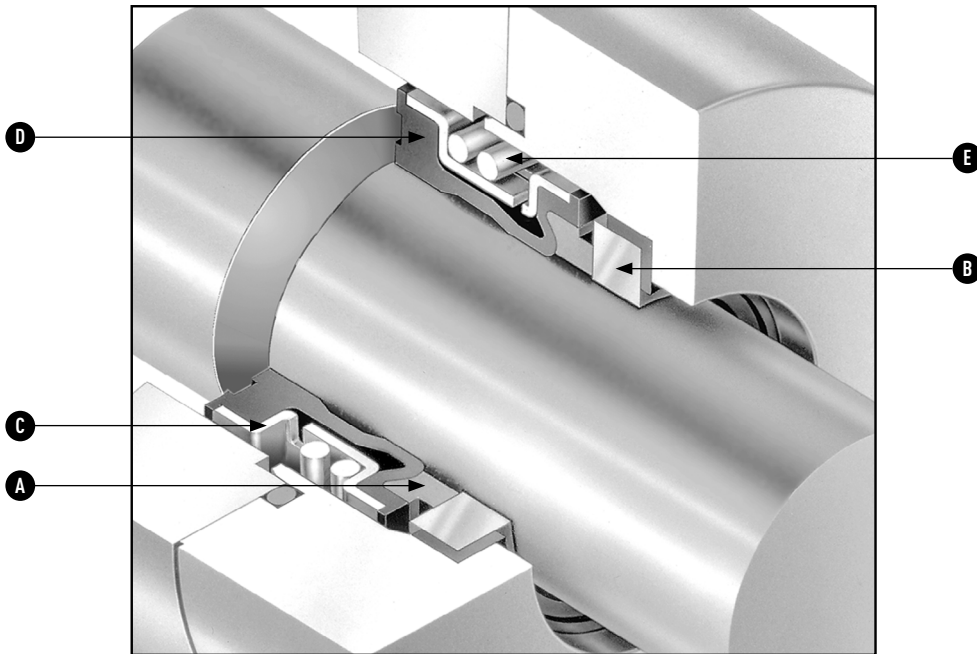


# TYPE 2100

## ELASTOMER BELLOWS UNITIZED SEAL

Technical Specification

- A – Face/primary ring
- B – Seat/mating ring
- C – Drive band
- D – Bellows
- E – Spring



### Product description

The Type 2100 is a compact, unitized, single spring, elastomer bellows mechanical seal.

- For centrifugal, rotary, and turbine pumps, compressors, blenders, chillers, and other rotary equipment
- For many water-based applications, such as wastewater treatment, pulp and paper, food processing, marine, and other general applications

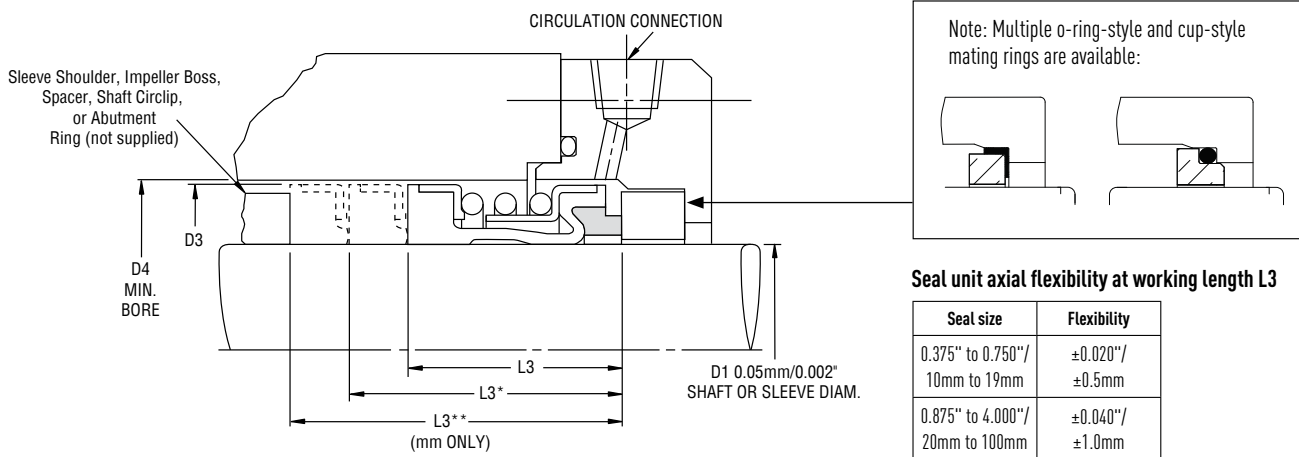
### Design features

- Unitized, easy-to-fit design
- Bellows design is pressure supported and eliminates creases or folds
- Compact design fits DIN 24960, ISO 3069, and ANSI B73.1 M-1991
- Positive key drive via drive bands protects bellows from torsional strain

### Performance capabilities

- Temperature: -40°F to 300°F/-40°C to 150°C (depending on materials used)
- Pressure: up to 290 psi(g)/20 bar(g) (depending on multiplier factors and size)
- Speed: up to 5000 rpm (depending on size)

### Type 2100 typical arrangement/dimensional data



Note: Equipment axial displacement must occur within these limits.

### Type 2100 dimensional data (inches)

Seal size/D1 (inches)	Seal size code	D3	D4	L3	L3*
0.375	0095	0.787	0.866	0.591	—
0.500	0127	0.945	1.024	0.591	0.812
0.625	0158	1.024	1.102	0.591	0.875
0.750	0190	1.260	1.339	0.787	0.875
0.875	0222	1.417	1.496	0.787	0.937
1.000	0254	1.535	1.614	0.787	1.000
1.125	0285	1.654	1.732	1.024	1.062
1.250	0317	1.811	1.890	1.024	1.062
1.375	0349	1.929	2.008	1.024	1.125
1.500	0381	2.126	2.283	1.181	1.125
1.625	0412	2.205	2.362	1.181	1.375
1.750	0444	2.402	2.559	1.181	1.375
1.875	0476	2.520	2.677	1.181	1.500
2.000	0508	2.598	2.756	1.181	1.500
2.125	0530	2.717	2.874	1.181	1.687
2.250	0571	3.031	3.189	1.299	1.687
2.375	0602	3.150	3.346	1.299	1.812
2.500	0635	3.268	3.465	1.299	1.812
2.750	0698	3.504	3.740	1.299	—
3.000	0762	3.898	4.094	1.575	—
3.250	0825	4.094	4.291	1.575	—
3.500	0889	4.409	4.606	1.575	—
3.750	0984	4.646	4.882	1.575	—

L3\* = Interchangeable with the Type 21 standard seal.

### Type 2100 dimensional data (mm)

Seal size/D1 (mm)	Seal size code	D3	D4	L3	L3*	L3**
10	0100	20	22	15	27.5	35.0
12	0120	22	24	15	26.05	34.0
14	0140	24	26	15	29.0	34.0
15	0150	25	27	15	29.0	34.0
16	0160	26	28	15	29.0	34.0
18	0180	32	34	20	31.5	39.0
20	0200	34	36	20	31.5	39.0
22	0220	36	38	20	31.5	39.0
24	0240	38	40	20	34.0	44.0
25	0250	39	41	20	34.0	44.0
28	0280	42	44	26	36.5	44.0
30	0300	44	46	26	35.5	43.0
32	0320	46	48	26	35.5	48.0
33	0330	47	49	26	35.5	48.0
35	0350	49	51	26	34.5	47.0
38	0380	54	58	30	37.0	47.0
40	0400	56	60	30	37.0	47.0
43	0430	59	63	30	37.0	52.0
45	0450	61	65	30	37.0	52.0
48	0480	64	68	30	35.0	50.0
50	0500	66	70	30	37.5	50.0
53	0530	69	73	30	37.5	60.0
55	0550	71	75	30	37.5	60.0
60	0600	80	85	33	40.5	58.0
63	0630	83	88	33	40.5	58.0
65	0650	85	90	33	40.5	68.0
70	0700	90	95	33	48.0	68.0
75	0750	99	104	40	48.0	68.0
80	0800	104	109	40	47.5	77.5
85	0850	109	114	40	47.5	77.5
90	0900	114	119	40	52.5	77.5
100	1000	124	129	40	52.5	77.5

L3= Standard seal working length.

L3\*= Working length for seals to DIN L1K (mating ring not included).

L3\*\*= Working length for seals to DIN L1N (mating ring not included).

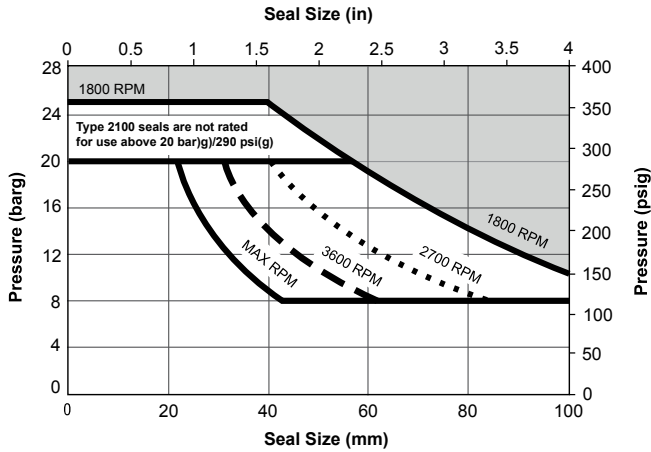


# TYPE 2100

## ELASTOMER BELLOWS UNITIZED SEAL

Technical Specification

### Basic pressure ratings



The basic pressure rating is for a standard 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 in a clean, cool, lubricating, non-volatile 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 accurate assessment of the dynamic pressure rating, contact John Crane for more information.

### Multiplier factors

	Selection considerations	Multiplier factor
Sealed fluid lubricity	Petrol/Gasoline, Kerosene, or Better	x 1.00
	Water and Aqueous Solutions† Flashing Hydrocarbons††	*
Face/primary ring & seat/mating ring materials	Carbon Graphite vs. Tungsten Carbide or Silicon Carbide†††	x 1.00
	Silicon Carbide vs. Silicon Carbide Standard Duty	x 0.85
	Commercial Duty	x 0.75
	Carbon Graphite vs Aluminum Oxide Ceramic	x 0.60
Sealed fluid temperature (for carbon only)	Up to 175°F/80°C	x 1.00
	From 175°F to 250°F/80°C to 120°C	x 0.90
	From 250°F to 300°F/120°C to 150°C	x 0.80

#### Example for Determining Pressure Rating Limits:

**Seal:** 1.750"/44.45mm diameter Type 2100

**Product:** Petrol/Gasoline

**Face materials:** Carbon graphite vs. silicon carbide

**Operating temperature:** 212°F/100°C

**Operating speed:** 2000 rpm

Using the basic pressure rating limits graph and interpolating between the lines for 1800 rpm and 2700 rpm, the maximum pressure would be 333 psi(g)/23 bar(g).

From the multiplier factors chart, apply the multiplier factors for the specific service requirements to determine the maximum operating pressure for the application:

$$333 \text{ psi(g)}/23 \text{ bar(g)} \times 1.00 \times 1.00 \times 0.90 = 300 \text{ psi(g)}/20.7 \text{ bar(g)}$$

Since the derated value of 300 psi(g)/20.7 bar(g) is greater than the recommended seal limits, the maximum operating pressure for this 1.750"/44.45mm Type 2100 seal is 290 psi(g)/20 bar(g).

\* For water duties, the temperature for fluorocarbon should not exceed 275°F/135°C; for water/steam duties, the ethylene propylene limit is 300°F/150°C.

† See multiplier factors for water and aqueous solutions graph.

†† 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.

††† Data only applicable to specialized grade of silicon carbide used with the Type 2100 seal.

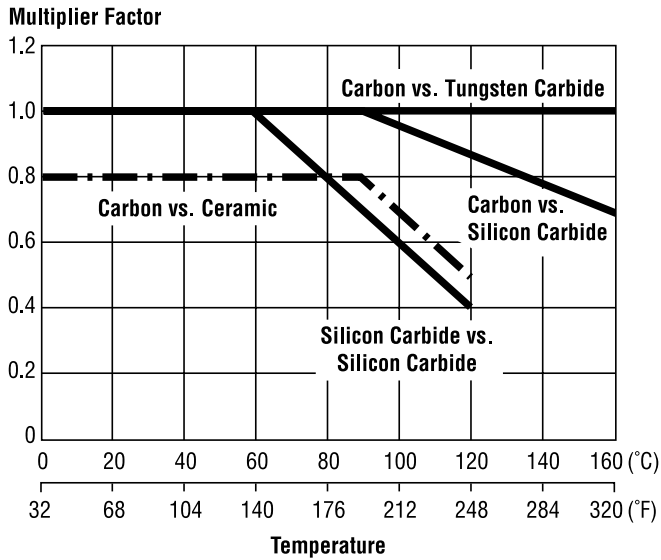


# TYPE 2100

## ELASTOMER BELLOWS UNITIZED SEAL

Technical Specification

### Multiplier factors for water and aqueous solutions



#### Example for determining pressure rating limits:

**Seal:** 3"/75mm Diameter Type 2100

**Product:** Water

**Face materials:** Silicon Carbide vs. Silicon Carbide

**Operating temperature:** 212°F/100°C

**Operating speed:** 1800 rpm

Using the basic pressure rating limits graph, the maximum pressure would be 217.5 psi(g)/15 bar(g).

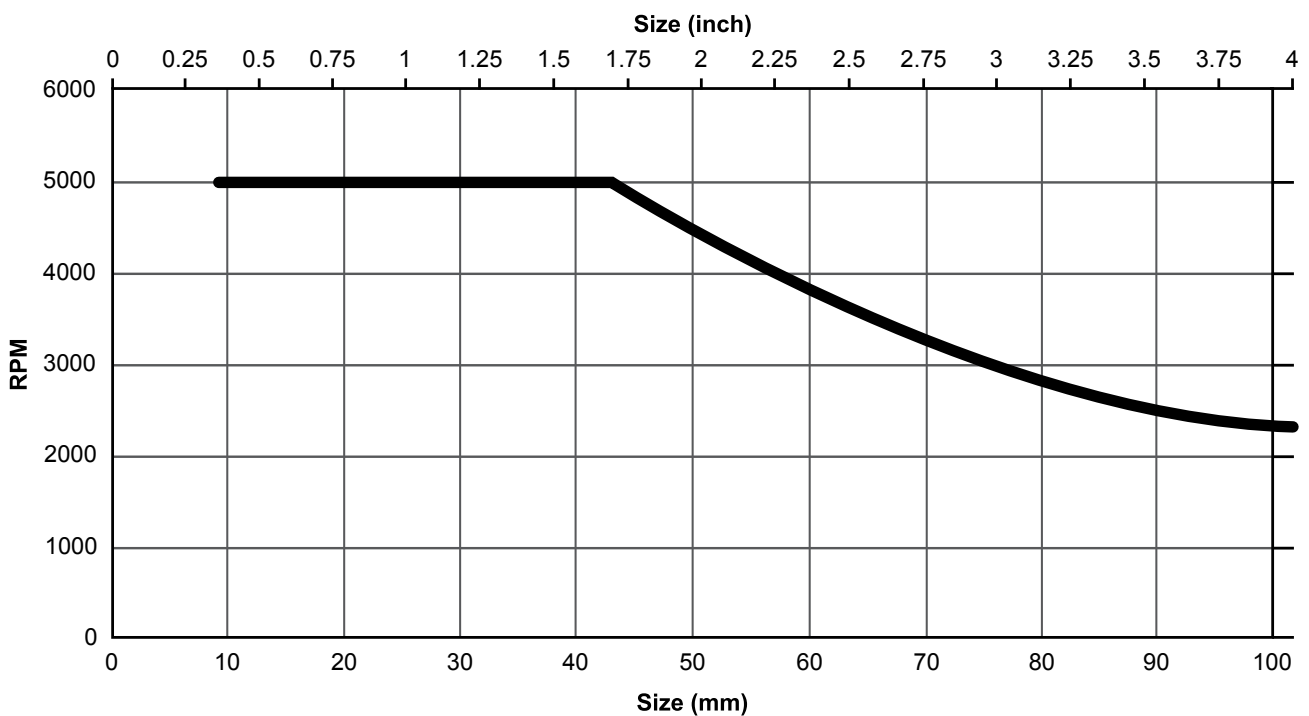
From the multiplier factors for water and aqueous solutions chart, apply the multiplier factors for the specific service requirements to determine the maximum operating pressure for the application:

$$217.5 \text{ psi(g)}/15 \text{ bar(g)} \times 0.60 = 130.5 \text{ psi(g)}/9 \text{ bar(g)}$$

The maximum operating pressure for this 3"/75mm Type 2100 seal is 130.5 psi(g)/9 bar(g).

### Speed - max RPM vs. size

#### Type 2100: Max RPM vs. Size



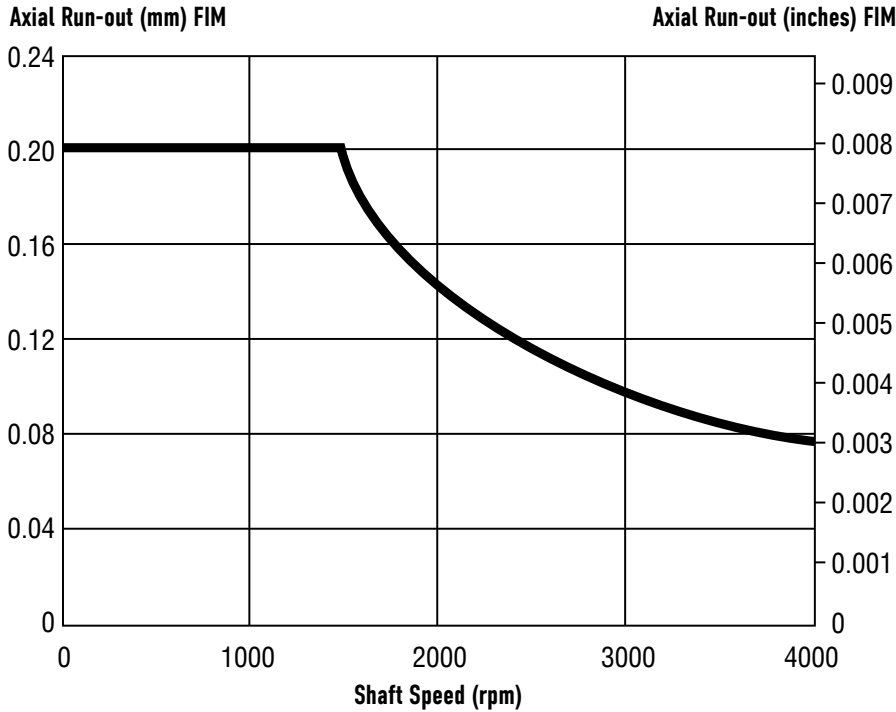


# TYPE 2100

## ELASTOMER BELLOWS UNITIZED SEAL

Technical Specification

### Housing squareness to shaft



The above specifications are given for general guidance only. If recommendations are required for a specific application, consult John Crane.

### Materials of construction

Seal components	Materials	
	Description	Options
Face/Primary Ring	Resin-Impregnated Carbon Graphite Sintered Silicon Carbide	Antimony-Loaded Carbon Graphite Tungsten Carbide
Bellows Cups O-ring	Nitrile/Buna-N Ethylene Propylene Fluorocarbon	HNBR GFLT
Drive Bands and Spring	316 Stainless Steel	—
Seat/Mating Ring	Aluminum Oxide (Ceramic) Sintered Silicon Carbide	John Crane Diamond



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