

first  **seals**TM
Division



540 Range
Bellows Seal

540 Range

Bellows Seal

Introduction

The first4seals™ bellows range has been specifically designed to offer the highest standard of operating performance, quality and availability of materials.

The quality of products is ensured by each seal being assembled in the first4seals™ UK headquarters. The components used have been produced in Group manufacturing facilities, thus ensuring that the product performs as intended each and every time.

Please contact the first4seals™ Technical Department for any further information regarding material compliance, performance parameters or material specifications.



Product Description

The 540 Range is an elastomeric bellows seal that is suitable for use in a wide range of industries and applications.

It offers the following features:

- **Full length bellows** – protects the shaft from particulates in the product media.
- **Close radial fit of bellows** – protects the rotary face from contact with the shaft during installation.
- **Maximised axial movement** – sealing capability maintained irrespective of shaft deflection due to axial movement.
- **Maximised spring wire diameter** – rotational drive is transmitted from the shaft to the rotary face.
- **DIN standard compliance** – the 540 Range is designed to meet DIN 24960, ISO 3069.
- **Modular Design** – The greatest number of product iterations available from stock.

| first4seals™ | AESSEAL | AESSEAL (OLD) | John Crane | Flowserve | Vulcan |
|--------------|---------|---------------|------------|-----------|---------|
| 540 | B05U | B05 | 2100 | 140 | 14DIN |
| 542 | B092U | B052 | 2100 (LK) | 142 | 142DIN |
| 543 | B093U | B053 | 2100 (L1N) | 143 | 143DIN |
| 540/DINS | B09SU | B05S | 2100 | 140 | 14DINS |
| 542/DINS | B092SU | B052S | 2100 (LK) | 142 | 142DINS |
| 543/DINS | B093SU | B053S | 2100 (L1N) | 143 | 143DINS |
| 540/DINL | B09SLU | B05SL | 2100 | 140 | |
| 542/DINL | B092SLU | B052SL | 2100 (LK) | 142 | |
| 543/DINL | B093SLU | B053SL | 2100 (L1N) | 143 | |

Typical Industries

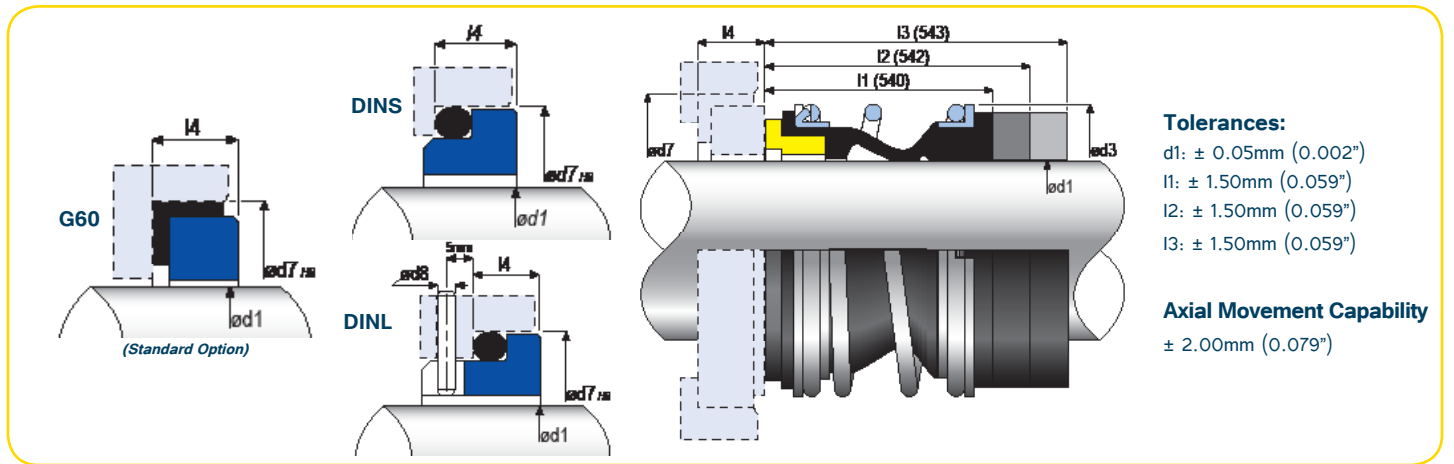
Typical Pumps

- Oil & Gas
- Power Generation
- Chemical
- Bio/Ethanol
- Mining & Minerals
- Pulp & Paper
- Water & Wastewater
- Automotive
- Metal Processing
- Building Services
- Marine
- Food & Beverage (4 prefix)
- Chemical Standard Pumps
- Helical Screw Pumps
- Stock Pumps
- Circulating Pumps

540 Range

Bellows Seal

Dimensional Information



| Seal Size | d1 | | d3 | | d7 | | d8 | | I1 | | I2 | | I3 | | I4 | |
|-----------|--------|--------|--------|--------|--------|--------|------|--------|-------|--------|-------|--------|-------|--------|-------|--------|
| | mm | inches | mm | inches | mm | inches | mm | inches | mm | inches | mm | inches | mm | inches | mm | inches |
| 0100 | 10.00 | 0.394 | 20.00 | 0.787 | 21.00 | 0.827 | 3.00 | 0.118 | 13.40 | 0.528 | 25.90 | 1.020 | 33.40 | 1.315 | 6.60 | 0.260 |
| 0120 | 12.00 | 0.472 | 22.00 | 0.866 | 23.00 | 0.906 | 3.00 | 0.118 | 14.40 | 0.567 | 25.90 | 1.020 | 33.40 | 1.315 | 6.60 | 0.260 |
| 0140 | 14.00 | 0.551 | 24.00 | 0.945 | 25.00 | 0.984 | 3.00 | 0.118 | 14.40 | 0.567 | 28.40 | 1.118 | 33.40 | 1.315 | 6.60 | 0.260 |
| 0160 | 16.00 | 0.630 | 26.00 | 1.024 | 27.00 | 1.063 | 3.00 | 0.118 | 14.40 | 0.567 | 28.40 | 1.118 | 33.40 | 1.315 | 6.60 | 0.260 |
| 0170 | 17.00 | 0.669 | 28.00 | 1.102 | 33.00 | 1.299 | 3.00 | 0.118 | 18.50 | 0.728 | 30.00 | 1.181 | 37.50 | 1.476 | 7.50 | 0.295 |
| 0180 | 18.00 | 0.709 | 32.00 | 1.260 | 33.00 | 1.299 | 3.00 | 0.118 | 18.50 | 0.728 | 30.00 | 1.181 | 37.50 | 1.476 | 7.50 | 0.295 |
| 0200 | 20.00 | 0.787 | 34.00 | 1.339 | 35.00 | 1.378 | 3.00 | 0.118 | 18.50 | 0.728 | 30.00 | 1.181 | 37.50 | 1.476 | 7.50 | 0.295 |
| 0220 | 22.00 | 0.866 | 36.00 | 1.417 | 37.00 | 1.457 | 3.00 | 0.118 | 18.50 | 0.728 | 30.00 | 1.181 | 37.50 | 1.476 | 7.50 | 0.295 |
| 0240 | 24.00 | 0.945 | 38.00 | 1.496 | 39.00 | 1.535 | 3.00 | 0.118 | 18.50 | 0.728 | 32.50 | 1.280 | 42.50 | 1.673 | 7.50 | 0.295 |
| 0250 | 25.00 | 0.984 | 39.00 | 1.535 | 40.00 | 1.575 | 3.00 | 0.118 | 18.50 | 0.728 | 32.50 | 1.280 | 42.50 | 1.673 | 7.50 | 0.295 |
| 0280 | 28.00 | 1.102 | 42.00 | 1.654 | 43.00 | 1.693 | 3.00 | 0.118 | 24.50 | 0.965 | 35.00 | 1.378 | 42.50 | 1.673 | 7.50 | 0.295 |
| 0300 | 30.00 | 1.181 | 44.00 | 1.732 | 45.00 | 1.772 | 3.00 | 0.118 | 25.50 | 1.004 | 35.00 | 1.378 | 42.50 | 1.673 | 7.50 | 0.295 |
| 0320 | 32.00 | 1.260 | 46.00 | 1.811 | 48.00 | 1.890 | 3.00 | 0.118 | 25.50 | 1.004 | 35.00 | 1.378 | 47.50 | 1.870 | 7.50 | 0.295 |
| 0330 | 33.00 | 1.299 | 47.00 | 1.850 | 48.00 | 1.890 | 3.00 | 0.118 | 25.50 | 1.004 | 35.00 | 1.378 | 47.50 | 1.870 | 7.50 | 0.295 |
| 0350 | 35.00 | 1.378 | 49.00 | 1.929 | 50.00 | 1.969 | 3.00 | 0.118 | 26.50 | 1.043 | 35.00 | 1.378 | 47.50 | 1.870 | 7.50 | 0.295 |
| 0380 | 38.00 | 1.496 | 54.00 | 2.126 | 56.00 | 2.205 | 4.00 | 0.157 | 29.00 | 1.142 | 36.00 | 1.417 | 46.00 | 1.811 | 9.00 | 0.354 |
| 0400 | 40.00 | 1.575 | 56.00 | 2.205 | 58.00 | 2.283 | 4.00 | 0.157 | 29.00 | 1.142 | 36.00 | 1.417 | 46.00 | 1.811 | 9.00 | 0.354 |
| 0430 | 43.00 | 1.693 | 59.00 | 2.323 | 61.00 | 2.402 | 4.00 | 0.157 | 29.00 | 1.142 | 36.00 | 1.417 | 51.00 | 2.008 | 9.00 | 0.354 |
| 0450 | 45.00 | 1.772 | 61.00 | 2.402 | 63.00 | 2.480 | 4.00 | 0.157 | 29.00 | 1.142 | 36.00 | 1.417 | 51.00 | 2.008 | 9.00 | 0.354 |
| 0480 | 48.00 | 1.890 | 64.00 | 2.520 | 66.00 | 2.598 | 4.00 | 0.157 | 31.00 | 1.220 | 36.00 | 1.417 | 51.00 | 2.008 | 9.00 | 0.354 |
| 0500 | 50.00 | 1.969 | 66.00 | 2.598 | 70.00 | 2.756 | 4.00 | 0.157 | 30.50 | 1.201 | 38.00 | 1.496 | 50.50 | 1.988 | 9.50 | 0.374 |
| 0530 | 53.00 | 2.087 | 69.00 | 2.717 | 73.00 | 2.874 | 4.00 | 0.157 | 29.00 | 1.142 | 36.50 | 1.437 | 59.00 | 2.323 | 11.00 | 0.433 |
| 0550 | 55.00 | 2.165 | 71.00 | 2.795 | 75.00 | 2.953 | 4.00 | 0.157 | 29.00 | 1.142 | 36.50 | 1.437 | 59.00 | 2.323 | 11.00 | 0.433 |
| 0580 | 58.00 | 2.283 | 78.00 | 3.071 | 78.00 | 3.071 | 4.00 | 0.157 | 32.00 | 1.260 | 41.50 | 1.634 | 59.00 | 2.323 | 11.00 | 0.433 |
| 0600 | 60.00 | 2.362 | 80.00 | 3.150 | 80.00 | 3.150 | 4.00 | 0.157 | 34.00 | 1.339 | 41.50 | 1.634 | 59.00 | 2.323 | 11.00 | 0.433 |
| 0650 | 65.00 | 2.559 | 85.00 | 3.346 | 85.00 | 3.346 | 4.00 | 0.157 | 34.00 | 1.339 | 41.50 | 1.634 | 69.00 | 2.717 | 11.00 | 0.433 |
| 0680 | 68.00 | 2.677 | 88.00 | 3.465 | 90.00 | 3.543 | 4.00 | 0.157 | 33.70 | 1.327 | 41.20 | 1.622 | 68.70 | 2.705 | 11.30 | 0.445 |
| 0700 | 70.00 | 2.756 | 90.00 | 3.543 | 92.00 | 3.622 | 4.00 | 0.157 | 33.70 | 1.327 | 48.70 | 1.917 | 68.70 | 2.705 | 11.30 | 0.445 |
| 0750 | 75.00 | 2.953 | 99.00 | 3.898 | 97.00 | 3.819 | 4.00 | 0.157 | 40.70 | 1.602 | 48.70 | 1.917 | 68.70 | 2.705 | 11.30 | 0.445 |
| 0800 | 80.00 | 3.150 | 104.50 | 4.114 | 105.00 | 4.134 | 4.00 | 0.157 | 40.50 | 1.594 | 48.00 | 1.890 | 78.00 | 3.071 | 12.00 | 0.472 |
| 0850 | 85.00 | 3.346 | 109.00 | 4.291 | 110.00 | 4.331 | 4.00 | 0.157 | 38.50 | 1.516 | 46.00 | 1.811 | 76.00 | 2.992 | 14.00 | 0.551 |
| 0900 | 90.00 | 3.543 | 114.00 | 4.488 | 115.00 | 4.528 | 4.00 | 0.157 | 38.50 | 1.516 | 51.00 | 2.008 | 76.00 | 2.992 | 14.00 | 0.551 |
| 0950 | 95.00 | 3.740 | 119.00 | 4.685 | 120.00 | 4.724 | 4.00 | 0.157 | 38.50 | 1.516 | 51.00 | 2.008 | 76.00 | 2.992 | 14.00 | 0.551 |
| 1000 | 100.00 | 3.937 | 124.00 | 4.882 | 125.00 | 4.921 | 4.00 | 0.157 | 38.50 | 1.516 | 51.00 | 2.008 | 76.00 | 2.992 | 14.00 | 0.551 |

540 Range

Bellows Seal

Material Variations

Metal Parts: 304 Stainless Steel
 Rotary Face: Refer to table below
 Stationary Face: Refer to table below
 Elastomer: Refer to table below

| Prefix | Type | Seal Size | Material | Suffix |
|--------|------|------------------|--------------------------|--------|
| 3 | 540 | / 0100 to 1000 / | / Refer to table below / | DINL |
| | 542 | | | |
| 4* | 543 | | | DINS |

| | Material Code | Rotary Face | Stationary Face | Elastomer | Standard Material | Alternative Option | |
|-------------|------------------|---------------------|---------------------|---------------------|-------------------|--------------------|----|
| Rotary Only | X6V-- | Carbon | N/A | Nitrile | ✓ | FS | |
| | X7V-- | Carbon | N/A | EPR | ✓ | FS | |
| | XYV-- | Carbon | N/A | Viton | ✓ | FS | |
| | X6K-- | Reaction Bonded SiC | N/A | Nitrile | ✓ | FS (on request) | |
| | X7K-- | Reaction Bonded SiC | N/A | EPR | ✓ | FS (on request) | |
| | XYK-- | Reaction Bonded SiC | N/A | Viton | ✓ | FS (on request) | |
| | X6B-- | Antimony Carbon | N/A | Nitrile | | ✓ | |
| | X7B-- | Antimony Carbon | N/A | EPR | | ✓ | |
| | XYB-- | Antimony Carbon | N/A | Viton | | ✓ | |
| | X6Q-- | Sintered SiC | N/A | Nitrile | | ✓ FS (on request) | |
| | X7Q-- | Sintered SiC | N/A | EPR | | ✓ FS (on request) | |
| | XYQ-- | Sintered SiC | N/A | Viton | | ✓ FS (on request) | |
| | X6R-- | Tungsten Carbide | N/A | Nitrile | | ✓ FS (on request) | |
| | X7R-- | Tungsten Carbide | N/A | EPR | | ✓ FS (on request) | |
| | XYR-- | Tungsten Carbide | N/A | Viton | | ✓ FS (on request) | |
| | Complete | V26 | Carbon | 99% Alumina Ceramic | Nitrile | ✓ | FS |
| | | V27 | Carbon | 99% Alumina Ceramic | EPR | ✓ | FS |
| | | V2Y | Carbon | 99% Alumina Ceramic | Viton | ✓ | FS |
| | | X6VK6 | Carbon | Reaction Bonded SiC | Nitrile | ✓ | FS |
| X7VK7 | | Carbon | Reaction Bonded SiC | EPR | ✓ | FS | |
| XYVKY | | Carbon | Reaction Bonded SiC | Viton | ✓ | FS | |
| X6KK6 | | Reaction Bonded SiC | Reaction Bonded SiC | Nitrile | ✓ | FS (on request) | |
| X7KK7 | | Reaction Bonded SiC | Reaction Bonded SiC | EPR | ✓ | FS (on request) | |
| XYKKY | | Reaction Bonded SiC | Reaction Bonded SiC | Viton | ✓ | FS (on request) | |
| X6VK6 | | Carbon | Reaction Bonded SiC | Nitrile | ✓ | FS | |
| X7VK7 | | Carbon | Reaction Bonded SiC | EPR | ✓ | FS | |
| XYVKY | | Carbon | Reaction Bonded SiC | Viton | ✓ | FS | |
| X6VQ6 | | Carbon | Sintered SiC | Nitrile | ✓ | FS | |
| X7VQ7 | | Carbon | Sintered SiC | EPR | ✓ | FS | |
| XYVQY | | Carbon | Sintered SiC | Viton | ✓ | FS | |
| X6VR6 | | Carbon | Tungsten Carbide | Nitrile | ✓ | FS | |
| X7VR7 | | Carbon | Tungsten Carbide | EPR | ✓ | FS | |
| XYVR7 | | Carbon | Tungsten Carbide | Viton | ✓ | FS | |
| X6QQ6 | | Sintered SiC | Sintered SiC | Nitrile | | ✓ FS (on request) | |
| X7QQ7 | | Sintered SiC | Sintered SiC | EPR | | ✓ FS (on request) | |
| XYQQY | | Sintered SiC | Sintered SiC | Viton | | ✓ FS (on request) | |
| B26 | | Antimony Carbon | 99% Alumina Ceramic | Nitrile | | ✓ | |
| B27 | | Antimony Carbon | 99% Alumina Ceramic | EPR | | ✓ | |
| B2Y | | Antimony Carbon | 99% Alumina Ceramic | Viton | | ✓ | |
| X6BK6 | | Antimony Carbon | Reaction Bonded SiC | Nitrile | | ✓ | |
| X7BK7 | | Antimony Carbon | Reaction Bonded SiC | EPR | | ✓ | |
| XYBK7 | | Antimony Carbon | Reaction Bonded SiC | Viton | | ✓ | |
| X6BQ6 | | Antimony Carbon | Sintered SiC | Nitrile | | ✓ | |
| X7BQ7 | | Antimony Carbon | Sintered SiC | EPR | | ✓ | |
| XYBQ7 | | Antimony Carbon | Sintered SiC | Viton | | ✓ | |
| X6BR6 | | Antimony Carbon | Tungsten Carbide | Nitrile | | ✓ | |
| X7BR7 | | Antimony Carbon | Tungsten Carbide | EPR | | ✓ | |
| XYBR7 | Antimony Carbon | Tungsten Carbide | Viton | | ✓ | | |
| X6RR6 | Tungsten Carbide | Tungsten Carbide | Nitrile | | ✓ FS (on request) | | |
| X7RR7 | Tungsten Carbide | Tungsten Carbide | EPR | | ✓ FS (on request) | | |
| XYRR7 | Tungsten Carbide | Tungsten Carbide | Viton | | ✓ FS (on request) | | |

*EC 1935/2004 Compliant Materials used

KEY:

✓ : Available (Not Food Safe)

FS : Food Safe Option

✓ FS : Available as not Food Safe or Food Safe on request

Availability:

Standard materials are typically available ex-stock for same day or next day shipment.

Alternative material options are typically available on an 8-10 week lead time, however, this may vary depending on the exact components required.

Please contact the first4seals™ Sales Office for exact availability and lead time.

Alternatively log onto the first4seals™ Customer Portal Stock Checker for full details of availability as well as the capability to track orders.

To access the portal go to <https://portal.first4seals.com>

N.B. Due to the modular design and build to order process, special material options can be made available on request. Please contact first4seals™ for more information.

540 Range

Bellows Seal

Application Limits

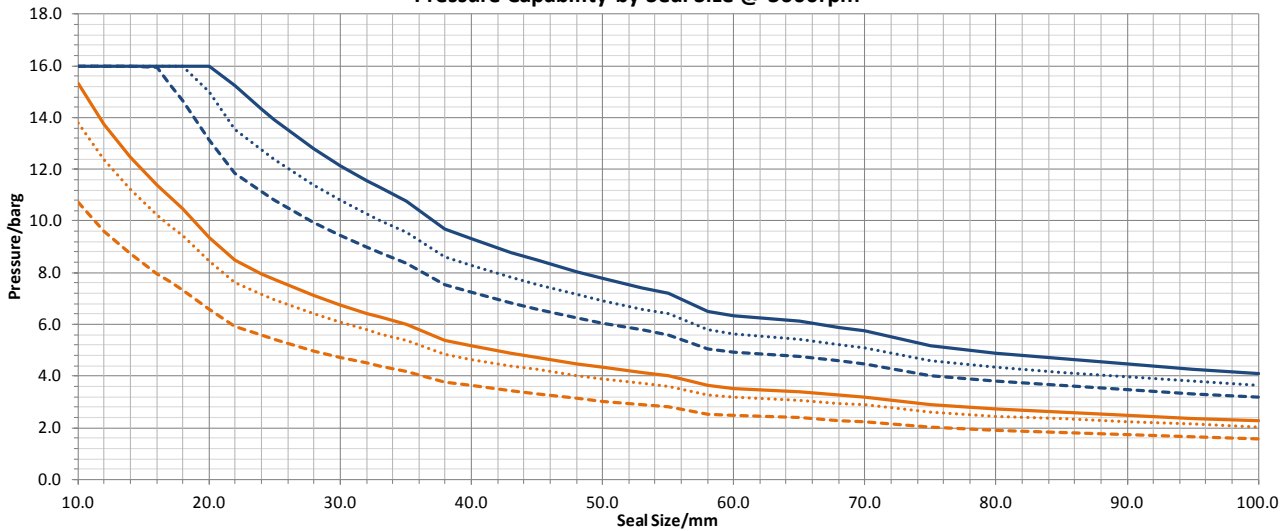
The following graphs show the maximum pressure that the particular sized seals are capable of sealing at temperatures below 80°C (176°F), whilst ensuring that they are operating within the PV limit for the particular face material combinations. If in doubt please contact the first4seals™ Technical Department.

For temperatures above 80°C (176°F) refer to the de-rating factors below to arrive at the application specific pressure rating of the seal.

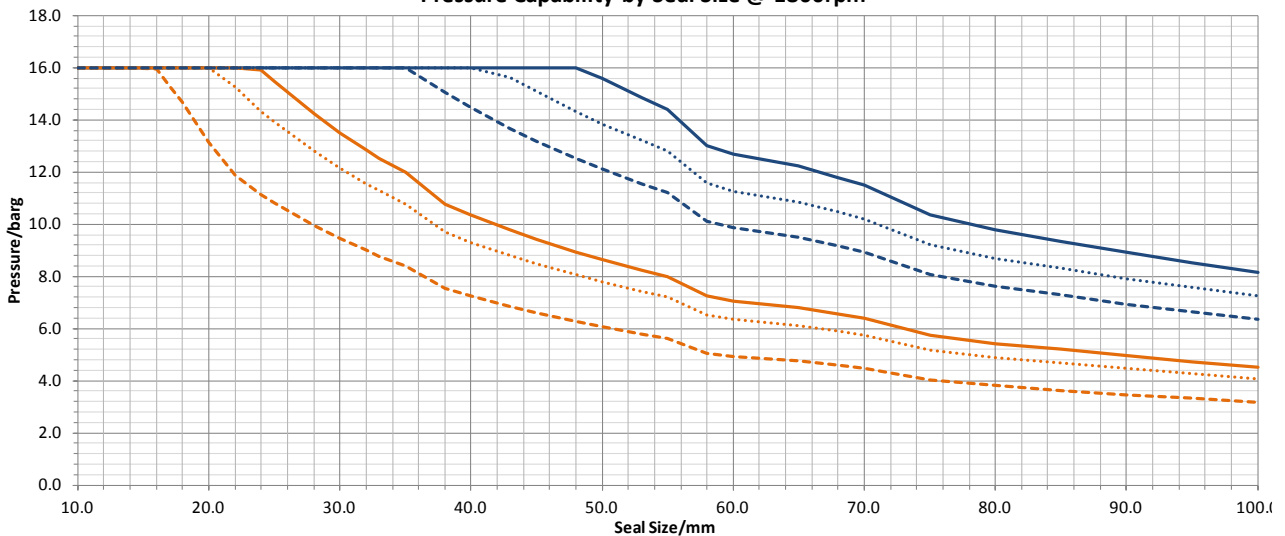
Rotation Speed (Maximum)

3600rpm or 20m/s (4000fpm) peripheral velocity - whichever value is exceeded first. Maximum rotational speed of 3600rpm and a peripheral velocity of 20m/s (4000fpm) is reached at sizes greater than 90mm seal size. Shaft sizes above this will have a lower rotational speed limit. For shaft speeds above 3600rpm contact first4seals™ Technical Department.

Pressure Capability by Seal Size @ 3600rpm



Pressure Capability by Seal Size @ 1800rpm



— Car/SiC in Aqueous Solutions & Car/SiC or Car/TC in Non-Aqueous Solutions
— SiC/SiC in Aqueous Solutions & Car/Cer in Non-Aqueous Solutions
- - - Car/Cer in Aqueous Solutions
- - - TC/TC in Non-Aqueous Solutions & Car/TC in Aqueous Solutions
- · - · SiC/SiC in Non-Aqueous Solutions
- · - · TC/TC in Aqueous Solutions

| Media Temperature | Multiplier |
|------------------------------------|------------|
| <80°C(175°F) | x1.00 |
| Above 80°C(175°F) to 120°C(250°F) | x0.90 |
| Above 120°C(250°F) to 180°C(355°F) | x0.80 |
| Above 180°C(355°F) to 230°C(445°F) | x0.65 |

UK Sales & Technical Advice:
AESSEAL Marine plc
Unit 4 Venlo Industrial Estate
Knowles Street
Bradford
West Yorkshire
BD4 6HA

tel: **+44 (0) 1274 720775**
fax: **+44 (0) 1274 729022**
email: **technical@first4seals.com**
web: **www.first4seals.com**

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