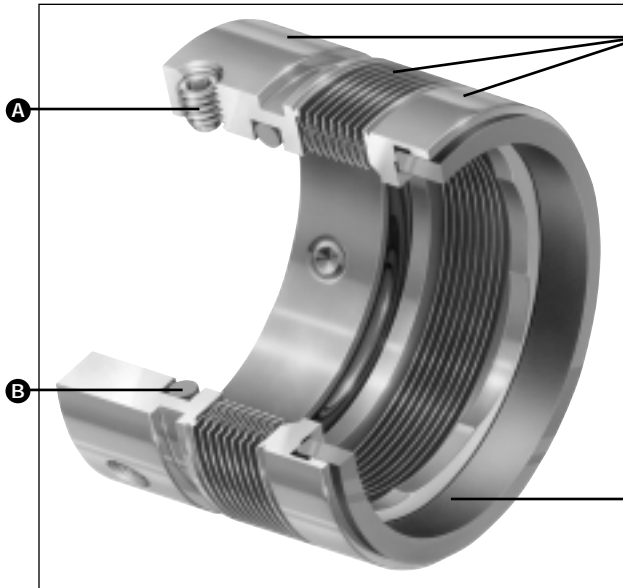




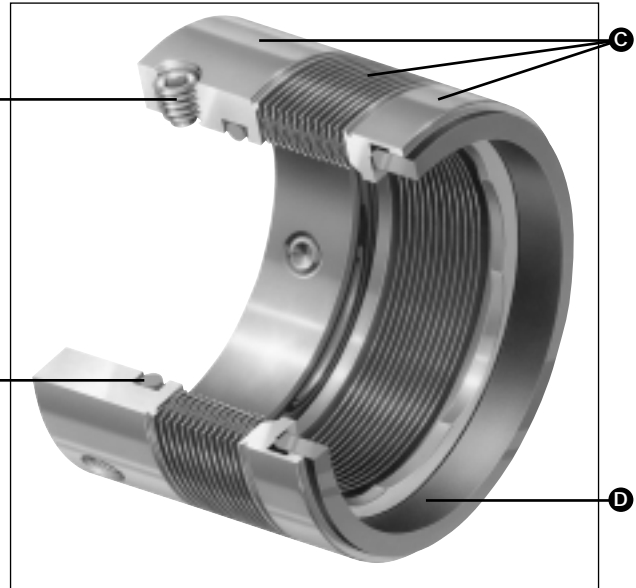
TYPE 670/676/680

Low-Temperature Sealol® Metal Bellows Seals

- A – Set Screws
- B – Shaft Packing
- C – Bellows Assembly
- D – Insert/Primary Ring



Type 680



Type 670/676



Sealol® Welded Metal Bellows

Product Description

- **Type 670:**
All-Alloy C-276 high-strength low-temperature bellows assembly for highly corrosive applications.
- **Type 676:**
AM350 low-temperature bellows assembly for large sizes and mildly corrosive applications.
- **Type 680:**
All-Alloy 20 low-temperature high performance seal for use on a broad range of corrosive media.

Design Features

- Sealol® Edge-welded Metal Bellows
- Static Secondary Seal
- Standard Components
- Available in Single or Dual Arrangements, Shaft-mounted or in a Cartridge
- The Type 670 meets API 682 Requirements

Performance Capabilities

- Temperature:
-75°C to +290°C / -100°F to +550°F
(depending on materials used)
- Pressure:
Vacuum to 25 bar/360 psi
(see Basic Pressure Ratings curve)
- Speed:
Up to 25m/s / 5,000 fpm

Typical Applications

- Acids
- Aqueous Solutions
- Caustics
- Chemicals
- Food Products
- Hydrocarbons
- Lubricating Fluids
- Slurries
- Solvents
- Thermo-Sensitive Fluids
- Viscous Fluids and Polymers
- Water

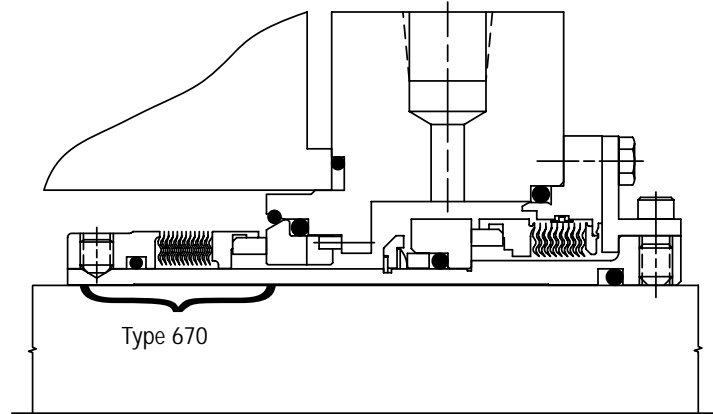
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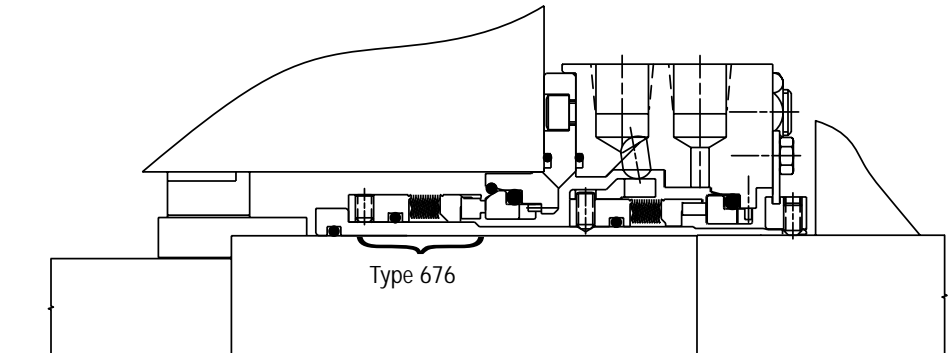
TYPE 670/676/680

Low-Temperature Sealol® Metal Bellows Seals

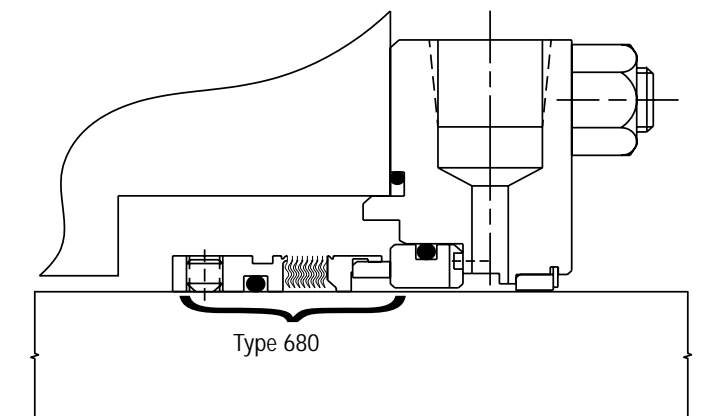
Typical 670 with a Secondary Containment Seal Arrangement



Typical 676 Dual Cartridge Arrangement



Typical 680 Single Shaft-Mounted Arrangement

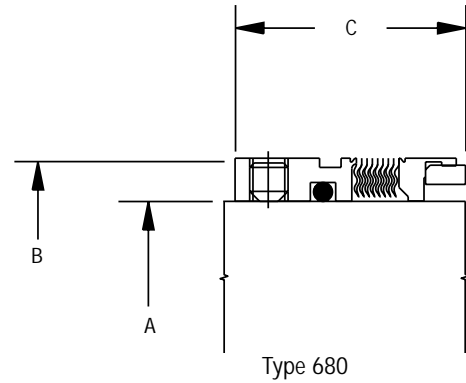
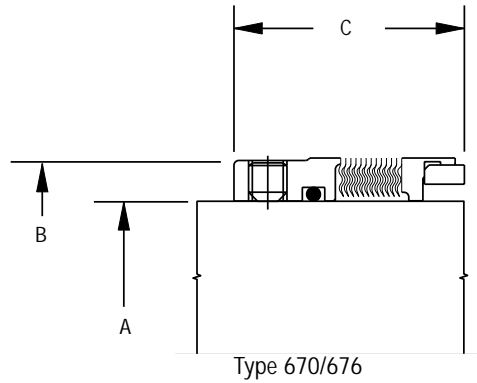




TYPE 670/676/680

Low-Temperature Sealol® Metal Bellows Seals

Typical 670/676/680 Heads



Typical 670/676/680 Dimensional Data (mm)

Seal Dash Number (size code)	A +.000 -0.05	B Ref.	C Ref.
-018	18	32.0	27.5
-020	20	33.3	27.5
-022	22	36.0	27.5
-024	24	38.1	30.0
-025	25	39.0	30.0
-028	28	42.0	32.5
-030	30	44.0	32.5
-032	32	46.0	32.5
-033	33	47.0	32.5
-035	35	49.2	32.5
-038	38	52.4	34.0
-040	40	55.6	34.0
-043	43	58.7	34.0
-045	45	58.7	34.0
-048	48	61.9	34.0
-050	50	65.1	34.5
-053	53	68.3	34.5
-055	55	71.0	34.5
-060	60	74.6	39.5
-065	65	84.1	39.5
-070	70	87.3	45.0
-075	75	95.3	45.0
-080	80	98.4	44.5
-085	85	104.8	44.5
-090	90	108.0	49.5
-095	95	114.3	49.5
-0100*	100	120.7	49.5
-0105*	105	131.7	48.3
-0110*	110	138.1	48.3
-0115*	115	144.5	48.3
-0120*	120	144.5	48.3
-0125*	125	150.8	48.3
-0130*	130	157.8	48.3
-0140*	140	170.5	48.3
-0150*	150	176.9	48.3

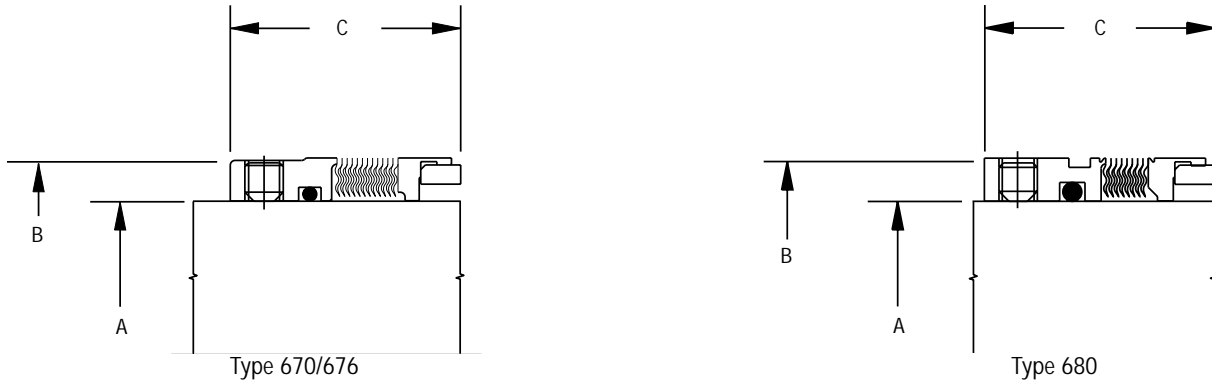
*670/676 only



TYPE 670/676/680

Low-Temperature Sealol® Metal Bellows Seals

Typical 670/676/680 Heads



Typical 670/676/680 Dimensional Data (Inches)

Seal Dash Number (size code)	A +.000/- .002	B Ref.	C Ref.
-12	.750	1.312	1.250
-14	.875	1.437	1.250
-15	.937	1.500	1.250
-16	1.000	1.562	1.250
-18	1.125	1.687	1.250
-20	1.250	1.812	1.312
-22	1.375	1.937	1.437
-24	1.500	2.062	1.437
-26	1.625	2.187	1.437
-28	1.750	2.312	1.437
-30	1.875	2.437	1.500
-32	2.000	2.562	1.500
-34	2.125	2.687	1.500
-36	2.250	2.812	1.562
-38	2.375	2.937	1.562
-40	2.500	3.187	1.562
-42	2.625	3.312	1.625
-44	2.750	3.437	1.625
-46	2.875	3.625	1.687
-48	3.000	3.750	1.687
-50	3.125	3.875	1.750
-52	3.250	4.000	1.750
-54	3.375	4.125	1.750
-56	3.500	4.250	1.875
-58	3.625	4.375	1.875
-60	3.750	4.500	1.875
-62	3.875	4.625	1.875
-64	4.000	4.750	1.875
-68*	4.250	5.187	1.903
-72*	4.500	5.438	1.903
-76*	4.750	5.688	1.903
-80*	5.000	5.938	1.903
-84*	5.250	6.213	1.903
-88*	5.500	6.463	1.903
-92*	5.750	6.714	1.903
-96*	6.000	6.964	1.903
-104*	6.500	7.470	1.903
-112*	7.000	7.971	1.903

*670/676 only

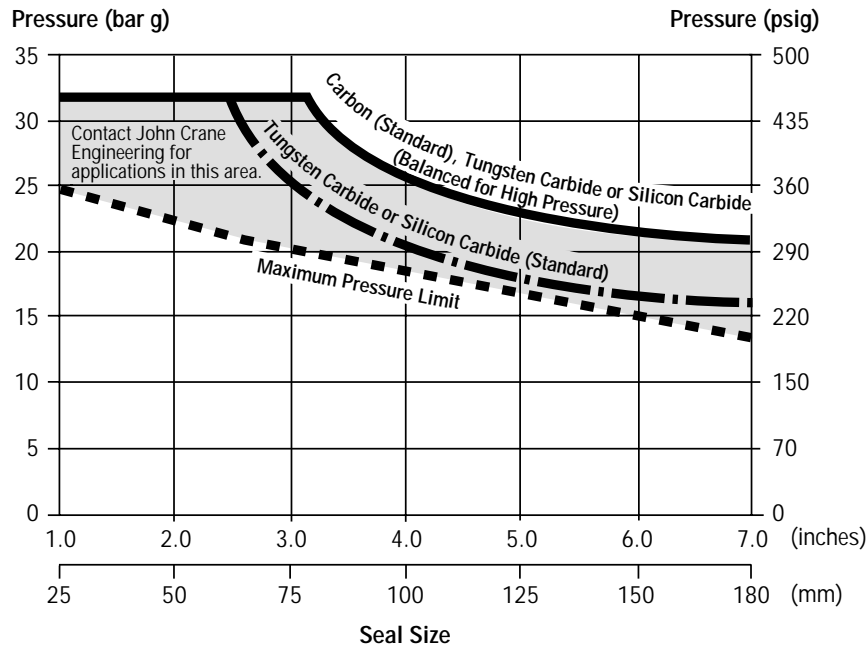
CUT LINE FOR SHORT PAGE



TYPE 670/676/680

Low Temperature Sealol® Metal Bellows Seals

Basic Pressure Rating



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.

Contact John Crane Engineering for process services outside this range or a more specific assessment of the dynamic pressure rating.

NOTES:

1. Basic Pressure Rating Curve based on Single-Ply Bellows.
2. Basic Pressure Rating Curve is differential pressure applied to seal outside diameter.
3. Inside Diameter Differential Pressure vs. Temperature Limits: If the inside diameter differential pressure is greater than 6 bar/90 psi or the operating temperature is greater than 165°C/325°F, or seal size is greater than 100mm/4", consult John Crane Engineering.

Multiplier Factors

	Selection Consideration	Multiplier Factors	
		Carbon vs. SiC	SiC vs. SiC
Speed	Up to 3600 rpm	x 1.00	x 1.00
	Above 3600 rpm	x (3600/speed)	x (3600/speed)
Sealed Fluid Lubricity	Petroleum/Gasoline, Kerosene, Lube Oil, etc...	x 1.00	x 1.00
	Water and Aqueous Solutions (< 80°C/176°F)	x 0.75	x 0.75
	Light Hydrocarbons (see Note 1)	x 0.60	(see Note 2)
Sealed Fluid Temperature (see Note 3)	Up to 80°C/176°F	x 1.00	x 1.00
	Up to 120°C/250°F	x 0.85	x 1.00
	Up to 205°C/400°F	x 0.70	x 1.00

Example for Determining Pressure Rating Limits:

Seal: Type 680
Size: 50mm/2"
Product: 50/50 Glycol and Water
Face Material: Carbon vs. Silicon Carbide
Operating Temperature: 95°C/200°F
Operating Speed: 3600 rpm

Example for Determining Dynamic Pressure Rating:

The maximum pressure for a particular application is the lesser of the maximum pressure limit curve or the pressure calculated when the multiplier factors are applied to the specific seal face material curve.

Maximum Pressure Limit Curve:
 21 bar(g)/300 psig max pressure

Carbon Limit Curve: 32 bar g/460 psig

Calculated Limit: 32 bar g/460 psig x 1.00 x 0.75 x 0.85 = 20.2 bar g/293 psig

At 3600 rpm with the service conditions noted, a 50mm/2.000" (Seal Size) Type 680 has a maximum operating pressure limit of 20.2 bar g/293 psig.

NOTES:

1. Specific gravity > 0.6 and ratio of sealed pressure to vapor pressure > 1.5.
2. More details regarding the fluid and the operating conditions are required.
3. Temperature at the seal faces includes effects of flush. Temperatures must not exceed limits shown in max. temperature limits section.
4. Contact John Crane Engineering for more information.

Maximum Temperature Limits:

- Type 670:** Carbon Insert: 290°C/550°F
 Tungsten Carbide or Silicon Carbide: 200°C/400°F
- Type 676:** Carbon Insert: 200°C/400°F
 Tungsten Carbide or Silicon Carbide: 190°C/375°F
- Type 680:** Carbon Insert: 260°C/500°F
 Tungsten Carbide or Silicon Carbide: 150°C/300°F

CUT LINE FOR SHORT PAGE



TYPE 670/676/680

Low-Temperature Metal Sealol® Bellows Seals

Materials of Construction

DESCRIPTION		MATERIALS	
Seal Components	Seal Types	Standard	Options
Bellows	Type 670 Type 676 Type 680	Alloy C-276 (UNS N10276) AM350 SS (UNS S35000) Alloy 20 (UNS N08020)	—
End-Fittings	Type 670 Type 676 Type 680	Alloy C-276 316L SS (UNS S31603) Alloy 20	—
Insert/Primary Ring		Premium Carbon Grade Tungsten Carbide, Silicon Carbide	—
Static Seals		Fluorocarbon, EPR, PTFE- Encapsulated Fluorocarbon, Nitrile, Perfluoroelastomer	—

Recommendations for Viscous Fluids

0 - 1,000 cSt: Standard Seal

1,000 - 3,500 cSt: Hard Face Material

3,500 - 10,500 cSt: Consult John Crane Engineering

NOTE: SSU (Saybolt Universal Seconds) approximately equals cSt (centistoke) x 4.6347cP (centipoise) = cSt (centistoke) x specific gravity.

Sealol Welded Metal Bellows

Sealol Bellows Design Features

- Optimum 45° Tilt Angle
- Three-Sweep Radius
- Nesting Ripple Plate Design
- Static Secondary Seal
- Light Spring Loads

Sealol Bellows Benefits

- Uniform Plate Rigidity and Stress Distribution
- Enhanced Fatigue Strength
- Pressure-Balanced by Design
- Less Heat Generated
- Lower Power Consumption



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
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Tel: 1-847-967-2400
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