VULCAN SEALS

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# Vulcan Seals Type 1609A

Technical Data Sheet

## Product Description

The Vulcan Seals Type 1609A is a robust, PTFE wedge-mounted "pusher" seal design with multiple springs and a monolithic sealing face. 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 provide even closing forces around the sealing face circumference giving improved pV capability and higher performance. The robust design and multi-spring arrangement provide optimised performance in challenging industrial applications when compared to single-spring seal designs.

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

## Why Choose the Vulcan Seals Type 1609A?

- 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
*Non-stock guarantee

## Elastomer Temperature Capabilities

| | Minimum | Maximum |
|---|---|---|
| EP | -40°C | +140°C |
| Nitrile | -30°C | +120°C |
| Viton™/FKM | -30°C | +180°C |

Pressure: Up to 23 bar (333 psi)

## Mechanical Seal Replacement Range

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

- John Crane® | Type 109/A seat*

**Rotary Face | **Stationary Face*

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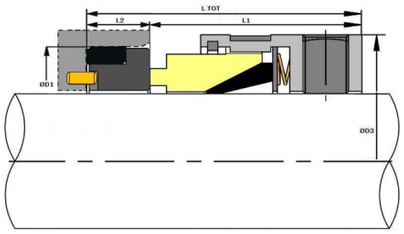


## Dimensional Data

| DØ (Imperial) | Seal Size Code | D1 (in) | D1 (mm) | D3 (in) | D3 (mm) | L1 (in) | L1 (mm) | L2 (in) | L2 (mm) |
|---|---|---|---|---|---|---|---|---|---|
| 0.625 | 0158 | 1.250 | 31.75 | 1.209 | 30.70 | 0.750 | 19.05 | 0.405 | 10.28 |
| 0.750 | 0191 | 1.375 | 34.93 | 1.366 | 34.70 | 0.875 | 22.23 | 0.405 | 10.28 |
| 0.875 | 0222 | 1.500 | 38.10 | 1.496 | 38.00 | 0.937 | 23.81 | 0.405 | 10.28 |
| 1.000 | 0254 | 1.625 | 41.28 | 1.614 | 41.00 | 1.000 | 25.40 | 0.437 | 11.10 |
| 1.125 | 0286 | 1.750 | 44.44 | 1.732 | 44.00 | 1.059 | 26.90 | 0.437 | 11.10 |
| 1.250 | 0317 | 1.875 | 47.63 | 1.929 | 49.00 | 1.059 | 26.90 | 0.437 | 11.10 |
| 1.375 | 0349 | 2.000 | 50.80 | 2.047 | 52.00 | 1.125 | 28.58 | 0.437 | 11.10 |
| 1.500 | 0381 | 2.125 | 53.98 | 2.189 | 55.60 | 1.125 | 28.58 | 0.437 | 11.10 |
| 1.625 | 0412 | 2.375 | 60.33 | 2.402 | 61.00 | 1.375 | 34.93 | 0.500 | 12.70 |
| 1.750 | 0444 | 2.500 | 63.50 | 2.531 | 64.30 | 1.375 | 34.93 | 0.500 | 12.70 |
| 1.875 | 0476 | 2.625 | 66.68 | 2.563 | 65.10 | 1.375 | 34.93 | 0.500 | 12.70 |
| 2.000 | 0508 | 2.750 | 69.85 | 2.783 | 70.70 | 1.375 | 34.93 | 0.500 | 12.70 |
| 2.125 | 0539 | 3.000 | 76.20 | 3.031 | 77.00 | 1.687 | 42.86 | 0.562 | 14.28 |
| 2.250 | 0571 | 3.125 | 79.38 | 3.154 | 80.10 | 1.687 | 42.86 | 0.562 | 14.28 |
| 2.375 | 0603 | 3.250 | 82.55 | 3.272 | 83.10 | 1.687 | 42.86 | 0.562 | 14.28 |
| 2.500 | 0635 | 3.375 | 85.73 | 3.409 | 86.60 | 1.687 | 42.86 | 0.562 | 14.28 |
| 2.625 | 0666 | 3.375 | 85.73 | 3.528 | 89.60 | 1.687 | 42.86 | 0.625 | 15.88 |
| 2.750 | 0698 | 3.500 | 88.90 | 3.654 | 92.80 | 1.687 | 42.86 | 0.625 | 15.88 |
| 2.875 | 0730 | 3.750 | 95.25 | 3.776 | 95.90 | 1.687 | 42.86 | 0.625 | 15.88 |
| 3.000 | 0762 | 3.875 | 98.43 | 3.846 | 97.70 | 1.687 | 42.86 | 0.625 | 15.88 |
| 3.125* | 0794 | 4.000 | 101.60 | 3.965 | 100.70 | 1.687 | 42.86 | 0.783 | 19.88 |
| 3.250* | 0825 | 4.125 | 104.78 | 4.154 | 105.50 | 1.687 | 42.86 | 0.783 | 19.88 |
| 3.375* | 0857 | 4.250 | 107.95 | 4.280 | 108.70 | 1.687 | 42.86 | 0.783 | 19.88 |
| 3.500* | 0889 | 4.375 | 111.13 | 4.409 | 112.00 | 1.687 | 42.86 | 0.783 | 19.88 |
| 3.625* | 0921 | 4.500 | 114.30 | 4.528 | 115.00 | 1.687 | 42.86 | 0.783 | 19.88 |
| 3.750* | 0953 | 4.625 | 117.48 | 4.654 | 118.20 | 1.687 | 42.86 | 0.783 | 19.88 |
| 3.875* | 0984 | 4.750 | 120.65 | 4.776 | 121.30 | 1.687 | 42.86 | 0.783 | 19.88 |
| 4.000* | 1016 | 4.875 | 123.83 | 4.906 | 124.60 | 1.687 | 42.86 | 0.783 | 19.88 |

Dimensions in mm and inches
*Non-stock guarantee

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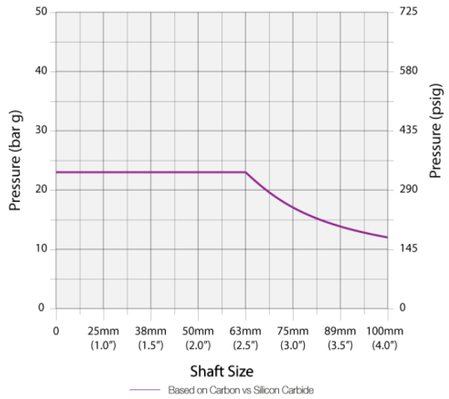
## Maximum Operating Pressure

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 to347°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 1609A

A. Shaft size: 38mm therefore pressure is 23 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 1609A seal size, the calculation for the approximate guidance maximum operating pressure would be:

A x B x C x D x E
23 bar x 0.85 x 1.00 x 1.00 x 1.00 = 19.55 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.



** 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.