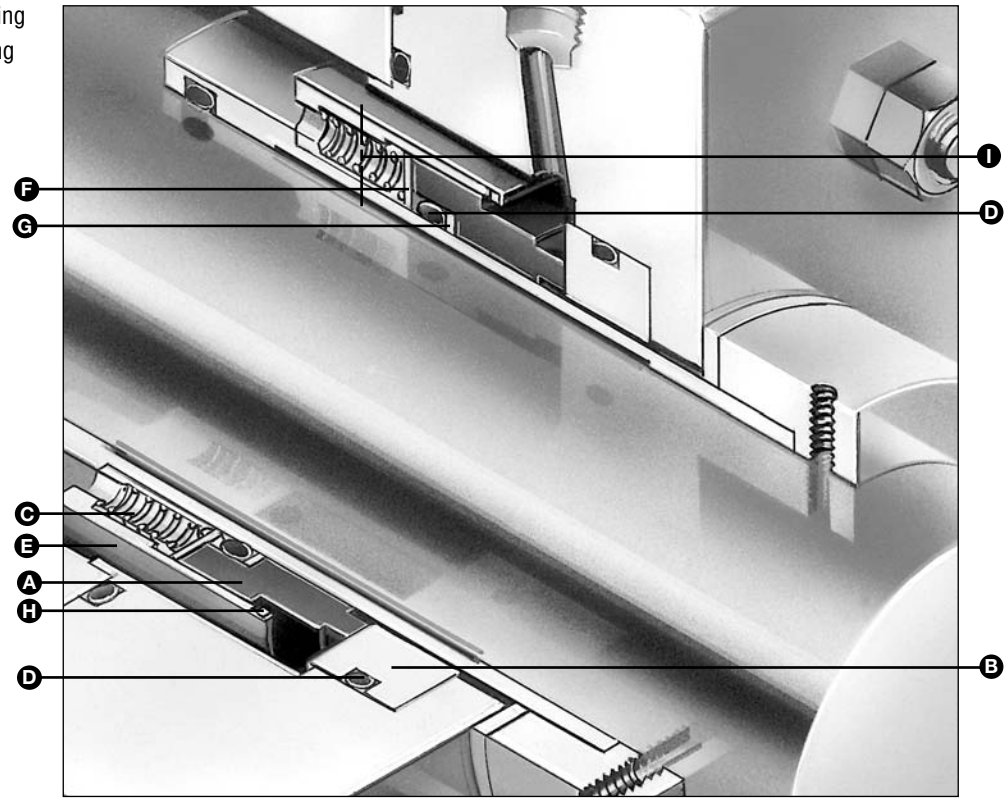
TYPE 8-1/8-1T

Elastomer O-Ring Seals

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



Product Description

Rugged Type 8-1/8-1T 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 chemical processing, food and beverage, petrochemical processing, pharmaceutical, pipeline, power generation and pulp and paper.
- Compact design permits use in all types of rotating equipment centrifugal pumps, mixers and agitators.
- 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.

Performance Capabilities

- Temperature:
  -40°C to 260°C/-40°F to 500°F
  (depending on materials used)
- Pressure:
  Type 8-1 22.5 bar g/325 psig
  Type 8-1T 13.8 bar g/200 psig
- Speed:
  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.

Design Features

- O-Ring Design.
- Positive Mechanical Drive Design Eliminates Slippage.
- Multiple Springs Provide Precise Face Loading.
- Full (8-1) and Narrow (8-1T) Cross-section Designs.

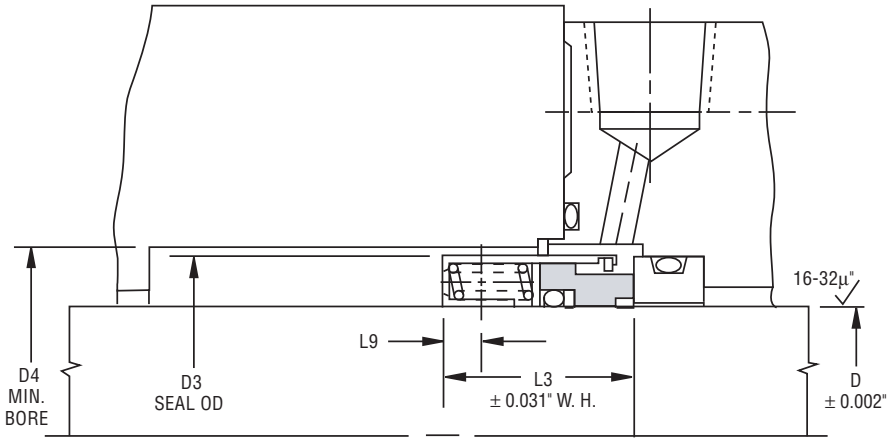
Typical Applications

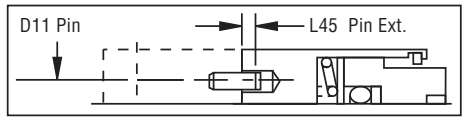
- Chemicals
- Caustics
- Acids
- Aqueous solutions
- Crystallizing fluids
- Lubricating liquid
- Hydrocarbons
- Solvents

TYPE 8-1/8-1T

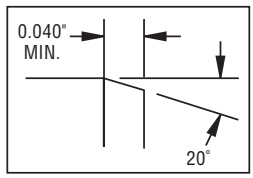
Elastomer O-Ring Seals

Type 8-1 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 8-1 Seals only.



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

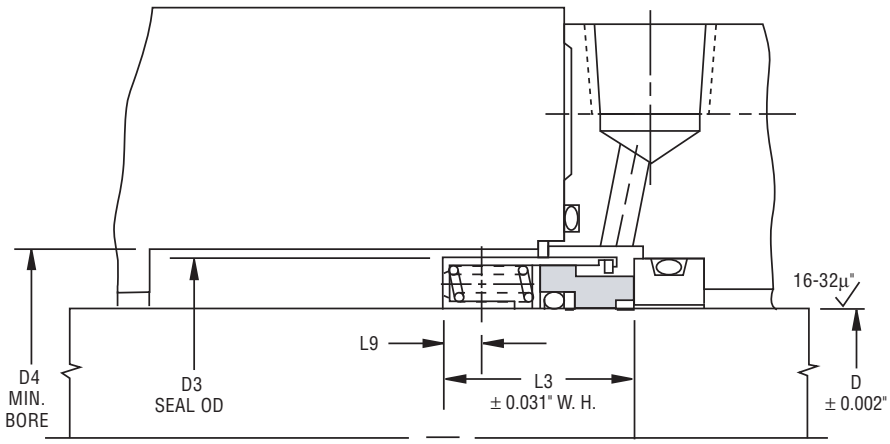
Type 8-1 Dimensional Data (inches)

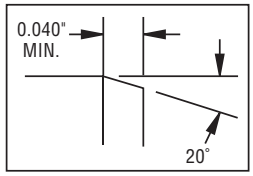
Seal Size/D (inches)	D3	D4	D11	D12	Working Height L3	L9	L45	N
0.500	1.031	1.156	—	—	0.812	0.156	—	—
0.625	1.187	1.312	—	—	0.750	0.156	—	—
0.750	1.312	1.437	—	—	0.875	0.187	—	—
0.875	1.437	1.562	1.140	0.156	0.937	0.187	0.125	1
1.000	1.562	1.750	—	—	1.000	0.187	—	—
1.125	1.687	1.875	1.437	0.187	1.062	0.218	0.187	1
1.250	1.875	2.000	1.562	0.187	1.062	0.187	0.187	1
1.375	2.000	2.125	1.687	0.187	1.125	0.187	0.187	1
1.500	2.125	2.250	1.812	0.187	1.125	0.187	0.187	1
1.625	2.375	2.500	2.000	0.187	1.375	0.281	0.250	1
1.750	2.500	2.625	2.125	0.187	1.375	0.281	0.250	1
1.875	2.625	2.750	2.250	0.187	1.375	0.281	0.250	1
2.000	2.750	2.875	2.375	0.187	1.375	0.281	0.250	1
2.125	3.000	3.125	2.593	0.250	1.687	0.343	0.312	1
2.250	3.125	3.250	2.718	0.250	1.687	0.343	0.312	1
2.375	3.250	3.375	2.843	0.250	1.687	0.343	0.312	1
2.500	3.375	3.500	2.968	0.250	1.687	0.343	0.312	1
2.625	3.500	3.625	3.062	0.312	1.687	0.343	0.312	1
2.750	3.625	3.750	3.187	0.312	1.687	0.343	0.312	1
2.875	3.750	3.875	3.312	0.312	1.687	0.343	0.312	1
3.000	3.812	4.000	3.406	0.312	1.687	0.343	0.312	2
3.125	3.937	4.062	3.531	0.312	1.687	0.343	0.312	1
3.250	4.125	4.250	3.687	0.312	1.687	0.343	0.312	1
3.375	4.250	4.375	3.812	0.312	1.687	0.343	0.312	1
3.500	4.375	4.500	3.937	0.312	1.687	0.343	0.312	1
3.625	4.500	4.625	4.062	0.312	1.687	0.343	0.312	1
3.750	4.625	4.750	4.187	0.312	1.687	0.343	0.312	1
3.875	4.750	4.875	4.312	0.312	1.687	0.343	0.312	1
4.000	4.875	5.000	4.437	0.312	1.687	0.343	0.312	2
4.125	5.000	5.250	4.656	0.312	1.687	0.343	0.312	2
4.250	5.250	5.375	4.781	0.312	1.687	0.343	0.312	2
4.375	5.375	5.500	4.906	0.312	1.687	0.343	0.312	2
4.500	5.500	5.625	4.968	0.312	1.687	0.343	0.312	2
4.625	5.625	5.750	—	—	1.687	0.343	—	—
4.750	5.750	5.875	5.250	0.312	1.687	0.343	0.312	2
4.875	5.875	6.000	5.375	0.312	1.687	0.343	0.312	2
5.000	6.000	6.125	5.500	0.312	1.687	0.343	0.312	2
5.125	6.125	6.260	5.625	0.312	1.687	0.343	0.312	2
5.250	6.500	6.625	5.750	0.312	2.000	0.312	0.312	2
5.375	6.625	6.750	5.875	0.312	2.000	0.312	0.312	2
5.500	6.750	6.875	6.000	0.312	2.000	0.312	0.312	2
5.625	6.875	7.000	6.125	0.312	2.000	0.312	0.312	2
5.750	7.000	7.125	6.250	0.312	2.000	0.390	0.437	2
5.875	7.125	7.250	6.375	0.281	2.000	0.390	0.437	2
6.000	7.250	7.375	6.500	0.281	2.000	0.312	0.437	2

TYPE 8-1/8-1T

Elastomer O-Ring Seals

Type 8-1T Typical Arrangement/Dimensional Data





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

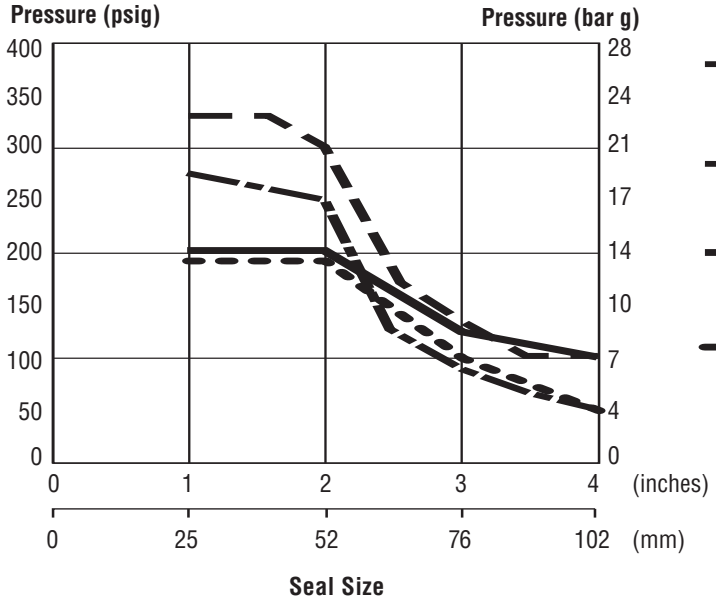
Type 8-1T Dimensional Data (inches)

Seal Size/D (inches)	D3	D4	Working Height L3	L9
0.500	0.937	1.062	0.937	0.187
0.625	1.062	1.187	0.937	0.156
0.750	1.187	1.312	0.937	0.187
0.875	1.312	1.437	0.937	0.187
1.000	1.437	1.562	1.000	0.187
1.125	1.562	1.687	1.000	0.218
1.250	1.687	1.812	1.000	0.187
1.375	1.937	2.062	1.375	0.187
1.500	1.937	2.062	1.125	0.187
1.625	2.250	2.375	1.156	0.187
1.750	2.312	2.437	1.375	0.281
1.875	2.500	2.625	1.375	0.281
2.000	2.625	2.750	1.375	0.281
2.125	2.812	2.937	1.687	0.343
2.250	2.843	2.968	1.375	0.234
2.375	3.000	3.125	1.687	0.343
2.500	3.125	3.250	1.375	0.234
2.625	3.250	3.375	1.687	0.343
2.750	3.375	3.500	1.687	0.343
2.875	3.500	3.625	1.687	0.343
3.000	3.625	3.750	1.687	0.343
3.125	3.750	3.875	1.687	0.343
3.250	3.875	4.000	1.687	0.343
3.375	4.000	4.125	1.687	0.343
3.500	4.125	4.250	1.687	0.343
3.625	4.250	4.375	1.687	0.343
3.750	4.375	4.500	1.687	0.343
3.875	4.500	4.625	1.687	0.343
4.000	4.625	4.750	1.687	0.343

TYPE 8-1/8-1T

Elastomer O-Ring Seals

Basic Pressure Ratings



Type 8-1 Carbon vs. Silicon Carbide (1800 rpm)

Type 8-1 Carbon vs. Silicon Carbide (3600 rpm)

Type 8-1T Carbon vs. Silicon Carbide (1800 rpm)

Type 8-1T Carbon vs. Silicon Carbide (3600 rpm)

To determine the maximum pressure for a Type 8-1 or 8-1T, multiply the maximum pressure by the Multiplier Factors to obtain the maximum operating pressure.

The Basic Pressure Rating is for a standard Type 8-1 or 8-1T 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	Up to 3600 rpm Above 3600 rpm*	x 1.00 **
Sealed Fluid Lubricity	Gasoline, Kerosene or better Aqueous Solutions	x 1.00 x 0.75
Sealed Fluid Temperature (for carbon only)	Below 80°C/175°F From 80°C to 120°C/175°F to 250°F From 120°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

Example for Determining Pressure Rating Limits

Seal: 50mm/2" diameter Type 8-1

Product: Water

Face Material: Carbon vs. Silicon Carbide

Temperature: 16°C/60°F

Speed: 3600 rpm

Using the Basic Pressure Rating chart the maximum pressure would be 17.25 bar g/250 psig.

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

17.25 bar g/250 psig x 0.75 x 1.00 x 1.00 = 188 psig/13 bar g

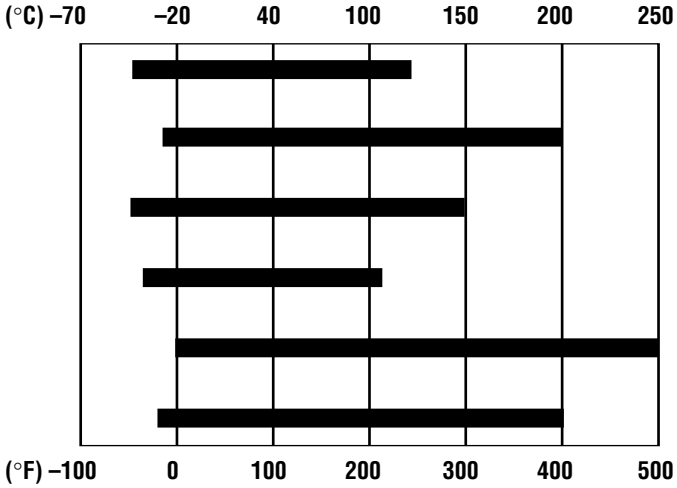
The maximum operating pressure of this 50mm/2" diameter Type 8-1 seal is 188 psig/13 bar g.

TYPE 8-1/8-1T

Elastomer O-Ring Seals

Elastomer Temperature Limits

Compound	Temperature
Nitrile	-40˚C to 120˚C / -40˚F to 250˚F
Fluorocarbon	-29˚C to 205˚C / -20˚F to 400˚F
Ethylene Propylene	-40˚C to 149˚C / -40˚F to 300˚F
Neoprene®	-40˚C to 100˚C / -40˚F to 212˚F
Perfluoroelastomer	-25˚C to 260˚C / -13˚F to 500˚F
Aflas®	-30˚C to 205˚C / -20˚F to 400˚F



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"

TYPE 8-1/8-1T

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
Anti-X-Ring	PTFE	—

Aflas is a registered trademark of Asashi Glass Co. Ltd.
Hastelloy B is a registered trademark of Hayes International.
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

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