



## Vulcan Seals Type

### 1645BA

#### Technical Data Sheet



#### Product Description

The Vulcan Seals Type 1645BA is a robust, PTFE wedge mounted "pusher" seal design with multiple springs and monolithic sealing face intended for step-shaft installations. The drive from the shaft and the seal working length are by set-screws tightened using the supplied Allen key. The set-screws provide bi-directional rotation capability.

The multi-springs and step-shaft layout provide even closing forces and hydraulic balancing giving improved pV capability and higher sealing performance. The robust design and multi-spring arrangement provides optimised performance in challenging industrial applications when compared to single spring seal designs.

The Vulcan Seals Type 1645BA complete seal is supplied with the Vulcan Seals Type 23 PTFE-mounted stationary. The Vulcan Seals Type 1645B rotary is compatible with a wide range of Vulcan Seals stationary types.

#### Why Choose the Vulcan Seals Type 1645BA?

- Step shaft design allows hydraulic balancing to be incorporated allowing high shaft speeds, higher pressures and longer run time to be achieved compared to non-balanced seal designs.
- Highly effective robust design that is commonly used in chemical and petrochemical duties.
- PTFE wedge secondary seal, VCT1 carbon primary seal face and Hastelloy-C276® springs ensure compatibility with a wide range of industrial medias.
- The design features a setting line to aid installation at the correct compressed length.
- Suitable for medium and heavy purpose applications with imperial shaft sizes.
- The Vulcan Seals Type 1645BA has a narrow radial profile to suit American ANSI B73-1974 centrifugal pump dimensions standard.
- Seal face dimensions ensure compatibility with a wide range of Vulcan Seals stationary ranges.

#### Standard Face Material Combinations

Rotary Face   Material	Stationary Face   Material	Complete Material Code
VCT1 Carbon	VAW1 Ceramic	IB
VCT1 Carbon	VSR1 Silicon Carbide	IS
VSS1 Silicon Carbide	VAW1 Ceramic	SG
VSS1 Silicon Carbide	VSR1 Silicon Carbide	SS
VTN2* Tungsten Carbide	VTN1* Tungsten Carbide	H

Guaranteed Stock/Material Elastomers: Viton™/FKM, EP, Nitrile and Metallurgy 316SS with Hastelloy®-C Springs

\*Non-stock guarantee

#### Elastomer Temperature Capabilities

	Minimum	Maximum
Nitrile	-30°C	+120°C
EPDM	-40°C	+140°C
Viton™/FKM	-30°C	+230°C
FEPM/AFLAS®	-10°C	+250°C
FFKM	-50°C	+315°C

Pressure: Up to 40 bar (580 psi)

#### Compliance & Certificates



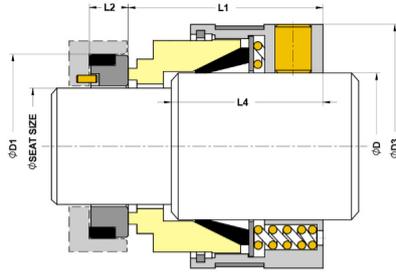
The Vulcan Seals mechanical seal range can be supplied with material combinations designed to meet the compliance standards and certifications listed above. Additional compliance or regulatory requirements can also be considered upon request. Please enquire to discuss your specific application.

#### Mechanical Seal Replacement Range

Vulcan Seals Type 1645BA is a dimensional replacement mechanical seal for the following seal ranges:

- John Crane® | Type 9BT / A-seat\*

\*Rotary Face | \*\*Stationary Face



**Dimensional Data**

DØ (Imperial)	Seat Size Code	Seal Size Code	D1 (in)	D1 (mm)	D3 (in)	D3 (mm)	L1 (in)	L1 (mm)	L2 (in)	L2 (mm)	L4 (in)	L4 (mm)
0.750	0191	0158	1.250	31.75	1.189	30.20	1.250	31.75	0.405	10.28	1.250	23.81
0.875	0222	0191	1.375	34.93	1.315	33.40	1.250	31.75	0.405	10.28	1.250	23.81
1.000	0254	0222	1.500	38.10	1.437	36.50	1.312	33.32	0.405	10.28	1.312	25.40
1.125	0286	0254	1.625	41.28	1.563	39.70	1.375	34.93	0.437	11.10	1.375	26.99
1.250	0317	0286	1.750	44.44	1.689	42.90	1.375	34.93	0.437	11.10	1.375	26.99
1.375	0349	0286	1.875	47.63	1.941	49.30	1.685	42.80	0.437	11.10	1.685	28.60
1.500	0381	0317	2.000	50.80	1.941	49.30	1.437	36.50	0.437	11.10	1.437	28.60
1.625	0412	0349	2.125	53.98	2.260	57.40	1.594	40.50	0.437	11.10	1.594	34.93
1.750	0444	0381	2.375	60.33	2.315	58.80	1.750	44.45	0.500	12.70	1.750	34.93
1.875	0476	0412	2.500	63.50	2.500	63.50	1.750	44.45	0.500	12.70	1.750	34.93
2.000	0508	0444	2.625	66.68	2.626	66.70	1.750	44.45	0.500	12.70	1.750	34.93
2.125	0539	0476	2.750	69.85	2.815	71.50	2.063	52.39	0.500	12.70	2.063	39.69
2.250	0571	0508	3.000	76.20	2.846	72.30	1.749	44.43	0.562	14.28	1.749	39.69
2.375	0603	0539	3.125	79.38	3.008	76.40	2.063	52.39	0.562	14.28	2.063	39.69
2.500	0635	0571	3.250	82.55	3.126	79.40	1.749	44.43	0.562	14.28	1.749	39.69
2.625	0666	0603	3.375	85.73	3.252	82.60	2.063	52.39	0.562	14.28	2.063	39.69
2.750	0698	0635	3.375	85.73	3.374	85.70	2.063	52.39	0.625	15.88	2.063	39.69
2.875	0730	0666	3.500	88.90	3.500	88.90	2.063	52.39	0.625	15.88	2.063	38.10
3.000	0762	0698	3.750	95.25	3.626	92.10	2.063	52.39	0.625	15.88	2.063	38.10
3.125*	0794*	0730	3.875	98.43	3.752	95.30	2.063	52.39	0.625	15.88	2.063	38.10
3.250*	0825*	0762	4.000	101.60	3.874	98.40	2.063	52.39	0.783	19.88	2.063	38.10
3.375*	0857*	0793	4.125	104.78	4.000	101.60	2.063	52.39	0.783	19.88	2.063	38.10
3.500*	0889*	0825	4.250	107.95	4.126	104.80	2.063	52.39	0.783	19.88	2.063	38.10
3.625*	0921*	0857	4.375	111.13	4.252	108.00	2.063	52.39	0.783	19.88	2.063	38.10
3.750*	0953*	0889	4.500	114.30	4.374	111.10	2.063	52.39	0.783	19.88	2.063	38.10
3.875*	0984*	0921	4.625	117.48	4.500	114.30	2.063	52.39	0.783	19.88	2.063	38.10
4.000*	1016*	0952	4.750	120.65	4.626	117.50	2.063	52.39	0.783	19.88	2.063	38.10

DØ = Imperial size shaft  
 Dimensions in mm and inches  
 \\*Non-stock guarantee



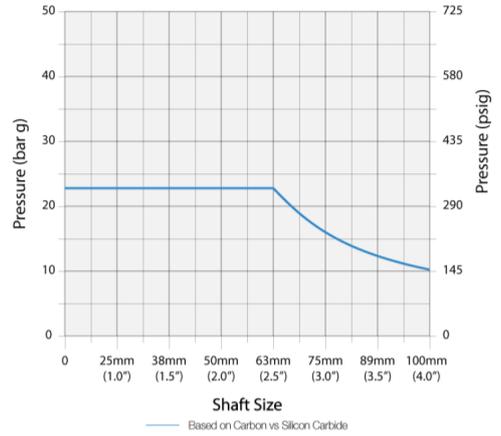
**Maximum Operating Pressure**

The PV Chart shows the maximum operating pressures of this Vulcan Seals type, based on the seal face materials used. Different lines on the chart indicate different material combinations, as shown underneath.

It also assumes stable operation in a clean, cool, lubricating and nonvolatile fluid with an adequate flush rate.

For more in-depth pressure rating calculations based on specific material combinations and application conditions, please consult us.

**PV Chart**



**Application Conditions**

Criteria	Multiplier	
Product Fluid	Lubricating fluids	X 1.00
	Aqueous solutions / Water	X 0.85
Temperature	Below 70°C (158°F)	X 1.00
	71°C to 120°C (160°F to 248°F)	X 0.85
	121°C to 175°C (250°F to 347°F)	X 0.75
	Over 176°C (349°F)	X 0.60
Speed	Up to 1750 rpm	X 1.00
	1750 to 3600 rpm	X 0.80

**Face and Seat Materials**

Combination	Multiplier
Carbon vs Ceramic	x 0.50
Carbon vs RB Silicon Carbide	x 1.00
SiSiC vs Ceramic	x 0.35
SiSiC vs RB Silicon Carbide	x 0.41
Tungsten Carbide vs Tungsten Carbide	x 0.50

**Example Calculation for Vulcan Seals Type 1645BA**

- A. Shaft size: 38mm therefore pressure is 13 bar (from PV Chart)
- B. Media: Water (multiplier = 0.85)
- C. Temperature: 50°C (multiplier = 1.00)
- D. Speed: 1450 rpm (multiplier = 1.00)
- E. Face combination: Carbon vs Silicon Carbide (multiplier = 1.00)

For this particular Vulcan Seals Type 1645BA seal size, the calculation for the approximate guidance maximum operating pressure would be:

A x B x C x D x E  
 13 bar x 0.85 x 1.00 x 1.00 x 1.00 = 11.05 bar

**Guidance Only**

Please note that due to the many operational and application variables that affect seal performance, the information given on this page is for guidance only.

We therefore strongly recommend careful individual testing and monitoring of all seals and related equipment for any proposed application.

Our policy is one of continuous technical and efficiency improvement. As such, all specifications may be subject to change without prior notice.

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\*\* Important: These limits are the theoretical elastomer or design limitations. For maximum theoretical operating pressure for your specific size and application please refer to calculation example within this data sheet. All performance information given is for guidance only and is dependent on material, operating and application factors that affect seal performance.