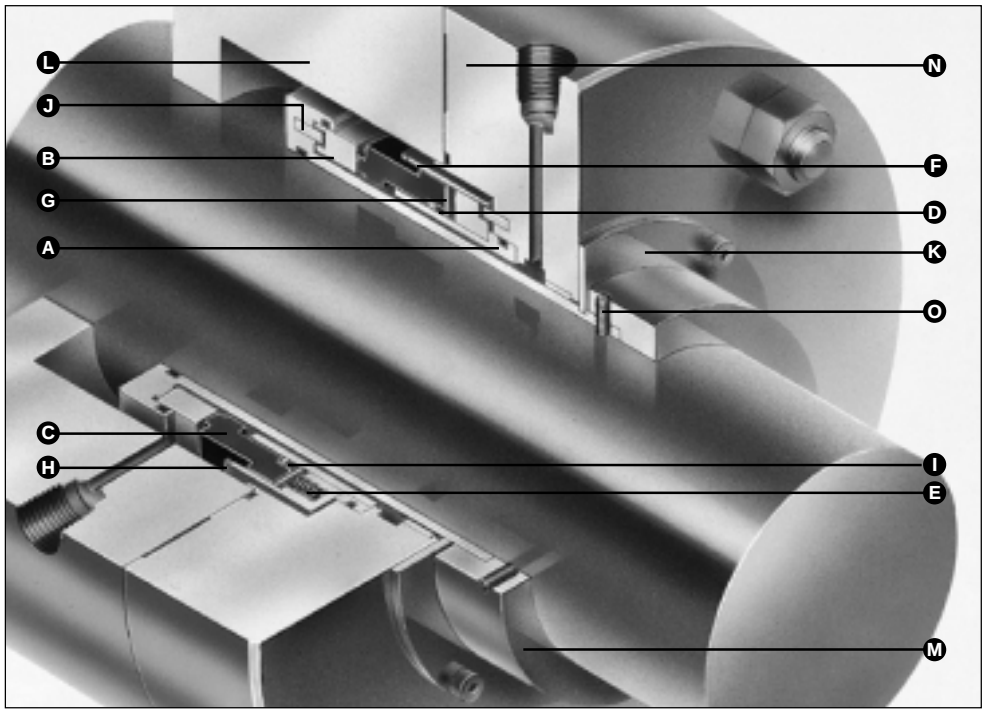
Type 8B1RS
Elastomer O-Ring Cartridge Seal



Applications

- General industrial applications including process services and API.
- Lubricating liquids, aqueous solutions, chemical, corrosives, and some acids.
- High shaft speeds.

Rugged mechanical seals are available in a wide variety of elastomers for handling practically every industrial fluid. All components are held together by a spacer in a unitized construction design.

Operating Conditions

- **Temperatures:**
  -40°C to + 260°C/-40°F to + 500°F
- **Pressures:**
  83 bar g/1200 psig
- **Speeds:**
  51 m/s/Up to 10,000 fpm

Design Features/Benefits

O-Ring Design
Permits accommodation of many different fluids through use of a wide variety of materials.

Rotating Mating Ring Design
Permits use at higher shaft speeds.

Mechanical Drive Design
Eliminates slippage on shaft and sleeve to eliminate galling and premature wear.

Balanced Design
Balanced construction, including anti-extrusion ring, permits use in higher pressures.

Lapped Faces
Lapping process results in high precision finish with optimal flatness.

Field Repairable
Reduces inventory requirements. Seals can be repaired easily on-site or at any John Crane Seal Rebuilding Center, and/or converted to wedge-type seals for broader service capabilities.

Industries Served
Chemical Processing
Conveyor/Industrial Equipment
Cryogenics
Food Processing
Gas Compression
Heat Transfer
Industrial Blowers & Fans
Marine
Mixers & Agitators
Nuclear Service
Offshore
Oil & Refinery
Paint & Ink
Petrochemical Processing
Pharmaceutical
Pipeline
Power Generation
Pulp & Paper
Wastewater
Water Desalination

A – O-Ring
B – Mating Ring
C – Primary Ring
D – O-Ring
E – Spring
F – Retainer
G – Disc
H – Snap Ring
I – Anti-X-Ring
J – Drive Pin
K – Spacer
L – Sleeve
M – Collar
N – Gland Plate
O – Set Screws

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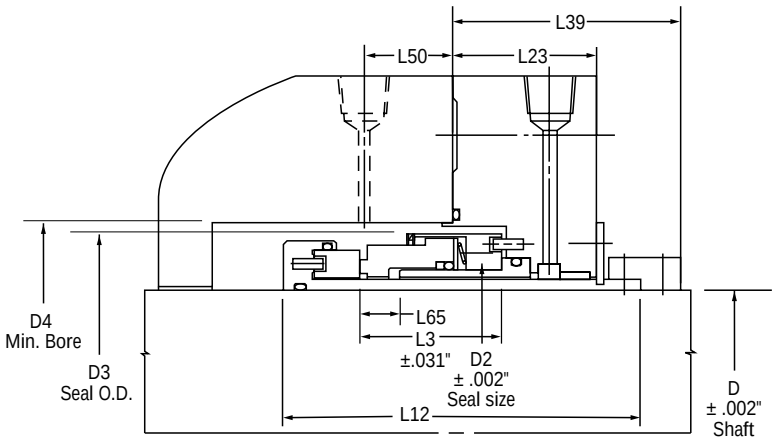
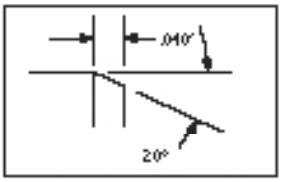
Typical Arrangement/Dimensional Data





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

Chart 1. Type 8B1RS Dimensional Data (Inches)

Shaft Size	D	D2	D3	D4	L3	L12	L23	L39	L50	L65
1.000	1.000	1.500	2.125	2.625	1.437	4.281	1.937	3.062	1.687	.343
1.125	1.125	1.625	2.375	2.875	1.750	4.593	1.937	3.062	2.000	.437
1.250	1.250	1.750	2.500	3.000	1.750	4.593	1.937	3.062	2.000	.437
1.375	1.375	1.875	2.625	3.125	1.750	4.718	1.937	3.062	2.125	.437
1.500	1.500	2.000	2.750	3.250	1.750	4.718	1.937	3.062	2.125	.437
1.625	1.625	2.125	3.000	3.500	2.062	5.031	1.937	3.062	2.437	.500
1.750	1.750	2.250	3.125	3.625	2.062	5.031	1.937	3.062	2.437	.500
1.875	1.875	2.375	3.250	3.750	2.062	5.156	1.937	3.062	2.562	.500
2.000	2.000	2.500	3.375	3.875	2.062	5.156	1.937	3.062	2.562	.500
2.125	2.125	2.625	3.500	4.000	2.062	5.156	1.937	3.062	2.562	.500
2.250	2.250	2.750	3.625	4.125	2.062	5.156	1.937	3.062	2.562	.500
2.375	2.375	2.875	3.750	4.250	2.062	5.281	1.937	3.062	2.687	.500
2.500	2.500	3.000	3.812	4.312	2.062	5.281	1.937	3.062	2.687	.500
2.625	2.625	3.125	3.937	4.437	2.062	5.281	1.937	3.062	2.687	.562
2.750	2.750	3.250	4.125	4.625	2.062	5.281	1.937	3.062	2.687	.562
2.875	2.875	3.375	4.375	4.875	2.062	5.593	2.125	3.250	2.812	.562
3.000	3.000	3.500	4.500	5.000	2.062	5.593	2.125	3.250	2.812	.562
3.125	3.125	3.625	4.625	5.125	2.062	5.593	2.125	3.250	2.812	.562
3.250	3.250	3.750	4.750	5.250	2.062	5.593	2.125	3.250	2.812	.562
3.375	3.375	3.875	4.875	5.375	2.062	5.593	2.125	3.250	2.812	.562
3.500	3.500	4.000	5.000	5.500	2.062	5.593	2.125	3.250	2.812	.562
3.625	3.625	4.125	5.250	5.750	2.062	5.593	2.125	3.250	2.812	.562
3.750	3.750	4.250	5.250	5.750	2.062	5.593	2.125	3.250	2.812	.562
3.875	3.875	4.375	5.375	5.875	2.062	5.593	2.125	3.250	2.812	.562
4.000	4.000	4.500	5.625	6.125	2.062	5.593	2.125	3.250	2.812	.625
4.125	4.125	4.625	5.750	6.250	2.062	5.593	2.125	3.250	2.812	.625
4.250	4.250	4.750	5.875	6.375	2.062	5.593	2.125	3.250	2.812	.625
4.375	4.375	4.875	6.000	6.500	2.062	5.593	2.125	3.250	2.812	.625
4.500	4.500	5.000	6.125	6.625	2.062	5.593	2.125	3.250	2.812	.625
4.625	4.625	5.125	6.250	6.750	2.375	5.906	2.125	3.250	3.125	.625
4.750	4.750	5.250	6.375	6.875	2.375	5.906	2.125	3.250	3.125	.625
4.875	4.875	5.375	6.750	7.250	2.375	5.906	2.125	3.250	3.125	.625
5.000	5.000	5.500	6.875	7.375	2.375	5.906	2.125	3.250	3.125	.625
5.125	5.125	5.625	7.000	7.500	2.375	5.906	2.125	3.250	3.125	.625
5.250	5.250	5.750	7.125	7.625	2.375	5.906	2.125	3.250	3.125	.625
5.375	5.375	5.875	7.250	7.750	2.375	5.906	2.125	3.250	3.125	.625
5.500	5.500	6.000	7.375	7.875	2.375	5.906	2.125	3.250	3.125	.625
5.625	5.625	6.125	7.500	8.000	2.375	5.906	2.125	3.250	3.125	.625
5.750	5.750	6.250	7.625	8.125	2.375	5.906	2.125	3.250	3.125	.625
5.875	5.875	6.375	7.750	8.250	2.375	5.906	2.125	3.250	3.125	.625
6.000	6.000	6.500	7.875	8.375	2.375	5.906	2.125	3.250	3.125	.625

Type 8B1RS
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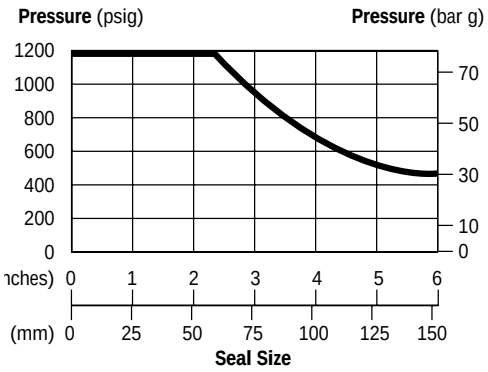
Chart 2. Operating Limits

Seal Type	Pressure Limits		Temperature	Speed
	Operating	Static Test		
Type 8B1RS	Reference Chart 3	Reference Chart 8	Reference Chart 5	51 m/s 10,000 fpm

Note: For application with speeds less than 5,000 fpm, a standard arrangement is recommended.

Chart 3 Pressure/Velocity (PV) Limits



determine the maximum pressure for the size of Type 8B1RS seal required, ultiply the maximum pressure by the factors in Chart 4 to obtain the aximum operating pressure.

Chart 4. Multiplier Factors

	Selection Considerations	Multiplier
Speed	1800 rpm Other speeds	x 1.00 **
Sealed Fluid Lubricity	Gasoline, Kerosene or better Aqueous Solutions, Light Hydrocarbons (Specific Gravity ≤.65)	x 1.00 x .60
Sealed Fluid Temperature	Below 79° C/175° F Above 79° C to 121°C/175° F to 250° F Above 121° C to 177°C/250° F to 350°F Above 177°C/350° F	x 1.00 x .90 x .80 x .65

** Multiplier = 1800/new speed
Example: If new Speed = 2700 rpm
Multiplier = 1800/2700 = .67

Example for Determining PV Limits:

Seal: 51 mm/2" diameter Type 8B1RS

Product: Light hydrocarbon

Temperature: 40°C/100°F

Speed: 1200 rpm

Face materials: Carbon vs. Tungsten Carbide

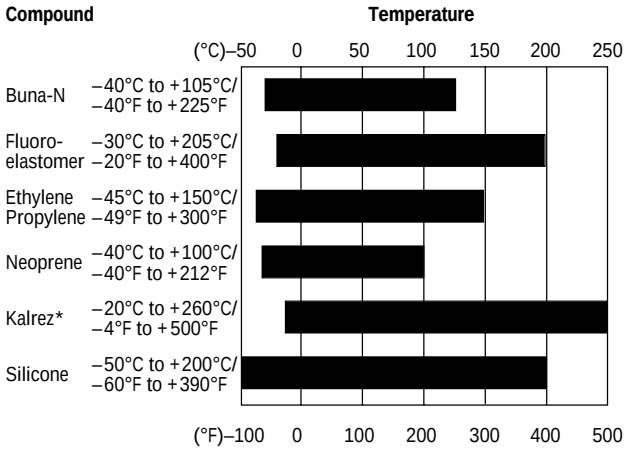
Using Chart 3 the maximum pressure would be 83 bar g/1200 psig.

From the table of multipliers (Chart 4), apply the multipliers for the specific service requirements to determine the maximum operating pressure for the application.

83 bar g x 1 x .6 x 1.5 = 74 bar g/1080 psig

At 1200 rpm with the service conditions noted, a 2" diameter Type 8B1RS Seal has a maximum operating limit of 74 bar g/1080 psig .

Chart 5. Elastomer Temperature Limits



*Kalrez is a registered trademark of Du Pont.

Type 8B1RS
Elastomer O-Ring Cartridge Seal

Chart 6. Material Identification Code

		1st Symbol		2nd Symbol		3rd Symbol		4th Symbol	5th Symbol	
Seal Component Materials		**Secondary Sealing Element** O-Ring / Secondary Sealing Element for Mating Rings		**Primary Ring**		**Hardware** Retainer, Disc, Snap Ring, Set Screw		**Mating Ring**	**Mechanical Loading Device** Springs	
Materials	**Standard**	**Buna-N**	B	**Carbon** Hot Water	F_{10}	**316 Stainless Steel**	1	**See Bulletin S-2051 for Mating Ring Configuration and Material Selection**	**316 Stainless Steel**	1
		Fluoroelastomer	X	**Carbon** Chromate Resistant	P_{66}					
		Ethylene Propylene	0_{28}	**Carbon** General Service	F_{51}					
		Neoprene	N							
		Kalrez	X_5							
		Silicone	J							
	Options	**Ethylene Propylene** Radiation Resistant	O_{40}	**Carbon** Nuclear Service	F_5	**Monel**	M		**Monel**	M
				Carbon FDA Approved Food Service	F_6	**20 CB-3 SS** Alloy 20	1		**20 CB-3 SS** Alloy 20	1
		Buna-N FDA Approved	B_{33}	**Siliconized Graphite**	P_{90}	**Hastelloy B***	H		**Hastelloy B**	H
		Fluoroelastomer FDA Approved	X_4	**Tungsten Carbide**	O_{15}	**Alloy C-276** (UNS N10276)	H		**Alloy C-276** (UNS N10276)	
		Ethylene Propylene FDA Approved`	O_{54}	**Solid Silicon Carbide** General Service	O_8					
		Neoprene FDA Approved	N_{26}	**Solid Silicon Carbide** Chemical Service	O_{58}					

* Hastelloy is a registered trademark of Haynes Int'l.

Sample Code Number–$BF_{51}1$–1

B	**F_{51}**	**1**	**–**	**1**
1st Symbol	2nd Symbol	3rd Symbol	4th Symbol	5th Symbol
Secondary Sealing Element	Primary Ring	Hardware	Mating Ring	Mechanical Loading Device
Buna-N	Carbon	316 Stainless Steel	Mating Ring*	316 Stainless Steel

*A dash (–) is placed to indicate that the mating ring is not part of this assembly material code.

Type 8B1RS
Elastomer O-Ring Cartridge Seal

Chart 7. Criteria for Installation

Shaft/Sleeve	Limits
Surface Finish	25 to 32 Ra
Ovality/Out of Roundness (Shaft)	.051 mm/.002"
End Play/Axial Float Allowance	.13 mm/± .005"

Chart 8. Hydrostatic Pressure Limits