



## Vulcan Seals Type 1688

### Technical Data Sheet



#### Product Description

The Vulcan Seals Type 1688 is a highly robust, 'O'-ring mounted single wave-spring "non-pusher" seal design, with a very narrow cross-section and compact working length.

The drive from the shaft and set of working lengths is by set screws to the shaft, providing bi-directional rotation capability. The single wave-spring provides even closing force to the sealing faces ensuring higher sealing performance and short working height compared to a single spring seal design.

The Vulcan Seals Type 1688 features a monolithic steelhead, optimised for abrasion resistance and high-temperature applications.

Vulcan Seals Type 1688 complete seal is supplied with the Vulcan Seals Type 1688 'O'-ring stationary to suit UK imperial housings commonly used in rotary lobe pumps.

#### Why Choose the Vulcan Seals Type 1688?

- The design of the Vulcan Seals Type 1688 head ensures the 'O'-ring is supported by the set-screw fixed barrel, providing superior performance against service pressure variations and minimising shaft fretting.
- The compact design and set-screw mounting of the Vulcan Seals Type 1688 allow installation in very short-length seal chambers.
- The Vulcan Seals Type 1688 is highly suited to rotary lobe pumps due to the short installation length, reduced radial clearance, and design suited to slow shaft speed operation.
- The one-piece sinusoidal wave spring provides superior strength and reliability compared to cut-section wave springs, which are not as robust.

#### Standard Face Material Combinations

| Rotary Face   Material | Stationary Face   Material | Complete Material Code |
|------------------------|----------------------------|------------------------|
| 304 Stainless Steel    | VCP1 Carbon                | P                      |
| VTN2* Tungsten Carbide | VCP1 Carbon                | U                      |
| VTN2* Tungsten Carbide | VTN1* Tungsten Carbide     | H                      |

Guaranteed Stock/Material Elastomers: Viton™/FKM, EP, Nitrile and Metallurgy 304SS

\*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 10 bar (145 psi)

#### Compliance & Certificates



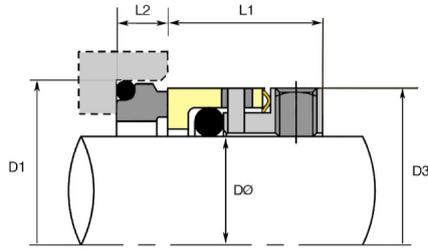
The Vulcan Seals mechanical seal range can be supplied with material combinations designed to meet the compliance standards and certifications listed above. Additional compliance or regulatory requirements can also be considered upon request. Please enquire to discuss your specific application.

#### Mechanical Seal Replacement Range

Vulcan Seals Type 1688 is a dimensional replacement mechanical seal for the following seal ranges:

- AES® | Type N-W01\*
- John Crane® | Type DF\*\*
- Roten® | Roten® 7KS\*
- John Crane® | Type 80\*
- Lidering® | Type 270\*

\*Rotary Face | \*\*Stationary Face



**Dimensional Data**

| DØ (Metr.) | Size Code | D1     | D3     | L1    | L2   | DØ (Imp.) | Size Code 2 | D1 (mm) | D3 (mm) | L1 (mm) | L2 (mm) |
|------------|-----------|--------|--------|-------|------|-----------|-------------|---------|---------|---------|---------|
| 16         | 0160      | 28.58  | 27.00  | 19.10 | 5.32 | 0.625     | 0158        | 28.58   | 27.00   | 19.10   | 5.32    |
| 24         | 0240      | 35.40  | 34.10  | 19.10 | 6.62 | 0.750     | 0191        | 31.70   | 30.00   | 19.10   | 5.32    |
| 28         | 0280      | 42.00  | 39.00  | 19.10 | 6.62 | 1.125     | 0286        | 41.20   | 39.50   | 19.10   | 6.62    |
| 30         | 0300      | 42.70  | 41.00  | 19.10 | 6.62 | 1.250     | 0317        | 44.45   | 42.40   | 19.10   | 6.62    |
| 32         | 0320      | 44.45  | 42.40  | 19.10 | 6.62 | 1.375     | 0349        | 47.63   | 45.50   | 19.10   | 6.62    |
| 35         | 0350      | 47.63  | 45.50  | 19.10 | 6.62 | 1.500     | 0381        | 53.98   | 51.80   | 21.10   | 7.12    |
| 38         | 0380      | 53.98  | 51.80  | 21.10 | 7.12 | 1.750     | 0444        | 60.33   | 58.20   | 21.10   | 7.12    |
| 45         | 0450      | 63.50  | 58.20  | 21.10 | 7.12 | 1.875     | 0476        | 63.50   | 61.40   | 21.10   | 7.12    |
| 50         | 0500      | 63.96  | 61.90  | 21.10 | 7.12 | 2.000     | 0508        | 66.68   | 64.60   | 21.10   | 8.62    |
| 54         | 0540      | 73.95  | 71.00  | 22.10 | 8.62 | 2.125     | 0539        | 73.03   | 71.00   | 22.10   | 8.62    |
| 54.6*      | 0546      | 75.00  | 72.00  | 22.10 | 8.62 | 2.500     | 0635        | 88.90   | 79.30   | 25.80   | 7.83    |
| 55         | 0550      | 75.00  | 72.00  | 22.10 | 8.62 | 2.750     | 0698        | 95.25   | 90.80   | 25.80   | 7.83    |
| 63         | 0630      | 83.00  | 79.30  | 25.80 | 7.83 | 2.875     | 0730        | 98.43   | 94.00   | 25.80   | 7.83    |
| 75         | 0750      | 100.40 | 96.00  | 25.80 | 7.83 | 3.000     | 0762        | 101.60  | 96.90   | 25.80   | 7.83    |
| 80         | 0800      | 104.00 | 101.00 | 25.80 | 7.83 |           |             |         |         |         |         |
| 95         | 0950      | 125.00 | 116.00 | 25.80 | 7.83 |           |             |         |         |         |         |
| 100        | 1000      | 130.00 | 121.00 | 25.80 | 7.83 |           |             |         |         |         |         |

Dimensions in mm  
 \\*Non-stock guarantee



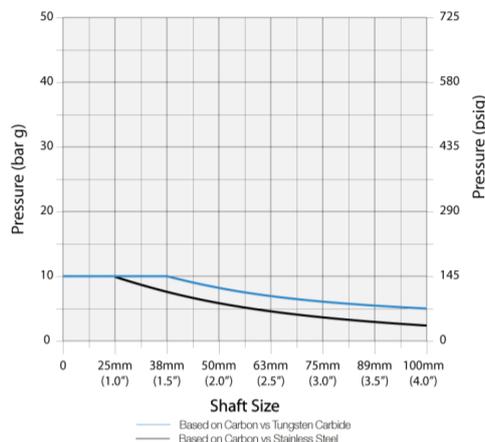
**Maximum Operating Pressure**

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 Stainless Steel            | x 0.30     |
| Carbon vs Tungstn Carbide            | x 0.90     |
| Tungsten Carbide vs Tungsten Carbide | x 0.50     |

**Example Calculation for Vulcan Seals Type 1688**

- A. Shaft size: 38mm therefore pressure is 7 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 1688 seal size, the calculation for the approximate guidance maximum operating pressure would be:

A x B x C x D x E  
 7 bar x 0.85 x 1.00 x 1.00 x 1.00 = 5.95 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.