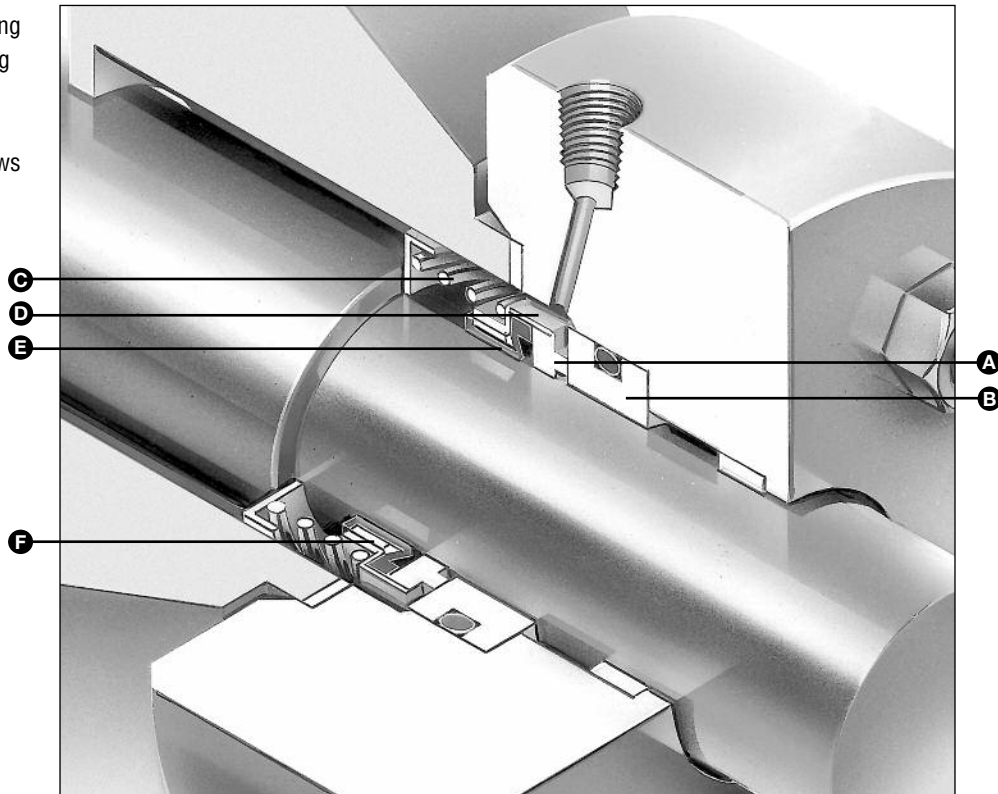


ELASTOMER BELLOWS SEAL

Technical Specification

- A – Face/Primary Ring
- B – Seat/Mating Ring
- C – Spring
- D – Retainer
- E – Elastomer Bellows
- F – Drive Band



Product Description

The Type 21, a general purpose seal, has become an industry standard with OEM designers. Made of stainless steel, it provides a service range well beyond that which is possible with comparably priced seals of other metallurgical construction.

- The positive static seal between the bellows and the shaft, along with the free movement of the bellows, means that there is no sliding action could lead to shaft damage by fretting. This ensures that the seal will automatically compensate for normal shaft run-out and axial movements.
- This versatile seal can be used on a wide range of equipment including centrifugal, rotary and turbine pumps, compressors, mixers, blenders, chillers, agitators, and other rotary shaft equipment.
- Ideal for pulp and paper, pool and spa, water, food processing, wastewater treatment, and other general applications.

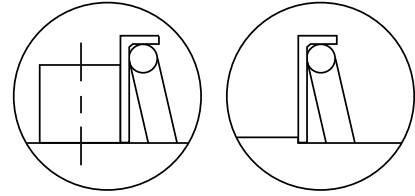
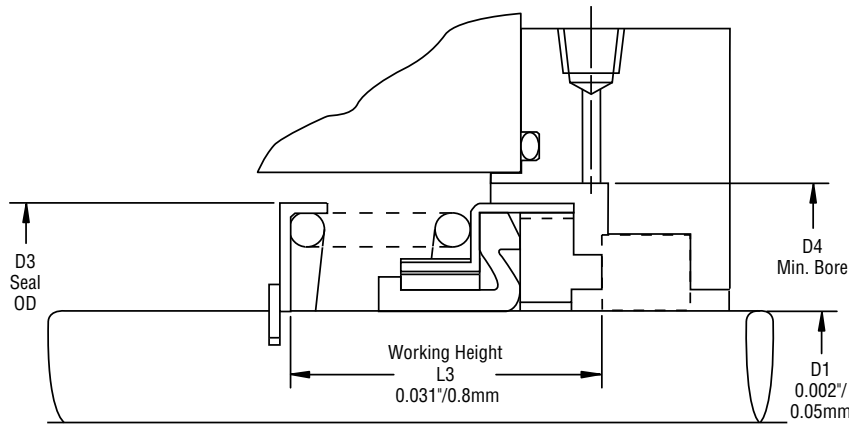
Performance Capabilities

- Temperature: -40°F to 400°F/-40°C to 205°C (depending on materials used)
- Pressure: up to 150 psi(g)/11 bar(g)
- Speed: up to 2500 fpm/13 m/s (depending on configuration and shaft size)

Design Features

- Self-aligning unit automatically adjusts for shaft end play and run-out
- Eliminates potential shaft fretting damage between the seal and shaft
- Positive mechanical drive protects the elastomer bellows from overstressing
- Single coil spring improves tolerance to clogging
- Simple to fit and field repairable
- Can be used with practically any type of mating ring

Type 21 Typical Arrangement



Alternate Methods

Note: For primary ring optional Hard Face Design, contact John Crane Engineering.

Type 21 Dimensional Data (inches)

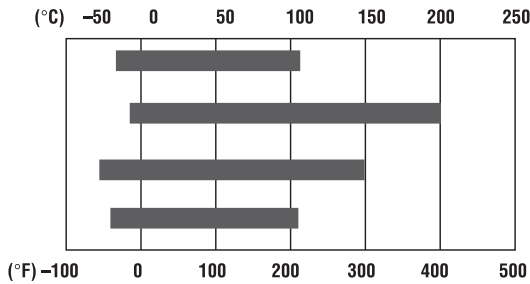
Seal Size (Inches)	D1	D3	D4	Working Height L3
0.250	0.250	0.718	0.843	0.625
0.375	0.375	0.812	0.937	0.812
0.500	0.500	0.937	1.187	0.812
0.625	0.625	1.062	1.187	0.875
0.750	0.750	1.187	1.312	0.875
0.875	0.875	1.312	1.437	0.937
1.000	1.000	1.687	1.937	1.000
1.125	1.125	1.812	2.062	1.062
1.250	1.250	1.937	2.187	1.062
1.375	1.375	2.062	2.312	1.125
1.500	1.500	2.187	2.437	1.125
1.625	1.625	2.500	2.750	1.375
1.750	1.750	2.625	2.875	1.375
1.875	1.875	2.750	3.000	1.500
2.000	2.000	2.875	3.187	1.500
2.125	2.125	3.000	3.312	1.687
2.250	2.250	3.125	3.437	1.687
2.375	2.375	3.250	3.562	1.812
2.500	2.500	3.343	3.687	1.812
2.625	2.625	3.500	4.000	1.937
2.750	2.750	3.750	4.125	1.937
2.875	2.875	3.875	4.375	2.062
3.000	3.000	4.000	4.500	2.062
3.125	3.125	4.125	4.750	2.187
3.250	3.250	4.250	4.875	2.187
3.375	3.375	4.500	5.250	2.187
3.500	3.500	4.625	5.375	2.187
3.625	3.625	4.750	5.500	2.312
3.750	3.750	4.875	5.625	2.312
3.875	3.875	5.000	5.750	2.437
4.000	4.000	5.125	5.875	2.437

Elastomer Temperature Limits

Compound

Buna-N (Nitrile)	-40°F to 225°F/-40°C to 107°C
Fluoroelastomer	-20°F to 400°F/-29°C to 205°C
Ethylene Propylene	-49°F to 300°F/-45°C to 150°C
Neoprene®	-40°F to 212°F/-40°C to 100°C

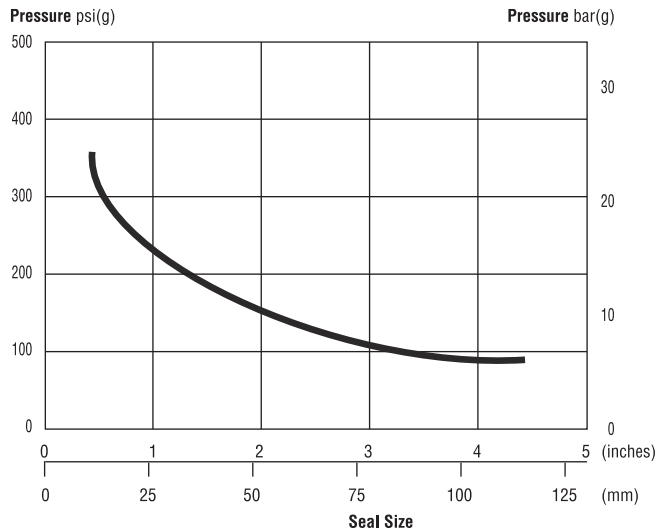
Temperature



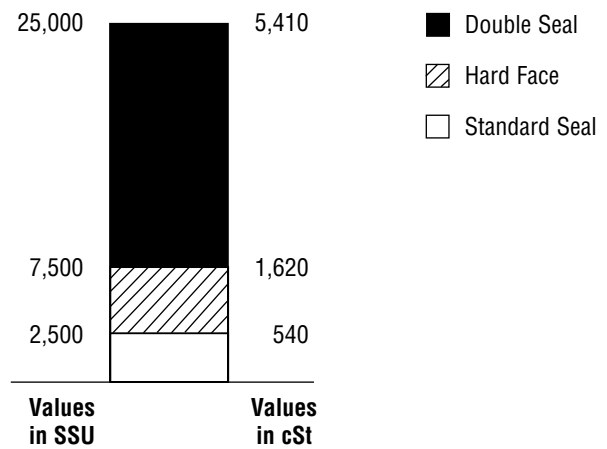
Materials of Construction

SEAL COMPONENTS	MATERIALS	
Description	Standard	Options
Face/Primary Ring	Carbon	Siliconized Graphite Tungsten Carbide (Nickel Binder) Solid Silicon Carbide
Elastomer Bellows	Buna-N Fluoroelastomer Ethylene Propylene Neoprene	
Drive Band Retainer Spring Holder	18-8 Stainless Steel	316 Stainless Steel Monel®
Springs	18-8 Stainless Steel	316 Stainless Steel Monel

Hydrostatic Pressure Limits



Recommendations for Viscous Fluids

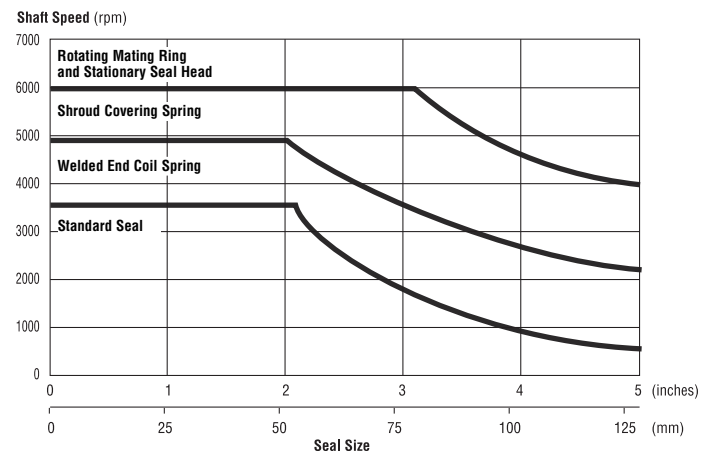


cSt = Centistokes (cSt x 4.62 = SSU)
SSU = Saybolt Seconds Universal

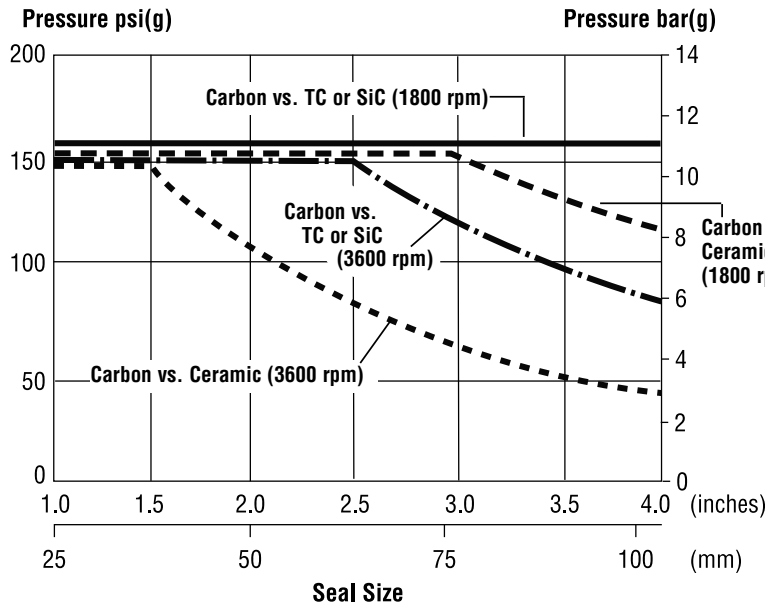
Criteria for Installation

Shaft/Sleeve	Limits
Surface Finish (Shaft or Sleeve)	Up to 3.125" diameter 125 Ra Over 3.125" diameter 63 Ra
Ovality/Out of Roundness (Shaft)	0.002"/0.051 mm
End Play/ Axial Float Allowance	± 0.005"/0.13 mm

Speed Limits



Basic Pressure Ratings



1. Lubricating liquid is defined as having lubricating properties of gasoline or better.
2. Pressure capabilities to 150 psi(g)/10 bar(g) are based on lubricating oil service, F50 carbon vs. tungsten carbide.

The basic pressure rating is for a standard Type 21 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
Seal Fluid Lubricity	Gasoline, Kerosene or better	x 1.00
	Aqueous solutions, etc.	x 0.67
Sealed Fluid Temperature	Below 175°F/79°C	x 1.00
	Above 175°F to 250°F/79°C to 121°C	x 0.90
	Above 250°F to 350°F/121°C to 177°C	x 0.80
	Above 350°F/177°C	x 0.65

Example for Determining Pressure Rating Limits:

Seal: 2.5 inches/64 mm diameter Type 21

Product: gasoline

Face material: carbon vs. ceramic

Temperature: 150°F/65°C

Speed: 3600 rpm

Using the basic pressure rating chart, the maximum pressure would be 350 psi(g)/24 bar(g).

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

$$82 \text{ psi(g)} \times 1 \times 1 = 82 \text{ psi(g)}/6 \text{ bar(g)}$$

The maximum operating pressure for this 2.5 inch diameter Type 21 Seal is 82 psi(g).

Monel is a registered trademark of Inco Alloys International, Inc.
Neoprene is a registered trademark of DuPont.

