



Vulcan Seals Type
1609BA
Technical Data Sheet



Product Description

The Vulcan Seals Type 1609BA 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 1609BA complete seal is supplied with the Vulcan Seals Type 23 PTFE-mounted stationary. The Vulcan Seals Type 1609B rotary is compatible with a wide range of Vulcan Seals stationary types.

Why Choose the Vulcan Seals Type 1609BA?

- 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.
- Seal face dimensions ensure compatibility with a wide range of Vulcan Seals stationary ranges.
- Short working length and set-screw mounting allow the rotary to be fitted to a wide range of equipment shafts.

Standard Face Material Combinations

Rotary Face	Stationary Face	Complete Seal 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
EP	-40°C	+140°C
Viton™/FKM	-30°C	+180°C

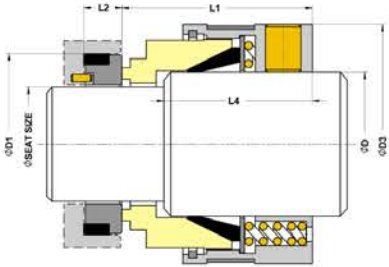
Pressure: Up to 40 bar (580 psi)

Mechanical Seal Replacement Range

Vulcan Seals Type 1609BA is a dimensional replacement mechanical seal for the following seal ranges:

- John Crane® | Type 109B / 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)
0.625	0158	0127	1.000	25.40	1.209	30.70	1.062	26.97	0.313	7.95	0.875	22.23
0.750	0191	0158	1.250	31.75	1.366	34.70	1.187	30.14	0.405	10.28	1.000	25.40
0.875	0222	0191	1.375	34.93	1.496	38.00	1.250	31.75	0.405	10.28	1.000	25.40
1.000	0254	0222	1.500	38.10	1.614	41.00	1.313	33.34	0.405	10.28	1.063	26.99
1.125	0286	0254	1.625	41.28	1.732	44.00	1.375	34.93	0.437	11.10	1.063	26.99
1.250	0317	0286	1.750	44.44	1.929	49.00	1.375	34.93	0.437	11.10	1.063	26.99
1.375	0349	0286	1.750	44.44	2.047	52.00	1.437	36.50	0.437	11.10	1.063	26.99
1.500	0381	0317	1.875	47.63	2.189	55.60	1.437	36.50	0.437	11.10	1.063	26.99
1.625	0412	0349	2.000	50.80	2.402	61.00	1.750	44.45	0.437	11.10	1.375	34.93
1.750	0444	0381	2.125	53.98	2.531	64.30	1.750	44.45	0.437	11.10	1.375	34.93
1.875	0476	0412	2.375	60.33	2.563	65.10	1.750	44.45	0.500	12.70	1.375	34.93
2.000	0508	0444	2.500	63.50	2.783	70.70	1.750	44.45	0.500	12.70	1.375	34.93
2.125	0539	0476	2.625	66.68	3.031	77.00	2.063	52.39	0.500	12.70	1.625	41.28
2.250	0571	0508	2.750	69.85	3.154	80.10	2.063	52.39	0.500	12.70	1.625	41.28
2.375	0603	0539	3.000	76.20	3.272	83.10	2.063	52.39	0.562	14.28	1.625	41.28
2.500	0635	0571	3.125	79.38	3.409	86.60	2.063	52.39	0.562	14.28	1.625	41.28
2.625	0666	0603	3.250	82.55	3.528	89.60	2.063	52.39	0.562	14.28	1.625	41.28
2.750	0698	0635	3.375	85.73	3.654	92.80	2.063	52.39	0.562	14.28	1.625	41.28
2.875	0730	0666	3.375	85.73	3.776	95.90	2.063	52.39	0.625	15.88	1.625	41.28
3.000	0762	0698	3.500	88.90	3.846	97.70	2.063	52.39	0.625	15.88	1.594	40.48
3.125*	0794	0730	3.750	95.25	3.965	100.70	2.063	52.39	0.625	15.88	1.594	40.48
3.250*	0825	0762	3.875	98.43	4.154	105.50	2.063	52.39	0.625	15.88	1.594	40.48
3.375*	0857	0794	4.000	101.60	4.280	108.70	2.063	52.39	0.783	19.88	1.594	40.48
3.500*	0889	0825	4.125	104.78	4.409	112.00	2.063	52.39	0.783	19.88	1.594	40.48
3.625*	0921	0857	4.250	107.95	4.528	115.00	2.063	52.39	0.783	19.88	1.594	40.48
3.750*	0953	0889	4.375	111.13	4.654	118.20	2.063	52.39	0.783	19.88	1.594	40.48
3.875*	0984	0921	4.500	114.30	4.776	121.30	2.063	52.39	0.783	19.88	1.594	40.48
4.000*	1016	0953	4.625	117.48	4.906	124.60	2.063	52.39	0.783	19.88	1.594	40.48

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



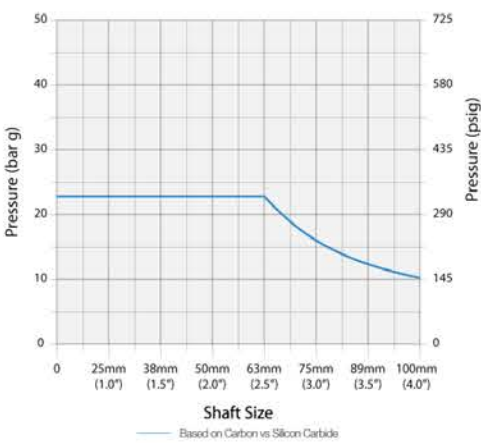
Maximum Operating Pressure

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 1609BA

- 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 1609BA 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.