



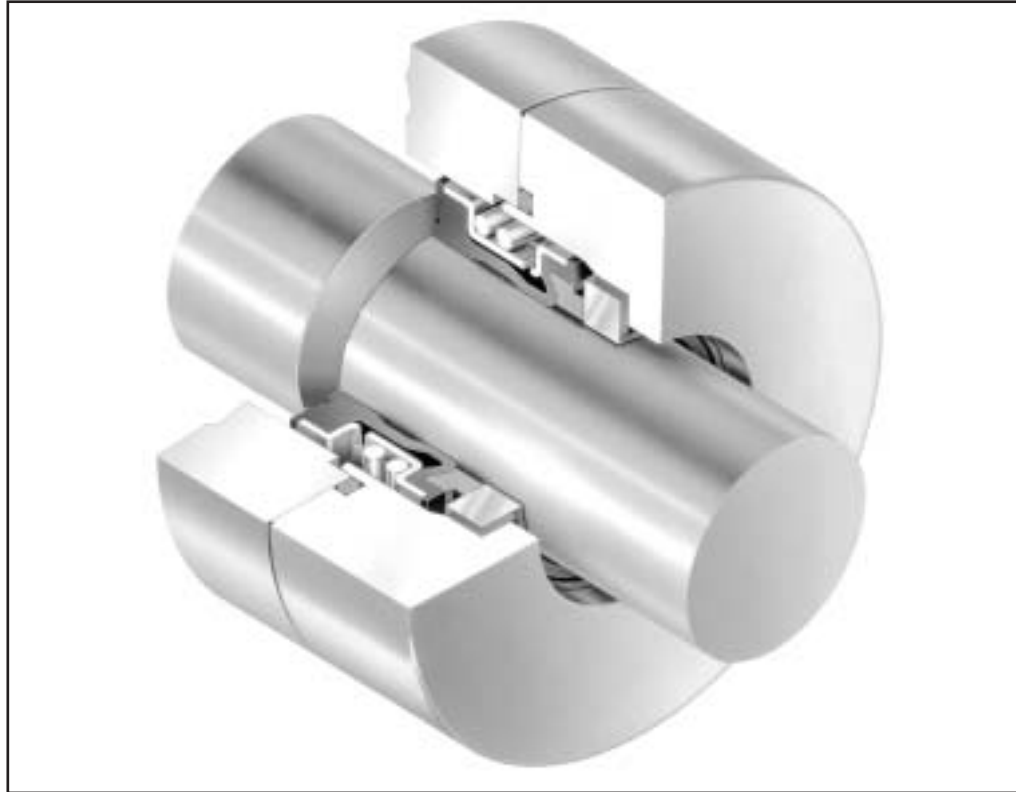
TYPE 2100

Elastomer Bellows Unitized Seal

TYPE 2100

Industries Served

Chemical Processing
Conveyor and Industrial Equipment
Cryogenics
Food Processing
Gas Compression
Industrial Blowers and Fans
Marine
Mixers and Agitators
Nuclear Service
Offshore
Oil and Refinery
Paint and Ink
Petrochemical Processing
Pharmaceutical
Pipeline
Power Generation
Pulp and Paper
Water Systems
Wastewater Treatment
Water Desalination



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.

Performance Capabilities

Temperature: -40°C to 150°C/
-40°F to 300°F
depending on materials used

Pressure: up to 20 bar g/290 psig

Speed: up to 15 m/s/3000 fpm

Design Features

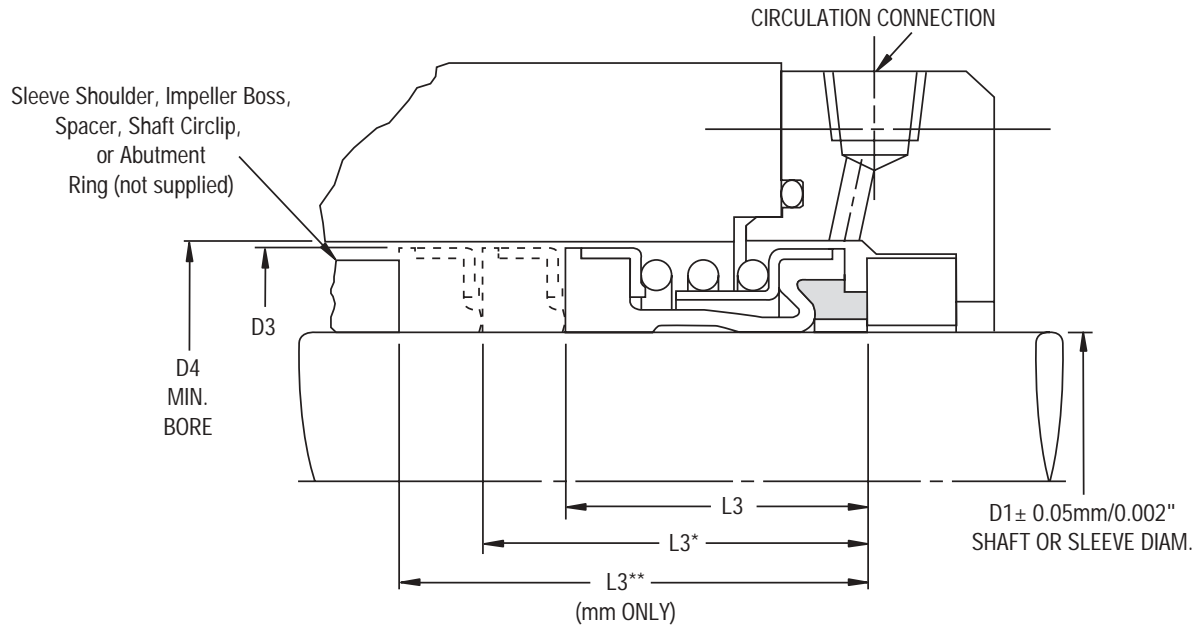
- Unitized, Easy-to-Fit Design.
- Bellows Design is Pressure Supported and Eliminates Creases or Folds.
- Compact Design Fits DIN 24960, ISO 3069, and ANSI B73.1 M-1991.
- Positive Key Drive via Drive Bands Protects Bellows from Torsional Strain.



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Type 2100 Typical Arrangement/Dimensional Data



Type 2100 Dimensional Data (inches)

Seal Size/D1 (inches)	D3	D4	L3	L3*
0.375	0.787	0.866	0.591	-
0.500	0.945	1.024	0.591	0.812
0.625	1.024	1.102	0.591	0.875
0.750	1.260	1.339	0.787	0.875
0.875	1.417	1.496	0.787	0.937
1.000	1.535	1.614	0.787	1.000
1.125	1.654	1.732	1.024	1.062
1.250	1.811	1.890	1.024	1.062
1.375	1.929	2.008	1.024	1.125
1.500	2.126	2.283	1.181	1.187
1.625	2.205	2.362	1.181	1.375
1.750	2.402	2.559	1.181	1.375
1.875	2.520	2.677	1.181	1.500
2.000	2.598	2.756	1.181	1.500
2.125	2.717	2.874	1.181	1.687
2.250	3.031	3.189	1.299	1.687
2.375	3.150	3.346	1.299	1.812
2.500	3.268	3.465	1.299	1.812
2.625	3.465	3.661	1.299	-
2.750	3.504	3.740	1.299	-
2.875	3.780	3.976	1.299	-
3.000	3.898	4.094	1.575	-

Note: For larger seal sizes, consult John Crane.

Seal Unit Axial Flexibility at Working Length L3

Seal Size	Flexibility
10 to 16mm/ 0.375 to 0.625"	±1.0mm/ ±0.040"
19 to 75mm/ 0.750 to 3.000"	±1.5mm/ ±0.060"

Note: Equipment axial displacement must occur within these limits.



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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	26.5	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
58	0580	78	83	33	42.5	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
68	0680	88	93	33	40.5	68.0
70	0700	90	95	33	48.0	68.0
75	0750	99	104	40	48.0	68.0

Note: For larger seal sizes, consult John Crane.

L3 = Standard seal working length.

L3* = Working length for seals to DIN LTK (seat not included).

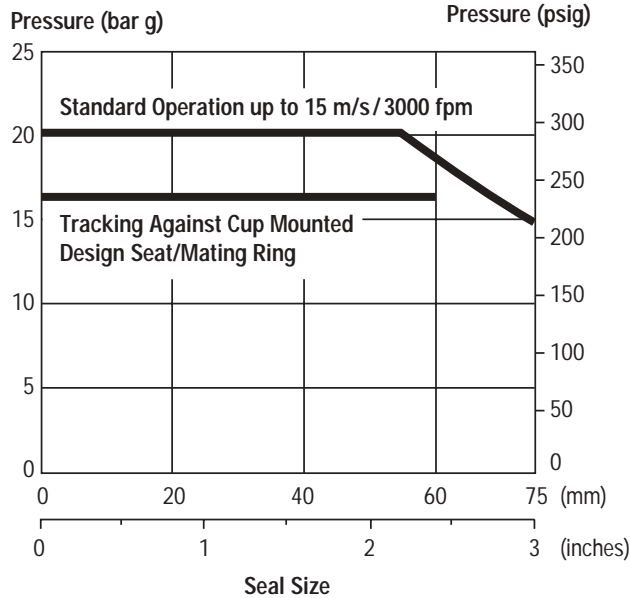
L3** = Working length for seals to DIN LTN (seat not included).



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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 at 3600 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 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 ^{††}	x 0.60
Face/Primary Ring & Seat/Mating Ring Materials	Carbon vs. Tungsten Carbide or Silicon Carbide ^{†††}	x 1.00
	Silicon Carbide vs. Silicon Carbide	x 0.75
	Carbon Graphite vs. Aluminum Oxide Ceramic	x 0.60
Sealed Fluid Temperature (for carbon only)	Up to 80°C/175°F	x 1.00
	From 80°C to 120°C/175°F to 250°F	x 0.90
	From 120°C to 150°C/250°F to 300°F	x 0.80
Speed	Up to 1800 rpm	x 1.00
	From 1800 to 3600 rpm	x 0.85

Example for Determining Pressure Rating Limits:

Seal: 50.8mm/2" Diameter Type 2100

Product: Petrol/Gasoline

Face Materials: Carbon Graphite vs. Aluminum Oxide Ceramic

Operating Temperature: 65°C/150°F

Operating Speed: 1800 rpm

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

† 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.

Using the Basic Pressure Rating Limits graph, the maximum pressure would be 20 bar g/290 psig.

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

$$20 \text{ bar g/290 psig} \times 1.00 \times 0.60 \times 1.00 \times 1.00 = 12 \text{ bar g/174 psig}$$

The maximum operating pressure for this 0.8mm/2" Type 2100 seal is 12 bar g/174 psig.

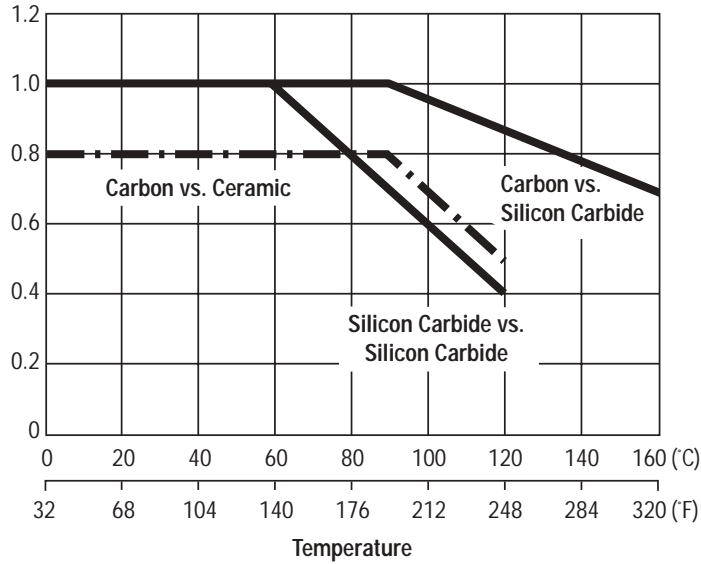


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Multiplier Factors for Water and Aqueous Solutions

Multiplier Factor



Example for Determining Pressure Rating Limits:

Seal: 75mm/3" Diameter Type 2100

Product: Water

Face Materials: Silicon Carbide vs. Silicon Carbide

Operating Temperature: 100°C/212°F

Operating Speed: 3600 rpm

Using the Pressure Rating Limits graph, the maximum pressure would be 14 bar g/203 psig.

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:

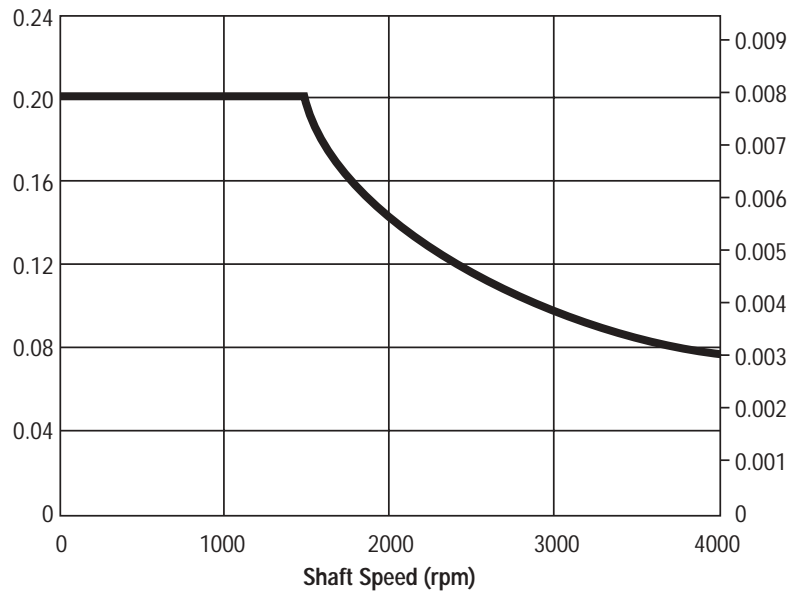
$$14 \text{ bar g/203 psig} \times 0.60 \times 1.00 = 8.4 \text{ bar g/122 psig}$$

The maximum operating pressure for this 75mm/3" Type 2100 seal is 8.4 bar g/122 psig.

Housing Squareness to Shaft

Axial Run-out (mm) FIM

Axial Run-out (inches) FIM



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



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Materials of Construction

SEAL COMPONENTS Description	MATERIALS	
	Standard	Options
Face/Primary Ring	Resin-Impregnated Carbon Graphite Sintered Silicon Carbide	Antimony-Loaded Carbon Graphite
Bellows	Nitrile/Buna-N Ethylene Propylene Fluorocarbon	-
Drive Bands and Spring	316 Stainless Steel	-



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

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