V.P. Type 1683, with stainless-steel rotary and carbon seat.
xxxx.1688.V.P. Type 1688, with stainless-steel rotary and carbon seat.



VULCAN STANDARD SIZES

Inch Shaft Size D	Size Code	L1	L2	D3
0.625	0158	26.00	10.50	44.50
1.000	0254	26.00	10.00	53.50
1.500	0381	31.00	15.50	74.00

Vulcan offer the Type 1683 range of seals to suit the Inoxpa® SLR pump , utilising a stainless-steel wave spring rotary with a unique, double 'O'-Ring mounted carbon stationary. The Type 1683 seal is available in four shaft sizes to suit the common SLR pumps.

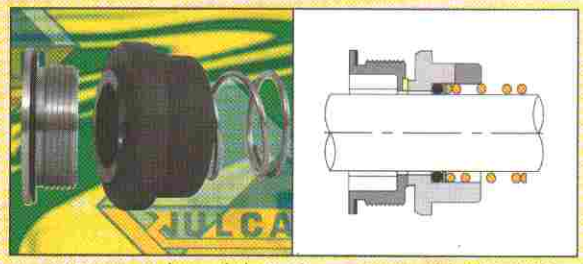
Seals to suit Inoxpa Prolac® Pumps.

PUMP MODEL	SEAL TYPE	VULCAN EQUIVALENT
S-15, -20, -26, -28 & -35	5/8" Single-internal	0158.50.V.P.
S-15, -20, -26, -28 & -35	28mm Double-external seal	0280.1688.V.P.
S-38, -70 & -80 with 160kW motor	1.0" Single-internal	0254.50.V.P.
S-38, -70 & -80	35mm Double-external seal	0350.1688.V.P.
S-38, -70 & -80 with 180 or 200kW motor	1.1/2" Single-internal	0381.50.V.P.
S-38, -70 & -80	50mm Double-external seal	0500.1688.V.P.
S-38, -70 & -80, MR200-250 version	1.1/2" Single-internal	0381.50.V.P.
S-38, -70 & -80	65mm External seal	0650.1688.V.P.

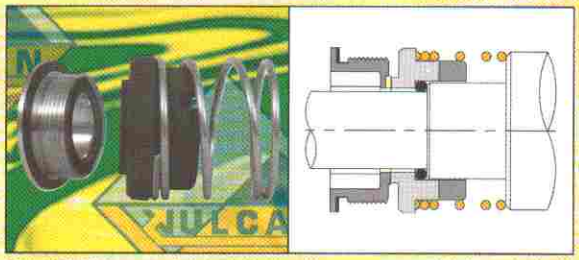
Vulcan can supply these seals in FDA compliant materials, please refer to Section 2 - 'Technical and Material Standards' for further details.

VULCAN TYPE 9x SEALS TO SUIT VARIOUS ALFA LAVAL® PUMPS.

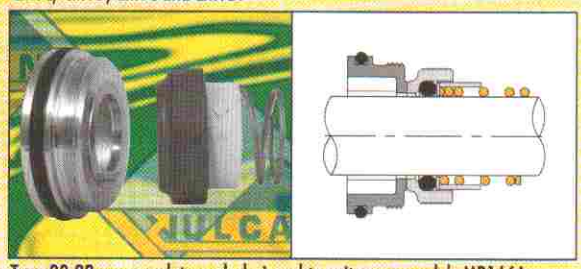
Vulcan manufacture and stock a complete range to suit CMx, EMx, FMx, and GMx series pumps, as well as MR and LKH series pumps. Seals are available from stock with carbon or silicon carbide rotary heads vs. stainless steel or inserted silicon carbide faced left-hand threaded seats. E.P. 'O'-rings are fitted as standard, if another elastomer is required please advise at time of order.



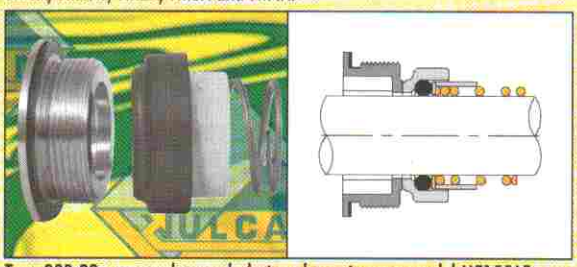
Type 91 22mm complete seal, designed to suit pump models CM1A, CM1B, CM1C, CM1D, EM1C and EM1D.



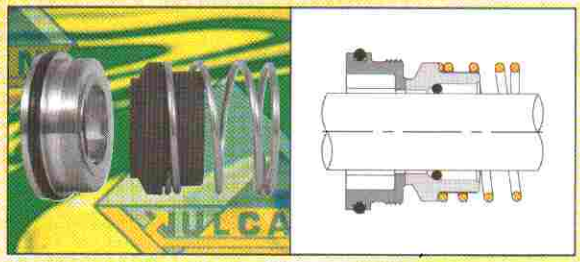
Type 91B 22mm complete seal, designed to suit pump models FM0, FM0S, FM1A, FM1AE, FM2A, FM3A and FM4A.



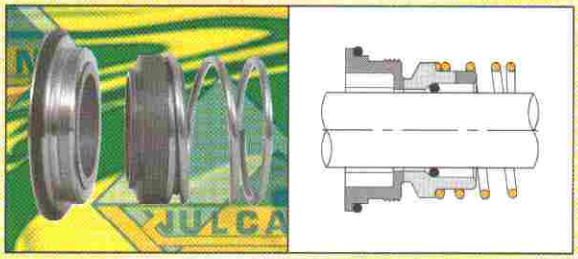
Type 93 22mm complete seal, designed to suit pump models MR166A, MR166B and MR166E.



Type 93B 22mm complete seal, designed to suit pump model ME155AE, GM1, GM1A, GM2 and GM2A.



Type 92 27mm complete seal, designed to suit pump models MR185A to MR200A.



Type 92 32mm complete seal, designed to suit pump models LKH5 through to LKH60 with single or flushed seals fitted.
Type 92D 32mm complete double seal also available.
Type 92 42mm complete seal, designed to suit pump models LKH70 through to LKH80 with single seals fitted.

VULCAN CODING

If Nitrile or Viton® is required, replace the E character in the code with an N or V.
Where yyyy is stated in code, insert relevant shaft size, where xx is stated in code, insert relevant seal type

yyyy.xx.E.Q.	Complete seals, with carbon rotary head and stainless steel seat.
yyyy.xx.E.D.	Complete seals, with carbon rotary head and inserted silicon carbide seat.
yyyy.xx.E.S.	Complete seals, with silicon carbide head and inserted silicon carbide seat.
0320.92D.E.YC.	Complete double seals, carbon vs. inserted silicon carbide seat inboard and outboard.
yyyy.xx.E.C.SEAL	Rotary unit only, with carbon head.
yyyy.xx.E.S.SEAL	Rotary unit only, with silicon carbide head.
yyyy.xx.E.Q.STAT	Threaded seat unit, in solid stainless steel.
yyyy.xx.E.S.STAT	Threaded seat unit, in stainless steel with inserted silicon carbide face.

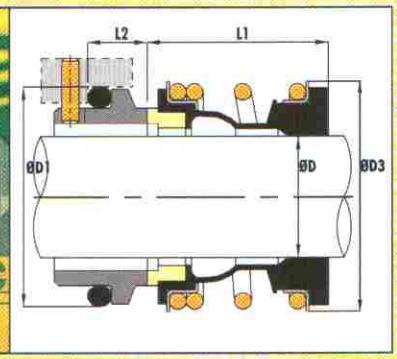
Vulcan also produce seals to suit other Alfa Laval® MR series pumps, models MR260A to MR300A, as well seals to suit Alfa Laval® Tri-Clover® pumps and face kits for LKH multi-stage pump models. Please ask for details.

Vulcan can supply these seals in FDA compliant materials, please refer to Section 2 - 'Technical and Material Standards' for further details.

VULCAN SEALS TO SUIT ALFA LAVAL® EQUIPMENT

Vulcan manufacture seals to suit the Alfa Laval® ALC, ALP and other Alfa Laval® pump and equipment ranges.

TYPE 19C

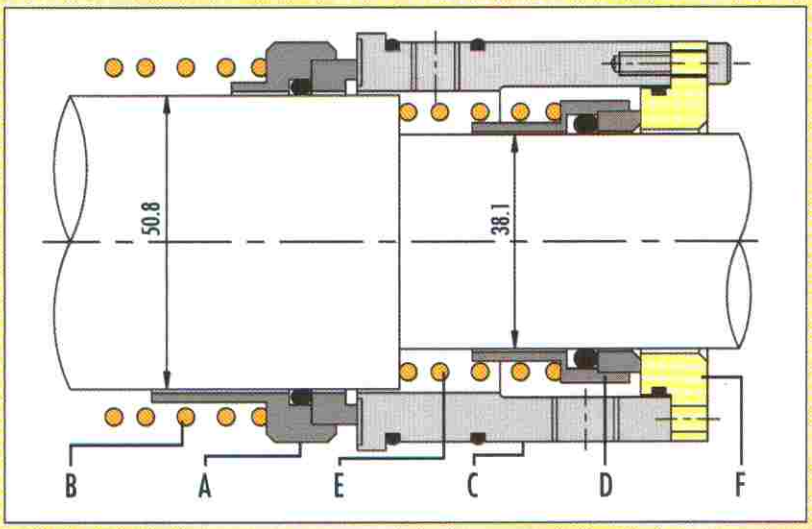


Vulcan produce a special Type 19 seal to suit Alfa Laval ALC® series pumps, motor sizes from 1.5kW to 22kW. Available from stock with silicon carbide vs. carbon seat as standard, in all common elastomers.

VULCAN STANDARD SIZES

Metric Shaft Size D	Size Code	D1	D3	L1	L2
40	0400	58.00	60.00	30.00	14.00
53	0530	73.00	76.00	33.00	15.00
60	0600	80.00	85.00	38.00	15.00

VULCAN SEALS TO SUIT ALFA LAVAL CONTHERM® DRYER SEAL SYSTEM



SHELLEND

2"FLUSHSINGLE

1.1/2" FLUSHSINGLE

2" NONFLUSHSINGLE

VULCAN CODING.

All components are supplied as standard with Nitrile 'O'-rings, if other materials are required please advise at time of order.

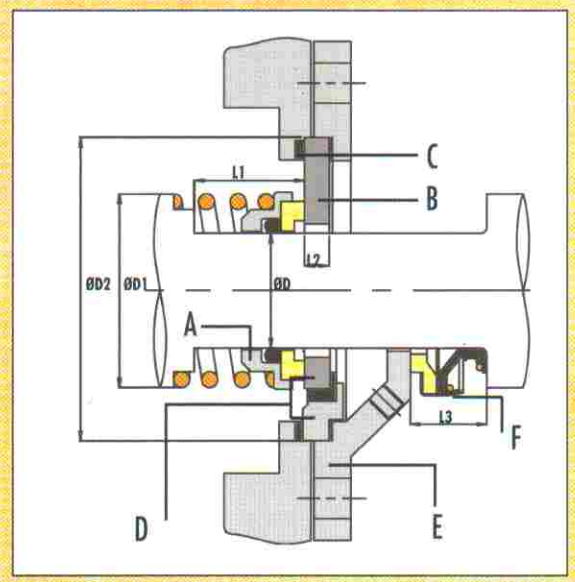
A	SHELLEND	2.000" Outer shaft rotary head, with inserted tungsten carbide face.
	SHELLEND.CARB	2.000" Outer shaft rotary head, with inserted carbon face.
B	SHELLEND.COIL	Spring to suit 2.000" outer shaft rotary head.
C	2"FLUSHSINGLE	2.000" Outer shaft collet, with chrome dioxide coated running face.
D	1.1/2".SHELLEND	1.1/2" Inner shaft rotary head, with inserted carbon face.
E	1.1/2.SHELLEND.COIL	Spring to suit 1.1/2" inner shaft rotary head.
F	1.1/2"FLUSHSINGLE	1.1/2" Inner shaft bush, with chrome dioxide coated running face.

We also produce and stock an alternative component C, with a reduced length and no flush ports.

C	2"NONFLUSHSINGLE	2.000" Outer shaft collet, with chrome dioxide coated running face.

Vulcan can supply these seals in FDA compliant materials, please refer to Section 2 - 'Technical and Material Standards' for further details.

VULCAN TYPE 26 SEALS TO SUIT APV PUMA® PUMPS



Vulcan have been successfully supplying the dairy and beverage industries with seals to suit APV Puma® pumps for over 15 years. Vulcan produce and stock all the seals and associated components commonly used on the 1.000" and 1.500" shaft Puma® pumps.

Every seal, seat and gasket component, used on the range of these pumps, is available ex-stock, in all common face and elastomer materials.

VULCAN STANDARD SIZES

Shaft Size D	Size Code	D1	D2	L1	L2	L3
1.000	0254	41.20	68.20	25.40	7.80	14.00
1.500	0381	55.70	80.10	33.30	9.00	17.00

VULCAN STOCK CODES.

Where XXXX is stated in the code, add 0254 for 1.000" or 0381 for 1.500" shaft size as required.
If E.P. or Viton® is required, replace the N with an E or V respectively.

INTERNAL SEAL =A

XXXX.26.N.C.SEAL	Type 26 'O'-Ring mounted rotary with inserted carbon face.
XXXX.26.N.S.SEAL	Type 26 'O'-Ring mounted rotary with inserted silicon carbide face.
XXXX.26.N.H.SEAL	Type 26 'O'-Ring mounted rotary with inserted tungsten carbide face.

SEAT ARRANGEMENT ONE =B and C

XXXX.26.S.S.	Type 26 monolithic stainless steel stationary plate, lapped one side.
XXXX.26.S.S.D.	Type 26 monolithic stainless steel stationary plate, lapped both sides.
XXXX.26.C.C.D.	Type 26 monolithic ceramic stationary plate, lapped both sides.
XXXX.26.N.C.GASK	Gasket set, with flat and L-shaped gasket, for above plate seat.

SEAT ARRANGEMENT TWO =D and C

XXXX.26.N.C.SEAT	Type 26 boot mounted ceramic seat, inserted in stainless adaptor.
XXXX.26.N.S.SEAT	Type 26 boot mounted silicon carbide seat, inserted in stainless adaptor.
XXXX.26.N.C.GASK	Gasket set, with flat and L-shaped gasket, for above plate seat.

ADDITIONAL DOUBLE SEAL COMPONENTS, FOR WATER JACKETED PUMPS, WITH EXTERNAL SEAL =E and F

XXXX.26.S.S.PLAT	Type 26 stainless steel backing plate with flush connection holes.
XXXX.18.N.C.SEAL	Type 18 inboard rotary, Nitrile bellows and carbon face.

ANCILLARY INFORMATION.

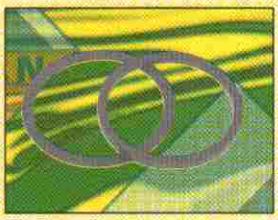
All parts are fitted with Nitrile elastomers as standard. If E.P. or Viton® are required, please specify this at the time of order.

Vulcan also manufacture and stock the following square-section replacement gaskets to suit the body of the APV Puma® pump.

P.7"BODYSEAL	Square section Nitrile gasket, with 7.0" ID
P.9"BODYSEAL	Square section Nitrile gasket, with 9.0" ID
P.11"BODYSEAL	Square section Nitrile gasket, with 11.0" ID


XXXX.26.N.C.SEAL


XXXX.26.S.S.(D)


XXXX.26.GASK

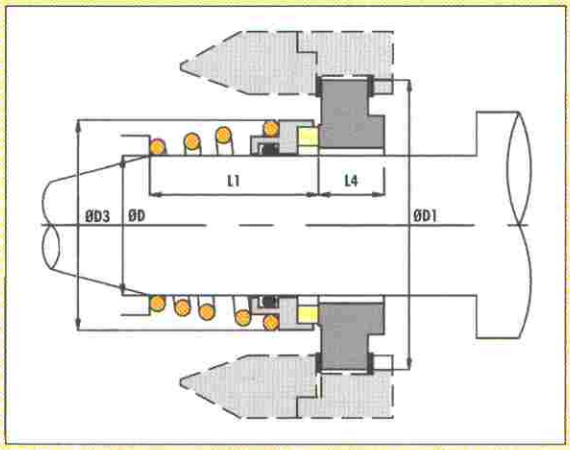

XXXX.26.S.S.PLAT

Vulcan can supply these seals in FDA compliant materials, please refer to Section 2 - 'Technical and Material Standards' for further details.

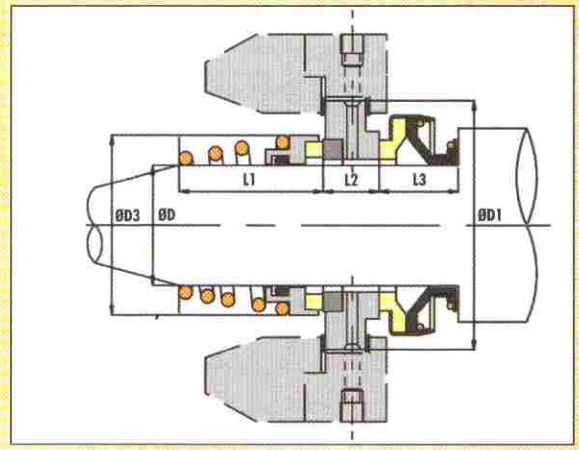
VULCAN TYPE 16 SEALS TO SUIT APV W® AND APV W+® PUMPS

The APV W® and APV W+® pumps have been introduced to replace the APV Puma® pumps. Vulcan manufacture and stock a complete range of mechanical seals designed to suit APV W® and APV W+® pumps, in single and double configuration.

VULCAN SINGLE SEAL ARRANGEMENT AND STANDARD DIMENSIONS



VULCAN DOUBLE SEAL ARRANGEMENT AND STANDARD DIMENSIONS



VULCAN STANDARD SIZES

Metric Shaft Size D	Size Code	D1	D3	L1	L2	L3	L4
25	0250	52.00	38.20	25.40	17.00	14.00	16.00
35	0350	62.50	49.50	33.30	20.00	16.00	16.00

XXXX.16.DOUB.V.X

VULCAN STOCK CODES.

Where XXXX is stated in the code, add 0250 or 0350 for 25mm or 35mm shaft size as appropriate.
If E.P. is required, replace the N character in the code with an E.

SINGLE SEAL ARRANGEMENTS

XXXX.16.N.D.	Type 16 with carbon rotary face and monolithic silicon carbide seat
XXXX.16.N.S.	Type 16 with silicon carbide rotary face and monolithic SIC seat
XXXX.16.N.H.	Type 16 with tungsten carbide rotary face and monolithic TC seat
XXXX.16.N.C.GASK	Two-part gasket set for the Type 16 stationary

XXXX.16.N.X

DOUBLE SEAL ARRANGEMENTS

XXXX.16.DOUB.N.W.	Carbon vs silicon carbide inboard, stainless vs carbon outboard
XXXX.16.DOUB.N.Y.	Carbon vs silicon carbide inboard, silicon carbide vs carbon outboard
XXXX.16.DOUB.N.WS.	Silicon carbide vs silicon carbide inboard, stainless vs carbon outboard
XXXX.16.DOUB.N.Z.	Silicon carbide vs silicon carbide inboard, silicon vs carbon outboard
XXXX.16.DOUB.N.ZS.	Silicon carbide vs silicon carbide inboard, silicon vs silicon outboard
XXXX.16.DOUB.N.ZH.	Tungsten carbide vs tungsten inboard, tungsten vs tungsten outboard
XXXX.16.D.NWSTATMON	Central seat only, monolithic silicon carbide

XXXX.16.D.XX.STATMON

ANCILLARY INFORMATION.

Vulcan manufacture and stock replacement face kits for APV W+® pumps, available in carbon vs silicon carbide, or silicon carbide vs silicon carbide, with E.P., Nitrile or Viton® 'O'-rings. The kits include rotary and stationary faces, with two 'O'-rings to suit, and a replacement face pin.

XXXX.16.PLUS.N.D.	Type 16 PLUS face kit, silicon long face, carbon short face
XXXX.16.PLUS.N.T.	Type 16 PLUS face kit, with carbon long face, silicon carbide short face
XXXX.16.PLUS.N.S.	Type 16 PLUS face kit, with silicon carbide long face, silicon carbide short face

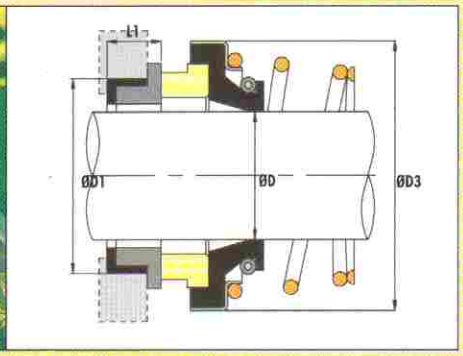
XXXX.16.PLUS.N.X

Vulcan can supply these seals in FDA compliant materials, please refer to Section 2 - 'Technical and Material Standards' for further details.

VULCAN TYPE 29 SERIES SEALS TO SUIT APV® PUMPS

Vulcan produce and stock a wide range of mechanical seals designed to directly replace all other common APV® pump seals. We are continually extending this range, if what you require is not shown in this brochure, then please ask.

TYPE 29



Vulcan Type 29, suitable for APV® ZMA, ZMB, ZMD, ZMS, ZMH & ZMK "Rosista®" and "Pasilac®" pumps. Available with carbon rotary face vs. stainless boot mounted seat as standard, or with hard silicon carbide faces, in all standard elastomers.

VULCAN STANDARD SIZES

Metric Shaft Size D	Size Code	D1	D3	L1	Pump Type
20	0200	30.00	40.60	9.80	ZMA, ZMB, ZMH-1, ZMH-2,ZMK-1 & ZMK-2
25	0250	35.00	45.40	9.80	ZMS-3 & ZMS-4
30	0300	42.00	57.00	13.00	ZMH-4, ZMK-3 & ZMD

VULCAN CODING.

Where XXXX is stated in the code, add 0200, 0250 or 0300 for 20, 25 or 30mm as required.
If E.P. or Viton® is required, replace the N character in the code with an E or V respectively.

XXXX.29.N.Q. Type 29 with carbon rotary face and monolithic stainless steel seat
XXXX.29.N.S. Type 29 with silicon carbide rotary face and monolithic silicon seat.

VULCAN TYPE 295

Wave-spring seal available in two sizes, 48mm for APV® ZMS-5 and 54mm for APV® ZMS-6 pumps. Rotary unit has a carbon inserted face, with a monolithic stainless steel pinned-seat. Inserted carbide faces are also available.
Where XXXX is stated in the code, add 0480 or 0540 for required shaft size.
If Nitrile or Viton® is required, replace the E character in the code with an N or V respectively.

VULCAN CODING.

XXXX.295.E.Q. Type 295 carbon rotary face vs. stainless steel seat, E.P. 'O'-rings
XXXX.295.E.H. Type 295 Tungsten Carbide rotary face vs. Tungsten Carbide seat, E.P. 'O'-rings.

0480.295.V.Q

VULCAN TYPE 292

Bearing face kits, for 1.1/8" shaft size, suitable for APV, Osborne Craig® mixers.
The bearing seat is monolithic carbon, with the bearing being monolithic ceramic.

VULCAN CODING.

0286.292.X.C. 1.1/8" Type 292 complete bearing; ceramic bearing vs. carbon seat

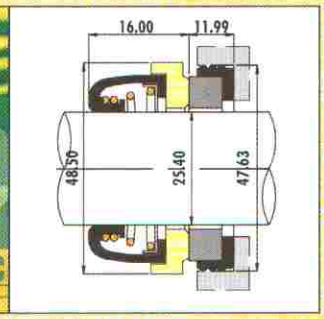
0286.292.X.C

FURTHER VULCAN TYPES FOR APV® PUMPS.

Vulcan also produce mechanical seals to suit APV®, ZMS410 and ZM8-610 pumps. Vulcan Type 294 repair kits for APV Howard® Cleanline R900® wave-spring seals, in single or double arrangement, consisting of rotary face with 'O'-Ring, stationary face with elastomer boot, and a wave-spring, are available usually from stock.

Vulcan can supply these seals in FDA compliant materials, please refer to Section 2 - 'Technical and Material Standards' for further details.

VULCAN TYPE 66 RUBBER-ENCASED SEAL.



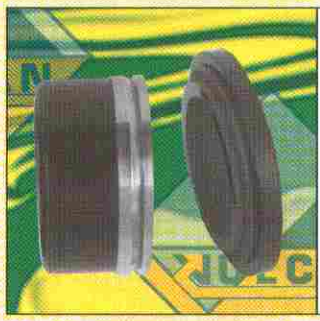
Vulcan produce a simple, 1.0" shaft size rubber encased, single-spring seal for use in several common food and dairy equipment applications.

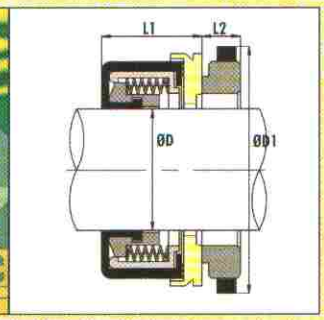
VULCAN CODING.

Available in Nitrile as standard, if E.P. is required, replace the N character in the code with an E.

0254.66.N.C.	Type 66 seal, with carbon face rotary vs. ceramic boot mounted seat.
0254.66.N.C.SEAL	Type 66, carbon-faced, rotary unit only.

VULCAN TYPE 1644 RUBBER-ENCASED SEAL.





Vulcan Type 1644 rubber-encased multi-spring seal, for use in the food, beverage and dairy industries applications.
Available with Ni-Resist seal face and carbon seat-ring, Nitrile elastomers, other material combinations available to special order.

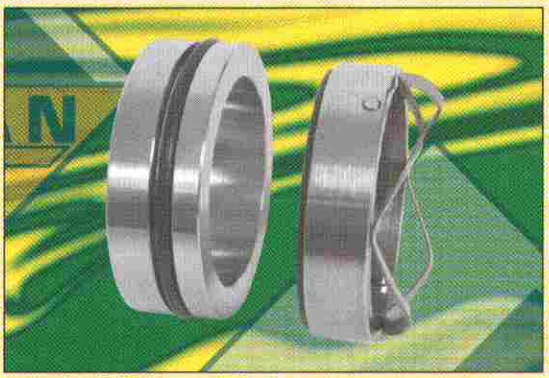
Shaft Size D	Size Code	D1	L1	L2
1.500	0381	75.70	33.00	16.00
1.750	0444	82.05	33.00	16.00

VULCAN CODING.

Where XXXX is stated in the code, replace with 0381 or 0444 for 1.1/2" or 1.3/4" shaft sizes.

XXXX.1644.N.K.	Type 1644 seal, with Ni-Resist seal face vs. carbon seat, Nitrile elastomers

VULCAN TYPE 1655 WAVE-SPRING SEALS TO SUIT IBEX® MOG PUMPS



Vulcan manufacture and stock a range of face repair kits and barrels to suit MOG® and ALP® pumps.
Available with inserted carbon or silicon carbide faced rotary heads, and monolithic stainless steel, or inserted silicon carbide pinned seats as standard, with inserted tungsten carbide faces available to order. Repair kits comprise of rotary head with 'O'-Ring and wave-spring, with seat and 'O'-Ring. The barrels to complete the rotary unit are available as separate items. Other shaft sizes are available to suit APV® Howard CL® pumps.

Shaft Size DØ			Seal O.D.		Seat O.D.		Working Length	
Metric	Inch	Size Code	Metric	Inch	Metric	Inch	Metric	Inch
1.188	30.16	0300	40.75	1.604	42.70	1.681	10.00	0.394
1.375	34.90	0349	46.75	1.841	47.60	1.874	15.80	0.622
2.000	50.80	0508	65.40	2.575	66.60	2.622	11.50	0.453
3.000	76.20	0762	98.60	3.882	101.60	4.000	11.50	0.453

VULCAN CODING.

If Nitrile or Viton® is required, replace the E character in the code with an N or V.
Where XXXX appears in the code, replace with relevant size code, according to the dimension table.

XXXX.1655.E.Q.	Face repair kit, with inserted carbon rotary face and stainless steel seat
XXXX.1655.E.S.	Face repair kit, with inserted silicon carbide faces to rotary and seat
XXXX.1655.BARR	Replacement rotary barrel, complete with grub screws.

Further Vulcan Types for the Food and Dairy Industries

As can be seen from this section of this brochure, Vulcan offer an exceptional range of mechanical seals specifically for the Food and Dairy Industries, and this range is constantly under further expansion. For example, Vulcan have recently developed repair kits to suit Maso-Sine® SPS pumps, consisting of ceramic rotary face with 'O'-Ring, pressure ring and double-wave spring, together with carbon, 'O'-Ring mounted seat. If you require details of these, or any other application not illustrated here, please ask. With our excellent design and production facilities, we are sure to be able to help.

Vulcan can supply these seals in FDA compliant materials, please refer to Section 2 - 'Technical and Material Standards' for further details.

VULCAN MECHANICAL SEALS TO SUIT FRISTAM® PUMP APPLICATIONS

Fristam® seal, seat and collet arrangements are widely utilised in the Dairy and Whey industries. Vulcan offer a complete range of components and collets which can be fitted directly into Fristam® pump applications without any need for amendment to the pump housing. These components are available either as individual components (see below) or as complete collet arrangements (see following pages) to suit your requirements. Only the most common components are shown, therefore If you require anything else, please contact us.

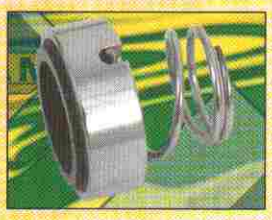
XX08/12

Individual Vulcan Rotary Components;

Inboard Rotaries

Vulcan Coding	Description
Where XX is stated in the code, apply 22, 30 or 35 as appropriate to shaft size required.	
XX08/12	Inboard rotary, with base plate, with inserted carbon face
XX08/12.S.C.	Inboard rotary, with base plate, with inserted silicon carbide face
XX08/12.T.C.	Inboard rotary, with base plate, with inserted tungsten carbide face
	Note: 35mm has a right hand coil with No base plate

2209/1



XX08/12B

Outboard Rotaries

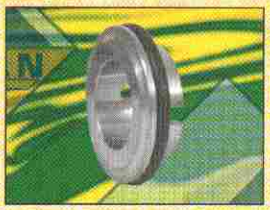
These do not have a base plate and have left hand springs.

XX08/12B	Outboard rotary (no base plate), with inserted carbon face
XX08/12B.S.C	Outboard rotary (no base plate), with inserted silicon carbide face
XX08/12B.T.C.	Outboard rotary (no base plate), with inserted tungsten carbide face

Alternative Rubber Encased Rotaries.

2209/1	22mm Outboard encased rotary, with carbon face
2209/2	22mm Inboard encased rotary, with carbon face
2209/3	22mm Outboard encased rotary, with carbon face and garter spring
3009/1	30mm Outboard encased rotary, with carbon face
3009/2	30mm Inboard encased rotary, with carbon face
3009/3	30mm Outboard encased rotary, with carbon face and garter spring

2209/2 & 3009/2



XX06/61

Individual Vulcan Rotary Components;

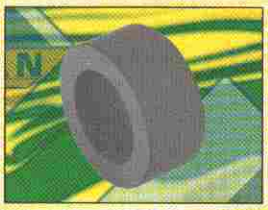
'O'-Ring Mounted Stationaries.

Where XX is stated in the code, apply 22, 30 or 35 as appropriate to shaft size required.

XX06/61	Inboard pinned-seat, monolithic stainless steel
XX06/61.S.C.	Inboard pinned-seat, with inserted silicon carbide face
XX06/61.S.C.MON	Inboard pinned-seat, monolithic silicon carbide
XX06/61.T.C.	Inboard pinned-seat, with inserted tungsten carbide face
XX06/61.T.C.MON	Inboard pinned-seat, monolithic tungsten carbide
3006/8	Inboard double 'O'-Ring seat, monolithic stainless steel, 30mm
XX05/6	Outboard seat, monolithic stainless steel
XX05/6.S.C.	Outboard seat, with inserted silicon carbide face
XX05/6.S.C.MON	Outboard seat, monolithic silicon carbide
XX05/6.T.C.	Outboard seat, with inserted tungsten carbide face
XX05/6.T.C.MON	Outboard seat, monolithic tungsten carbide
2207/1	Outboard seat, monolithic ceramic (22mm only)

2209/3 & 3009/3

XX05/6



2204/9

2201/1

Individual Vulcan Rotary Components;

Vulcan Coding	Description
2201/1	Outer collet, without internal carbon bush
2201/2	Outer collet, with internal carbon bush
2201/3	Outer collet, with internal carbon bush and reduced ID dimension at internal flush port.
2204/9	Replacement carbon bush for the above collets.
2201/4	Collet for single seal arrangement.

XX01/1

2201/2 OR 2201/3

Where XX is stated in the following codes, apply 30 or 35 as appropriate to shaft size required. Not Available in 22mm

XX01/1	Centre collet, to accept inboard and outboard seats
XX01/2	Centre seat with lapped faces, monolithic stainless steel
XX01/2.CER	Centre seat with lapped faces, monolithic ceramic
XX01/2.S.C.MON	Centre seat with lapped faces, monolithic silicon carbide

XX01/2

Vulcan can supply these seals in FDA compliant materials, please refer to Section 2 - 'Technical and Material Standards' for further details.

VULCAN MECHANICAL SEALS TO SUIT FRISTAM® PUMP APPLICATIONS

2201/5 & 2201/51

VULCAN ADDITIONAL COLLET COMPONENTS;

For line diagrams please see following pages.

VULCAN CODING	DESCRIPTION
2201/5	Outer collet, with internal carbon bush
2201/51	Outer collet, with internal carbon bush
3001/6	Outer collet, with internal carbon bush
3501/7	Outer collet, with internal carbon bush and external gland plate.
3501/7.GLAN	Gland plate for above collet
2201/8	Outer collet, with internal carbon bush
2201/91	Outer collet, without internal carbon bush
2204/6	Replacement carbon bush for 2201/5 collet
2204/9	Replacement carbon bush for 2201/51 collet
3004/6	Replacement carbon bush for 3001/6 collet
3004/7	Replacement carbon bush for 3501/7 collet
2204/3	Replacement carbon bush for 2201/8 collet

3501/7 with gland fitted

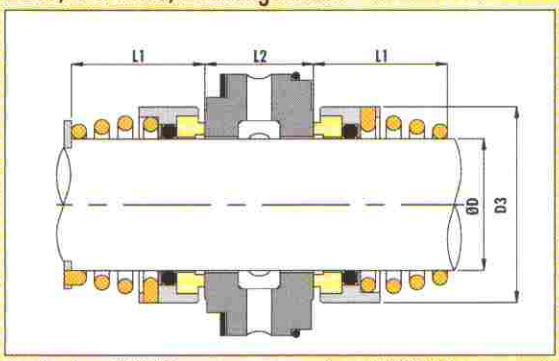
2201/8

3006/8

VULCAN GASKET-MOUNTED CENTRAL STATIONARY COMPONENTS;

Where XX is started please add relevant size code.

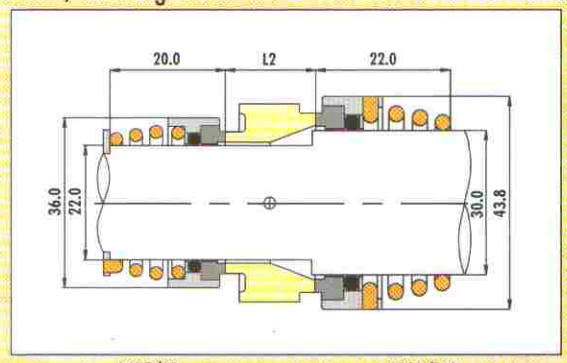
2205/1 & XX05/2 Arrangement



XX08/12 INBOARD ROTARY

XX08/12B OUTBOARD ROTARY

2205/3 Arrangement



2208/12 INBOARD ROTARY

3008/12B OUTBOARD ROTARY

2205/1 & XX05/2

Metric Shaft Size D	D1	D3	L1	L2
22	50.0	36.0	20.0	22.5
22	44.7	36.0	20.0	31.0
30	60.0	43.8	22.0	28.0
35	64.0	48.9	26.0	30.0
22/30	45.0	See Above Diagram		29.7

2205/2.CARB

VULCAN CODING	DESCRIPTION
2205/1	Central Gasket Seat in Stainless Steel
2205/2	Central Gasket Seat in Stainless Steel
2205/2.CARB	Central Gasket Seat in Carbon

VULCAN CODING	DESCRIPTION
3005/2	Central Gasket Seat in Stainless Steel
3505/2	Central Gasket Seat in Stainless Steel
2205/3.CARB	Central Gasket Seat for Stepped Shaft, in Carbon

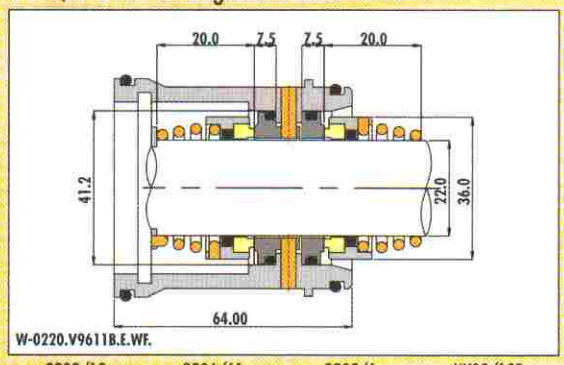
Vulcan can supply these seals in FDA compliant materials, please refer to Section 2 - 'Technical and Material Standards' for further details.

VULCAN EQUIVALENTS TO REPLACE FRISTAM® COLLET ARRANGMENTS

Vulcan supply from stock complete seal units for Fristam® pumps, based on the extensive range of Vulcan components. These complete seal units directly replace the Fristam® original collet assembley while giving the benefits of Vulcan quality and reliability.

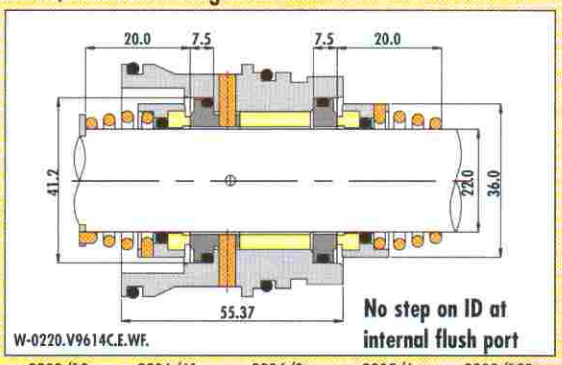
The following illustrations only show the most common arrangements for each collet style, please ask for alternatives, we have a huge range of variations available to suit your requirements.

2201/1 Collet Arrangement



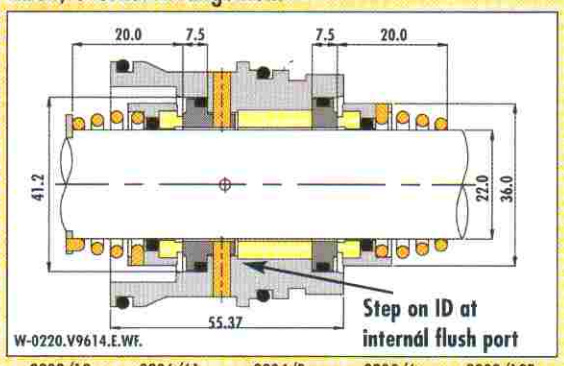
2208/12	2206/61	2205/6	XX08/12B
INBOARD ROTARY	INBOARD STAT	OUTBOARD STAT	OUTBOARD ROTARY

2201/2 Collet Arrangement



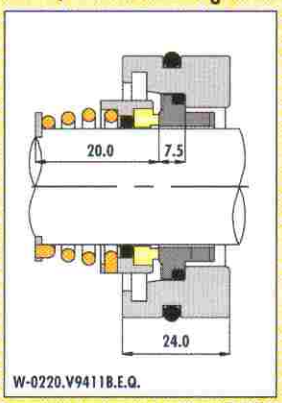
2208/12	2206/61	2204/9	2205/6	2208/12B
INBOARD ROTARY	INBOARD STAT	CARBON BUSH	OUTBOARD STAT	OUTBOARD ROTARY

2201/3 Collet Arrangement



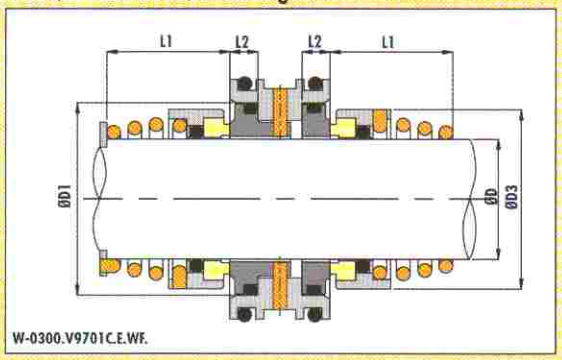
2208/12	2206/61	2204/9	2205/6	2208/12B
INBOARD ROTARY	INBOARD STAT	CARBON BUSH	OUTBOARD STAT	OUTBOARD ROTARY

2201/4 Collet Arrangement



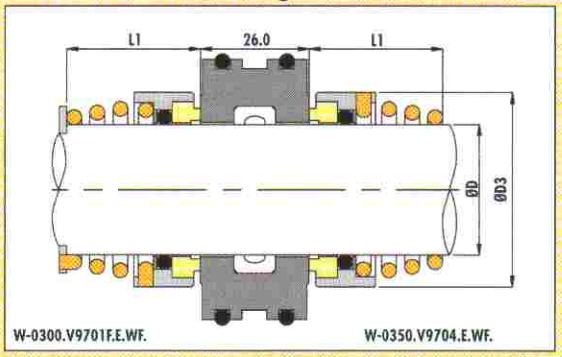
2201/4

3001/1 and 3501/1 Arrangement



XX08/12	XX06/61	XX05/6	XX08/12B
INBOARD ROTARY	INBOARD STAT	OUTBOARD STAT	OUTBOARD ROTARY

3001/2 and 3501/2 Arrangement



XX08/12	XX08/12B
INBOARD ROTARY	OUTBOARD ROTARY

30/35mm Collet Assembly Dimensions	Metric Shaft Size D	Size Code	D1	D3	L1	L2
	30	0300	48.0	43.8	22.0	7.6
	35	0350	55.5	48.9	26.0	8.6

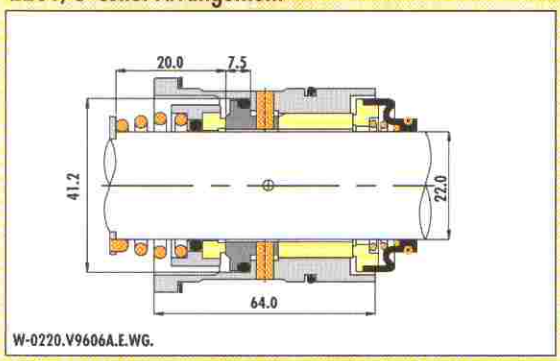
Vulcan can supply these seals in FDA compliant materials, please refer to Section 2 - 'Technical and Material Standards' for further details.

VULCAN EQUIVALENTS TO REPLACE FRISTAM® COLLET ARRANGMENTS

To aid the identification of the correct seat unit, the Vulcan code is derived from the original seal code, with a "W-V" prefix, and a standard Vulcan material code suffix. For example, a Vulcan seal to replace code "9.611b" would be W-V9611B.E.WF. , where the E denotes E.P. elastomers, and WF denotes a double seal, with carbon vs 316 stainless steel running faces inboard and outboard.

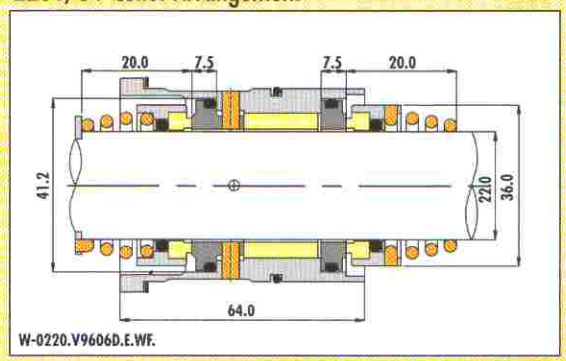
The following illustrations only show the most common arrangements for each collet style, please ask for alternatives, we have a huge range of variations available to suit your requirements.

2201/5 Collet Arrangement



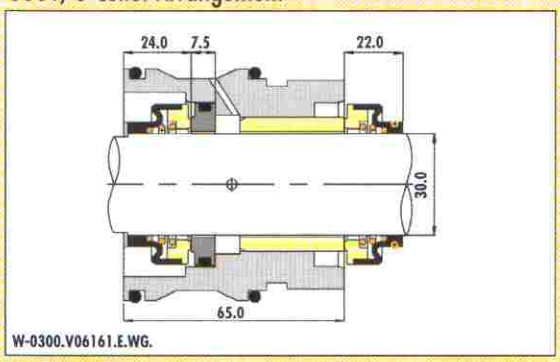
2208/12	2206/61	2204/6	2209/3
INBOARD ROTARY	INBOARD STAT	CARBON BUSH	OUTBOARD ROTARY

2201/51 Collet Arrangement



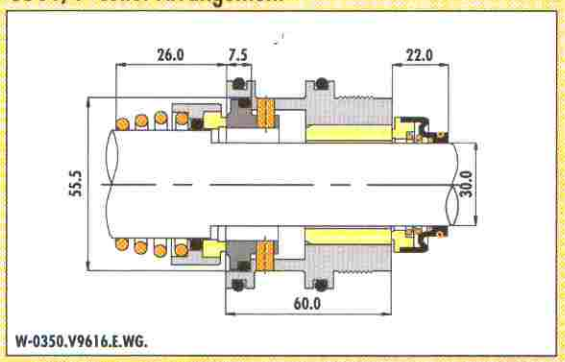
2208/12	2206/61	2204/9	2205/6	2208/12B
INBOARD ROTARY	INBOARD STAT	CARBON BUSH	OUTBOARD STAT	OUTBOARD ROTARY

3001/6 Collet Arrangement



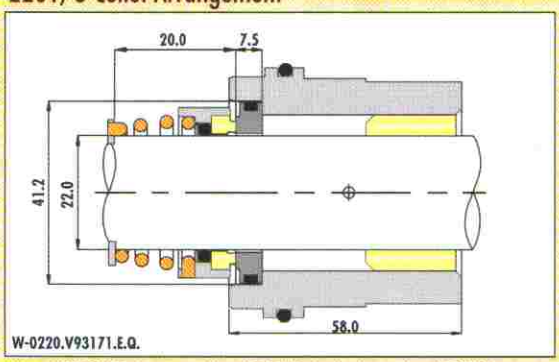
3009/2	3005/6	3004/6	3009/3
INBOARD ROTARY	INBOARD STAT	CARBON BUSH	OUTBOARD ROTARY

3501/7 Collet Arrangement



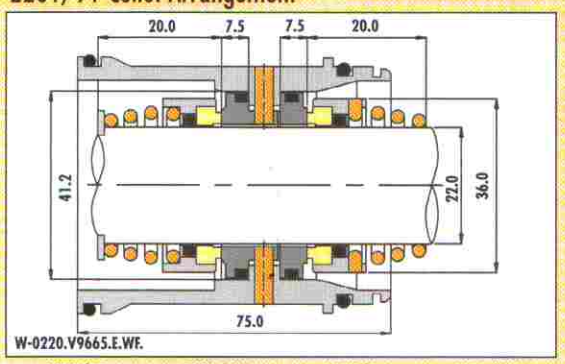
3508/12	3506/61	3004/7	3009/3
INBOARD ROTARY	INBOARD STAT	CARBON BUSH	OUTBOARD ROTARY

2201/8 Collet Arrangement



2208/12	2205/6	2204/3
INBOARD ROTARY	INBOARD STAT	CARBON BUSH

2201/91 Collet Arrangement



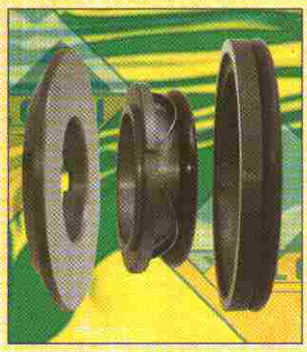
2208/12	2206/61	2205/6	2208/12B
INBOARD ROTARY	INBOARD STAT	OUTBOARD STAT	OUTBOARD ROTARY

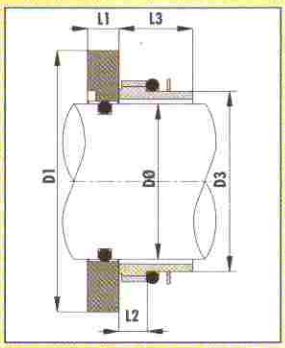
Vulcan can supply these seals in FDA compliant materials, please refer to Section 2 - 'Technical and Material Standards' for further details.

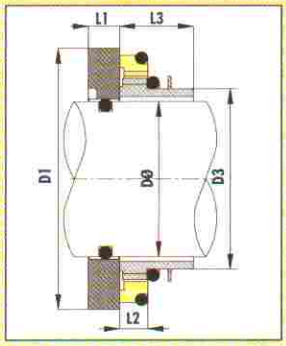
VULCAN MECHANICAL SEALS TO SUIT WAUKESHA® UNIVERSAL SERIES PUMPS

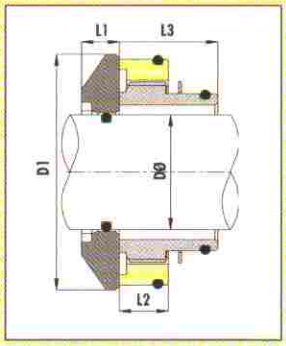
Vulcan can now offer replacement seals for the common models of Waukesha® Universal-series pumps. These seals comprise complete seals with rotary and inner and outer static faces, 'O'-rings and wave-springs as required. The Vulcan Type 87 is designed for the Universal I®-series of pumps, Type 88 is designed for Universal II®-series of pumps. Rotary with inner face is Type 87 or 88. Rotary with inner and outer statics is Type 87A or 88A. The profile of the reverse of the rotary face can be flat or sloped depending on shaft size. Details are included in the data table below.

Rotaries faces are ceramic or monolithic silicon carbide as standard. Inner statics will be carbon or silicon carbide, outer statics are always carbon. 'O'-rings are normally E.P. but Viton® or nitrile can be supplied to order.









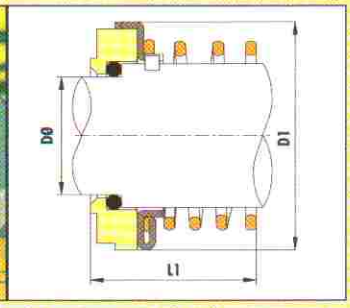
Type 87 Table for the Universal I®-series of pumps

Shaft Size DØ		Size	D1		D3		L1		L2		L3		OEM SEAL	Face
Inch	Metric	Code	Metric	Inch	Metric	Inch	Metric	Inch	Metric	Inch	Metric	Inch	CODE	Profile
1.125	28.60	0286	63.90	2.516	37.50	1.476	8.00	0.315	10.50	0.413	19.10	0.752	U6, U14, U15, U18, U24	SLOPE
1.500	38.10	0381	80.50	3.169	43.80	1.724	8.50	0.335	11.50	0.453	17.00	0.669	U30, U34	SLOPE
1.875	47.60	0476	94.20	3.709	56.60	2.228	13.80	0.543	13.50	0.531	32.50	1.280	U60, U64, U130, U134	FLAT
2.750	69.80	0698	114.50	4.508	79.00	3.110	13.80	0.543	13.50	0.531	32.50	1.280	U220, U224	FLAT

Type 88 Table for the Universal II®-series of pumps

Shaft Size DØ		Size	D1		D3		L1		L2		L3		OEM SEAL	Face
Inch	Metric	Code	Metric	Inch	Metric	Inch	Metric	Inch	Metric	Inch	Metric	Inch	CODE	Profile
1.250	31.70	0317	63.50	2.500	39.20	1.543	10.30	0.406	11.60	0.457	10.60	0.417	006U2, 015U2, 018U2	SLOPE
1.625	41.20	0412	80.10	3.154	50.00	1.969	10.30	0.406	9.00	0.354	18.30	0.720	030U2	SLOPE
2.000	50.80	0508	98.40	3.874	63.20	2.488	13.80	0.543	12.00	0.472	25.40	1.000	045U2, 060U2, 130U2	FLAT
2.750	69.80	0698	116.00	4.567	112.80	4.440	13.80	0.543	12.00	0472	25.40	1.000	180U2, 220U2	FLAT

VULCAN MECHANICAL SEALS TO SUIT TRI-CLOVER® C-SERIES PUMPS



Vulcan manufacture direct replacement rotary parts for the Common models of Tri-Clover® Tri-Flo® pumps. The Vulcan Type 293 is an 'O'-ring, external mounted, hydraulically-balanced seal to replace the Tri-Clover® "Type-D" seal. Clamped seats with PTFE gaskets are also available to combine with the Type 293 rotary to replace the "Type-DG" seal, details available on request. Rotary faces are carbon as standard, with silicon carbide available to order.
'O'-ring material is normally E.P. or Viton®.

Shaft Size DØ		Size	D1		L1		OEM SEAL
Inch	Metric	Code	Metric	Inch	Metric	Inch	CODE
0.750	19.10	0191*	47.00	1.850	39.50	1.555	C114, SP114
1.125	28.60	0286	54.00	2.125	39.00	1.535	C216, SP216
1.250	31.70	0317	54.40	2.141	60.00	2.362	-
1.500	38.10	0381	66.60	2.612	33.50	1.319	C218, C328, SP218, SP328

* Size 0.750" (19.10mm) is supplied complete with set-screw sleeve.

Vulcan can supply these seals in FDA compliant materials, please refer to Section 2 - 'Technical and Material Standards' for further details.

VULCAN SEALS TO SUIT APV® HOWARD & CREPACO PUMPS

Vulcan produce and stock a range of seals to directly replace the two common seals types found fitted to these pumps. The most common seal Types are illustrated. If what you require is not shown in this section, then please ask.

VULCAN TYPE 1655 WAVE-SPRING SEALS.

Vulcan manufacture and stock a range of complete wave-spring seals to suit the common sizes of Howard® and Crepaco® Cleanline (CL) pumps. Available with inserted carbon faced rotaries running with monolithic stainless steel pinned 'O'-ring mounted seats.

VULCAN CODING

Where XXXX is stated in the code, add required shaft size, code.
If Nitrile or Viton® is required, replace the E character in the code with an N or V respectively.

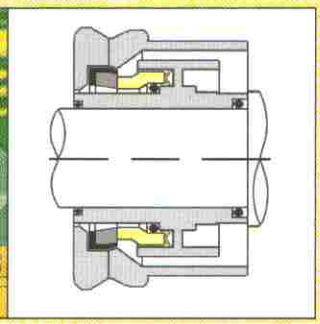
XXXX.1655.E.Q. Type 1655 complete seal, with carbon rotary face vs. stainless steel seat, E.P. 'O'-rings

Shaft Size	Size Code	Suits Pump Models
1.1/8	0286	CL 0S & CL 1
1.7/8	0476	CL 2
2.1/8	0539	CL 3

This table applies to both Type 1655 and Type 294 seals

VULCAN TYPE 294 WAVE-SPRING SEAL KITS.

Vulcan manufacture and stock a range of complete wave-spring seal kits to suit the common sizes of Howard® and Crepaco® Cleanline (CL) pumps fitted with the R900® seal. Available with carbon or silicon carbide rotary faces running with silicon carbide boot-mounted seats. Kits include rotary face with 'O'-ring and wave spring, and stationary ring fitted with boot.



VULCAN CODING

Where XXXX is stated in the code, add required shaft size according to the Type 1655 table above.
If Viton® is required, replace the E character in the code with a V.

XXXX.294.E.D. Type 294 complete seal kit, with carbon rotary face vs. silicon carbide seat, E.P. elastomers.

XXXX.294.E.S. Type 294 complete seal kit, with silicon carbide rotary and stationary faces, E.P. elastomers.

VULCAN TYPE 1650 WAVE-SPRING SEAL KITS.

Vulcan manufacture and stock a range of complete wave-spring seal kits to suit the common sizes of Johnson® OL pumps. Available with inserted carbon or silicon carbide rotary faces running with monolithic stainless steel or inserted silicon carbide stationary faces. Kits include rotary face with 'O'-ring and wave spring, and stationary ring with 'O'-ring.

VULCAN CODING

Where XXXX is stated in the code, add required shaft size, code.
If Viton® is required, replace the E character in the code with a V.

XXXX.1650.E.Q. Type 1650 seal kit, with carbon rotary face vs. stainless steel stationary, E.P. elastomers.

XXXX.1650.E.S. Type 1650 seal kit, with silicon carbide rotary and stationary faces, E.P. elastomers.

XXXX.1650.E.T. Type 1650 seal kit, with silicon carbide rotary and carbon stationary faces, E.P. elastomers.

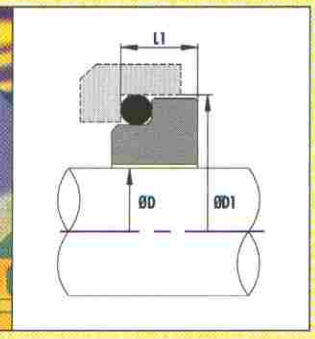
Size Code	Suits Pump Models
0240	OL1
0400	OL2
0530	OL3
0750	OL4

Vulcan can supply these seals in FDA compliant materials, please refer to Section 2 - 'Technical and Material Standards' for further details.

Vulcan Stationary Seat Types, Clamp Rings. Seal Repair, Fitting, Identification And Vulcan

section 2

COMMON VULCAN '0'-RING MOUNTED SEATS



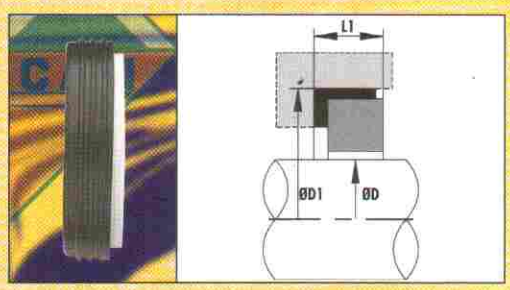
Common Vulcan '0'-Ring Mounted Short Stationary designs to suit DIN and other standard housings. These short '0'-Ring Mounted Seats are not pinned and rely upon compression on the '0'-Ring for retention. Consideration should be given to Long Pinned Seats or Boot Mounted Seats where conditions necessitate.

VULCAN STANDARD SIZES

Metric Shaft	Size	Type 8/19 STD		Type 8B		Type 12		Type 12 DIN		Type 13		Type 13 DIN	
Size D	Code	D1	L1	D1	L1	D1	L1	D1	L1	D1	L1	D1	L1
10	0100	19.2	6.6	19.2	7.1	18.1	5.5	21.0	7.0	18.1	5.5	21.0	7.0
11	0110	-	-	-	-	20.6	5.5	-	-	20.6	5.5	-	-
12	0120	21.6	5.6	21.6	7.6	20.6	5.5	23.0	7.0	20.6	5.5	23.0	7.0
13	0130	-	-	-	-	23.1	6.0	-	-	23.1	6.0	-	-
14	0140	24.6	5.6	24.6	7.6	23.1	6.0	25.0	7.0	23.1	6.0	25.0	7.0
15	0150	24.6	6.6	24.6	8.6	26.9	7.0	-	-	26.9	7.0	-	-
16	0160	28.0	7.5	28.0	9.0	26.9	7.0	27.0	7.0	26.9	7.0	27.0	7.0
17	0170	-	-	-	-	26.9	7.0	-	-	26.9	7.0	-	-
18	0180	30.0	8.0	30.0	10.0	30.9	8.0	33.0	10.0	30.9	8.0	33.0	10.0
19	0190	31.0	7.5	31.0	9.0	30.9	8.0	-	-	30.9	8.0	-	-
20	0200	35.0	7.5	35.0	9.5	30.9	8.0	35.0	10.0	30.9	8.0	35.0	10.0
21	0210	-	-	-	-	35.4	8.0	-	-	35.4	8.0	-	-
22	0220	35.0	7.5	35.0	9.5	35.4	8.0	37.0	10.0	35.4	8.0	37.0	10.0
23	0230	-	-	-	-	35.4	8.0	-	-	35.4	8.0	-	-
24	0240	38.0	7.5	38.0	9.5	35.4	8.0	39.0	10.0	35.4	8.0	39.0	10.0
25	0250	38.0	7.5	38.0	9.5	38.2	8.5	40.0	10.0	38.2	8.5	40.0	10.0
26	0260	40.0	8.0	40.0	10.0	38.2	8.5	-	-	-	-	-	-
28	0280	42.0	9.0	42.0	11.0	43.3	9.0	43.0	10.0	43.3	9.0	43.0	10.0
29	0290	-	-	-	-	43.3	9.0	-	-	43.3	9.0	-	-
30	0300	45.0	10.5	45.0	11.0	43.3	9.0	45.0	10.0	43.3	9.0	45.0	10.0
32	0320	48.0	10.5	48.0	11.0	43.3	9.0	48.0	10.0	43.3	9.0	48.0	10.0
33	0330	-	-	-	-	53.5	11.5	48.0	10.0	53.5	11.5	48.0	10.0
35	0350	52.0	11.0	52.0	11.5	53.5	11.5	50.0	10.0	53.5	11.5	50.0	10.0
38	0380	55.0	10.3	55.0	11.5	60.5	11.5	56.0	13.0	60.5	11.5	56.0	13.0
40	0400	58.0	10.8	58.0	11.5	60.5	11.5	58.0	13.0	60.5	11.5	58.0	13.0
42	0420	62.0	12.0	62.0	14.3	60.5	11.5	-	-	-	-	-	-
43	0430	62.0	12.0	62.0	14.3	60.5	11.5	61.0	13.0	-	-	-	-
44	0440	-	-	-	-	65.5	11.5	-	-	-	-	-	-
45	0450	64.0	11.6	64.0	14.3	65.5	11.5	63.0	13.0	-	-	-	-
48	0480	68.4	11.6	68.4	14.3	65.5	11.5	66.0	13.0	-	-	-	-
50	0500	69.3	11.6	69.3	14.3	72.5	11.5	70.0	14.0	-	-	-	-
53	0530	-	-	-	-	-	-	73.0	14.0	-	-	-	-
55	0550	75.4	13.3	75.4	15.3	72.5	11.5	75.0	14.0	-	-	-	-
58	0580	78.4	13.3	78.4	15.3	-	-	78.0	14.0	-	-	-	-
60	0600	80.4	13.3	80.4	15.3	79.3	11.5	80.0	14.0	-	-	-	-
63	0630	-	-	-	-	-	-	83.0	14.0	-	-	-	-
65	0650	85.4	13.0	85.4	15.3	84.5	11.5	85.0	14.0	-	-	-	-
68	0680	91.5	13.7	91.5	16.0	-	-	90.0	16.0	-	-	-	-
70	0700	92.0	13.0	92.0	15.3	89.5	11.5	92.0	16.0	-	-	-	-
75	0750	99.0	14.0	99.0	15.3	94.5	11.5	97.0	16.0	-	-	-	-
80	0800	104.0	15.0	104.0	16.3	99.5	11.5	105.0	18.0	-	-	-	-
85	0850	109.0	14.8	-	-	105.5	13.5	110.0	18.0	-	-	-	-
90	0900	114.0	14.8	-	-	111.5	13.5	115.0	18.0	-	-	-	-
95	0950	120.3	15.8	-	-	116.5	13.5	120.0	18.0	-	-	-	-
100	1000	123.3	15.8	-	-	119.5	13.5	125.0	18.0	-	-	-	-

STANDARD STOCK SEAT MATERIALS
Carbon, Ceramic, Silicon Carbide, Tungsten Carbide.
OTHER SEAT MATERIALS TO ORDER

VULCAN BOOT MOUNTED SEATS



Vulcan offer a wide variety of stock Boot Mounted Seats, to suit a variety of different housings and working length standards, as well as different ring I.D.'s to track against all Vulcan Seal faces. Boot Mounted Seats offer optimum cost and performance benefits and are widely utilised. Please specify your shaft size because each seat size shown has a unique I.D.

TYPES 11 & 1511
VULCAN STANDARD SIZES

Shaft Size DØ		D1		L1	
Inch	Metric	Metric	Inch	Metric	Inch
0.500	12,13	25.40	1.000	7.93	0.312
0.625	14,15,16	31.75	1.250	10.28	0.405
0.750	18,19	34.93	1.375	10.26	0.404
0.875	20,22	38.10	1.500	10.28	0.405
1.000	24,25	41.28	1.625	11.10	0.437
1.125	28	44.44	1.750	11.10	0.437
1.250	30,32	47.63	1.875	11.10	0.437
1.375	33,34,35	50.80	2.000	11.10	0.437
1.500	38	53.98	2.125	11.10	0.437
1.625	40	60.33	2.375	12.70	0.500
1.750	43,44,45	63.50	2.500	12.70	0.500
1.875	48	69.85	2.750	12.70	0.500
2.000	50	69.85	2.750	12.70	0.500
2.125	53	76.20	3.000	14.28	0.562
2.250	55	79.38	3.125	14.28	0.562
2.375	58,60	82.55	3.250	14.28	0.562
2.500	63	85.73	3.375	14.28	0.562
2.625	65	85.73	3.375	15.90	0.626
2.750	68,70	88.90	3.500	15.90	0.626
2.875	73	95.25	3.750	15.90	0.626
3.000	75	98.43	3.875	15.90	0.626

TYPES 20 & 1520
VULCAN STANDARD SIZES

Shaft Size DØ		D1		L1	
Inch	Metric	Metric	Inch	Metric	Inch
0.375	10	24.60	0.969	8.74	0.344
0.500	12,13	27.79	1.094	8.74	0.344
0.625	14,15,16	30.95	1.219	10.32	0.406
0.750	18,19	34.15	1.344	10.32	0.406
0.875	20,22	37.30	1.469	10.32	0.406
1.000	24,25	40.50	1.594	10.32	0.406
1.125	28	47.63	1.875	11.99	0.472
1.250	30,32	50.80	2.000	11.99	0.472
1.375	33,34,35	53.98	2.125	11.99	0.472
1.500	38	57.15	2.250	11.99	0.472
1.625	40	60.35	2.376	11.99	0.472
1.750	43,44,45	63.50	2.500	11.99	0.472
1.875	48	66.70	2.626	11.99	0.472
2.000	50	69.85	2.750	13.50	0.531
2.125	53	73.05	2.876	13.50	0.531
2.250	55	76.20	3.000	13.50	0.531
2.375	58,60	79.40	3.126	13.50	0.531
2.500	63	82.55	3.250	13.50	0.531
2.625	65	92.10	3.626	15.90	0.626
2.750	68,70	95.25	3.750	15.90	0.626
2.875	73	98.45	3.876	15.90	0.626
3.000	75	101.65	4.002	15.90	0.626
3.125	-	111.15	4.376	20.00	0.787
3.250	80	114.30	4.500	20.00	0.787
3.375	85	117.50	4.626	20.00	0.787
3.500	-	120.65	4.750	20.00	0.787
3.625	90	123.85	4.876	20.00	0.787
3.750	95	127.00	5.000	20.00	0.787
3.875	-	130.20	5.126	20.00	0.787
4.000	100	133.35	5.250	20.00	0.787

TYPES 19B/24
VULCAN STANDARD SIZES

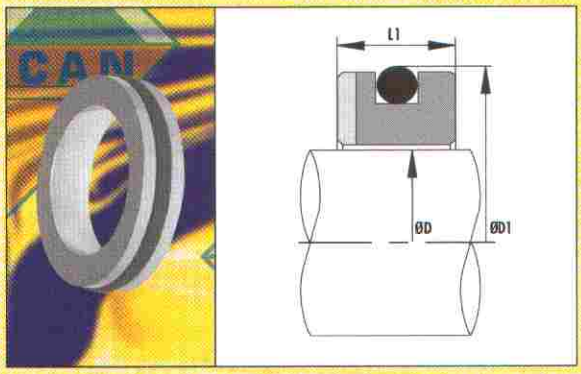
Metric Shaft Size D	Size Code	D1	Type 19B L1	Type 24 L1
12	0120	23.00	6.60	8.60
14	0140	25.00	6.60	8.60
15	0150	27.00	6.60	8.60
16	0160	27.00	6.60	10.00
18	0180	33.00	7.50	10.00
20	0200	35.00	7.50	10.00
22	0220	37.00	7.50	10.00
24	0240	39.00	7.50	10.00
25	0250	40.00	7.50	10.00
28	0280	43.00	7.50	10.00
30	0300	45.00	7.50	10.00

Metric Shaft Size D	Size Code	D1	Type 19B L1	Type 24 L1
32	0320	48.00	7.50	10.00
35	0350	50.00	7.50	10.00
38	0380	56.00	9.00	11.00
40	0400	58.00	9.00	11.00
43	0430	61.00	9.00	11.00
45	0450	63.00	9.00	11.00
48	0480	66.00	9.00	11.00
50	0500	70.00	9.50	13.00
53	0530	73 00	11.0	13.00
55	0550	75.00	11.0	13.00
58	0580	71.00	11.0	13.00

Metric Shaft Size D	Size Code	D1	Type 19B L1	Type 24 L1
60	0600	80.00	11.0	13.00
65	0650	85.00	11.0	13.00
68	0680	90.00	11.3	13.00
70	0700	92.00	11.3	15.30
75	0750	97.00	11.3	15.30
80	0800	105.0	12.0	15.30
85	0850	110.0	14.0	15.70
90	0900	115.0	14.0	15.70
95	0950	120.0	14.0	15.70
100	1000	125.0	14.0	15.70

STANDARD STOCK SEAT MATERIALS
Stat Ring: Ceramic, Silicon Carbide, Tungsten Carbide.
OTHER SEAT MATERIALS TO ORDER

VULCAN NON-DIN 'O'-RING MOUNTED SEATS



TYPE 21/31 SEATS

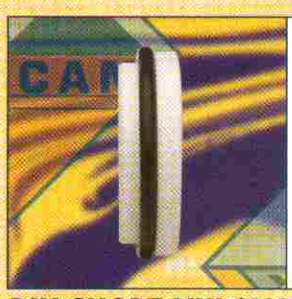
'O'-Ring mounted 'H' configuration stationary seat, to suit both standard European (Type 21) or American (Type 31) housing dimensions. These seats provide the benefit of being able to be pinned through-out the size range.

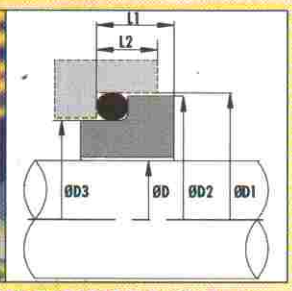
VULCAN STANDARD SIZES

Shaft Size DØ			Shaft Size DØ			Type 21				Type 31			
						D1		L1		D1		L1	
Inch	Metric	Code Size	Metric	Inch	Code Size	Metric	Inch	Metric	Inch	Metric	Inch	Metric	Inch
0.375	9.53	0950	-	-	-	24.60	0.969	8.70	0.343	22.22	0.875	7.95	0.313
-	-	-	10	0.394	0100	24.60	0.969	8.70	0.343	22.22	0.875	7.95	0.313
-	-	-	12	0.472	0120	27.79	1.094	8.70	0.343	25.40	1.000	7.95	0.313
0.500	12.70	0127	-	-	-	27.79	1.094	8.70	0.343	25.40	1.000	7.95	0.313
-	-	-	13	0.512	0130	27.79	1.094	8.70	0.343	25.40	1.000	7.95	0.313
-	-	-	14	0.551	0140	30.95	1.219	10.30	0.406	31.75	1.250	10.30	0.406
-	-	-	15	0.591	0150	30.95	1.219	10.30	0.406	31.75	1.250	10.30	0.406
0.625	15.88	0158	-	-	-	30.95	1.219	10.30	0.406	31.75	1.250	10.30	0.406
-	-	-	16	0.630	0160	30.95	1.219	10.30	0.406	31.75	1.250	10.30	0.406
-	-	-	18	0.709	0180	34.15	1.344	10.30	0.406	34.93	1.375	10.30	0.406
0.750	19.05	0191	-	-	-	34.15	1.344	10.30	0.406	34.93	1.375	10.30	0.406
-	-	-	20	0.787	0200	35.70	1.406	10.30	0.406	38.10	1.500	10.30	0.406
-	-	-	22	0.866	0220	37.30	1.469	10.30	0.406	38.10	1.500	10.30	0.406
0.875	22.23	0222	-	-	-	37.30	1.469	10.30	0.406	38.10	1.500	10.30	0.406
-	-	-	24	0.945	0240	40.50	1.594	10.30	0.406	41.28	1.625	11.10	0.437
-	-	-	25	0.984	0250	40.50	1.594	10.30	0.406	41.28	1.625	11.10	0.437
1.000	25.40	0254	-	-	-	40.50	1.594	10.30	0.406	41.28	1.625	11.10	0.437
-	-	-	28	1.102	0280	47.63	1.875	11.90	0.469	44.44	1.750	11.10	0.437
1.125	28.58	0286	-	-	-	47.63	1.875	11.90	0.469	44.44	1.750	11.10	0.437
-	-	-	30	1.181	0300	50.80	2.000	11.90	0.469	47.63	1.875	11.10	0.437
1.250	31.75	0317	-	-	-	50.80	2.000	11.90	0.469	47.63	1.875	11.10	0.437
-	-	-	32	1.260	0320	50.80	2.000	11.90	0.469	47.63	1.875	11.10	0.437
-	-	-	33	1.299	0330	53.98	2.125	11.90	0.469	50.80	2.000	11.10	0.437
1.375	34.93	0349	-	-	-	53.98	2.125	11.90	0.469	50.80	2.000	11.10	0.437
-	-	-	35	1.378	0350	53.98	2.125	11.90	0.469	50.80	2.000	11.10	0.437
-	-	-	38	1.496	0380	57.15	2.250	11.90	0.469	53.98	2.125	11.10	0.437
1.500	38.10	0381	-	-	-	57.15	2.250	11.90	0.469	53.98	2.125	11.10	0.437
-	-	-	40	1.575	0400	60.35	2.376	11.90	0.469	60.35	2.376	12.70	0.500
1.625	41.28	0412	-	-	-	60.35	2.376	11.90	0.469	60.33	2.375	12.70	0.500
-	-	-	42	1.654	0420	63.50	2.500	11.90	0.469	63.50	2.500	12.70	0.500
-	-	-	43	1.693	0430	63.50	2.500	11.90	0.469	63.50	2.500	12.70	0.500
1.750	44.45	0444	-	-	-	63.50	2.500	11.90	0.469	63.50	2.500	12.70	0.500
-	-	-	45	1.772	0450	63.50	2.500	11.90	0.469	66.68	2.625	12.70	0.500
1.875	47.63	0475	-	-	-	66.70	2.626	11.90	0.469	66.68	2.625	12.70	0.500
-	-	-	48	1.890	0480	66.70	2.626	11.90	0.469	69.85	2.750	12.70	0.500
-	-	-	50	1.969	0500	69.85	2.750	13.50	0.531	69.85	2.750	12.70	0.500
2.000	50.80	0508	-	-	-	69.85	2.750	13.50	0.531	69.85	2.750	12.70	0.500
-	-	-	53	2.087	0530	73.05	2.876	13.50	0.531	76.20	3.000	14.30	0.563
2.125	53.98	0539	-	-	-	73.05	2.876	13.50	0.531	76.20	3.000	14.30	0.563
-	-	-	55	2.165	0550	76.20	3.000	13.50	0.531	79.38	3.125	14.30	0.563
2.250	57.15	0571	-	-	-	76.20	3.000	13.50	0.531	79.30	3.122	14.30	0.563
-	-	-	58	2.283	0580	79.40	3.126	13.50	0.531	82.55	3.250	14.30	0.563
-	-	-	60	2.362	0600	79.40	3.126	13.50	0.531	82.55	3.250	14.30	0.563
2.375	60.33	0603	-	-	-	79.40	3.126	13.50	0.531	82.55	3.250	14.30	0.563
-	-	-	63	2.480	0630	82.55	3.250	13.50	0.531	85.73	3.375	14.30	0.563
2.500	63.50	0635	-	-	-	82.55	3.250	13.50	0.531	85.73	3.375	14.30	0.563
-	-	-	65	2.559	0650	92.10	3.626	15.90	0.626	85.73	3.375	15.90	0.626
2.625	66.68	0666	-	-	-	92.10	3.626	15.90	0.626	85.73	3.375	15.90	0.626
2.750	69.85	0698	-	-	-	95.25	3.750	15.90	0.626	88.90	3.500	15.90	0.626
-	-	-	70	2.756	0700	95.25	3.750	15.90	0.626	88.90	3.500	15.90	0.626
2.875	73.03	0730	-	-	-	98.45	3.876	15.90	0.626	95.25	3.750	15.90	0.626
-	-	-	75	2.953	0750	101.65	4.002	15.90	0.626	98.43	3.875	15.90	0.626
3.000	76.20	0762	-	-	-	101.65	4.002	15.90	0.626	98.43	3.875	15.90	0.626
-	-	-	80	3.150	0800	111.15	4.376	19.90	0.783	101.60	4.000	19.88	0.783
-	-	-	90	3.543	0900	120.65	4.750	19.90	0.783	111.13	4.375	19.88	0.783
-	-	-	100	3.937	1000	133.35	5.250	19.90	0.783	123.83	4.875	19.88	0.783

STANDARD STOCK SEAT MATERIALS
Stat Ring: Ceramic, Stainless Steel, Silicon Carbide, Tungsten Carbide, Ni-Resist.
OTHER SEAT MATERIALS TO ORDER

TYPE 8 DIN SHORT





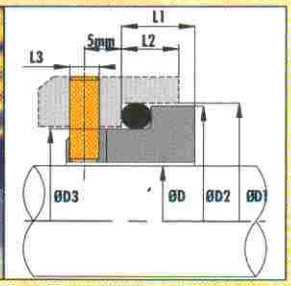
Common 'O'-Ring mounted DIN Short seat. DIN Short seats are normally only best recommended for smaller shaft sizes or for non-arduous duties.

DIN SHORT VULCAN STANDARD SIZES

Metric Shaft Size D	Size Code	D1	D2	D3	L1	L2
10	0100	21.0	20.6	16.4	6.6	5.5
12	0120	23.0	22.6	18.4	6.6	5.5
14	0140	25.0	24.6	20.4	6.6	5.5
15	0150	27.0	26.6	22.4	6.6	5.5
16	0160	27.0	26.6	22.4	6.6	5.5
18	0180	33.0	32.6	26.6	7.5	7.0
20	0200	35.0	34.6	28.6	7.5	7.0
22	0220	37.0	36.6	30.6	7.5	7.0
24	0240	39.0	38.6	32.6	7.5	7.0
25	0250	40.0	39.6	33.6	7.5	7.0
28	0280	43.0	42.6	36.6	7.5	7.0
30	0300	45.0	44.6	38.6	7.5	7.0
32	0320	48.0	47.6	41.6	7.5	7.0
33	0330	48.0	47.6	41.6	7.5	7.0
35	0350	50.0	49.6	43.8	7.5	7.0
38	0380	56.0	55.6	48.8	9.0	8.0
40	0400	58.0	57.4	50.8	9.0	8.0
43	0430	61.0	60.6	53.8	9.0	8.0

Metric Shaft Size D	Size Code	D1	D2	D3	L1	L2
45	0450	63.0	62.6	55.8	9.0	8.0
48	0480	66.0	65.6	58.8	9.0	8.0
50	0500	70.0	69.6	61.25	9.5	8.5
53	0530	73.0	72.6	64.25	11.0	8.5
55	0550	75.0	74.4	66.25	11.0	8.5
58	0580	78.0	77.5	69.25	11.0	8.5
60	0600	80.0	79.5	71.25	11.0	8.5
65	0650	85.0	84.5	76.25	11.0	8.5
68	0680	90.0	89.5	80.50	11.3	9.5
70	0700	92.0	91.4	82.60	11.3	9.5
75	0750	97.0	96.4	87.60	11.3	9.5
80	0800	105.0	104.2	94.70	12.0	10.0
85	0850	110.0	109.2	99.70	14.0	10.0
90	0900	115.0	114.2	104.70	14.0	10.0
95	0950	120.0	119.2	109.70	14.0	10.0
100	1000	125.0	124.2	114.70	14.0	10.0

TYPE 8 DIN LONG



DIN Long Type seats, with anti-rotation slot, are preferred for higher shaft size/speeds/pressures or sticky, co-agulating etc. media.

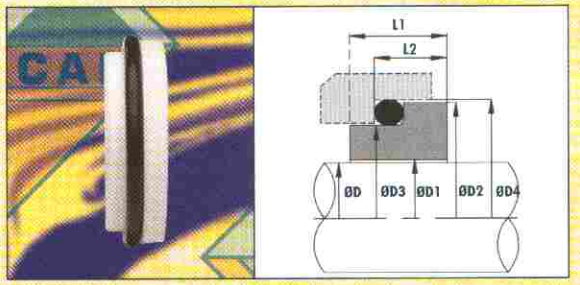
DIN LONG VULCAN STANDARD SIZES

Metric Shaft Size D	Size Code	D1	D2	D3	L1	L2	L3
10	0100	21.0	20.6	16.4	10.0	5.5	3.0
12	0120	23.0	22.6	18.4	10.0	5.5	3.0
14	0140	25.0	24.6	20.4	10.0	5.5	3.0
15	0150	27.0	26.6	22.4	10.0	5.5	3.0
16	0160	27.0	26.6	22.4	10.0	5.5	3.0
18	0180	33.0	32.6	26.6	11.5	7.0	3.0
20	0200	35.0	34.6	28.6	11.5	7.0	3.0
22	0220	37.0	36.6	30.6	11.5	7.0	3.0
24	0240	39.0	38.6	32.6	11.5	7.0	3.0
25	0250	40.0	39.6	33.6	11.5	7.0	3.0
28	0280	43.0	42.6	36.6	11.5	7.0	3.0
30	0300	45.0	44.6	38.6	11.5	7.0	3.0
32	0320	48.0	47.6	41.6	11.5	7.0	3.0
33	0330	48.0	47.6	41.6	11.5	7.0	3.0
35	0350	50.0	49.6	43.8	11.5	7.0	3.0
38	0380	56.0	55.6	48.8	14.0	8.0	4.0
40	0400	58.0	57.4	50.3	14.0	8.0	4.0

Metric Shaft Size D	Size Code	D1	D2	D3	L1	L2	L3
43	0430	61.0	60.6	53.8	14.0	8.0	4.0
45	0450	63.0	62.6	55.8	14.0	8.0	4.0
48	0480	66.0	65.6	58.8	14.0	8.0	4.0
50	0500	70.0	69.6	61.25	15.0	8.5	4.0
53	0530	73.0	72.6	64.25	15.0	8.5	4.0
55	0550	75.0	74.4	66.25	15.0	8.5	4.0
58	0580	78.0	77.5	69.25	15.0	8.5	4.0
60	0600	80.0	79.5	71.25	15.0	8.5	4.0
65	0650	85.0	84.5	76.25	15.0	8.5	4.0
68	0680	90.0	89.5	80.50	18.0	9.5	4.0
70	0700	92.0	91.4	88.60	18.0	9.5	4.0
75	0750	97.0	96.4	87.60	18.0	9.5	4.0
80	0800	105.0	104.2	94.70	18.2	10.0	4.0
85	0850	110.0	109.2	99.70	18.2	10.0	4.0
90	0900	115.0	114.2	104.70	18.2	10.0	4.0
95	0950	120.0	119.2	109.70	17.2	10.0	4.0
100	1000	125.0	124.2	114.70	17.2	10.0	4.0

STANDARD STOCK SEAT MATERIALS
Ceramic, Silicon Carbide, Tungsten Carbide, Carbon.
OTHER SEAT MATERIALS TO ORDER

TYPE 24 DIN

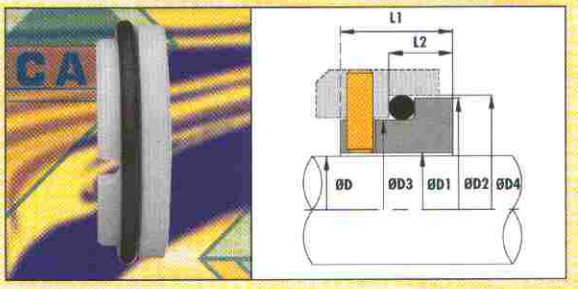


'O'-Ring mounted stationary seat to DIN 24960 (EN12756) Standard with short tail.
The seat offers different axial dimensions to the Type 8 DIN short seat and can be utilised with most seals particularly the Type 24 and 1724 designs.

DIN SHORT VULCAN STANDARD SIZES

Metric Shaft Size D	Size Code	D1	D2	D3	D4	L1	L2
10	0100	11.0	20.6	16.4	21.0	10.0	8.6
12	0120	13.0	22.6	18.4	23.0	10.0	8.6
14	0140	15.0	24.6	20.4	25.0	10.0	8.6
16	0160	17.0	26.6	22.4	27.0	10.0	8.6
18	0180	19.0	32.6	26.6	33.0	11.5	10.0
20	0200	21.0	34.6	28.6	35.0	11.5	10.0
22	0220	23.0	36.6	30.6	37.0	11.5	10.0
24	0240	25.0	38.6	32.6	39.0	11.5	10.0
25	0250	26.0	39.6	33.6	40.0	11.5	10.0
28	0280	29.0	42.6	36.6	43.0	11.5	10.0
30	0300	31.0	44.6	38.6	45.0	11.5	10.0
32	0320	33.0	47.6	41.6	48.0	11.5	10.0
33	0330	34.0	47.6	41.6	48.0	11.5	10.0
35	0350	36.0	49.6	43.8	50.0	11.5	10.0
38	0380	39.0	55.6	48.8	56.0	12.5	11.0
40	0400	41.0	57.6	50.8	58.0	12.5	11.0
43	0430	44.0	60.6	53.8	61.0	12.5	11.0

Metric Shaft Size D	Size Code	D1	D2	D3	D4	L1	L2
45	0450	46.0	62.6	55.8	63.0	12.5	11.0
48	0480	49.0	65.6	58.8	66.0	12.5	11.0
50	0500	51.0	69.6	61.3	70.0	14.5	13.0
53	0530	54.0	72.6	64.3	73.0	14.5	13.0
55	0550	56.0	74.6	66.3	75.0	14.5	13.0
58	0580	59.0	77.5	69.3	78.0	14.5	13.0
60	0600	61.0	79.5	71.3	80.0	14.5	13.0
63	0630	64.0	82.5	74.3	83.0	14.5	13.0
65	0650	66.0	84.5	76.3	85.0	14.5	13.0
68	0680	69.0	89.5	80.5	90.0	16.5	15.3
70	0700	71.2	91.4	82.6	92.0	16.5	15.3
75	0750	76.2	96.4	87.6	97.0	16.5	15.3
80	0800	81.2	104.2	94.7	105.0	17.5	15.7
85	0850	86.2	109.2	99.7	110.0	17.5	15.7
90	0900	91.2	114.2	104.7	115.0	17.5	15.7
95	0950	96.2	119.2	109.7	120.0	17.5	15.7
100	1000	101.2	124.2	114.7	125.0	17.5	15.7



'O'-Ring mounted stationary seat to DIN 24960 (EN12756) Standard with long tail and drive slot.
The seat offers different axial dimensions to the Type 8 DIN long seat and can be utilised with most seals particularly the Type 24 and 1724 designs.

DIN LONG VULCAN STANDARD SIZES

Metric Shaft Size D	Size Code	D1	D2	D3	D4	L1	L2	Slot Width	Slot Depth
10	0100	11.2	20.6	16.4	21.0	15.0	8.6	4.0	5.0
12	0120	13.2	22.6	18.4	23.0	15.0	8.6	4.0	5.0
14	0140	15.2	24.6	20.4	25.0	15.0	8.6	4.0	5.0
16	0160	17.2	26.6	22.4	27.0	15.0	8.6	4.0	5.0
18	0180	19.2	32.6	26.6	33.0	17.0	10.0	4.0	5.5
20	0200	21.2	34.6	28.6	35.0	17.0	10.0	4.0	5.5
22	0220	23.2	36.6	30.6	37.0	17.0	10.0	4.0	5.5
24	0240	25.2	38.6	32.6	39.0	17.0	10.0	4.0	5.5
25	0250	26.2	39.6	33.6	40.0	17.0	10.0	4.0	5.5
28	0280	29.2	42.6	36.6	43.0	17.0	10.0	4.0	5.5
30	0300	31.2	44.6	38.6	45.0	17.0	10.0	4.0	5.5
32	0320	33.2	47.6	41.6	48.0	17.0	10.0	4.0	5.5
33	0330	34.2	47.6	41.6	48.0	17.0	10.0	4.0	5.5
35	0350	36.2	49.6	43.8	50.0	17.0	10.0	4.0	5.5
38	0380	39.2	55.6	48.8	56.0	18.0	11.0	5.0	5.5
40	0400	41.2	57.6	50.8	58.0	18.0	11.0	5.0	5.5
43	0430	44.2	60.6	53.8	61.0	18.0	11.0	5.0	5.5

Metric Shaft Size D	Siz Code	D1	D2	D3	D4	L1	L2	lot Width	Slot Depth
45	0450	46.2	62.6	55.8	63.0	18.0	11.0	5.0	5.5
48	0480	49.2	65.6	58.8	66.0	18.0	11.0	5.0	5.5
50	0500	51.2	69.6	61.3	70.0	20.0	13.0	5.0	5.5
53	0530	54.2	72.6	64.3	73.0	20.0	13.0	5.0	5.5
55	0550	56.3	74.6	66.3	75.0	20.0	13.0	5.0	5.5
58	0580	59.2	77.5	69.3	78.0	20.0	13.0	5.0	5.5
60	0600	61.2	79.5	71.3	80.0	20.0	13.0	5.0	5.5
63	0630	64.2	82.5	74.3	83.0	20.0	13.0	5.0	5.5
65	0650	66.2	84.5	76.3	85.0	20.0	13.0	5.0	5.5
68	0680	69.2	89.5	80.5	90.0	22.0	15.3	5.0	5.5
70	0700	71.2	91.4	82.6	92.0	22.0	15.3	5.0	5.5
75	0750	76.2	96.4	87.6	97.0	22.0	15.3	5.0	5.5
80	0800	81.2	104.2	94.7	105.0	23.0	15.7	5.0	5.5
85	0850	86.2	109.2	99.7	110.0	23.0	15.7	5.0	5.5
90	0900	91.2	114.2	104.7	115.0	23.0	15.7	5.0	5.5
95	0950	96.2	119.2	109.7	120.0	23.0	15.7	5.0	5.5
100	1000	101.2	124.2	114.7	125.0	23.0	15.7	5.0	5.5

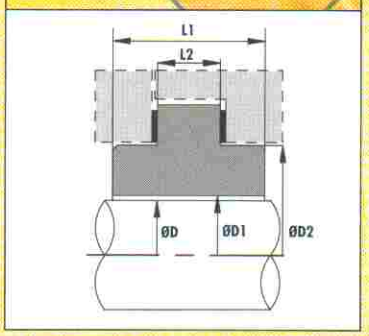
STANDARD STOCK SEAT MATERIALS
Ceramic, Silicon Carbide, Tungsten Carbide, Carbon.
OTHER SEAT MATERIALS TO ORDER

TYPE 25

VULCAN STANDARD SIZES

Shaft Size DØ			Shaft Size DØ			D1		D2		L1		L2		Gasket Thickness	
Inch	Metric	Code Size	Metric	Inch	Code Size	Metric	Inch	Metric	Inch	Metric	Inch	Metric	Inch	Metric	Inch
0.500	12.70	0127	13	0.512	0130	13.70	0.539	29.05	1.144	17.40	0.685	7.90	0.311	0.80	0.031
0.625	15.88	0158	16	0.630	0160	16.80	0.661	33.04	1.301	17.40	0.685	7.90	0.311	0.80	0.031
0.750	19.05	0191	19	0.748	0190	20.00	0.787	36.21	1.426	17.40	0.685	7.90	0.311	0.80	0.031
-	-	0200	20	0.787	0200	21.00	0.827	36.90	1.453	17.40	0.685	7.90	0.311	0.80	0.031
0.875	22.23	0222	22	0.866	0220	23.20	0.913	39.39	1.551	17.40	0.685	7.90	0.311	0.80	0.031
-	-	0250	25	0.984	0250	26.00	1.024	41.90	1.650	17.40	0.685	7.90	0.311	0.80	0.031
1.000	25.40	0254	-	-	-	26.40	1.039	42.56	1.676	17.40	0.685	7.90	0.311	0.80	0.031
1.125	28.58	0286	-	-	-	29.60	1.165	45.74	1.801	26.90	1.059	11.10	0.437	1.60	0.063
-	-	0300	30	1.181	0300	31.00	1.220	48.69	1.917	26.90	1.059	11.10	0.437	1.60	0.063
1.250	31.75	0317	32	1.260	0320	32.70	1.287	50.50	1.988	26.90	1.059	11.10	0.437	1.60	0.063
1.375	34.93	0349	35	1.378	0350	36.00	1.417	53.68	2.113	26.90	1.059	11.10	0.437	1.60	0.063
1.500	38.10	0381	38	1.496	0380	39.10	1.539	56.85	2.238	26.90	1.059	11.10	0.437	1.60	0.063
1.625	41.28	0412	-	-	-	42.20	1.661	63.20	2.488	26.90	1.059	11.10	0.437	1.60	0.063
1.750	44.45	0444	45	1.772	0450	45.40	1.787	66.38	2.613	26.90	1.059	11.00	0.433	1.60	0.063
1.875	47.63	0476	48	1.890	0480	49.00	1.929	69.55	2.738	26.90	1.059	11.10	0.437	1.60	0.063
-	-	0500	50	1.969	0500	51.00	2.008	71.90	2.831	26.90	1.059	11.10	0.437	1.60	0.063
2.000	50.80	0508	-	-	-	51.80	2.039	72.73	2.863	26.90	1.059	11.10	0.437	1.60	0.063
2.125	53.98	0539	-	-	-	54.90	2.161	79.08	3.113	33.30	1.311	14.30	0.563	1.60	0.063
2.250	57.15	0571	-	-	-	58.10	2.287	82.25	3.238	33.30	1.311	14.30	0.563	1.60	0.063
2.375	60.33	0603	60	2.362	0600	61.30	2.413	85.43	3.363	33.30	1.311	14.30	0.563	1.60	0.063
2.500	63.50	0635	-	-	-	64.50	2.539	88.60	3.488	33.30	1.311	14.30	0.563	1.60	0.063
2.625	66.68	0666	-	-	-	67.60	2.661	91.78	3.613	33.30	1.311	14.30	0.563	1.60	0.063
2.750	69.85	0698	70	2.756	0700	71.00	2.795	94.90	3.736	33.30	1.311	14.30	0.563	1.60	0.063
2.875	73.03	0730	-	-	-	74.00	2.913	98.13	3.863	33.30	1.311	14.30	0.563	1.60	0.063
3.000	76.20	0762	-	-	-	77.20	3.039	99.71	3.926	33.30	1.311	14.30	0.563	1.60	0.063
3.125	79.38	0794	-	-	-	80.40	3.165	102.89	4.051	33.30	1.311	14.30	0.563	1.60	0.063
3.500	88.90	0889	-	-	-	89.90	3.539	114.00	4.488	34.30	1.350	14.30	0.563	1.60	0.063
3.750	95.25	0953	-	-	-	96.30	3.791	120.35	4.738	34.30	1.350	14.30	0.563	1.60	0.063
4.000	101.60	1016	-	-	-	102.60	4.039	126.70	4.988	34.30	1.350	14.30	0.563	1.60	0.063
4.125	104.78	1050	105	4.134	1050	106.00	4.173	139.90	5.508	36.00	1.417	16.00	0.630	1.60	0.063
4.500	114.30	1143	-	-	-	115.30	4.539	139.40	5.488	34.30	1.350	14.30	0.563	1.60	0.063
5.500	139.70	1397	-	-	-	140.70	5.539	177.50	6.988	36.00	1.417	16.00	0.630	1.60	0.063

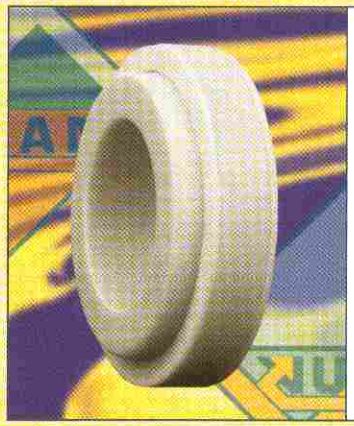
The Type 25 seat is an industry standard stationary design with 'V' shape profile, supplied complete with 2 off PTFE gaskets. Commonly used with a wide variety of seals, particularly the multi-spring Type 16XX series.

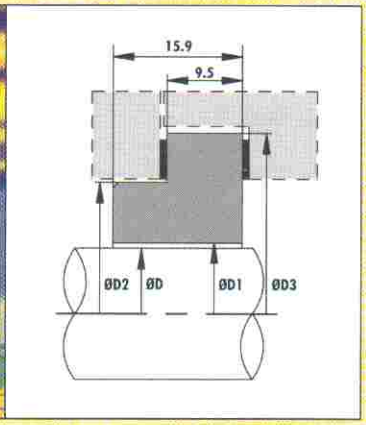


TYPE 27

VULCAN STANDARD SIZES

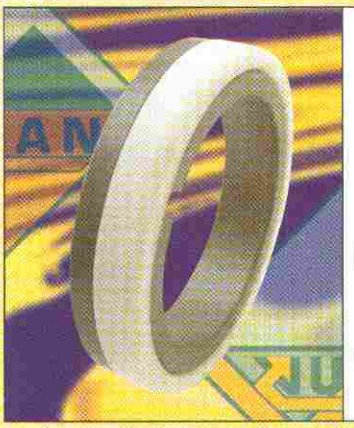
Inch Shaft Size D	Size Code	D1	D2	D3	Gasket Thick
0.750	0191	21.60	34.80	44.45	1.60
0.875	0222	24.75	37.95	47.65	1.60
1.000	0254	27.95	41.15	50.80	1.60
1.125	0286	31.10	44.30	53.95	1.60
1.187	0300	32.70	45.90	55.55	1.60
1.250	0317	34.30	47.50	57.15	1.60
1.375	0349	37.45	50.65	60.30	1.60
1.500	0381	40.65	57.00	66.65	1.60
1.625	0412	43.80	60.15	69.85	1.60
1.750	0444	47.00	63.35	76.20	1.60
1.875	0476	50.15	66.50	79.35	1.60
2.000	0508	53.35	69.70	82.55	1.60
2.125	0539	56.50	72.85	88.90	1.60
2.250	0571	59.70	76.05	92.05	1.60
2.375	0603	62.85	79.20	95.25	1.60
2.500	0635	66.00	82.40	101.50	1.60
2.625	0666	69.20	85.60	104.75	1.60
3.000	0762	78.00	93.50	121.00	1.60

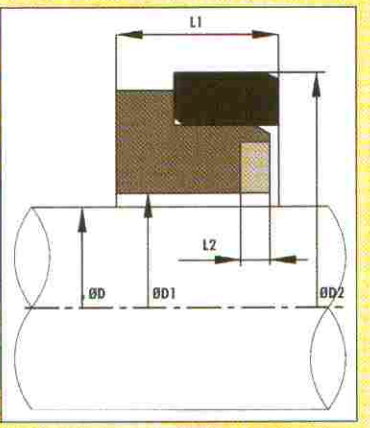




The Type 27 seat is an industry standard stationary design with 'L' shape profile, supplied complete with two off PTFE gaskets. Commonly used with multiple-spring balanced seals.

TYPE 23





'L'-shaped seat that seals to the housing by the P.T.F.E ring supplied. The design provides for use of an anti-rotation pin (recommended).

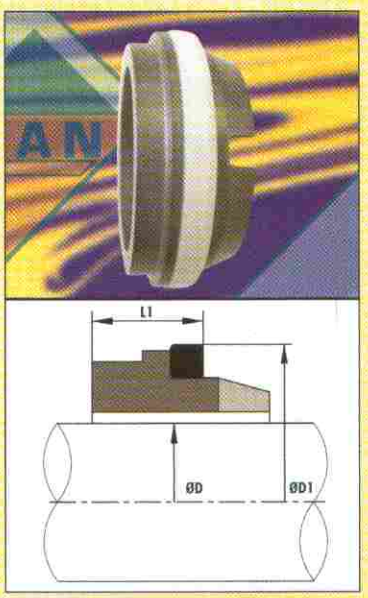
The P.T.F.E ring allows easy installation and helps the seat align, whilst providing exceptional chemical resistance.

VULCAN TYPE 23

Shaft Size DØ		D1		D2		L1		L2	
Inch	Metric	Metric	Inch	Metric	Inch	Metric	Inch	Metric	Inch
2.375	60.33	61.93	2.438	82.55	3.250	14.30	0.563	3.50	0.138
2.500	63.50	65.00	2.559	85.73	3.375	14.30	0.563	3.50	0.138
2.625	66.68	68.18	2.684	85.73	3.375	15.90	0.626	3.50	0.138
2.750	69.85	71.35	2.809	88.90	3.500	15.90	0.626	3.50	0.138
2.875	73.03	74.53	2.934	95.25	3.750	15.90	0.626	3.50	0.138
3.000	76.20	77.70	3.059	98.43	3.875	15.90	0.626	3.50	0.138
3.125	79.38	81.92	3.225	101.60	4.000	19.80	0.780	4.00	0.157
3.250	82.55	85.09	3.350	104.78	4.125	19.80	0.780	4.00	0.157
3.375	85.73	88.27	3.475	107.95	4.250	19.80	0.780	4.00	0.157
3.500	88.90	91.44	3.600	111.13	4.375	19.80	0.780	4.00	0.157
3.625	92.08	94.64	3.726	114.30	4.500	19.80	0.780	4.00	0.157
3.750	95.25	97.79	3.850	117.48	4.625	19.80	0.780	4.00	0.157
3.875	98.43	100.97	3.975	120.65	4.750	19.80	0.780	4.00	0.157
4.000	101.60	104.14	4.100	123.83	4.875	19.80	0.780	4.00	0.157

Shaft Size DØ		D1		D2		L1		L2	
Inch	Métric	Metric	Inch	Metric	Inch	Metric	Inch	Metric	Inch
2.375	60.33	61.93	2.438	82.55	3.250	14.30	0.563	3.50	0.138
2.500	63.50	65.00	2.559	85.73	3.375	14.30	0.563	3.50	0.138
2.625	66.68	68.18	2.684	85.73	3.375	15.90	0.626	3.50	0.138
2.750	69.85	71.35	2.809	88.90	3.500	15.90	0.626	3.50	0.138
2.875	73.03	74.53	2.934	95.25	3.750	15.90	0.626	3.50	0.138
3.000	76.20	77.70	3.059	98.43	3.875	15.90	0.626	3.50	0.138
3.125	79.38	81.92	3.225	101.60	4.000	19.80	0.780	4.00	0.157
3.250	82.55	85.09	3.350	104.78	4.125	19.80	0.780	4.00	0.157
3.375	85.73	88.27	3.475	107.95	4.250	19.80	0.780	4.00	0.157
3.500	88.90	91.44	3.600	111.13	4.375	19.80	0.780	4.00	0.157
3.625	92.08	94.64	3.726	114.30	4.500	19.80	0.780	4.00	0.157
3.750	95.25	97.79	3.850	117.48	4.625	19.80	0.780	4.00	0.157
3.875	98.43	100.97	3.975	120.65	4.750	19.80	0.780	4.00	0.157
4.000	101.60	104.14	4.100	123.83	4.875	19.80	0.780	4.00	0.157

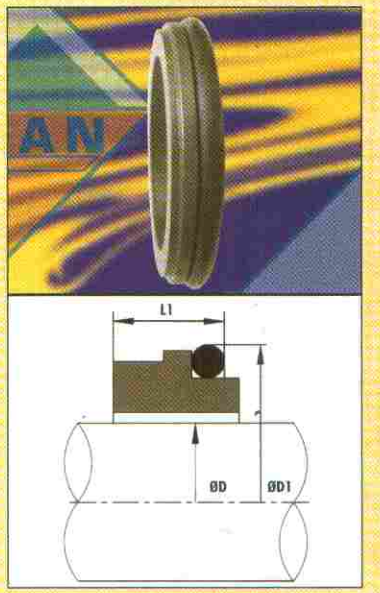
TYPE 24



TYPE 24 BEZL

DIN 24960 pinned seat designed to readily push fit, with a rectangular section seat ring in P.T.F.E. Pin diameter recommended is 3mm up to size 35mm and 4mm from 38mm to 100mm. Face profiled to accept a restraining bezel plate.

Dimension table overleaf



TYPE 24 BEZS

DIN 24960 non-pinned short seat, designed to readily push fit. Seat is fitted with an elastomer '0'-Ring, and the face is profiled to accept a restraining bezel plate.

Dimension table overleaf

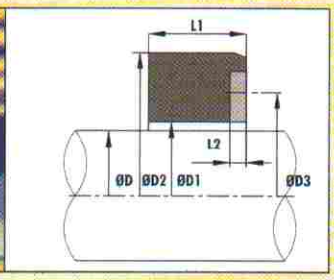
TYPE 24 BEZL / BEZS

Metric Shaft Size D	Size Code	D1	L1
20	0200	35.00	13.50
22	0220	37.00	13.50
24	0240	39.00	13.50
25	0250	40.00	13.00
28	0280	43.00	12.50
30	0300	45.00	12.00
32	0320	48.00	12.00
33	0330	48.00	12.00
35	0350	50.00	12.00
38	0380	56.00	13.00
40	0400	58.00	13.00
43	0430	61.00	13.00
45	0450	63.00	13.00
48	0480	65.00	13.00
50	0500	70.00	13.50

Metric Shaft Size D	Size Code	D1	L1
53	0530	73.00	13.50
55	0550	75.00	13.50
58	0580	78.00	13.50
60	0600	80.00	13.50
63	0630	83.00	13.50
65	0650	85.00	13.50
68	0680	90.00	13.50
70	0700	92.00	14.50
75	0750	97.00	14.50
80	0800	105.00	15.00
85	0850	110.00	15.00
90	0900	115.00	15.00
95	0950	120.00	15.00
100	1000	125.00	15.00

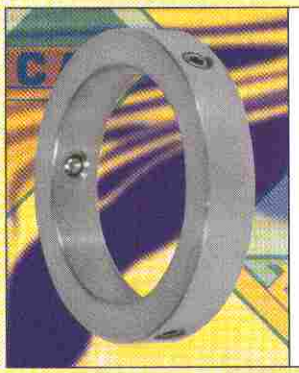
TYPE 32

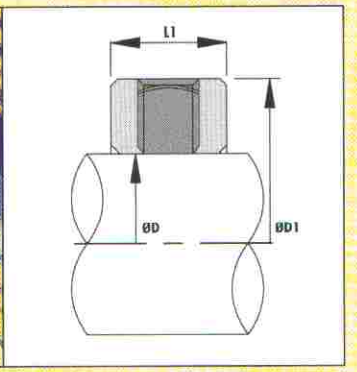
The Type 32 seat is an 'O'-Ring mounted seat suited for higher pressure applications. Easy fitting and good heat transfer, leading to enhanced performance are features of this design.



Shaft Size DØ		D1		D2		D3 (slot PCD)		L1		L2		O-Ring
Inch	Metric	Metric	Inch	Metric	Inch	Metric	Inch	Metric	Inch	Metric	Inch	Size
0.500	12.70	13.80	0.543	25.30	0.996	19.80	0.780	7.90	0.311	2.50	0.098	BS214
0.625	15.88	16.98	0.669	31.65	1.246	24.20	0.953	10.30	0.406	2.50	0.098	BS215
0.750	19.05	20.15	0.793	34.82	1.371	27.75	1.093	10.30	0.406	2.50	0.098	BS216
0.875	22.23	23.33	0.919	38.00	1.496	31.00	1.220	10.30	0.406	2.50	0.098	BS217
1.000	25.40	26.50	1.043	41.18	1.621	34.10	1.343	11.15	0.439	2.50	0.098	BS218
1.125	28.58	30.08	1.184	44.35	1.746	37.30	1.469	11.15	0.439	2.50	0.098	BS219
1.250	31.75	33.25	1.309	47.53	1.871	40.50	1.594	11.15	0.439	2.50	0.098	BS220
1.375	34.93	36.43	1.434	50.70	1.996	43.60	1.717	11.15	0.439	2.50	0.098	BS221
1.500	38.10	39.60	1.559	53.88	2.121	46.80	1.843	11.15	0.439	2.50	0.098	BS222
1.625	41.28	42.78	1.684	60.23	2.371	51.60	2.031	12.75	0.502	3.00	0.118	BS223
1.750	44.45	45.95	1.809	63.40	2.496	54.80	2.157	12.75	0.502	3.00	0.118	BS224
1.875	47.63	49.13	1.934	66.58	2.621	57.90	2.280	12.75	0.502	3.00	0.118	BS225
2.000	50.80	52.30	2.059	69.75	2.746	61.10	2.406	12.75	0.502	3.00	0.118	BS226
2.125	53.98	55.48	2.184	76.10	2.996	65.90	2.594	14.33	0.564	3.50	0.138	BS227
2.250	57.15	58.65	2.309	79.28	3.121	69.00	2.717	14.33	0.564	3.50	0.138	BS228
2.375	60.33	61.83	2.434	82.45	3.246	72.20	2.843	14.33	0.564	3.50	0.138	BS229
2.500	63.50	65.00	2.559	85.63	3.371	75.40	2.969	14.33	0.564	3.50	0.138	BS230
2.625	66.68	68.18	2.684	85.63	3.371	77.00	3.031	15.93	0.627	3.50	0.138	BS231
2.750	69.85	71.35	2.809	88.80	3.496	80.20	3.157	15.93	0.627	3.50	0.138	BS232
2.875	73.03	74.53	2.934	95.15	3.746	84.90	3.343	15.93	0.627	3.50	0.138	BS233
3.000	76.20	77.70	3.059	98.33	3.871	88.10	3.469	15.93	0.627	3.50	0.138	BS234
3.125	79.38	81.92	3.225	101.50	3.996	91.30	3.594	19.84	0.781	3.50	0.138	BS235
3.250	82.55	85.09	3.350	104.68	4.121	94.40	3.717	19.84	0.781	3.50	0.138	BS236
3.375	85.73	88.27	3.475	107.85	4.246	97.60	3.843	19.84	0.781	3.50	0.138	BS237
3.500	88.90	91.44	3.600	111.03	4.371	100.80	3.969	19.84	0.781	3.50	0.138	BS238
3.625	92.08	94.62	3.725	114.20	4.496	104.00	4.094	19.84	0.781	3.50	0.138	BS239
3.750	95.25	97.79	3.850	117.38	4.621	107.10	4.217	19.84	0.781	3.50	0.138	BS240
3.875	98.43	100.97	3.975	120.55	4.746	110.30	4.343	19.84	0.781	3.50	0.138	BS241
4.000	101.60	104.14	4.100	123.73	4.871	113.50	4.469	19.84	0.781	3.50	0.138	BS242

VULCAN CLAMP RINGS





Stainless Steel, working length setting, Clamp Rings, available in all common imperial and metric shaft sizes. Standard thickness as shown, but other sizes and widths available to order. All fitted with three grub screws at 120° apart.

The Clamp Rings have a variety of uses, most particularly to set or amend seal housing depth to suit the preferred seal's working length.

VULCAN STANDARD SIZES

Shaft Size DØ			Shaft Size DØ			D1		L1	
Inch	Metric	Code Size	Metric	Inch	Code Size	Metric	Inch	Metric	Inch
0.375	9.53	0095	10	0.394	0100	19.00	0.748	7.50	0.295
0.500	12.70	0127	12	0.472	0120	21.00	0.827	7.50	0.295
-	-	-	14	0.551	0140	23.00	0.906	7.50	0.295
-	-	-	15	0.591	0150	24.00	0.945	7.50	0.295
0.625	15.88	0158	16	0.630	0160	25.00	0.984	7.50	0.295
0.750	19.05	0191	18	0.709	0180	31.00	1.220	7.50	0.295
-	-	-	20	0.787	0200	33.00	1.299	7.50	0.295
0.875	22.23	0222	22	0.866	0220	35.00	1.378	7.50	0.295
-	-	-	24	0.945	0240	37.00	1.457	7.50	0.295
1.000	25.40	0254	25	0.984	0250	38.00	1.496	7.50	0.295
1.125	28.58	0286	28	1.102	0280	41.00	1.614	7.50	0.295
-	-	-	30	1.181	0300	43.00	1.693	7.50	0.295
1.250	31.75	0317	32	1.260	0320	45.00	1.772	10.00	0.394
-	-	-	33	1.299	0330	46.00	1.811	10.00	0.394
1.375	34.93	0349	35	1.378	0350	48.00	1.890	10.00	0.394
1.500	38.10	0381	38	1.496	0380	53.00	2.087	10.00	0.394
1.625	41.28	0412	40	1.575	0400	55.00	2.165	10.00	0.394
-	-	-	43	1.693	0430	58.00	2.283	10.00	0.394
1.750	44.45	0444	45	1.772	0450	60.00	2.362	10.00	0.394
1.875	47.63	0476	48	1.890	0480	63.00	2.480	10.00	0.394
2.000	50.80	0508	50	1.969	0500	65.00	2.559	10.00	0.394
2.125	53.98	0539	53	2.087	0530	68.00	2.677	10.00	0.394
2.250	57.15	0571	55	2.165	0550	70.00	2.756	10.00	0.394
-	-	-	58	2.283	0580	70.00	2.756	10.00	0.394
2.375	60.33	0603	60	2.362	0600	79.00	3.110	10.00	0.394
2.500	63.50	0635	63	2.480	0630	82.00	3.228	10.00	0.394
2.625	66.68	0666	65	2.559	0650	84.00	3.307	12.00	0.472
-	-	-	68	2.677	0680	87.00	3.425	12.00	0.472
2.750	69.85	0698	70	2.756	0700	89.00	3.504	12.00	0.472
2.875	73.03	0730	73	2.874	0730	95.00	3.740	12.00	0.472
3.000	76.20	0762	75	2.953	0750	98.00	3.858	12.00	0.472
3.125	79.38	0794	80	3.150	0800	103.00	4.055	12.00	0.472
3.250	82.55	0826	-	-	-	103.00	4.055	12.00	0.472
3.375	85.73	0857	85	3.346	0850	108.00	4.252	12.00	0.472
3.500	88.90	0889	90	3.543	0900	113.00	4.449	12.00	0.472
3.625	92.08	0921	-	-	-	113.00	4.449	12.00	0.472
3.750	95.25	0953	95	3.740	0950	118.00	4.646	12.00	0.472
3.875	98.43	0984	-	-	-	121.00	4.764	12.00	0.472
4.000	101.60	1016	100	3.937	1000	123.00	4.843	12.00	0.472

STANDARD STOCK SEAT MATERIALS
304 Stainless Steel as standard
316 Stainless Steel and other metals available to order.

FITTING INSTRUCTIONS

FITTING INSTRUCTIONS FOR STANDARD ROTARY MECHANICAL SEALS; PLEASE OBSERVE THE FOLLOWING;

EQUIPMENT CONDITION

- Check the condition of the equipment shaft and bearings for the following:
- Shaft diameter is within tolerance +/- 0.05mm (+/- 0.002").
- Shaft run out is less than 0.1mm (0.004") for shaft speeds up to and including 1800rev/min and less than 0.05mm (0.002") for shaft speeds greater than 1800 rev/min.
- Shaft max. ovality (concentricity) +/- 0.025mm.
- Shaft bearing clearances should not permit lateral axial movements exceeding 0.12mm i.e. Shaft End Float should be less than 0.12mm.
- Shaft surface finish, should be a maximum of 0.3/0.6µRm.
- Seat housing diameter tolerance should be within +/-0.05mm. Make sure the seat housing surfaces are free from damage or corrosion.

PREPARATION

- There are no sharp edges, burns, scratches or corrosion where the seal must pass over. It is recommended that the shaft is chamfered at the end to aid assembly. A typical lead in of 2.5 X ten degree angle for seal sizes up to 63.5mm and 4 X ten degree angle for seal sizes over 63.5mm is satisfactory.
- Do not place face(s) down on any surface unless protected by clean cloth or paper.

Ensure that equipment operating conditions do not exceed the seal design parameters.

INSTALLATION OF SEAL AND SEAT

- Extreme cleanliness and care is essential during installation. When ready to use, lay parts onto a clean flat surface and remove protective wrapping. Take care not to cut or damage any seal parts, as these can easily be damaged if mishandled.

- SEAT: Lightly lubricate the seat boot and housing with clean water, alcohol or other elastomer compatible liquid. Press fit the stationary seat into the gland plate and check the face is square to the gland plate face, utilizing a small hand press or pillar of a drilling machine if necessary. Protect the seat face first with a plastic material. Place onto the shaft the assembled gland plate and stationary seat.

- SEAL: Lightly lubricate the sleeve and the neck of the seal bellows with clean water or soft soap. Light oil may be used with elastomers, other than Ethylene Propylene (EP). Fitting with grease may prevent a bellows or diaphragm seal from gripping the shaft. Use grease, if you prefer, solely on 'O' Rings.

- Slide onto the shaft the rotary seal and set to the correct working length. If necessary, gently turning the seal as it slides (in a direction opposite to the direction of the coil, if the seal is a Conical Spring Seal). If the seal is fitted with grub-screws, tighten uniformly and lock with thread sealant, if considered desirable. Carefully clean both seal faces to remove all traces of grease.

- Assemble the equipment in the normal manner. Finally bolt the gland plate to the stuffing box in an even manner, to the correct necessary torque. Turn the shaft by hand to check that it will turn freely with no obstructions.

ENSURE THAT THE EQUIPMENT IS PRIMED BEFORE START-UP

SEAL IDENTIFICATION

VULCAN WEB PORTAL

Vulcan have created and collated a vast array of seal identification information, all of which is contained on our Web Portals, which we establish for each of our partner customers.

The first half of the portal contains an entire on-line product enquiry, order and supply processing site. This sleek, easy to use, facility enables you to check stock and production due dates, on all Vulcan products, immediately see your nett quantity-related prices, contact us with enquiries and place orders. Orders are received electronically, automatically into Vulcan's system and this initiates an integrated, automated, electronic supply chain, of bar-coded product, moving through all of our processes to despatch. Customers can monitor their account and track all orders live on screen.

The second half of the Portal has been designed as a complete Technical and Commercial Data-base of all information on Vulcan, and its products. Our aim, in building this over many years, has been to provide our customers with instant answers or detail, on all common, possible commercial or technical questions.

The principal sections are;

- Commercial and Vulcan Information Section
- Mechanical Seals Product Section
- Encapsulated 'O' Rings Product Section
- Gland Packing Product Section
- Tefcan Expanded P.T.F.E Product Section
- New and Up-Dated Advice Section
- Help and Instructions Section

The Mechanical Seal Section has been developed to provide comprehensive information and support on all aspects of our seals and contains the following sections;-

- Introduction to Vulcan Seals
- Vulcan Seal Electronic Presentations
- Mechanical Seal Technical Suite
- Seal Material Compatibility Charts
- Seal and Seat Identification Data-Bases

Ready seal identification is vital for our customers and recognising this, Vulcan have focused heavily on creating the best suite of tools available, to assist. This Data-base section thus contains;

- In depth, seal/seat cross-reference charts to other manufacturers
- Comprehensive code cracker information on our main competitors
- A Vast Pump Model/Seal Search Engine
- A Unique Seal Identification Suite

This seal identification suite facility has been designed to enable rapid identification and specification of any common Standard Mechanical Seal. The process allows you to visually recognise any common seal/seat and then prompts you with advice, to check/stipulate what are the main critical dimensions or application details.

The suite is simply and logically laid out, in sections by seal design type, with photographs for easy recognition. Behind each photograph, there is extensive clear advice showing;

- What are the Main Types
- Tables of Dimensions
- What Dimensions are Crucial
- Our Codes and Competitor Codes
- Product Pump/Media Information
- Seal Material Recommendations
- Most Common Applications
- Features/Benefits of Vulcan's Design
- Vulcan Stock Enquiry Link

EQUIVALENTS LISTING TO OTHER SEAL SUPPLIERS

BURGMANN®	VULCAN
BT-AR, BT-AR3	Type 18
BT-FN	Type 13
H7N	Type 1678
H12N or H17GN	Type 82
HJ92	Type 40S
M2	Type 9
M2N	Type 9L
M2N4	Type 9S
M3	Type 8B
M3N	Type 8.DIN
M3N4	Type 8S
M32	Type 8
M32N	Type 8.DIN
M32N4	Type 8S
M37	Type 8
M37N	Type 8.DIN
M37N4	Type 8S
M37G	Type 8
M37GN	Type 8.DIN
M37GN4	Type 8S
M377S6	Type 8W
M7N	Type 1677
M74 or H74	Consult Vulcan
MG1	Type 19
MG12	Type 192
MG13	Type 193
MG1S/20	Type 1520
MG1S	Consult Vulcan
MG901	Type 22
MG910	Type 10
MG912	Type 24
MG913	Type 143
MG920	Type 20
MG921	Type 11
SEATS ONLY;	
G1 or G2	Consult Vulcan
G4	Type 8.STD
G6	Type 8.DINS
G7 & G8	Type 8.BEZ
G9	Type 8.DINL
G13	Type 8B seat
G15 or G115	Consult Vulcan
G16	Consult Vulcan
G30	Consult Vulcan
G46	Type 24.DINL
G50	Type 20 seat
G55	Type 11 seat
G60	Type 19B
G61	Type 24 seat

EAGLE®	VULCAN
15M5	Type 97
15O5	Type 97

PILLAR®	VULCAN
CCU	Type 98
CGU	Type 97
US-1	Type 98
US-2	Type 97
US-3	Type 97

AES®	VULCAN
N-B01	Type 18
N-B012	Type 192
N-B013	Type 193
N-B02	Type 19
N-B03	Type 70
N-B03U	Type 75
N-B04	Type 60
N-B04U	Type 65
N-B05	Type 14DIN
N-B052	Type 142DIN
N-B053	Type 143DIN
N-B07	Type 1724
N-BP02	Type 1520
N-BP04	Type 1511
N-BP05	Type 1522
N-C01	Type CLAM
N-M01	Type 1609
N-M01S	Type 1609S
N-M02	Type 1609B
N-M02S	Type 1609BS
N-M03	Type 1659
N-M03S	Type 1659S
N-M04	Type 1659B
N-M04S	Type 1659BS
N-M05	Type 1645
N-M05S	Type 1645S
N-M06	Type 1645B
N-M06S	Type 1645BS
N-M07	Type 50
N-P01	Type 10
N-P01U	Type A1
N-P02	Type 20
N-P02U	Type A2
N-P03	Type 24
N-P04	Type 11
N-P04U	Type A4
N-P05	Type 22
N-P05U	Type A5
N-P06	Type 26
N-P07	Consult Vulcan
N-P08	Type 95
N-P080	Type 98
N-P09	Type 94
N-S01	Type 8.STD
N-S02	Type 8.DINL
N-S03	Type 8.DINS
N-S04	Type 24 STAT
N-S040	Type 19B STAT
N-S05	Type 24.DINL
N-S06	Type 24.DINS
N-S07	Type 21 STAT
N-S070	Type 31 STAT
N-S08	Type 25 STAT
N-S09	Type 23
N-T01	Type 8
N-T01.DIN	Type 8.DIN
N-T02	Type 8B
N-T03	Type 12
N-T03.DIN	Type 12.DIN
N-T04	Type 13
N-T04.DIN	Type 13.DIN
N-T05	Type 06 Range
N-W01	Type 1688
N-W02	Type 1688L
N-W03	Type 1688W
N-W04	Type 1688Y
N-W07D	Type 1677

JOHN CRANE®	VULCAN
1 (USA)	Type A5
1A (UK)	Type A1
2 (UK)	Type A2
2 (USA)	Type A4
4 (UK)	Type 1644
6A (USA)	Type 75
6A (UK)	Type 70
6D / 6J	Type 66
8-1	Type 1609S
8-1T	Type 1645S
8B1	Type 1609BS
8B1T	Type 1645BS
9	Type 1609
9T	Type 1645
9BT	Type 1645B
21	Type 11
58B	Type 1659BS
58U	Type 1659S
59B	Type 1659B
59U	Type 1659
80	Type 1688
87	Type 1682
106 (USA)	Type 65
106 (UK)	Type 60
109	Type 1609
109B	Type 1609B
502	Type 1724
521	Type 24
2100 K	Type 142
2100 N	Type 143
2100 S	Type 14
502	Type 1724
521	Type 24
SEATS ONLY;	
A	Type 23
BC	Type 24.BEZS
BD	Type 24.BEZL
BO	Type 24.DINS
BP	Type 24.DINL
BS	Type 8.TDP
DF	Type 1688
EI/EJ	Type 1682
FH	Type STAL
H	Type 34
J	Type 33
L	Type 27
M	Type 19B
N/NG	Type 20 seat
P/PP/PG	Type 32
V	Type 25
W/WM	Type 21
X	Type 1644 seat
Y	Type 36
Z	Type 20 seat

FLEXIBOX®	VULCAN
R00	Type 95
R10	Type 96
R20	Type 97
R30	Type 95N
R40	Type 96N
R50	Type 97N

M.T.U.®	VULCAN
Europa 1	Type 12.DIN
Europa 2	Type 12
Europa 4	Type 8B
FA	Type 18
FG 1	Type 19
FG 2	Type 192
FG 3	Type 193
FP/D	Type 24
FP/T35	Type 11
SIMPLEX	Type 13
SIMPLEX DIN	Type 13.DIN
TIPO 1 Seat	Type 19B
TIPO 2 Seat	Type 8.DINS

ROTEN®	VULCAN
Roten® 2	Type 12
Roten® 3	Type 13
Roten® 4	Type 12 with FEPs fitted
Roten® 45	Type 7 with FEPs fitted
Roten® 5	Type 7
Roten® 5H2	Type 7B
Roten® 7K	Type 1688U
Roten® EHS	Type 40U
Uniten® 2	Type 12.DIN
Uniten® 3	Type 13.DIN
Uniten® 4	Type 12.DIN FEPs fitted
Uniten® 45	Type 7D with FEPs fitted
Uniten® 5	Type 7D
Uniten® 5K	Type 135
Uniten® 7K	Type 1688L
Uniten® EHS	Type 40L

ROTEN® UK	VULCAN
16	Type 65
21	Type 20
21A	Type 11
37	Type 26
41	Type 28
51	Type 10
51A	Type 22
52	Type 24
68	Type 75

TEKHNISEAL®	VULCAN
100	Type 10
200	Type 20
304	Type 26
400	Type 12
402	Type 13
404	Type 13.DIN
406	Type 12.DIN
500	Type 24
552	Type 24
600	Type 65
700	Type 75
800	Type 11
900	Type 22

For a more comprehensive and upto date listings please see the comparison sheet on your customer web portal.
All information contained in this table is supplied in good faith and was considered correct at the time of going to press. However, VEL cannot guarantee that using this information will always result in an entirely suitable replacement, especially as specifications can change.

COMMON USA SEAL CODES TO VULCAN X REFERENCE LIST

USA	VULCAN CODE
100	SPSR15
101	0191.M65D.N.C.
102	0158.11.N.C.
102V	0158.11.V.C.
106	0127.11.N.C.
108N	0317.MA5.O.C.
109	0158.11.N.C.SEAL
112	0191.11B.N.C.
112V	0191.11B.V.C.
116	0191.11C.N.C.
127	0269.11.N.C.
128	0191.M11.N.C.
137	0317.A5.N.C.
137V	0317.A5.V.C.
142	0127.70T.N.C.
144	0222.11U.N.F.
147	0444.11.N.C.SEAL
150	0127.70.N.C.SEAL
153	0158.M65B.N.C.
153V	0158.M65B.V.C.
154	0317.11.N.C.SEAL
157	0191.11.N.C.SEAL
159N	0254.THK1.O.F.
162	0127.65.N.C.
163	0127.70.N.C.
164	0127.D73.N.C.
165	0127.D73.N.C.
168	0127.N11T.N.C.
172	0349.11.N.C.SEAL
172 52	0349.A5.N.C.SEAL
177	0349.11.N.C.
177V	0349.11.V.C.
185	0317.11.N.C.
185V	0317.11.V.C.
186	0349.11.N.C.
186V	0349.11.V.C.
188	0222.A5.N.C.
188V	0222.A5.V.C.
192	0349.M11J.O.F.
193N	0508.11J.O.F.
196	0508.11.N.C.SEAL
200	0158.65.N.C.
200A	0158.75E.N.C.
200V	0158.65.V.C.
201	0191.65.N.C.
201V	0191.65.V.C.
204	0286.A5.N.C.
204V	0286.A5.V.C.
205	0444.A5.N.C.
205V	0444.A5.V.C.
207	0191.11C.N.C.
208	0222.11.N.C.SEAL
210	0349.11.N.C.
210V	0349.11.V.C.
218	0158.65.N.C.SEAL
223	0476.11.N.C.SEAL
224	0381.A5J.O.F.
227	0254.M11B.N.C.
229	0222.A5J.N.F.
235	0254.11.N.C.
235V	0254.11.V.C.
236	0254.A5.N.C.
23621	0254.A5.V.C.
236V	0254.A5.V.C.
237	0444.11.N.C.
237V	0444.11.V.C.
238	0412.11.N.C.
238V	0412.11.V.C.
239	0412.11.N.C.
239V	0412.11.V.C.
245	0254.11.N.C.
245V	0254.11.V.C.
246	0317.11.N.C.
246V	0317.11.V.C.
247	0381.11C.N.C.
248	0254.11.N.C.
248V	0254.11.V.C.
249	0317.11.N.C.
249V	0317.11.V.C.
250	0222.11J.N.F.
251	0254.N11.N.C.
252	0254.M11J.N.F.
253	0286.M11.N.C.
254	0286.11J.N.F.
257	0349.MA5.N.C.
258	0381.A5J.N.F.
258 21	0381.22J.N.F.
259	0381.11J.N.F.
262	0444.A5J.N.F.

USA	VULCAN CODE
264	0317.A5J.N.F.
265	0191.11J.N.F.
267	0508.11.N.C.
267V	0508.11.V.C.
268	0603.11J.N.F.
269	0635.11J.N.F.
270	0730.11J.N.F.
274	0158.A5.N.C.
275	0191.A5.N.C.
278	0603.A5J.N.F.
278 21	0603.22J.N.F.
279	0635.A5J.N.F.
279 21	0635.22J.N.F.
282	0286.22J.N.F.
282 21	0286.22J.N.F.
283	0381.11.N.C.
288	0444.11.N.C.
288V	0444.11.V.C.
290	0158.11.N.C.
290V	0158.11.V.C.
292	0381.M11B.N.C.
298	0127.65.N.C.SEAL
299	0158.65.N.C.SEAL
300	0158.65.N.C.
300V	0158.65.V.C.
303	0222.11.N.C.
303V	0222.11.V.C.
305	0381.A5.N.C.
305V	0381.A5.V.C.
309	0222.11.N.C.
309V	0222.11.V.C.
312	0476.11J.N.F.
314	0381.A5U.N.Q.
316	0381.A5U.N.Q.
317	0444.A5B.N.C.
319	0508.A5U.N.Q.
320	0381.11B.N.C.
321	0698.22J.N.F.
323	0571.A5J.N.F.
324	0762.22J.N.F.
326	0317.M11U.N.Q.
327	0539.A5J.N.F.
328	0666.A5J.N.F.
328 21	0666.22J.N.F.
329	0730.22J.N.F.
332	0568.11J.N.F.
334	0365.11.N.C.
336	0539.11.N.C.
338	0539.11J.N.F.
340	0476.11.N.C.
342N	0508.A5J.O.F.
344	0286.11.N.C.
346	0412.A5B.N.C.
347	0381.11.N.C.
347V*	0381.11.V.C.
348	0286.11.N.C.SEAL
349	0635.A5J.N.F.
349 21	0635.22J.N.F.
349V	0635.A5J.V.F.
350	0603.A5J.N.F.
350 21	0603.22J.N.F.
351	0571.A5.N.C.
351V	0571.A5.V.C.
353	0539.A5J.N.F.
354	0349.22.N.C.
354V	0349.22.V.C.
355	0286.11.N.C.
355V	0286.11.V.C.
356	0286.11.N.C.
356V	0286.11.V.C.
357	0254.11.N.C.
357V	0254.11.V.C.
358	0191.11.N.C.
358V	0191.11.V.C.
359	0158.11.N.C.
359V	0158.11.V.C.
360	0254.65.N.C.
360V	0254.65.V.C.
361	0317.A5.N.C.
361V	0317.A5.V.C.
366	0444.A5.N.C.
366V	0444.A5.V.C.
370	0254.65.N.C.
371	0381.11.N.C.
371V	0381.11.V.C.
373	0191.A5B.N.C.
374	0381.A5.N.C.
374V	0381.A5.V.C.
376	0349.11.N.C.SEAL
378	0381.11.N.C.

USA	VULCAN CODE
378V	0381.11.V.C.
380	0254.M11.N.C.
380V	0254.M11.V.C.
381	0317.11.N.C.
381V	0317.11.V.C.
382	0381.11.N.C.
383	0317.11.N.C.
383V	0317.11.V.C.
384	0286.A5.N.C.
384V	0286.A5.V.C.
394	0317.A5J.N.F.
395	0381.A5J.N.F.
397	0254.11.N.C.SEAL
397V	0254.11.V.C.SEAL
398	0254.M11.V.C.
399	0191.11.N.C.SEAL
400	0127.M11.N.C.SEAL
401	0127.11.N.C.SEAL
401A	0127.11B.N.C.
402	0317.11B.N.C.
409	0158.D73.N.C.
416	0317.11.N.C.SEAL
425	0158.M65.N.C.
436	0444.11J.N.F.
436V	0444.11J.V.F.
440	0191.C73.N.C.
445	0508.11.N.C.
445V	0508.11.V.C.
446	0444.11.N.C.
446V	0444.11.V.C.
447	0158.73.N.C.
447V	0158.73.V.Q.
448	0444.11.N.C.
453	0158.73.N.C.
458	0412.MA5.N.C.
460	0254.M11.N.C.
460V	0254.M11.V.C.
461	0412.11.N.C.
461V	0412.11.V.C.
462	0508.11.N.C.
462V	0508.11.V.C.
463	0635.11J.N.F.
463V	0635.11J.V.F.
464	0698.11J.N.F.
465	0762.11J.N.F.
466	0317.11C.N.C.
466V*	0317.11C.V.C.
468	0635.11U.N.F.
469	0635.11U.N.F.
471	0158.11.N.C.
472	0317.11.N.C.
474	0158.11B.N.C.
475	0762.22J.N.F.
477	0476.A5J.N.F.
477V	0476.A5J.V.F.
478	0508.MA5U.N.F.
479	0508.A5.N.C.
483	0698.11J.N.F.
484	0412.A5B.N.C.
485	0158.A5C.N.C.
486	0158.A5D.N.C.
487	0158.A5B.N.C.
491	0349.11.N.C.
491V	0349.11.V.C.
492	0603.11J.N.F.
499	0254.11J.N.C.
501	0158.M65.N.C.
501V	0158.M65.V.C.
506	0127.65T.N.C.
507	0158.65B.N.C.
507V	0158.65B.N.C.
508	0158.11.N.C.
508V	0158.11.V.C.
510	0317.11C.N.C.
513	0476.A5.N.C.
513V	0476.A5.V.C.
514	0412.11.N.C.
514V	0412.11.V.C.
515	0381.A5V.N.F.
516	0158.65.N.C.
517	0317.11J.N.F.
518	0158.65D.N.C.
519	0444.MA5J.N.F.
523	0476.A5.N.C.
524	0158.65B.N.C.
525	0317.11J.N.F.
529	0286.11J.N.F.
530	05086.A5J.N.F.
532	0508.11J.N.F.
534	0381.11J.N.F.

USA	VULCAN CODE
535	0444.A5J.N.F.
537	0539.A5.N.C.
538	0476.MA5.N.C.
539	0254.22.N.C.
542	0666.A5J.N.F.
542 21	0666.22J.N.F.
543	0539.11.N.C.
543V	0539.11.V.C.
544	0412.11J.N.F.
546	0317.A5J.N.F.
547	0349.A5J.N.F.
548	0254.11J.N.C.
550	0444.11J.N.F.
552	0158.11J.N.F.
553	0381.11J.N.F.
554	0476.MA5U.N.F.
555	0444.MA5.N.C.
557	0254.A5J.N.F.
564	0191.A5.N.C.SEAL
578	0222.11.N.C.SEAL
584	0286.A5J.N.F.
586	0476.A5J.N.F.
588	0286.11J.N.F.
593	0476.11.N.C.
593V	0476.11.V.C.
594	0603.11J.N.F.
595	0412.A5J.N.F.
597	0317.11B.N.C.
598	0317.11V.N.F.
601	0191.75.N.C.
601SS	W-0191.75.N.C.
601V	0191.75.N.C.
604	0286.11J.N.F.
605	0286.11.N.C.
605V	0286.11.V.C.
606	0191.75B.N.C.
607	0286.A5U.N.F.
608	0286.A5U.N.F.
609	0412.A5B.N.C.
609V	0412.A5B.N.C.
610	0412.A5B.N.C.
610V*	0412.A5B.V.C.
617	0222.11J.N.F.
618	0317.11J.N.F.
628	0158.65E.N.C.
631	0127.11.N.C.
632	0127.11T.N.C.
633	0158.11B.N.C.
633V	0158.11B.N.C.
637	0158.65J.N.F.
642	4S7805
647	0191.75.N.C.SEAL
659	0381.11.N.C.
659V	0381.11.V.C.
666	0127.N11T.N.C.
677	0349.22.N.C.
677V	0349.22.V.C.
682	0381.11C.N.C.
687	0222.11.N.C.
687V	0222.11.V.C.
695N	0254.A5C.O.F.
703	0222.11.N.C.
703V	0222.11.V.C.
712	0158.75U.N.Q.
714	0158.75U.N.Q.
715	0158.75U.N.Q.
732	0158.11U.N.Q.
734	0158.11U.N.Q.
735	0158.11.N.C.
738	0158.A5J.N.F.
739	0158.A5J.N.F.
744	0412.A5.N.C.
744V	0412.A5.V.C.
745	0412.A5.N.C.
745V	0412.A5.V.C.
746	0412.A5.N.C.
747	0412.A5.N.C.
750	0191.11.N.C.
750V	0191.11.V.C.
752	0191.75B.N.C.
752V	0191.75B.V.C.
754	0254.A5.N.C.
754V	0254.A5.V.C.
756	0317.11.N.C.
756V	0317.11.V.C.
758	0381.11.N.C.
758V	0381.11.V.C.
760	0191.M65J.N.F.
761	0762.11J.N.F.
762	0191.L65J.N.F.

COMMON USA SEAL CODES TO VULCAN X REFERENCE LIST

USA	VULCAN CODE	USA	VULCAN CODE	USA	VULCAN CODE	USA	VULCAN CODE
764	0191.L65.N.C.	942	0571.11.N.C.SEAL	1183	0317.A5J.N.C.	2045	0349.11.N.C.
765	0191.75.N.C.	946	0476.MA5V.N.F.	1184	0317.A5J.N.C.	2046	0349.11.N.C.
766	0191.75.N.C.	947	0381.NA5V.N.F.	1185	0317.MA5.O.C.	2047	0349.11J.N.C.
767	0191.11J.N.F.	949	0476.MA5V.N.F.	1186	0317.A5C.N.C.	2048	0349.11J.N.C.
768	0191.11J.N.C.	950	0381.NA5V.N.F.	1189	0381.11B.N.C.	2049	0349.22.N.C.
769	0191.11J.N.F.	952	0158.M65.N.C.	1190	0381.A5.N.C.	2050	0349.22.N.C.
771	0191.A5J.N.F.	954	0158.M65B.N.C.	1191	0381.A5.N.C.	2051	0381.A4.N.C.
773	0191.A5J.N.F.	961	0158.75.N.C.	1192	0381.A5J.N.F.	2052	0381.A4.N.C.
774	0222.11J.N.F.	964	0158.75B.N.C.	1196	0444.A5.N.C.	2053	0381.A4J.N.F.
775	0222.11J.N.F.	973	0191.65B.N.C.	1199	0444.A5J.N.F.	2054	0381.A4J.N.F.
776	0222.A5J.N.F.	974	0191.65.N.C.SEAL	1510	0191.11D.N.C.	2055	0412.A4.N.C.
777	0254.65.N.C.	975	0254.65.N.C.SEAL	1514	0191.11C.N.C.	2056	0412.A4.N.C.
778	0254.65.N.C.	976	0317.20B.N.C.	1522	0191.65.N.C.SEAL	2057	0412.A5.N.C.
779	0254.A5.N.C.	977	0317.20B.N.C.	1608	0476.11.N.C.	2058	0412.A5.N.C.
786	0317.11.N.C.	978	0317.20B.N.C.	1609	0508.11B.N.C.	2059	0444.11.N.C.
788	0127.75C.N.C.	979	0317.20B.N.C.	1617	0539.A5J.N.F.	2060	0444.11.N.C.
789	0254.M11J.N.F.	980	0158.11.N.C.	1620	0476.11J.N.F.	2061	0444.11J.N.F.
791	0254.A5J.N.F.	981	0317.A4J.N.F.	1636	0286.A5V.N.F.	2062	0444.11J.N.F.
801	0286.11J.N.F.	982	0254.22.N.C.	1636V	0286.A5V.V.F.	2065	0476.11.N.C.
802	0286.11J.N.F.	983	0286.M22.N.C.	1637	0286.A5V.N.F.	2066	0476.11.N.C.
804	0317.11J.N.F.	1000	0158.75.N.C.	1637V	0286.A5V.V.F.	2067	0476.11J.N.F.
805	0349.11J.N.C.	1000V	0158.75.V.C.	1638	0286.A5V.N.F.	2068	0476.11J.N.F.
806	0349.11J.N.C.	1002	0127.11.N.C.	1638V	0286.A5V.V.F.	2069	0476.A5.N.C.
807	0349.A5J.N.F.	1002V	0127.11.V.C.	1639	0286.A5V.N.F.	2070	0476.A5.N.C.
808	0349.22J.N.C.	1013	SPTT12	1639V	0286.A5V.V.F.	2071	0476.A5J.N.F.
809	0349.22J.N.C.	1014	0254.65.V.C.	1644	0381.A5J.V.F.	2072	0476.A5J.N.F.
816	0381.11J.N.F.	1015	0317.A5.N.C.SEAL	1645	0381.A5J.V.F.	2073	0508.11.N.C.
817	0381.11J.N.F.	1017	0508.22.N.C.	1654	0476.A5J.N.F.	2074	0508.11.N.C.
818	0412.11J.N.F.	1018	0317.11W.N.F.	1656	0476.A5J.N.F.	2075	0508.11J.N.F.
819	0412.11J.N.F.	1021	0158.73.N.C.	1657	0476.A5J.N.F.	2076	0508.11J.N.F.
821	0412.11J.N.F.	1023	0254.M11.N.C.	1659V	0476.NA5J.V.F.	2077	0508.A5.N.C.
822	0412.A5J.N.F.	1024	0191.70.N.C.SEAL	1660V	0476.NA5J.V.F.	2078	0508.A5.N.C.
825	0444.11J.N.F.	1030	0254.A5J.N.F.	1666	0539.A5J.N.F.	2079	0508.A5J.N.F.
826	0444.11J.N.F.	1031	0444.A5J.N.F.	1667	0349.22.N.C.	2084	0539.A5.N.C.
827	0476.11J.N.F.	1031V	0444.A5J.V.F.	1674	0444.22.N.C.	2085	0539.A5.N.C.
828	0476.11.N.C.	1031V	0444.22J.V.F.	1676	0571.11J.N.F.	2086	0539.A5J.N.F.
829	0476.MA5V.N.F.	1032	0444.A5.N.C.	1678	0571.11J.N.F.	2087	0539.11.N.C.
831	0476.MA5V.N.F.	1033	0444.A5J.N.F.	1679	0571.11.N.C.	2087	0571.11.N.C.
832	0508.11J.N.F.	1042	0444.A5.N.C.	1680	0571.11.N.C.	2088	0571.11.N.C.
833	0508.11J.N.F.	1042	0444.22.N.C.	1683	0412.A5J.N.F.	2089	0539.11J.N.F.
834	0603.11J.N.F.	1046	0254.M11.N.C.	1684	0444.A5U.N.F.	2089	0571.11J.N.F.
835	0635.11J.N.F.	1047	0317.A4.V.C.	1685	0508.A5J.N.F.	2090	0539.11J.N.F.
836	0698.11J.N.F.	1050	0127.11.N.C.SEAL	1686	0539.11J.N.F.	2090	0571.11J.N.F.
837	0698.A4J.N.F.	1053V	0317.11J.V.C.	1687	0539.11J.N.F.	2091	0571.A5.N.C.
838	0698.22J.N.F.	1057	0539.11J.N.F.	1688	0571.A5J.N.F.	2092	0571.A5.N.C.
839	0730.11J.N.F.	1057V	0539.11J.V.F.	1696	0762.11.N.C.SEAL	2093	0539.11J.N.F.
841	0730.22J.N.F.	1058	0635.11.V.C.SEAL	1697	0412.A4J.N.C.	2094	0571.A5J.N.F.
842	0508.11.N.C.	1058V	0635.11J.V.F.	1698	0412.A4J.N.C.	2097	0603.A5J.N.F.
843	0508.A5.N.C.	1059	0762.22J.N.F.	1699	0412.A5J.N.F.	2098	0603.A5J.N.F.
844	0539.11B.N.C.	1059V	0762.22J.V.F.	2000	0158.A4.N.C.	2098V	0603.A5J.V.F.
846	0571.11J.N.F.	1060	0762.MA5.N.C.	2001	0158.A4.N.C.	2101	0635.A5J.N.F.
847	0571.11J.N.F.	1060V	0762.MA5.V.C.	2002	0158.A4J.N.C.	2101V	0635.A5J.V.F.
848	0571.A5J.N.F.	1066	0158.11J.N.F.	2003	0158.A4J.N.C.	2102	0539.11J.N.F.
849	0571.A5J.N.F.	1067	0286.A5.N.C.	2004	0158.A4C.N.C.	2103	0286.A5.N.C.SEAL
850	0127.11D.N.C.	1079	0158.11.O.C.	2005	0158.A4C.N.C.	2104	0349.22.N.C.SEAL
851	0191.65.N.C.	1080	0158.11.O.C.	2006	0158.A4V.N.F.	2105	0381.11.N.C.SEAL
853	0635.11J.N.F.	1081	0317.11.O.C.	2007	0158.A4D.N.C.	2106	0381.A5.N.C.SEAL
854	0539.11H.N.Q.	1082	0317.11.O.C.	2008	0191.A4.N.C.	2107	0412.11.N.C.SEAL
855	0539.11H.N.C.	1083	0317.22.O.C.	2009	0191.A4.N.C.	2108	0444.11.N.C.SEAL
856	0539.A5H.N.Q.	1084	0317.22.O.C.	2010	0191.A4J.N.C.	2109	0444.A5.N.C.SEAL
857	0539.A5H.N.C.	1085	0158.M11.N.C.	2011	0191.A4J.N.C.	2110	0476.A5.N.C.SEAL
858	0444.NA5J.N.F.	1085V	0158.M11.N.C.	2012	0191.A5.N.C.	2111	0508.11.N.C.SEAL
859	0444.NA5J.N.F.	1097	0476.11.N.C.	2013	0191.A5.N.C.	2112	0508.A5.N.C.SEAL
864	0349.M22J.N.F.	1109	0317.22J.N.F.	2014	0191.A5J.N.C.	2113	0571.A5.N.C.SEAL
865	0349.M22J.N.F.	1110	0381.22J.N.F.	2015	0191.A5J.N.C.	2114	0476.11J.N.F.
866	0286.MA5J.N.F.	1125	0191.P11.N.C.	2016	0158.A5.N.C.	2115	0762.11J.N.F.
867	0286.MA5J.N.F.	1128	0317.MA4J.N.F.	2017	0158.A5.N.C.	2116	0762.11J.N.F.
874	0571.11.N.C.	1130	0191.MA4.O.F.	2018	0158.A5J.N.F.	2117	0381.11B.N.C.
876	0508.11J.N.F.	1131	0286.A4.O.F.	2019	0158.A5J.N.F.	2120	0635.11.N.C.
877	0191.N11.N.C.	1132	0349.MA4C.O.F.	2020	0158.A5C.N.C.	2122	0317.A4.N.C.
877V	0191.N11.N.C.	1136	0317.A4.N.C.	2021	0158.A5C.N.C.	2123	0317.A4.N.C.
882	0158.N65.N.C.SEAL	11410	0365.89.V.S.	2022	0158.A5V.N.F.	2124	0698.11J.O.F.
885	0286.A5J.N.F.	1145	0508.11J.N.F.	2023	0158.A5D.N.C.	2127	0381.A4J.V.F.
898	0476.MA5U.N.F.	1149	0127.E73.N.C.	2024	0222.A4.N.C.	2131	0158.65.N.C.SEAL
899	0381.MA5J.N.F.	1152	0158.75.N.C.	2025	0222.A4.N.C.	2133	0508.22.N.C.
905	0191.11U.N.F.	1156	0158.11.N.C.	2026	0222.A4J.N.C.	2134	0349.22.N.C.
908	0191.011.N.C.	1160	0191.11.N.C.	2027	0222.A4J.N.C.	2135	0444.22.N.C.
912	0254.A5D.N.C.	1164	0254.65.N.C.	2028	0222.A5.N.C.	2137	0381.11C.N.C.
916	0635.A5J.V.F.	1165	0254.A5.N.C.	2029	0222.A5.N.C.	2142	0444.22.N.C.
921	0191.N65.N.C.	1166	0254.A5.N.C.	2030	0222.A5J.N.C.	2145	0254.11U.N.F.
926	0381.11V.N.F.	1168	0286.A5.N.C.	2031	0222.A5J.N.C.	2150	0444.22J.N.F.
930	0127.11.N.C.SEAL	1169	0286.A5.N.C.	2032	0254.A4.N.C.	2151	0444.22J.N.F.
933	0158.11.N.C.SEAL	1170	0286.A5B.N.C.	2033	0254.A4J.N.F.	2151V	0444.22J.V.F.
935	0222.A5.N.C.	1171	0286.A5B.N.C.	2034	0254.A4J.N.F.	2152	0698.11J.N.F.
935V	0222.A5.V.C.	1172	0286.A5V.N.F.	2035	0254.A5.N.C.	2160	0158.N11.N.C.
936	0222.A5.N.C.	1173	0286.A5V.N.F.	2036	0254.A5.N.C.	2161	0158.75Y.N.C.
937	0254.A5.N.C.SEAL	1174	0286.A5.N.C.	2041	0317.A4.N.C.	12519	0635.A5.N.C.SEAL
939	0381.11.N.C.SEAL	1175	0286.A5.N.C.	2042	0317.A4.N.C.	12520	0635.M5.V.H.
941	0571.11.N.C.	1181	0317.A5.N.C.	2043	0317.A4J.N.F.	32517	0635.M5.V.H.
941V	0571.11.V.C.	1182	0317.A5.N.C.	2044	0317.A4J.N.F.	80702	0191.75.N.C.SEAL

MECHANICAL SEAL REFURBISHMENT

Vulcan's Seal Repair Facility is a dedicated unit specialising in the repair or replacement of all makes and types of Mechanical Seals and associated components.

- Our comprehensive service offers the following significant advantages:

Price

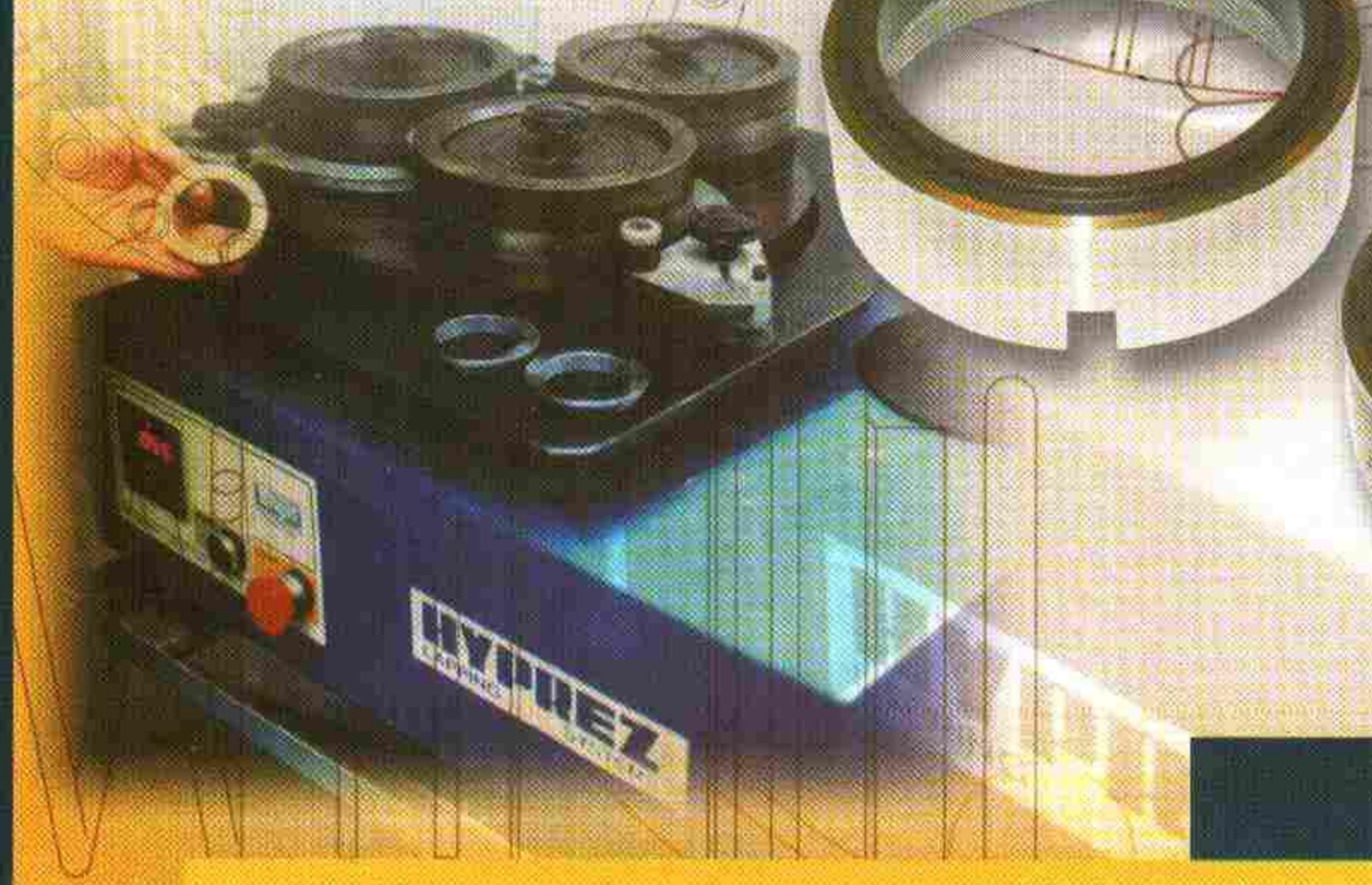
- Vulcan quote and price based upon the work to be done rather than the industry norm of a set percentage of new.
- In-house production of faces from raw powder and new components in volume provide cost savings and rapid service.
- Vulcan repair customers thus pay industry leading fair prices, without skimping or sacrifice to Quality, Repair Process and Detail.

Quality

- All components manufactured by NB Vulcan are to ISO9001, whilst Vulcan Engineering Limited supplies to ISO9002.
- The refurbishment of each seal assembly is carefully controlled by Process and Job Specification Sheets, which are provided to you upon quotation and delivery.
- Vulcan are dedicated to providing a quality "as new" repair. All seals are pressure tested, upon request on order.

Service

- Same day repair service, when necessary and technically possible.
- Fast service is the norm backed by extensive stocks of materials, components and replacement new seals.
- Total commitment to customer service.



VULCAN

Vulcan Vertical Integration.

In-house production, of all Vulcan Seals and most materials, gives us absolute Cost and Quality Control. This degree of vertical integration, with in-house production of materials as well as components, puts Vulcan ahead of our competitors.

Vulcan Production.

Modern, often automated machinery, continually assessed and updated, ensure cost efficient, volume production of quality components.

Vulcan Seal Engineering Solutions.

Design improvements and advanced seal engineering detail are built into each Vulcan seal, by our three seal design departments.

Vulcan Materials.

Exceptional materials, specified and fitted as standard, are a vital, integral part of our policy of solely producing seals that give long-lasting, high performance.

Vulcan Inspection.

Extensive and intensive electronic inspection systems, document and control all stages of production and final inspection.

Vulcan Means Quality and Reliability Assured.

Manufactured to ISO9001, electronically distributed to ISO.9001.2000 with a Quality Comes First Standard.Vulcan System, is designed to electronically assure Quality and Reliability.

Vulcan Electronic Distribution.

Product is distributed to over fifty countries world-wide from our Sheffield Head Quarters, with electronic, computer assisted, automation at all stages from inspection to final supply.

Vulcan; The Real Full Monty

Our philosophy is to be The World's Leading Single Spring Seal Manufacturer, by continuing to offer an Unbeatable combination of Product, Quality, Price and Service.

UNBEATABLE RANGE

Vulcan produce and stock the widest range of unbalanced seals, of any seal company in the world.

UNBEATABLE SERVICE

Our stocks are constantly available to view live on our web-site. We routinely despatch same-day, with an over 99.5% ex-stock assurance and performance, against our extensive stock policy range.

UNBEATABLE STOCKS

Practically every type and size of seal shown in this brochure, in all standard elastomer and face combinations, are available from stock.

UNBEATABLE PRICES

Because we efficiently manufacture and distribute all of our seals and most of our materials, Vulcan offer the greatest true cost savings in the industry.

Vulcan, the symbol of Sheffield's prowess in metal engineering, is a four metre, bronze statue that stands sixty metres high atop Sheffield's City Hall.