

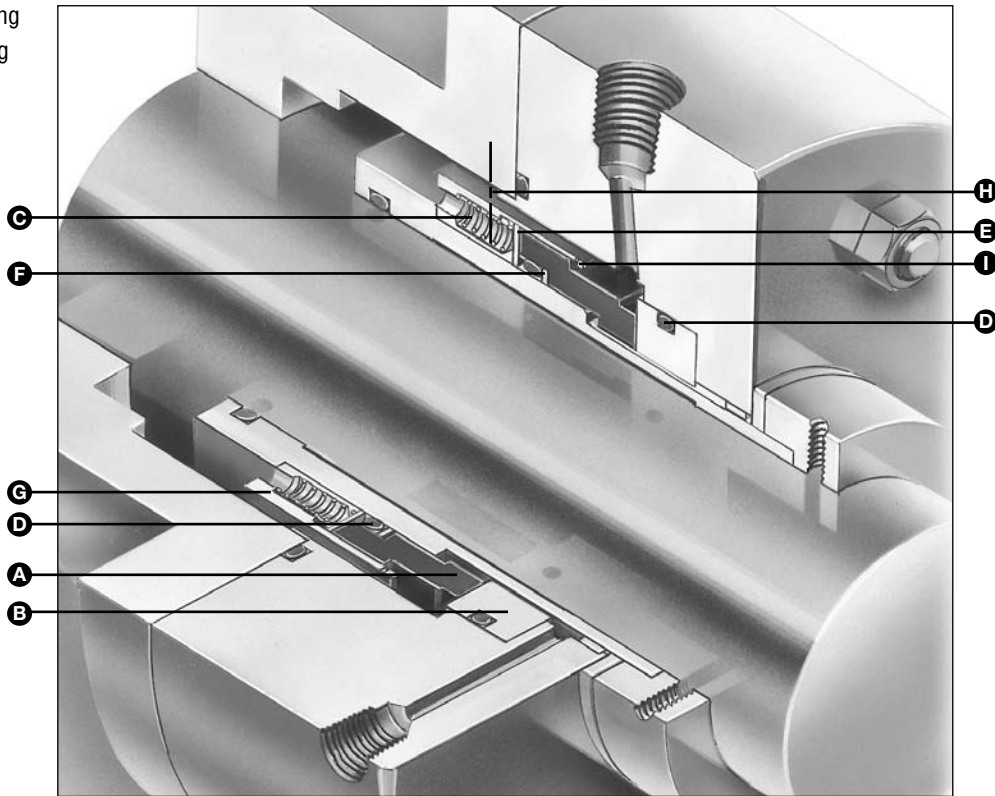


TYPE 8B1/8B1T

Elastomer O-Ring Seals

8B1/8B1T

- A – Face/Primary Ring
- B – Seat/Mating Ring
- C – Spring
- D – O-Ring
- E – Disc
- F – Anti-X Ring
- G – Retainer
- H – Set Screws
- I – Snap Ring



Product Description

Rugged Type 8B1/8B1T mechanical seals are available in a wide variety of elastomers for handling practically every industrial fluid. All components are held together by a snap ring in a unitized construction design.

- General industrial applications including refining, chemical processing, food and beverage, petrochemical processing, pharmaceutical, wastewater and power generation.
- Seals can be repaired easily on-site or at any John Crane Service Center.
- Seals can be shaft mounted or built into a cartridge as illustrated above.

Design Features

- Positive Set Screen Mechanical Drive Design — reduces slippage on shaft and sleeve to eliminate galling and premature wear.
- Lapped Faces — lapping process results in high precision finish for optimal sealing performance.
- Compact Design — permits use in all types of rotating equipment--centrifugal pumps, mixers and agitators.
- Balanced Design — balanced construction, including anti-extrusion ring, permits use in higher pressures.
- O-Ring Design — permits accommodation of many different fluids through use of wide variety of materials.
- Full (8B1) and narrow (8B1T) cross-section designs.

Performance Capabilities

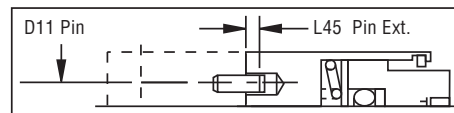
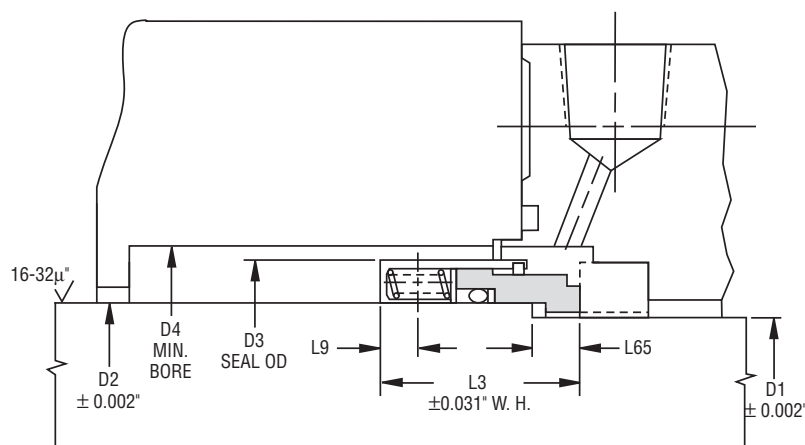
- Temperatures:
-40°C to 260°C/-40°F to 500°F
(depending on materials used)
 - Pressures:
Type 8B1: 76 bar g/1100 psig
Type 8B1T: 21 bar g/300 psig
For hydrostatic pressure limits, refer to the Hydrostatic Pressure Limits chart.
 - Speeds:
Up to 25 m/s/5000 fpm
- NOTE:** For applications with speeds greater than 25 m/s/5000 fpm, a rotating seat (RS) arrangement is recommended.



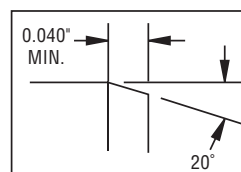
TYPE 8B1/8B1T

Elastomer O-Ring Seals

Type 8B1 Typical Arrangement/Dimensional Data



(N) number of pins (D12) pin diameter Pin press fit into collar or impeller. Engages holes in retainer. Design option standard on Type 8B1 Seals only.



For ease of installation, the lead-in edge of shaft or sleeve should be chamfered as shown.

Type 8B1 Dimensional Data (inches)

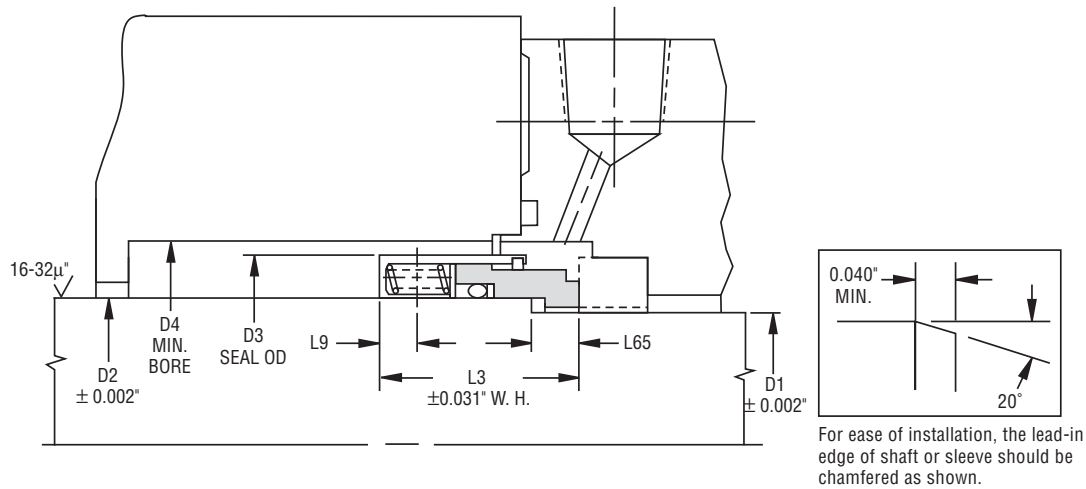
Seal Size	D1	D2	D3	D4	D11	D12	Working Height L3	L9	L45	L65	N
1.000	0.875	1.000	1.562	1.750	—	—	1.312	.187	—	.343	—
1.125	1.000	1.125	1.687	1.875	1.437	.187	1.375	.218	.187	.343	1
1.250	1.125	1.250	1.875	2.000	1.562	.187	1.375	.187	.187	.343	1
1.375	1.125	1.375	2.000	2.125	1.687	.187	1.437	.187	.187	.343	1
1.500	1.250	1.500	2.125	2.250	1.812	.187	1.437	.187	.187	.343	1
1.625	1.375	1.625	2.375	2.500	2.000	.187	1.750	.281	.250	.437	1
1.750	1.500	1.750	2.500	2.625	2.125	.187	1.750	.281	.250	.437	1
1.875	1.625	1.875	2.625	2.750	2.250	.187	1.750	.281	.250	.437	1
2.000	1.750	2.000	2.750	2.875	2.375	.187	1.750	.281	.250	.437	1
2.125	1.875	2.125	3.000	3.125	2.593	.250	2.062	.343	.312	.500	1
2.250	2.000	2.250	3.125	3.250	2.718	.250	2.062	.343	.312	.500	1
2.375	2.125	2.375	3.250	3.375	2.843	.250	2.062	.343	.312	.500	1
2.500	2.250	2.500	3.375	3.500	2.968	.250	2.062	.343	.312	.500	1
2.625	2.375	2.625	3.500	3.625	3.062	.312	2.062	.343	.312	.500	1
2.750	2.500	2.750	3.625	3.750	3.187	.312	2.062	.343	.312	.500	1
2.875	2.625	2.875	3.750	3.875	3.312	.312	2.062	.343	.312	.500	1
3.000	2.750	3.000	3.812	4.000	3.406	.312	2.062	.343	.312	.500	2
3.125	2.875	3.125	3.937	4.062	3.531	.312	2.062	.343	.312	.562	1
3.250	3.000	3.250	4.125	4.250	3.687	.312	2.062	.343	.312	.562	1
3.375	3.125	3.375	4.250	4.375	3.812	.312	2.062	.343	.312	.562	1
3.500	3.250	3.500	4.375	4.500	3.937	.312	2.062	.343	.312	.562	1
3.625	3.375	3.625	4.500	4.625	4.062	.312	2.062	.343	.312	.562	1
3.750	3.500	3.750	4.625	4.750	4.187	.312	2.062	.343	.312	.562	1
3.875	3.625	3.875	4.750	4.875	4.312	.312	2.062	.343	.312	.562	1
4.000	3.750	4.000	4.875	5.000	4.437	.312	2.062	.343	.312	.562	2
4.125	3.875	4.125	5.000	5.125	4.656	.312	2.062	.343	.312	.562	2
4.250	4.000	4.250	5.250	5.375	4.781	.312	2.062	.343	.312	.562	2
4.375	4.125	4.375	5.375	5.500	4.906	.312	2.062	.343	.312	.562	2
4.500	4.250	4.500	5.500	5.625	4.968	.312	2.062	.343	.312	.562	2
4.625	4.375	4.625	5.625	5.750	—	—	2.062	.343	.312	.562	—
4.750	4.500	4.750	5.750	5.875	5.250	.312	2.062	.343	.312	.562	2
4.875	4.625	4.875	5.875	6.000	5.375	.312	2.062	.343	.312	.562	2
5.000	4.750	5.000	6.000	6.125	5.500	.312	2.062	.343	.312	.562	2
5.125	4.875	5.125	6.125	6.250	5.625	.312	2.062	.343	.312	.562	2
5.250	5.000	5.250	6.500	6.625	5.750	.312	2.375	.312	.312	.625	2
5.375	5.125	5.375	6.625	6.750	5.875	.312	2.375	.312	.312	.625	2
5.500	5.250	5.500	6.750	6.875	6.000	.312	2.375	.312	.312	.625	2
5.625	5.375	5.625	6.875	7.000	6.125	.312	2.375	.312	.312	.625	2
5.750	5.500	5.750	7.000	7.125	6.250	.312	2.375	.390	.437	.625	2
5.875	5.625	5.875	7.125	7.250	5.375	.281	2.375	.390	.437	.625	2
6.000	5.750	6.000	7.250	7.375	6.500	.281	2.375	.312	.437	.625	2



TYPE 8B1/8B1T

Elastomer O-Ring Seals

Type 8B1T Typical Arrangement/Dimensional Data



Type 8B1T Dimensional Data (inches)

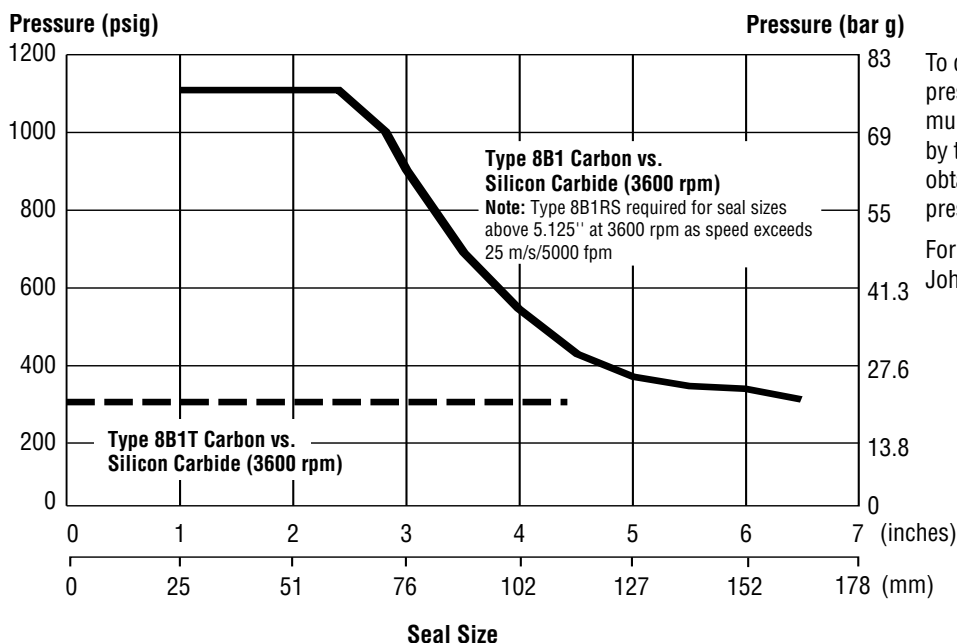
Seal Size	D1	D2	D3	D4	Working Height L3	L9	L65
1.000	0.875	1.000	1.437	1.625	1.312	.187	.343
1.125	1.000	1.125	1.562	1.750	1.375	.218	.343
1.250	1.125	1.250	1.687	1.875	1.375	.187	.343
1.375	1.125	1.375	1.937	2.125	1.687	.187	.343
1.500	1.250	1.500	1.937	2.125	1.437	.187	.343
1.625	1.375	1.625	2.250	2.437	1.593	.187	.437
1.750	1.500	1.750	2.312	2.500	1.750	.281	.437
1.875	1.625	1.875	2.500	2.687	1.750	.281	.437
2.000	1.750	2.000	2.625	2.812	1.750	.281	.437
2.125	1.875	2.125	2.812	3.000	2.062	.343	.500
2.250	2.000	2.250	2.843	3.031	1.750	.234	.500
2.375	2.125	2.375	3.000	3.187	2.062	.343	.500
2.500	2.250	2.500	3.125	3.312	1.750	.234	.500
2.625	2.375	2.625	3.250	3.437	2.062	.343	.500
2.750	2.500	2.750	3.375	3.562	2.062	.343	.500
2.875	2.625	2.875	3.500	3.687	2.062	.343	.500
3.000	2.750	3.000	3.625	3.812	2.062	.343	.500
3.125	2.875	3.125	3.750	3.937	2.062	.343	.562
3.250	3.000	3.250	3.875	4.062	2.062	.343	.562
3.375	3.125	3.375	4.000	4.187	2.062	.343	.562
3.500	3.250	3.500	4.125	4.312	2.062	.343	.562
3.625	3.375	3.625	4.250	4.437	2.062	.343	.562
3.750	3.500	3.750	4.375	4.562	2.062	.343	.562
3.875	3.625	3.875	4.500	4.687	2.062	.343	.562
4.000	3.750	4.000	4.625	4.812	2.062	.343	.562



TYPE 8B1/8B1T

Elastomer O-Ring Seals

Basic Pressure Ratings



To determine the maximum pressure for a Type 8B1 or 8B1T, multiply the maximum pressure by the Multiplier Factors to obtain the maximum operating pressure.

For hard combinations consult John Crane Engineering.

The Basic Pressure Rating is for a standard Type 8B1 or 8B1T seal, as shown in the typical arrangement, when installed according to the criteria given in this data sheet and generally accepted industrial practices.

The Basic Pressure Rating assumes stable operation at 3600 rpm in a clean, cool, lubricating, nonvolatile liquid, with an adequate flush rate. When used with the Multiplier Factors, the Basic Pressure Rating can be adjusted to provide a conservative estimate of the dynamic pressure rating. For process services outside this range or a more precise assessment of the dynamic pressure rating, contact John Crane for more information.

Multiplier Factors

	Selection Considerations	Multiplier Factor
Speed	3600 rpm Above 3600 rpm*	x 1.00 **
Sealed Fluid Lubricity	Petrol/Gasoline, Kerosene, or better Water and Aqueous Solutions Flashing Hydrocarbons*** (Specific Gravity ≤.65)	x 1.00 x 0.75 x 0.60
Sealed Fluid Temperature (for carbon only)	Below 80°C/175°F From 80°C to 125°C/175°F to 250°F From 125°C to 180°C/250°F to 350°F Above 180°C/350°F	x 1.00 x 0.90 x 0.80 x 0.65

* Not to exceed 25m/s/5000 fpm.

** Multiplier = 3600/new speed
Example: If new speed = 4000 rpm
Multiplier = 3600/4000 = 0.90

*** The ratio of sealed pressure to vapor pressure must be greater than 1.5, otherwise consult John Crane. If the specific gravity is less than 0.60, consult John Crane.

Example for Determining Pressure Rating Limits

Seal: 50mm/2" diameter Type 8B1

Product: Water

Face Material: Carbon vs. Silicon Carbide

Temperature: 16°C/60°F

Speed: 1800 rpm

Using the Basic Pressure Rating chart, the maximum pressure would be 76 bar g/1100 psig.

From the Multiplier Factors chart, apply the multipliers for the specific service requirements to determine the maximum operating pressure for the application.

76 bar g/1100 psig x 1.00 x 0.75 x 1.00 = 825 psig/57 bar g.

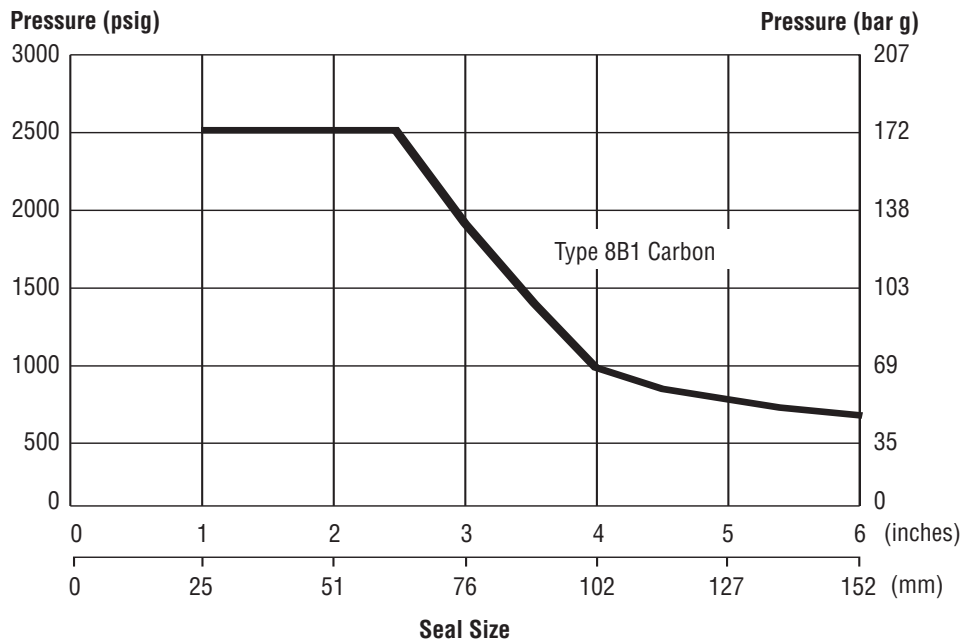
At 3600 rpm with the service conditions noted, a 50mm/2" diameter Type 8B1 Seal has a maximum operating limit of 825 psig/57 bar g. If operating pressure exceeds the pressure limit, consult John Crane.



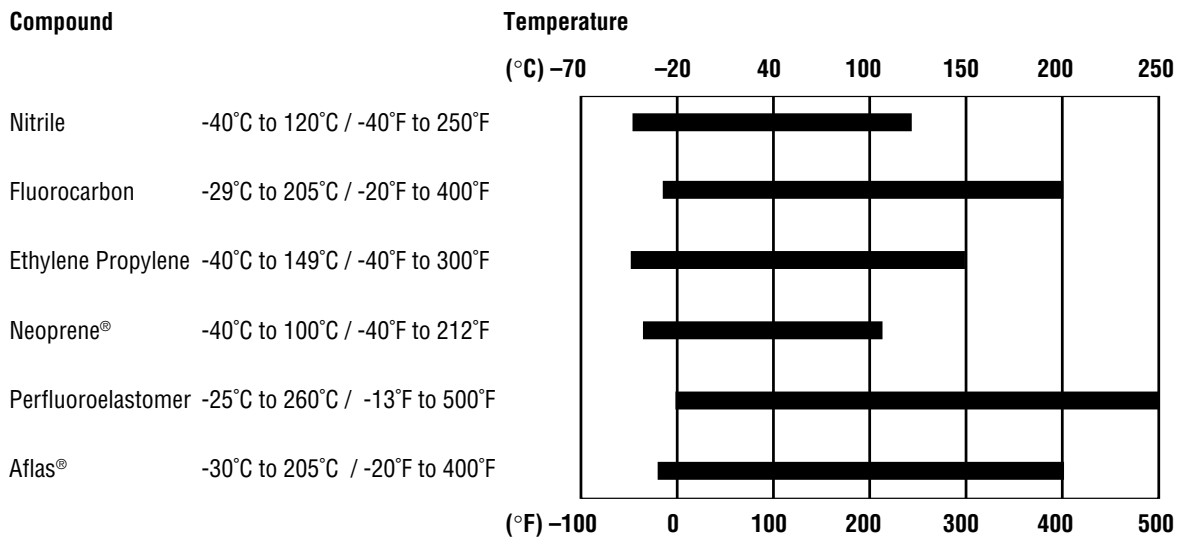
TYPE 8B1/8B1T

Elastomer O-Ring Seals

Hydrostatic Pressure Limits



Elastomer Temperature Limits



Criteria for Installation

Shaft/Sleeve	Limits
Surface Finish (max.)	0.8µm/32 Ra
Ovality/Out of Roundness (Shaft)	0.051mm/0.002"
End Play/Axial Float Allowance	±0.13mm/0.005"

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TYPE 8B1/8B1T

Elastomer O-Ring Seals

Materials of Construction

SEAL COMPONENTS	MATERIALS	
Description	Standard	Options
Face/Primary Ring	Carbon	Carbon (Nuclear Service) Carbon Severe (Chemical Service) Nickel Binder Tungsten Carbide Silicon Carbide
O-Ring	Fluorocarbon	Aflas® Ethylene Propylene Neoprene® Nitrile Perfluoroelastomer
Disc Set Screws Retainer Snap Ring Springs	316 Stainless Steel	Alloy 400 (Monel®) Alloy 20 Cb-3 Hastelloy B® Alloy C-276 Titanium

Aflas is a registered trademark of Asahi Glass Co. Ltd.

Hastelloy B is a registered trademark of Haynes International, Inc.

Monel is a registered trademark of Inco Alloys International, Inc.

Neoprene is a registered trademark of DuPont Dow.



Europe
Slough, UK

Tel: 44-1753-224000
Fax: 44-1753-224224

Latin America
São Paulo, Brazil

Tel: 55-11-3371-2500
Fax: 55-11-3371-2599

Middle East, Africa, Asia
Dubai, United Arab Emirates

Tel: 971-4-3438940
Fax: 971-4-3438970

North America
Morton Grove, Illinois USA

1-800-SEALING
Tel: 1-847-967-2400
Fax: 1-847-967-3915

smiths

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