



# Vulcan Multiple Spring Seals



**Section 8**



## 16xx Series Introduction (XX = 09, 45 OR 59)

Vulcan's Types 1609 / 1645 / 1659 Series Range of Multi-Spring 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 Stationaries, most commonly our Type 25 V Seat. Balanced stepped-shaft 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 Seals in this Range are ideally suited for corrosive duties and are commonly utilized in chemical industries, 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-Spring, grub screwed Seal, available in a wide variety of face and secondary Seal, materials and designs.

#### 1659 Series

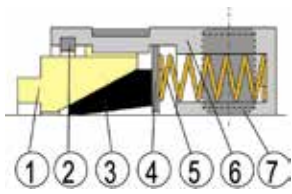
As above, but compact design complies to DIN24960 (EN12756) and ISO 3069 standards.

#### 1645 Series

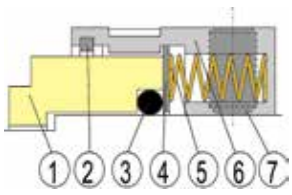
Thin profiled, Multi-Spring, grub screw Mounted Seal, conforming to ANSI B 73 for American standard equipment.

### Standard Components

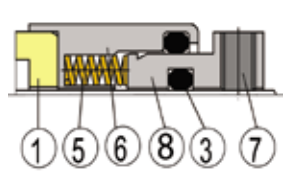
#### TYPE 16XX



#### Standard Wedge Type Type 16xxbs



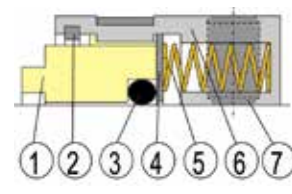
#### Balanced 'O'-Ring Type 'BS' Type 40



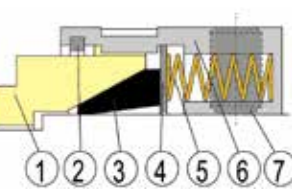
#### Balanced 'O'-Ring Type

<b>No</b>	<b>Description</b>	<b>4</b>	Plate
<b>1</b>	Face	<b>5</b>	Coils
<b>2</b>	Circlip	<b>6</b>	Retainer
<b>3</b>	Wedge/'O'-Ring	<b>7</b>	Grub Screws
<b>8</b>	Inner Barrel	<b>9</b>	Sleeve
<b>10</b>	Spacer	<b>11</b>	Seat

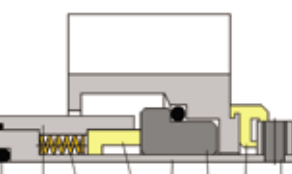
#### TYPE 16XXS



#### Standard 'O'-Ring Type 'S' Type 16xxb



#### Balanced Wedge Type 'B' Type 52B/55B/56B



#### Balanced Cartridge Type

## Vulcan Design Advantages; 16xx Series

### Materials

Grade FH82Z5 Triple Phenolic Resin Impregnated Carbon has been adopted by Vulcan, as our standard for this 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, improving chemical resistance capabilities. Please refer to our data-sheets for all Seal material alternatives, such as Carbide Seal faces and 'O'-Ring material options.

### Improved Design

These Vulcan 1609 / 1645 / 1659 Series are superior performance Seals, specifically designed to incorporate a number of improvements, compared to the original Seal designs and other direct copies.



No awkward setting pieces - Our designs have eliminated the setting clips, making the Seals easier and more reliable to fit.



Improved face loading values - Vulcan's 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 utilized in many applications. They give extremely reliable performance, based upon Vulcan's design improvements and the quality materials utilized.

### Vulcan Type 40

Vulcan Type 40 is an internally Balanced, Multiple-Spring internal Seal of advanced robust design and proficient performance. Versatile and economical, the Type 40 can be supplied with a wide Range of elastomers, face materials and be installed with a variety of Stationaries.

### Vulcan Type 52B/ 55B/ 56B

The Vulcan Type 52B, 55B, 56B are designed to conveniently replace and upgrade, unbalanced component Seals or Gland Packings with a Multiple-Spring, Balanced cartridge Seal assembly. With pressure Balanced Seal faces, anti clogging and spring protecting features, these offers improved Seal performance, capability and life, combined with economical cost and ease of fitting.

### Vulcan multiple spring Type Seals PV Chart

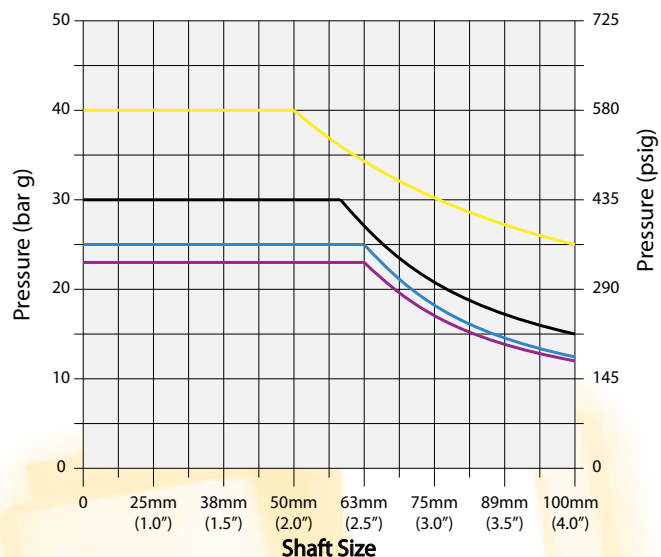
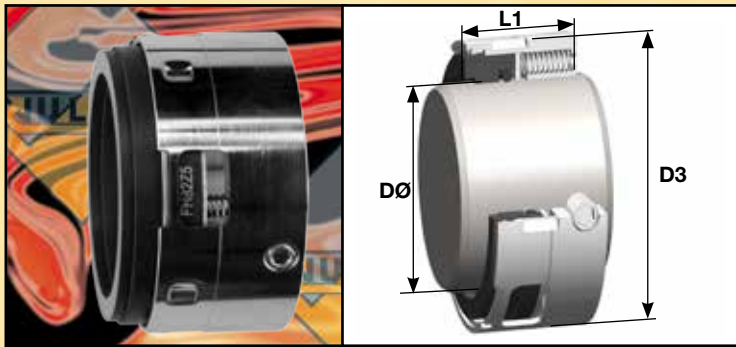


Chart based upon: Carbon vs reaction bonded Silicon Carbide Seal faces

16XX, 16XXS	16XXB, 16XXBS
40	52B, 55B, 56B



## Types 1609 / 1609S / 1609B\* / 1609BS\*



Multiple Spring Seal with a highly effective design, commonly used in chemical and petrochemical duties. Frequently fitted along with the Type 25 clamped Stationary. Type 1609 incorporates a PTFE Wedge secondary Seal, Type 1609S is an 'O'-Ring Mounted design. PTFE Back-Up Ring is recommended to be specified for higher pressure 'O'-Ring applications. Types 1609B and 1609BS are designed for stepped shafts.

The stock size code is always set by the shaft size under the Seal body.

### Vulcan Standard Sizes

Imperial Shaft Size DØ	Metric Shaft Size DØ	Seal / Assembly Stock Code	Seat Size Fitted (1609B/ BS Only)	D3		Type 1609/S L1		Type 1609B/BS L1	
				in	mm	in	mm	in	mm
0.625		0158	0127	1.209	30.70	0.750	19.05	1.062	26.97
0.750		0191	0158	1.366	34.70	0.875	22.23	1.187	30.14
	20	0200	N/a	1.406	35.70	0.937	23.81	N/a	N/a
	22	0220	N/a	1.457	37.00	0.937	23.81	N/a	N/a
0.875		0222	0191	1.496	38.00	0.937	23.81	1.250	31.75
	24	0240	N/a	1.563	39.70	1.000	25.40	N/a	N/a
	25	0250	N/a	1.614	41.00	1.000	25.40	N/a	N/a
1.000		0254	0222	1.614	41.00	1.000	25.40	1.313	33.34
	28	0280	N/a	1.752	44.50	1.059	26.90	N/a	N/a
1.125		0286	0254	1.732	44.00	1.059	26.90	1.375	34.93
	30	0300	N/a	1.870	47.50	1.059	26.90	N/a	N/a
1.250		0317	0286	1.929	49.00	1.059	26.90	1.375	34.93
	32	0320	N/a	1.996	50.70	1.125	28.58	N/a	N/a
1.375		0349	0286	2.047	52.00	1.125	28.58	1.437	36.50
	35	0350	N/a	2.047	52.00	1.125	28.58	N/a	N/a
	38	0380	N/a	2.189	55.60	1.125	28.58	N/a	N/a
1.500		0381	0317	2.189	55.60	1.125	28.58	1.437	36.50
	40	0400	N/a	2.358	59.90	1.375	34.93	N/a	N/a
1.625		0412	0349	2.402	61.00	1.375	34.93	1.750	44.45
1.750		0444	0381	2.531	64.30	1.375	34.93	1.750	44.45
	45	0450	N/a	2.555	64.90	1.375	34.93	N/a	N/a
1.875		0476	0412	2.563	65.10	1.375	34.93	1.750	44.45
	48	0480	N/a	2.563	65.10	1.375	34.93	N/a	N/a
	50	0500	N/a	2.751	69.90	1.375	34.93	N/a	N/a
2.000		0508	0444	2.783	70.70	1.375	34.93	1.750	44.45
2.125		0539	0476	3.031	77.00	1.687	42.86	2.063	52.39
	55	0550	N/a	3.078	78.20	1.687	42.86	N/a	N/a
2.250		0571	0508	3.154	80.10	1.687	42.86	2.063	52.39
	60	0600	N/a	3.272	83.10	1.687	42.86	N/a	N/a
2.375		0603	0539	3.272	83.10	1.687	42.86	2.063	52.39
2.500		0635	0571	3.409	86.60	1.687	42.86	2.063	52.39
	65	0650	N/a	3.461	87.90	1.687	42.86	N/a	N/a
2.625		0666	0603	3.528	89.60	1.687	42.86	2.063	52.39
2.750		0698	0635	3.654	92.80	1.687	42.86	2.063	52.39
	70	0700	N/a	3.654	92.80	1.687	42.86	N/a	N/a
2.875		0730	0666	3.776	95.90	1.687	42.86	2.063	52.39
	75	0750	N/a	3.787	96.20	1.687	42.86	N/a	N/a
3.000		0762	0698	3.846	97.70	1.687	42.86	2.063	52.39
3.125*		0794	0730	3.965	100.70	1.687	42.86	2.063	52.39
	80*	0800	N/a	3.984	101.20	1.687	42.86	N/a	N/a
3.250*		0825	0762	4.154	105.50	1.687	42.86	2.063	52.39
	85*	0850	N/a	4.240	107.70	1.687	42.86	N/a	N/a
3.375*		0857	0794	4.280	108.70	1.687	42.86	2.063	52.39
3.500*		0889	0825	4.409	112.00	1.687	42.86	2.063	52.39
3.625*		0900	N/a	4.441	112.80	1.687	42.86	N/a	N/a
	90*	0921	0857	4.528	115.00	1.687	42.86	2.063	52.39
	95*	0950	N/a	4.634	117.70	1.687	42.86	N/a	N/a
3.750*		0953	0889	4.654	118.20	1.687	42.86	2.063	52.39
3.875*		0984	0921	4.776	121.30	1.687	42.86	2.063	52.39
	100*	1000	N/a	4.831	122.70	1.687	42.86	N/a	N/a
4.000*		1016	0953	4.906	124.60	1.687	42.86	2.063	52.39

All Type, sizes and materials shown are part of Vulcan's Guaranteed Ex-Stock Range, unless marked with an asterisk\*.

However, most asterisked sizes are stocked in some, but not all, materials. And the asterisked materials in some sizes.

Guaranteed Stock Materials and Face Material Code					
Seal And Seat Assembly		Rotary face		Stationary face	
Face Reference Term	Code	Material	Code	Material	Code
Soft	IB	Carbon FH82Z5	IB	99% Ceramic	A
Soft vs Hard	IS	Carbon FH82Z5	IB	VES2 RB SiC	S
Hard vs Soft	SG	WNV2 SiNSiC Carbide	R	99% Ceramic	A
Hard	SS	WNV2 SiNSiC Carbide	R	VES2 RB SiC	S
Hard 1st alt	H	Tungsten Carbide*	H	Tungsten Carbide*	H
Guaranteed Stock Elastomers: PTFE Wedge, Viton™, E.P. And Nitrile			Guaranteed Stock Metallurgy: 316SS		

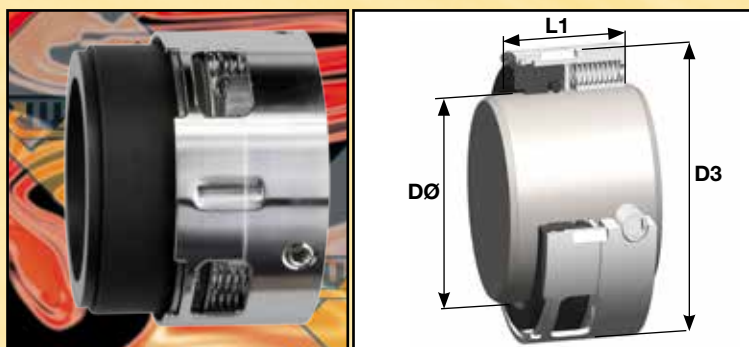
### Suggested Operating Limits

Maximum Operating Pressure Limits primarily depend upon Face Materials, Shaft Size, Speed and Media. Please refer to the Seal Type Specific PV Chart, found at the front of this Brochure Section, in combination with the Vulcan Multiplying Factors found in Technical and Material Standards Section 2.





# Types 1645 / 1645S / 1645B\* / 1645BS\*



Narrow profile, multiple spring Seal, designed for the common American ANSI B73-1974 Centrifugal Pump standard. Frequently fitted with Type 23 PTFE Boot Stationary. Type 1645 utilizes a PTFE Wedge secondary Seal, Type 1645S is 'O'-Ring Mounted design, Types 1645B and 1645BS are balanced designs for stepped-shafts. PTFE Back-Up Ring is recommended for higher pressure 'O'-Ring applications.

The stock size code is always set by the shaft size under the Seal body.

## Vulcan Standard Sizes

Imperial Shaft Size DØ	Seal / Assembly Stock Code	Seat Size Fitted (1645B/BS Only)	D3		Type 1645/S L1		Type 1645B/BS L1	
			in	mm	in	mm	in	mm
0.500	0127	N/a	0.937	23.80	0.937	23.80	N/a	N/a
0.625	0158	N/a	1.063	27.00	0.937	23.80	N/a	N/a
0.750	0191	0158	1.189	30.20	0.937	23.80	1.250	31.75
0.875	0222	0191	1.315	33.40	0.937	23.80	1.250	31.75
1.000	0254	0222	1.437	36.50	1.000	25.40	1.312	33.32
1.125	0286	0254	1.563	39.70	1.000	25.40	1.375	34.93
1.250	0317	0286	1.689	42.90	1.000	25.40	1.375	34.93
1.375	0349	0286	1.941	49.30	1.375	34.93	1.685	42.80
1.500	0381	0317	1.941	49.30	1.125	28.58	1.437	36.50
1.625	0412	0349	2.260	57.40	1.157	29.40	1.594	40.50
1.750	0444	0381	2.315	58.80	1.375	34.93	1.750	44.45
1.875	0476	0412	2.500	63.50	1.375	34.93	1.750	44.45
2.000	0508	0444	2.626	66.70	1.375	34.93	1.750	44.45
2.125	0539	0476	2.815	71.50	1.687	42.86	2.063	52.39
2.250	0571	0508	2.846	72.30	1.375	34.93	1.749	44.43
2.375	0603	0539	3.008	76.40	1.687	42.86	2.063	52.39
2.500	0635	0571	3.126	79.40	1.375	34.93	1.749	44.43
2.625	0666	0603	3.252	82.60	1.687	42.86	2.063	52.39
2.750	0698	0635	3.374	85.70	1.687	42.86	2.063	52.39
2.875	0730	0666	3.500	88.90	1.687	42.86	2.063	52.39
3.000	0762	0698	3.626	92.10	1.687	42.86	2.063	52.39
3.125*	0794*	0730	3.752	95.30	1.687	42.86	2.063	52.39
3.250*	0825*	0762	3.874	98.40	1.687	42.86	2.063	52.39
3.375*	0857*	0793	4.000	101.60	1.687	42.86	2.063	52.39
3.500*	0889*	0825	4.126	104.80	1.687	42.86	2.063	52.39
3.625*	0921*	0857	4.252	108.00	1.687	42.86	2.063	52.39
3.750*	0953*	0889	4.374	111.10	1.687	42.86	2.063	52.39
3.875*	0984*	0921	4.500	114.30	1.687	42.86	2.063	52.39
4.000*	1016*	0952	4.626	117.50	1.687	42.86	2.063	52.39

All Type, sizes and materials shown are part of Vulcan's Guaranteed Ex-Stock Range, unless marked with an asterisk\*. However, most asterisked sizes are stocked in some, but not all, materials. And the asterisked materials in some sizes.

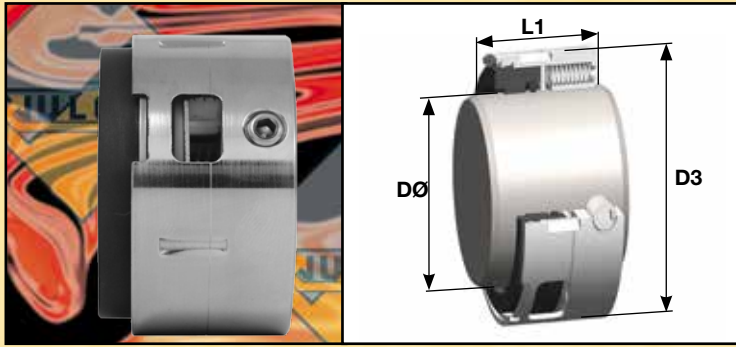
## Suggested Operating Limits

Maximum Operating Pressure Limits primarily depend upon Face Materials, Shaft Size, Speed and Media. Please refer to the Seal Type Specific PV Chart, found at the front of this Brochure Section, in combination with the Vulcan Multiplying Factors found in Technical and Material Standards Section 2.

Guaranteed Stock Materials and Face Material Code					
Seal And Seat Assembly		Rotary face		Stationary face	
Face Reference Term	Code	Material	Code	Material	Code
Soft	IB	Carbon FH82Z5	IB	99% Ceramic	A
Soft vs Hard	IS	Carbon FH82Z5	IB	VES2 RB SiC	S
Hard vs Soft	SG	WNV2 SiNSiC Carbide	R	99% Ceramic	A
Hard	SS	WNV2 SiNSiC Carbide	R	VES2 RB SiC	S
Hard 1st alt	H	Tungsten Carbide*	H	Tungsten Carbide*	H
Guaranteed Stock Elastomers: PTFE Wedge, Viton™, E.P. And Nitrile			Guaranteed Stock Metallurgy: 316SS		



## Types 1659 / 1659S / 1659B\* / 1659BS\*



Narrow profile, metric shaft, multiple spring Seal with a highly efficient design.

These Seals are frequently fitted with Type 24 DIN Long 'O'-Ring stationaries, see the opposite Page. Type 1659 incorporates a PTFE Wedge secondary Seal, Type 1659S is an 'O'-Ring Mounted design. Types 1659B and 1659BS are balanced designs for stepped-shafts. PTFE Back-Up Ring is recommended for higher pressure 'O'-Ring applications. The stock size code is always set by the shaft size under the Seal body.

### Vulcan Standard Sizes

Metric Shaft Size DØ	Seal / Assembly Stock Code	Seat Size Fitted (1659B/BS Only)	D3 (mm)	Type 1659/SL1 (mm)	Type 1659B/BSL1 (mm)
16	0160	N/a	26.00	23.00	N/a
18	0180	0140	32.00	24.00	30.50
20	0200	0160	34.50	24.00	30.50
22	0220	0180	36.50	24.00	31.50
24	0240	0200	38.60	26.70	31.50
25	0250	N/a	40.00	27.00	N/a
28	0280	0240	43.00	30.00	34.50
30	0300	0250	45.00	30.50	34.50
32	0320	N/a	47.10	30.50	N/a
33	0330	0280	48.20	30.50	37.50
35	0350	0300	50.00	30.50	38.00
38	0380	0330	54.00	32.00	38.00
40	0400	0350	56.00	32.00	38.00
43	0430	0380	59.00	32.00	39.50
45	0450	0400	61.00	32.00	39.50
48	0480	0430	64.20	32.00	39.50
50	0500	0450	66.30	34.00	39.50
53	0530	0480	69.70	34.00	39.50
55	0550	0500	70.80	34.00	44.00
58	0580	0530	78.00	39.00	44.00
60	0600	0550	80.10	39.00	44.00
63	0630	0580	85.20	39.00	49.00
65	0650	0600	85.20	39.00	49.00
68	0680	0630	87.80	39.00	49.00
70	0700	0650	90.00	45.50	49.00
75*	0750	0700	95.00	45.50	55.50
80*	0800	0750	104.10	45.00	55.50
85*	0850	0800	109.30	45.00	55.00
90*	0900	0850	114.00	50.00	60.00
95*	0950	0900	119.20	50.00	60.00
100*	1000	0950	124.10	50.00	60.00

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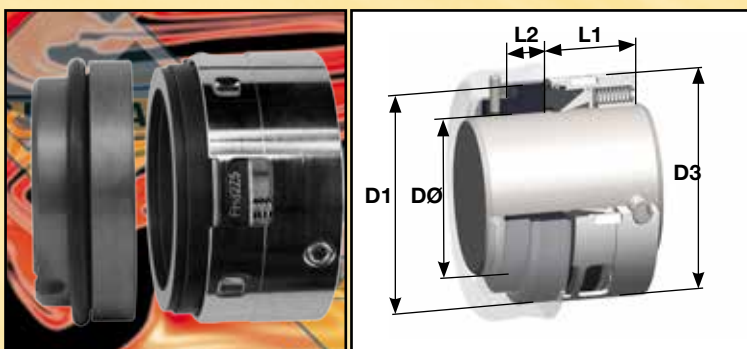
### Suggested Operating Limits

Maximum Operating Pressure Limits primarily depend upon Face Materials, Shaft Size, Speed and Media. Please refer to the Seal Type Specific PV Chart, found at the front of this Brochure Section, in combination with the Vulcan Multiplying Factors found in Technical and Material Standards Section 2.

Guaranteed Stock Materials and Face Material Code					
Seal Only Assembly		Rotary face		Stationary face	
Face Reference Term	Code	Material	Code	Material	Code
Soft	IB	Carbon FH82Z5	IB	N/a	X
Hard	R	WNV2 SINSIC Carbide	R	N/a	X
Hard 1st alt	H	Tungsten Carbide*	H	N/a	X
Guaranteed Stock Elastomers: PTFE Wedge, Viton™, E.P. And Nitrile			Guaranteed Stock Metallurgy: 316SS		



## Types 1659L / 1659SL / 1659BSL \*



Narrow profile, multiple spring Rotary with standard Type 24 DIN LONG Stationary to DIN dimensions with anti-rotation provision. This combination is widely utilized in many chemical duties. Type 1659L incorporates a PTFE .Wedge secondary Seal. Type 1659SL is an 'O'-Ring Mounted Rotary design, with Type 1659BSL as the balanced stepped-shaft version. PTFE Back-Up Ring is recommended for higher pressure 'O'-Ring applications. The stock size code is always set by the shaft size under the Seal body.

### Vulcan Standard Sizes

Metric Shaft Size DØ	Seal Assembly Stock Code	Seat Size Fitted (1659BSL Only)	1659L / 1659SL			D3 (mm)	1659BSL		
			D1 (mm)	L1 (mm)	L2 (mm)		D1 (mm)	L1 (mm)	L2 (mm)
16	0160	N/a	27.00	23.00	8.60	26.00	N/a	N/a	N/a
18	0180	0140	33.00	24.00	10.00	32.00	25.00	30.50	8.60
20	0200	0160	35.00	24.00	10.00	34.50	27.00	30.50	8.60
22	0220	0180	37.00	24.00	10.00	36.50	33.00	31.50	10.00
24	0240	0200	39.00	26.70	10.00	38.60	35.00	31.50	10.00
25	0250	N/a	40.00	27.00	10.00	40.00	N/a	N/a	N/a
28	0280	0240	43.00	30.00	10.00	43.00	39.00	34.20	10.00
30	0300	0250	45.00	30.50	10.00	45.00	40.00	34.50	10.00
32	0320	N/a	48.00	30.50	10.00	47.10	N/a	N/a	N/a
33	0330	0280	48.00	30.50	10.00	48.20	43.00	37.50	10.00
35	0350	0300	50.00	30.50	10.00	50.00	45.00	38.00	10.00
38	0380	0330	56.00	32.00	11.00	54.00	48.00	38.00	10.00
40	0400	0350	58.00	32.00	11.00	56.00	50.00	38.00	10.00
43	0430	0380	61.00	32.00	11.00	59.00	56.00	39.50	11.00
45	0450	0400	63.00	32.00	11.00	61.00	58.00	39.50	11.00
48	0480	0430	66.00	32.00	11.00	64.20	61.00	39.50	11.00
50	0500	0450	70.00	34.00	13.00	66.30	63.00	39.50	11.00
53	0530	0480	73.00	34.00	13.00	69.20	66.00	39.50	11.00
55	0550	0500	75.00	34.00	13.00	70.80	70.00	44.00	13.00
58	0580	0530	78.00	39.00	13.00	78.00	73.00	44.00	13.00
60	0600	0550	80.00	39.00	13.00	80.10	75.00	44.00	13.00
63	0630	0580	83.00	39.00	13.00	83.20	78.00	49.00	13.00
65	0650	0600	85.00	39.00	13.00	85.20	80.00	49.00	13.00
68	0680	0630	90.00	39.00	15.30	87.80	83.00	49.00	13.00
70	0700	0650	92.00	45.50	15.30	90.00	85.00	49.00	13.00
75*	0750	0700	97.00	45.50	15.30	95.00	92.00	55.50	15.30
80*	0800	0750	105.00	45.00	15.70	104.10	97.00	55.50	15.30
85*	0850	0800	110.00	45.00	15.70	109.30	105.00	55.00	15.70
90*	0900	0850	115.00	50.00	15.70	114.00	110.00	60.00	15.70
95*	0950	0900	120.00	50.00	15.70	119.20	115.00	60.00	15.70
100*	1000	0950	125.00	50.00	15.70	124.10	120.00	60.00	15.70

All Type, sizes and materials shown are part of Vulcan's Guaranteed Ex-Stock Range, unless marked with an asterisk\*.

However, most asterisked sizes are stocked in some, but not all, materials. And the asterisked materials in some sizes.

### Suggested Operating Limits

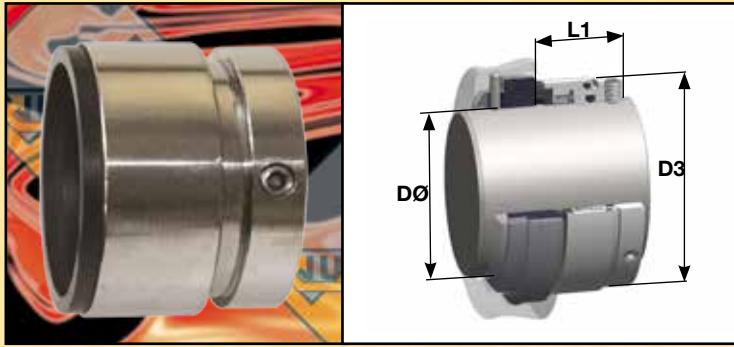
Maximum Operating Pressure Limits primarily depend upon Face Materials, Shaft Size, Speed and Media. Please refer to the Seal Type Specific PV Chart, found at the front of this Brochure Section, in combination with the Vulcan Multiplying Factors found in Technical and Material Standards Section 2.

Guaranteed Stock Materials and Face Material Code					
Seal And Seat Assembly		Rotary face		Stationary face	
Face Reference Term	Code	Material	Code	Material	Code
Soft	IB	Carbon FH82Z5	IB	99% Ceramic	A
Soft vs Hard	IS	Carbon FH82Z5	IB	VES2 RB SIC	S
Hard vs Soft	SG	WNV2 SiNSiC Carbide	R	99% Ceramic	A
Hard	SS	WNV2 SiNSiC Carbide	R	VES2 RB SIC	S
Hard 1st alt	H	Tungsten Carbide*	H	Tungsten Carbide*	H
Guaranteed Stock Elastomers: PTFE Wedge, Viton™, E.P. And Nitrile			Guaranteed Stock Metallurgy: 316SS		





## Type 40



Narrow profile, multiple spring, 'O'-Ring Mounted, set screw driven, non-clogging, Balanced Mechanical Seal. The Balanced design, protected springs sealed out of the fluid and dynamic 'O'-Ring enable use in demanding applications. A PTFE Back-up Ring is recommended to be specified for higher pressure applications.

Available as Type 40 Rotary only to match with a wide variety of Stationary Ring Styles, or as Type 40L/40S stock assemblies. Please see opposite Page for specific details.

### Vulcan Standard Sizes

Imperial Shaft Size DØ	Metric Shaft Size DØ	Size Code	D3		L1	
			in	mm	in	mm
	18	0180	1.280	32.50	1.181	30.00
0.750		0191	1.319	33.50	1.181	30.00
	20	0200	1.358	34.50	1.181	30.00
	22	0220	1.437	36.50	1.181	30.00
0.875		0222	1.437	36.50	1.181	30.00
	24	0240	1.516	38.50	1.181	30.00
	25	0250	1.559	39.60	1.181	30.00
1.000		0254	1.559	39.60	1.181	30.00
	28	0280	1.689	42.90	1.280	32.50
1.125		0286	1.689	42.90	1.280	32.50
	30	0300	1.752	44.50	1.280	32.50
1.250		0317	1.815	46.10	1.280	32.50
	32	0320	1.815	46.10	1.280	32.50
	33	0330	1.815	46.10	1.280	32.50
1.375		0349	1.941	49.30	1.280	32.50
	35	0350	1.941	49.30	1.280	32.50
	38	0380	2.079	52.80	1.339	34.00
1.500		0381	2.079	52.80	1.339	34.00
	40	0400	2.205	56.00	1.339	34.00
1.625		0412	2.205	56.00	1.339	34.00
	43	0430	2.330	59.20	1.339	34.00
1.750		0444	2.330	59.20	1.339	34.00
	45	0450	2.330	59.20	1.339	34.00
1.875		0476	2.457	62.40	1.339	34.00
	48	0480	2.457	62.40	1.339	34.00
	50	0500	2.583	65.60	1.358	34.50
2.000		0508	2.583	65.60	1.358	34.50
	53	0530	2.709	68.80	1.358	34.50
2.125*		0539	2.709	68.80	1.358	34.50
	55	0550	2.787	70.80	1.358	34.50
2.250		0571	2.831	71.90	1.358	34.50
	58	0580	2.961	75.20	1.358	34.50
	60	0600	2.961	75.20	1.358	34.50
2.375		0603	2.961	75.20	1.358	34.50
	63	0630	3.083	78.30	1.358	34.50
2.500		0635	3.083	78.30	1.358	34.50
	65	0650	3.315	84.20	1.417	36.00
2.625		0666	3.315	84.20	1.417	36.00
2.750		0698	3.441	87.40	1.417	36.00
	70	0700	3.441	87.40	1.417	36.00
2.875*		0730	3.567	90.60	1.417	36.00
	75	0750	3.689	93.70	1.417	36.00
3.00		0762	3.689	93.70	1.417	36.00

All Type, sizes and materials shown are part of Vulcan's Guaranteed Ex-Stock Range, unless marked with an asterisk\*. However, most asterisked sizes are stocked in some, but not all, materials. And the asterisked materials in some sizes.

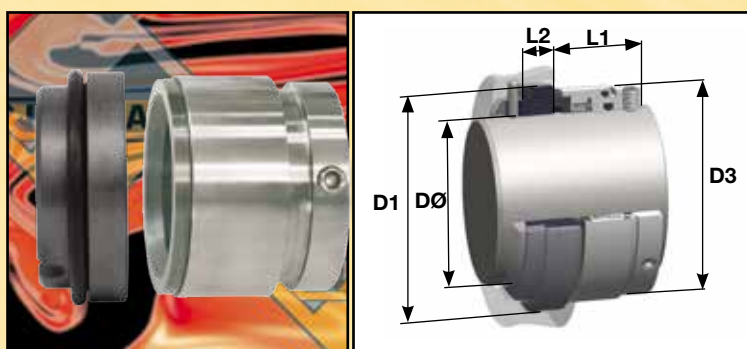
Guaranteed Stock Materials and Face Material Code					
Seal And Seat Assembly		Rotary face		Stationary face	
Face Reference Term	Code	Material	Code	Material	Code
Soft	N/a	M825 FDA Carbon	DB	N/a	A
Soft vs Hard	N/a	N/a	N/a	N/a	S
Hard vs Soft	N/a	N/a	N/a	N/a	A
Hard	N/a	WNV2 SiNSiC Carbide	R	N/a	S
Hard 1st alt	N/a	Tungsten Carbide*	H	N/a	H
Guaranteed Stock Elastomers: Viton™, E.P. And Nitrile			Guaranteed Stock Metallurgy: 316SS		

### Suggested Operating Limits

Maximum Operating Pressure Limits primarily depend upon Face Materials, Shaft Size, Speed and Media. Please refer to the Seal Type Specific PV Chart, found at the front of this Brochure Section, in combination with the Vulcan Multiplying Factors found in Technical and Material Standards Section 2.



# Types 40L / 40S



Types 40L and 40S feature the same robust, Balanced, 'O'-Ring Mounted, set-screw driven, Rotary unit as described on the preceding Page. The Type 40 Rotary can be used with a wide variety of Stationary Seat Rings depending on the dimensions of the equipment the Seal is to be fitted to. The most widely utilized stationaries are the 'O'-Ring Mounted Type 24 to suit metric DIN housing sizes. For convenience Vulcan stock these combinations as Type 40L with a 24 DIN LONG with anti-rotation pin provision. Or as Type 40S with a 24 DIN SHORT Seat without such pin drive provision.

## Vulcan Standard Sizes

Imperial Shaft Size DØ	Metric Shaft Size DØ	Size Code	D1		D3		L1		L2		40L Slot Width		40L Slot Depth	
			in	mm	in	mm	in	mm	in	mm	in	mm	in	mm
	18	0180	1.299	33.00	1.280	32.50	1.181	30.00	0.394	10.00	0.157	4.00	0.217	5.50
0.750		0191	N/a		1.319	33.50	1.181	30.00	N/a		N/a		N/a	
	20	0200	1.378	35.00	1.358	34.50	1.181	30.00	0.394	10.00	0.157	4.00	0.217	5.50
	22	0220	1.457	37.00	1.437	36.50	1.181	30.00	0.394	10.00	0.157	4.00	0.217	5.50
0.875		0222	N/a		1.437	36.50	1.181	30.00	N/a		N/a		N/a	
	24	0240	1.535	39.00	1.516	38.50	1.181	30.00	0.394	10.00	0.157	4.00	0.217	5.50
	25	0250	1.575	40.00	1.559	39.60	1.181	30.00	0.394	10.00	0.157	4.00	0.217	5.50
1.000		0254	N/a		1.559	39.60	1.181	30.00	N/a		N/a		N/a	
	28	0280	1.693	43.00	1.689	42.90	1.280	32.50	0.394	10.00	0.157	4.00	0.217	5.50
1.125		0286	N/a		1.689	42.90	1.280	32.50	N/a		N/a		N/a	
	30	0300	1.772	45.00	1.752	44.50	1.280	32.50	0.394	10.00	0.157	4.00	0.217	5.50
1.250		0317	N/a		1.815	46.10	1.280	32.50	N/a		N/a		N/a	
	32	0320	1.89	48.00	1.815	46.10	1.280	32.50	0.394	10.00	0.157	4.00	0.217	5.50
	33	0330	1.89	48.00	1.815	46.10	1.280	32.50	0.394	10.00	0.157	4.00	0.217	5.50
1.375		0349	N/a		1.941	49.30	1.280	32.50	N/a		N/a		N/a	
	35	0350	1.969	50.00	1.941	49.30	1.280	32.50	0.394	10.00	0.157	4.00	0.217	5.50
	38	0380	2.205	56.00	2.079	52.80	1.339	34.00	0.433	11.00	0.197	5.00	0.217	5.50
1.500		0381	N/a		2.079	52.80	1.339	34.00	N/a		N/a		N/a	
	40	0400	2.283	58.00	2.205	56.00	1.339	34.00	0.433	11.00	0.197	5.00	0.217	5.50
1.625		0412	N/a		2.205	56.00	1.339	34.00	N/a		N/a		N/a	
	43	0430	2.402	61.00	2.330	59.20	1.339	34.00	0.433	11.00	0.197	5.00	0.217	5.50
1.750		0444	N/a		2.330	59.20	1.339	34.00	N/a		N/a		N/a	
	45	0450	2.48	63.00	2.330	59.20	1.339	34.00	0.433	11.00	0.197	5.00	0.217	5.50
1.875		0476	N/a		2.457	62.40	1.339	34.00	N/a		N/a		N/a	
	48	0480	2.598	66.00	2.457	62.40	1.339	34.00	0.433	11.00	0.197	5.00	0.217	5.50
	50	0500	2.756	70.00	2.583	65.60	1.358	34.50	0.433	13.00	0.197	5.00	0.217	5.50
2.00		0508	N/a		2.583	65.60	1.358	34.50	N/a		N/a		N/a	
	53	0530	2.874	73.00	2.709	68.80	1.358	34.50	0.433	13.00	0.197	5.00	0.217	5.50
2.125*		0539	N/a		2.709	68.80	1.358	34.50	N/a		N/a		N/a	
	55	0550	2.953	75.00	2.787	70.80	1.358	34.50	0.433	13.00	0.197	5.00	0.217	5.50
2.250		0571	N/a		2.831	71.90	1.358	34.50	N/a		N/a		N/a	
	58	0580	3.071	78.00	2.961	75.20	1.358	34.50	0.433	13.00	0.197	5.00	0.217	5.50
	60	0600	3.15	80.00	2.961	75.20	1.358	34.50	0.433	13.00	0.197	5.00	0.217	5.50
2.375		0603	N/a		2.961	75.20	1.358	34.50	N/a		N/a		N/a	
	63	0630	3.268	83.00	3.083	78.30	1.358	34.50	0.433	13.00	0.197	5.00	0.217	5.50
2.500		0635	N/a		3.083	78.30	1.358	34.50	N/a		N/a		N/a	
	65	0650	3.346	85.00	3.315	84.20	1.417	36.00	0.433	13.00	0.197	5.00	0.217	5.50
2.625		0666	N/a		3.315	84.20	1.417	36.00	N/a		N/a		N/a	
2.750		0698	N/a		3.441	87.40	1.417	36.00	N/a		N/a		N/a	
	70	0700	3.622	92.00	3.441	87.40	1.417	36.00	0.433	15.30	0.197	5.00	0.217	5.50
2.875*		0730	N/a		3.567	90.60	1.417	36.00	N/a		N/a		N/a	
	75	0750	3.819	97.00	3.689	93.70	1.417	36.00	0.433	15.30	0.197	5.00	0.217	5.50
3.00		0762	N/a		3.689	93.70	1.417	36.00	N/a		N/a		N/a	

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## Suggested Operating Limits

Maximum Operating Pressure Limits primarily depend upon Face Materials, Shaft Size, Speed and Media. Please refer to the Seal Type Specific PV Chart, found at the front of this Brochure Section, in combination with the Vulcan Multiplying Factors found in Technical and Material Standards Section 2.

Guaranteed Stock Materials and Face Material Code					
Seal And Seat Assembly		Rotary face		Stationary face	
Face Reference Term	Code	Material	Code	Material	Code
Soft	DB	M825 FDA Carbon	DB	99% Ceramic	A
Soft vs Hard	DS	M825 FDA Carbon	DB	VES2 RB SIC	S
Hard vs Soft	SG	WNV2 SiNSiC Carbide	R	99% Ceramic	A
Hard	SS	WNV2 SiNSiC Carbide	R	VES2 RB SIC	S
Hard 1st alt	H	Tungsten Carbide*	H	Tungsten Carbide*	H
Guaranteed Stock Elastomers: Viton™, E.P. And Nitrile				Guaranteed Stock Metallurgy: 316SS	