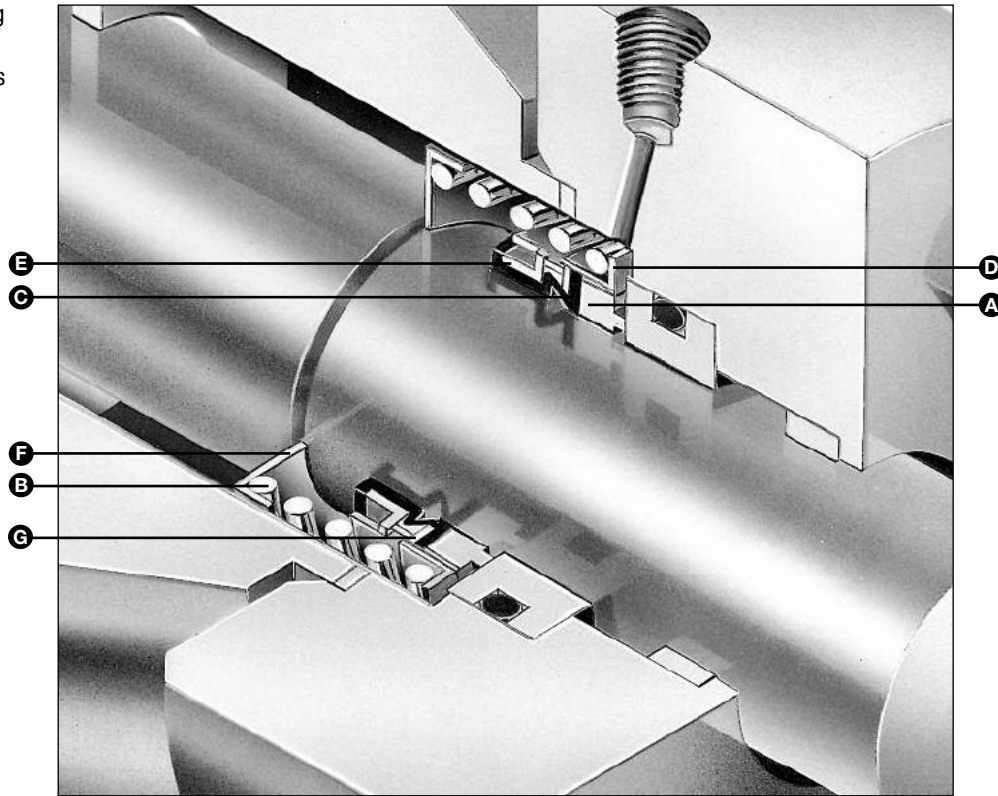


TYPE 2/2B

ELASTOMER BELLOWS SEALS

Technical Specification

- A – Face/Primary Ring
- B – Spring
- C – Elastomer Bellows
- D – Retainer
- E – Drive Band
- F – Spring Holder
- G – Disc



Product Description

John Crane Type 2 Elastomer Bellows Seals are specified in more original equipment than any other seal from any other manufacturer. With the highest success rate of any seal of their type, they are suitable for a wide range of service conditions, including water, refrigeration, oils and chemicals.

- Type 2B is a balanced seal used in higher pressure applications, offering greater operating speeds and reduced face wear
- Fits equipment with confined space requirements and limited seal chamber depths in pumps, mixers, blenders, agitators, compressors and other rotary shaft equipment
- For pulp and paper, food processing, water, wastewater, refrigeration, chemical processing and other demanding applications

Performance Capabilities

- Temperature: -40°C to 205°C/-40°F to 400°F (depending on materials used)
- Pressure: 2: up to 29 bar g/425 psig
2B: up to 83 bar g/1200 psig
- Speed: see enclosed speed limits chart.

Design Features

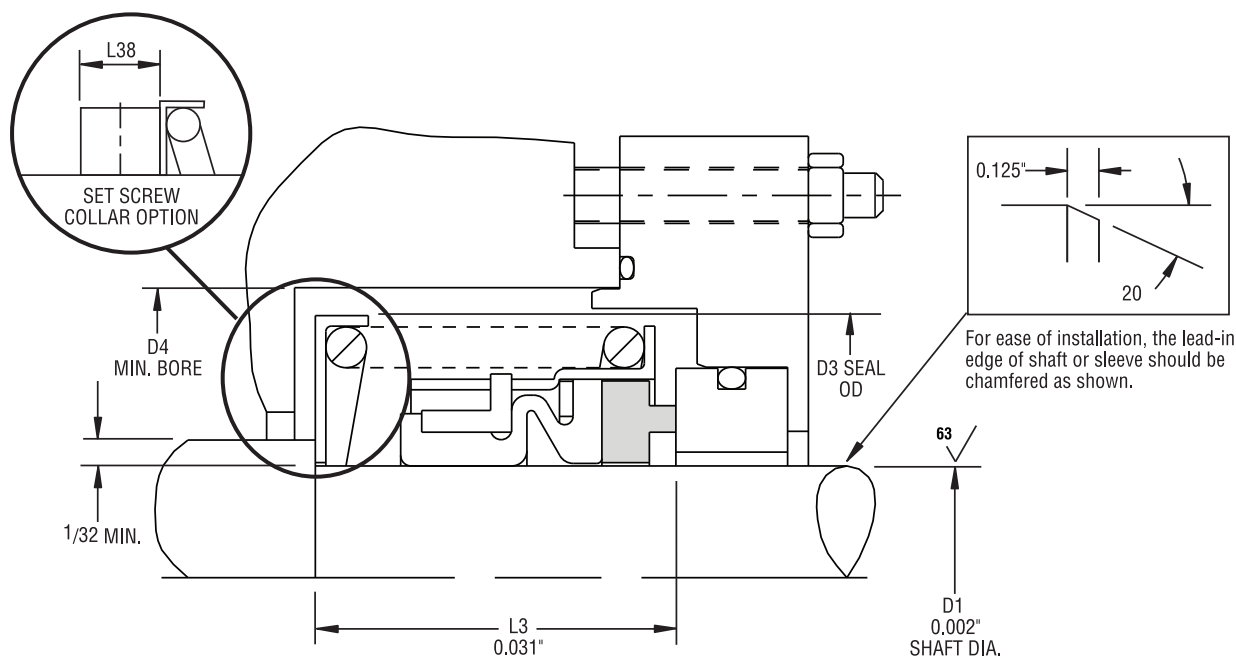
- Mechanical drive - Eliminates overstressing of the elastomer bellows
- Self-aligning capability - Automatic adjustment compensates for abnormal shaft end play runout, primary ring wear and equipment tolerances
- Special balancing - Allows operation at higher pressures
- Non-clogging, single-coil spring - Not affected by buildup of solids

TYPE 2/2B

ELASTOMER BELLOWS SEALS

Technical Specification

Type 2 Typical Arrangement



Type 2 Dimensional Data (inches)

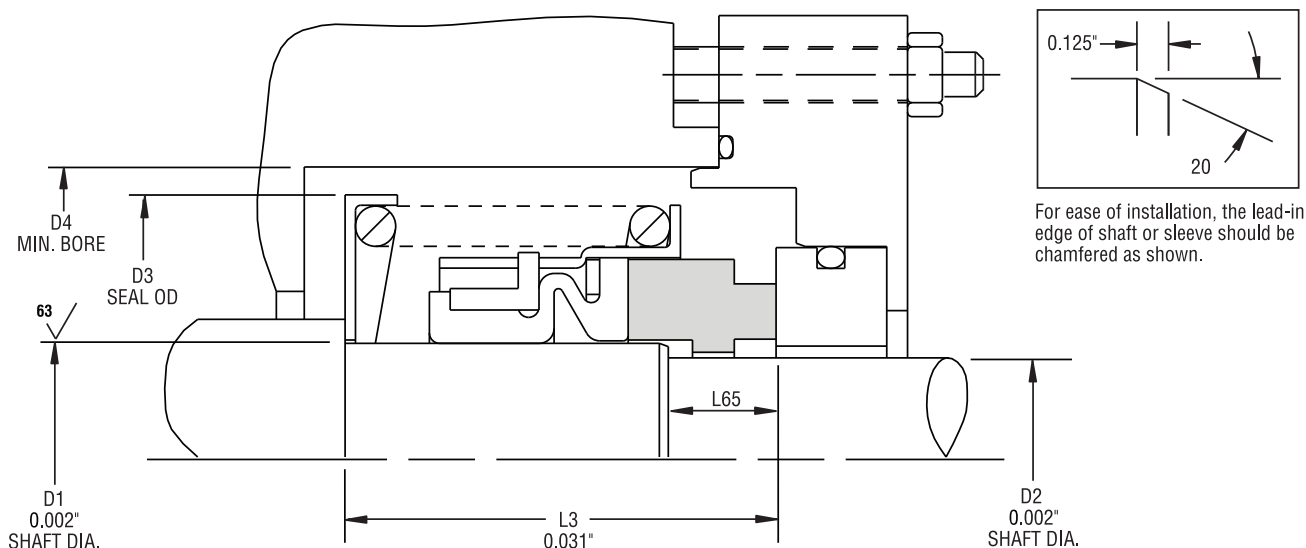
Seal Size/D1 (inches)	D3	D4	L3	L38
1.000	1.812	2.000	1.000	0.375
1.125	1.937	2.125	1.062	0.375
1.250	2.062	2.250	1.062	0.375
1.375	2.250	2.437	1.125	0.375
1.500	2.375	2.562	1.125	0.375
1.625	2.718	2.937	1.375	0.375
1.750	2.750	3.062	1.375	0.375
1.875	2.875	3.187	1.500	0.375
2.000	3.000	3.312	1.500	0.375
2.125	3.250	3.625	1.687	0.500
2.250	3.375	3.750	1.687	0.500
2.375	3.500	3.875	1.812	0.500
2.500	3.625	4.000	1.812	0.500
2.625	3.875	4.312	1.937	0.500
2.750	4.000	4.437	1.937	0.500
2.875	4.125	4.562	2.062	0.500
3.000	4.250	4.687	2.062	0.500
3.125	4.562	5.000	2.187	0.500
3.250	4.687	5.125	2.187	0.500
3.375	4.812	5.250	2.187	0.500
3.500	4.937	5.500	2.187	0.500
3.625	5.125	5.687	2.312	0.562
3.750	5.250	5.812	2.312	0.562
3.875	5.437	6.000	2.312	0.562
4.000	5.562	6.125	2.312	0.562

TYPE 2/2B

ELASTOMER BELLOWS SEALS

Technical Specification

Type 2B Typical Arrangement/Dimensional Data



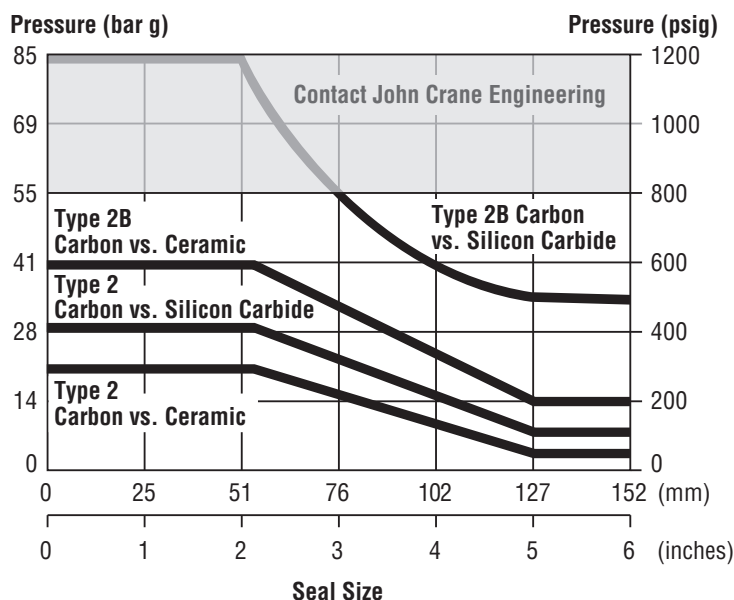
Type 2B Dimensional Data (inches)

Seal Size/D1 (inches)	D2	D3	D4	L3	L65
1.000	0.875	1.812	2.000	1.312	0.343
1.125	1.000	1.937	2.125	1.375	0.343
1.250	1.125	2.062	2.250	1.375	0.343
1.375	1.250	2.250	2.437	1.437	0.343
1.500	1.375	2.375	2.562	1.437	0.343
1.625	1.500	2.718	2.937	1.750	0.437
1.750	1.625	2.750	3.062	1.750	0.437
1.875	1.750	2.875	3.187	1.875	0.437
2.000	1.875	3.000	3.312	1.875	0.437
2.125	2.000	3.250	3.625	2.062	0.500
2.250	2.125	3.375	3.750	2.062	0.500
2.375	2.250	3.500	3.875	2.187	0.500
2.500	2.375	3.625	4.000	2.187	0.500
2.625	2.500	3.875	4.312	2.312	0.562
2.750	2.625	4.000	4.437	2.312	0.562
2.875	2.750	4.125	4.562	2.437	0.562
3.000	2.875	4.250	4.687	2.437	0.562
3.125	2.875	4.562	5.000	2.562	0.625
3.250	3.000	4.687	5.125	2.562	0.625
3.375	3.125	4.812	5.250	2.562	0.625
3.500	3.250	4.937	5.500	2.562	0.625
3.625	3.375	5.125	5.687	2.687	0.625
3.750	3.500	5.250	5.812	2.687	0.625
3.875	3.625	5.437	6.000	2.812	0.625
4.000	3.750	5.562	6.125	2.812	0.625

TYPE 2/2B

ELASTOMER BELLOWS SEALS

Basic Pressure Rating



To determine the maximum pressure for the Type 2 or 2B required, multiply the maximum pressure by the multiplier factors to obtain the maximum operating pressure.

The basic pressure rating is based on a standard type 2 or type 2b seal installed according to the criteria given in this data sheet and according to generally accepted industrial practices. The basic pressure rating assumes stable operation at 1800 rpm in a clean, cool, lubricating, non-volatile liquid, with an adequate flush rate. When used with the multiplier factors, the basic pressure rating can provide a conservative estimate of the dynamic pressure rating.

Contact John Crane for process services outside this range and with more detailed application information in order to obtain the actual dynamic pressure rating.

Multiplier Factors

	Selection Considerations	Multiplier Factor
Speed	1800 rpm Above 1800 rpm	x 1.00 *
Sealed Fluid Lubricity	Petrol/Gasoline, Kerosene, or Better Water and Aqueous Solutions Flashing Hydrocarbons** (Specific Gravity <0.65)	x 1.00 x 0.75 x 0.60
Sealed Fluid Temperature (for carbon only)	Below 79°C/175°F From 79°C to 121°C/175°F to 250°F From 121°C to 177°C/250°F to 350°F Above 177°C/350°F	x 1.00 x 0.90 x 0.80 x 0.65

* Multiplier = 1800/new speed Example: If new speed = 2700 rpm
Multiplier = 1800/2700 = 0.67

** 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: 76mm/3" diameter Type 2B

Product: water

Face material: carbon vs. silicon carbide

Temperature: 16°C/60°F

Shaft speed: 1800 rpm

Using the basic pressure rating chart, the maximum pressure would be 55 bar g/800 psig.

From the multiplier factors chart, apply the multipliers for the specific service requirements to determine the maximum dynamic pressure rating for the application.

$$55 \text{ bar g/800 psig} \times 1 \times 0.75 \times 1 \\ = 41 \text{ bar g/600 psig}$$

At 1800 rpm with the service conditions noted, a 76mm/3" diameter Type 2B seal has a dynamic pressure rating of 41 bar g/600 psig. If operating pressure exceeds this dynamic rating, consult your John Crane representative.

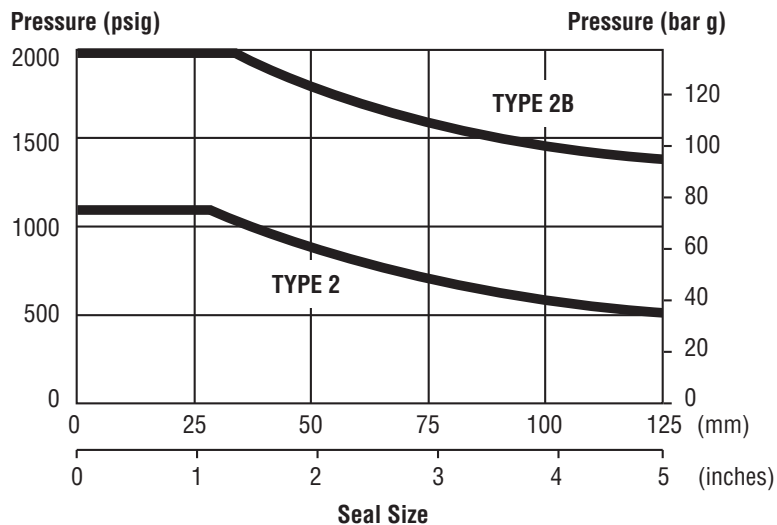
TYPE 2/2B

ELASTOMER BELLOWS SEALS

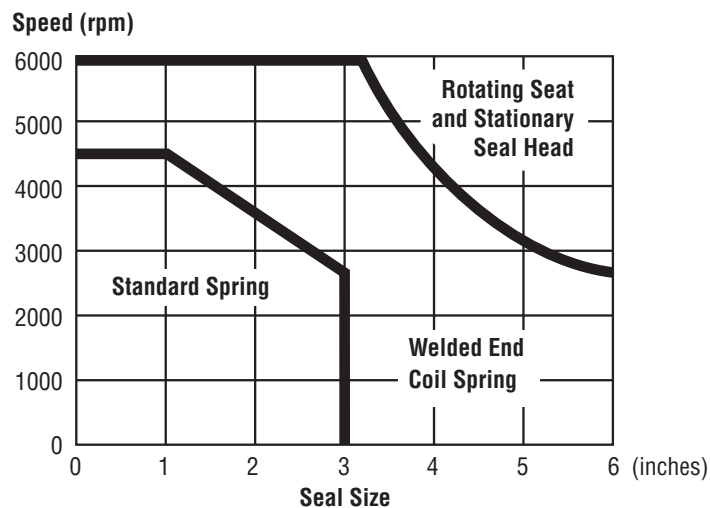
Breakout (Starting) Torque Consumption for Seal

For starting torque power consumption, consult John Crane.

Hydrostatic Pressure Limits



Speed Limits for Coil Springs



Criteria for Installation

Shaft/Sleeve	Limits
Surface Finish	1.00" to 3.125" dia. / 63 Ra 3.125" dia. and up / 32 Ra
Ovality/Out of Roundness (Shaft)	0.051mm/0.002"
End Play/Axial Float Allowance	±0.13mm/0.005"

TYPE 2/2B

ELASTOMER BELLOWS SEALS

Materials of Construction

SEAL COMPONENTS	MATERIALS	
Description	Standard	Options
Face/Primary Ring	Carbon	Antimony-Impregnated Carbon Tungsten Carbide Silicon Carbide
Retainer Drive Band Disc Spring Holder	18-8 Stainless Steel	Monel® Alloy 20 CB-3 Stainless Steel 316 Stainless Steel
Bellows	Buna-N	Aflas® Fluoroelastomer Ethylene Propylene Neoprene® (Chloroprene)
Springs	18-8 Stainless Steel	Monel Alloy 20 CB-3 Stainless Steel 316 Stainless Steel

Application Criteria

Type 2/2B elastomer bellows seals can be customized for specific installations after review and evaluation by John Crane. The following data is needed to evaluate the proposed service:

- Make and model of equipment
- Shaft or sleeve outside diameter (OD)
- Direction of shaft rotation
viewed from drive end
- Seal cavity dimensions
- Speed
- Process fluid
 - Specific gravity
 - Box pressure
 - Vapor pressure
 - Temperature
 - Viscosity



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