

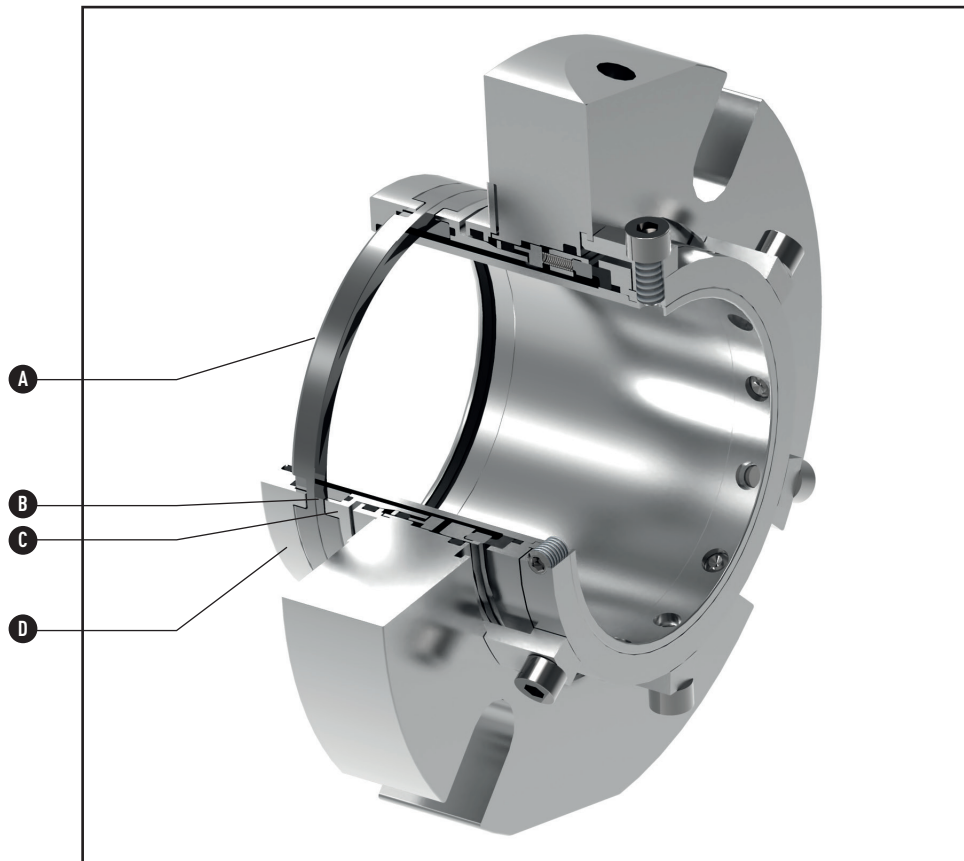


TYPE SB2 USP/SB2A USP

UPSTREAM PUMPING DUAL CARTRIDGE SEAL

Technical Specification

- A – Spiral groove mating ring
- B – Primary ring/Sealing ring
- C – Primary ring carrier
- D – Sleeve



Product Description

The Type SB2/SB2A USP seal combines the robustness a heavy-duty dual cartridge seal with our unique Upstream Pumping (USP) technology. The addition of the new seal enhances our current USP product portfolio to include a more robust seal that is ideal for the rugged applications in the pulp and paper and mining industries where the standard Type SB2 seal is recognized for its reliable performance.

The Type SB2/SB2A USP seal is ideal for use with environmentally hazardous and abrasive fluids and other slurry duties up to 40 percent solids by weight and a solids hardness of 8 Mohs. It is widely used on pumps and other process equipment.

Spiral groove technology – The non-contacting inboard seal uses patented John Crane spiral groove technology to pump a small quantity of a safe, product-compatible barrier liquid upstream to block leakage of the product being sealed.

Non-contact face sealing – Provides reliable sealing for abrasive, low lubricity, and multi-phase liquids, because the upstream pumping effect keeps harmful particles away from the seal faces, and induces clean barrier fluid between them.

Low heat generation – Seal reliability is enhanced by lower levels of seal heat generation.

Design Features

Temperature:	Up to 250°F/120°C
Pressure:	Up to 200 psig/14 barg
Speed:	1,500 to 3,600 rpm
End play/axial float allowance:	±0.08"/± 2.03 mm
Runout/out of squareness:	±0.02"/± 0.5 mm

Design Features

Non-contacting inboard seal

- Ear-driven primary ring ensures a reliable seal performance at a wider range of operating conditions
- Retrofits with existing SB2 and SB2A seal heads
- Optimized primary ring and mating ring design provides a robust performance

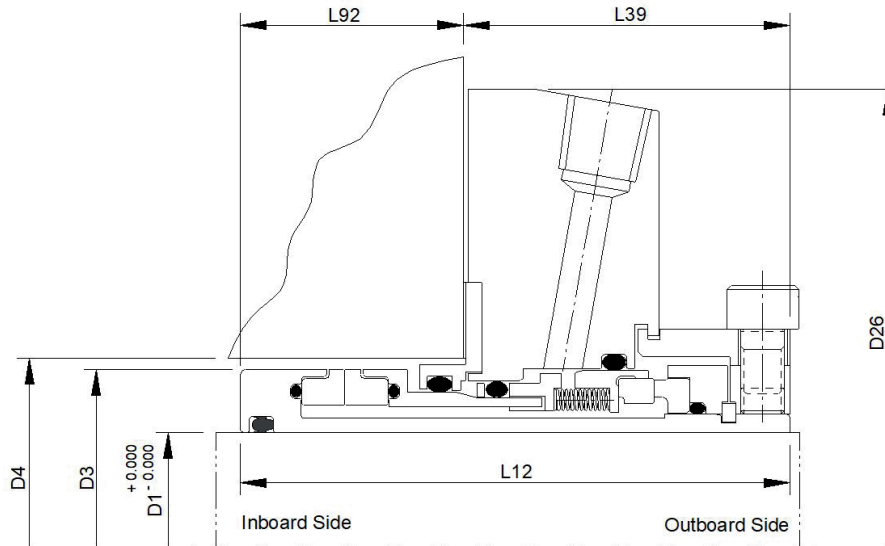


TYPE SB2 USP/SB2A USP

UPSTREAM PUMPING DUAL CARTRIDGE SEAL

Technical Specification

Typical installation of Type SB2 USP and SB2A USP



Dimensional Data (Inches) for SB2A-USP

Seal Size	Seal Size Code	D1	D3	D4	D26	L12	L39	L92
1.000	0254	1.000	1.575	1.626 - 1.941	3.811	3.513	2.087	1.426
1.125	0285	1.125	1.701	1.752 - 2.087	3.937	3.513	2.087	1.426
1.250	0317	1.250	1.823	1.874 - 2.244	4.134	3.513	2.087	1.426
1.375	0349	1.375	1.949	2.000 - 2.362	4.331	3.513	2.087	1.426
1.500	0381	1.500	2.075	2.126 - 2.500	4.488	3.552	2.126	1.426
1.625	0412	1.625	2.323	2.374 - 2.626	4.961	3.552	2.126	1.426
1.750	0444	1.750	2.449	2.500 - 2.835	5.472	3.630	2.126	1.504
1.875	0476	1.875	2.575	2.626 - 2.933	5.472	3.591	2.126	1.465
2.000	0508	2.000	2.697	2.752 - 3.071	5.500	3.591	2.126	1.465
2.125	0539	2.125	2.823	2.874 - 3.425	5.984	3.591	2.126	1.465
2.250	0571	2.250	2.949	3.000 - 3.559	5.984	3.591	2.126	1.465
2.375	0603	2.375	3.071	3.126 - 3.681	6.299	3.591	2.126	1.465
2.500	0635	2.500	3.197	3.252 - 3.819	6.378	3.650	2.126	1.524
2.625	0666	2.625	3.323	3.374 - 3.937	6.378	3.630	2.126	1.504
2.750	0698	2.750	3.661	3.752 - 4.449	7.953	3.894	2.362	1.531
2.875	0730	2.875	3.787	3.874 - 4.567	7.953	3.874	2.362	1.512
3.000	0762	3.000	3.913	4.000 - 4.685	7.953	3.894	2.362	1.531
3.125	0793	3.125	4.035	4.126 - 4.823	8.228	3.874	2.362	1.512
3.250	0825	3.250	4.161	4.252 - 4.937	8.228	3.874	2.362	1.512
3.375	0857	3.375	4.287	4.374 - 5.063	8.374	3.874	2.362	1.512
3.500	0889	3.500	4.413	4.500 - 5.181	8.465	3.874	2.362	1.512
3.625	0920	3.625	4.535	4.626 - 5.307	8.583	3.874	2.362	1.512
3.750	0952	3.750	4.661	4.752 - 5.433	8.740	3.874	2.362	1.512
3.875	0984	3.875	4.787	4.874 - 5.555	8.858	3.874	2.362	1.512
4.000	1016	4.000	4.913	5.000 - 5.685	9.000	4.005	2.362	1.643
4.125	1047	4.125	5.043	5.126 - 5.717	9.016	3.989	2.362	1.626
4.250	1079	4.250	5.165	5.252 - 5.921	9.228	3.989	2.362	1.626
4.500	1143	4.500	5.413	5.500 - 6.169	9.488	3.989	2.362	1.626
4.625	1174	4.625	5.539	5.626 - 6.299	9.606	3.989	2.362	1.626
4.750	1206	4.750	5.661	5.752 - 6.417	9.606	3.989	2.362	1.626
4.875	1238	4.875	5.787	5.874 - 6.551	9.843	3.989	2.362	1.626
5.000	1270	5.000	5.913	6.000 - 6.685	10.000	3.989	2.362	1.626



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Dimensional Data (Millimeters) for SB2A-USP

Seal Size	Seal Size Code	D1	D3	D4	D26	L12	L39	L92
25	0250	25	40.01	41.28 - 49.28	96.8	89.22	53	36.21
30	0300	30	46.30	47.63 - 57	105	89.22	53	36.21
35	0350	35	49.50	50.8 - 59.99	110	89.22	53	36.21
38	0380	38	52.70	53.98 - 63.5	114	90.21	54	36.21
40	0400	40	59.00	60.33 - 66.68	126	90.21	54	36.21
43	0430	43	62.20	63.5 - 73	139	92.21	54	38.21
45	0450	45	62.20	63.5 - 73	139	92.21	54	38.21
48	0480	48	65.40	66.68 - 75.01	139	91.21	54	37.21
50	0500	50	68.50	69.85 - 78	139.7	91.21	54	37.21
53	0530	53	71.70	73.03 - 87	152	91.21	54	37.21
55	0550	55	74.90	76.2 - 90.42	152	91.21	54	37.21
58	0580	58	74.90	76.2 - 90.42	152	91.21	54	37.21
60	0600	60	78.00	79.38 - 93.5	160	91.21	54	37.21
63	0630	63	81.20	82.55 - 97	162	92.71	54	38.71
65	0650	65	81.20	82.55 - 97	162	92.71	54	38.71
68	0680	68	84.40	85.73 - 100	162	92.21	54	38.21
70	0700	70	92.99	95.25 - 113	202	98.90	60	38.91
80	0800	80	105.70	107.95 - 125.4	209	98.40	60	38.41
85	0850	85	108.90	111.13 - 128.57	212.7	98.40	60	38.41
90	0900	90	112.10	114.3 - 131.6	215	98.40	60	38.41
95	0950	95	118.40	120.65 - 138	222	98.40	60	38.41
100	1000	100	124.80	127 - 144.45	228	101.72	60	41.73
105	1050	105	128.10	130.18 - 145.19	229	101.31	60	41.32
110	1100	110	134.30	136.53 - 153.82	237	101.11	60	41.12
115	1150	115	137.50	139.7 - 156.72	241	101.31	60	41.32
120	1200	120	143.80	146.05 - 162.99	244	101.31	60	41.32
125	1250	125	150.20	152.4 - 169.85	254	101.31	60	41.32

Upstream Pumping (USP) Seals

Max Process Pressure*: 1,450 to 3,600 rpm:

Up to 200 psig/14 barg Barrier fluid pressure relative to seal chamber pressure (API Plan 52 or 53) determines the usage of the USP seal as a tandem style seal arrangement.

John Crane recommends using our GS USP seal support system for USP seals. See the support system section for details.

Acceptable maximum pressure limits relative to shaft speed are shown in the chart above.

* John Crane recommend the use of clean filtered water below 90°F/32°C. If the application or barrier fluid fall outside of these conditions please contact John Crane. It is always recommended that a low pressure and cooling is applied to the barrier system.

Seal Selection

If water is used as the barrier fluid, and the operating conditions are within the specification limits for pressure, speed and temperature, then standard upstream pumping seals may be used. For applications outside the specification limits, and/or use of a barrier fluid other than these specified, the proposed seal service should be reviewed by John Crane. The following data is needed for evaluation of a specific application.

Application Criteria

USP cartridge seals may be customized for specific installations after review and evaluation by John Crane Engineering. The following data is needed to evaluate the proposed service:

- Make and model of equipment
- Shaft or sleeve OD
- Direction of shaft rotation viewed from drive end
- Seal cavity dimensions
- Buffer/barrier fluid
- Process fluid
 - Specific gravity
 - Box pressure
 - Vapor pressure
 - Temperature
 - Viscosity

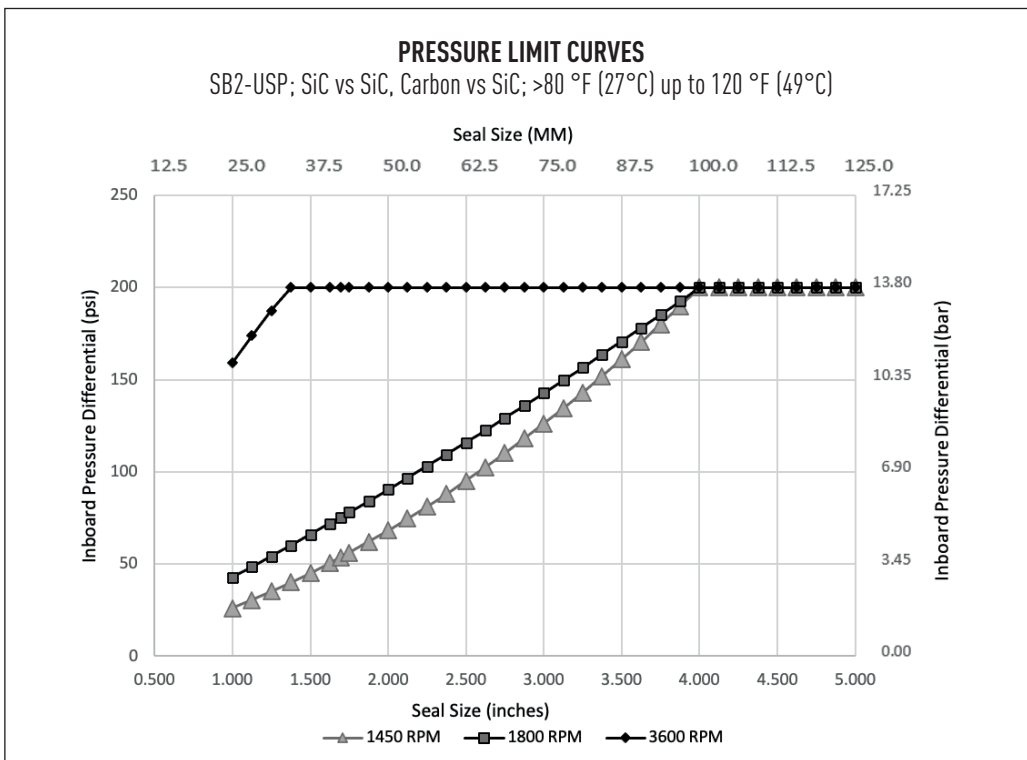
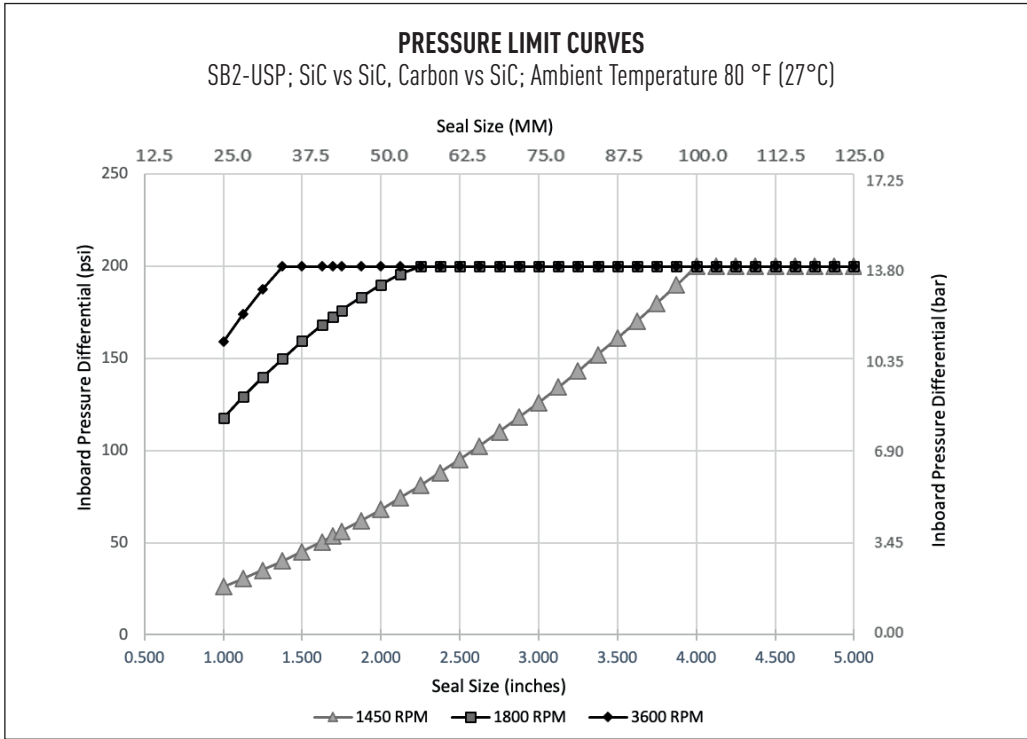


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Pressure Rating Limits



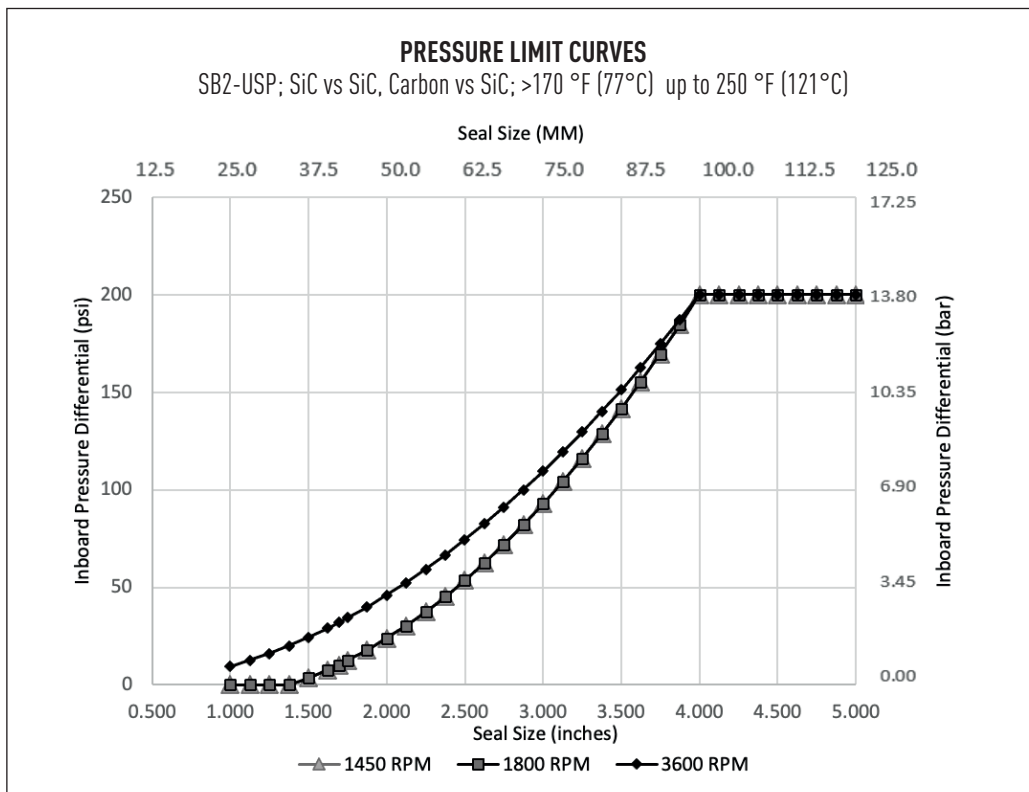
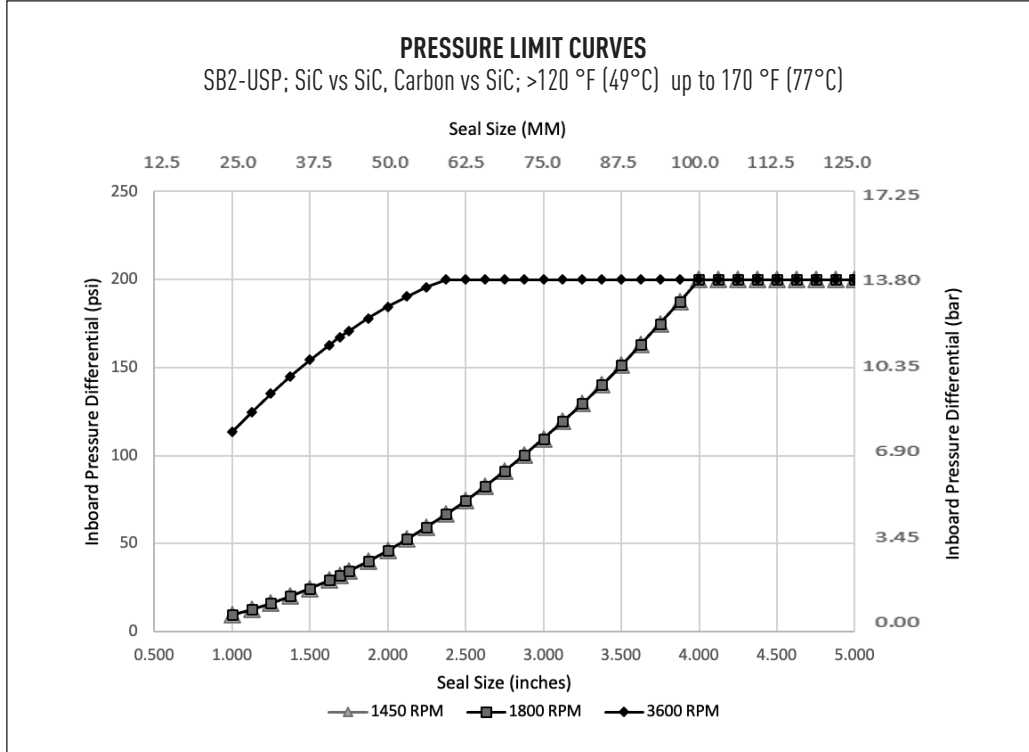


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Technical Specification

Pressure Rating Limits





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UPSTREAM PUMPING DUAL CARTRIDGE SEAL

Technical Specification

Support System

Mechanical seals using upstream pumping seal face technology have support system requirements unique from traditional dual mechanical seals. A standardized support system is available to supply our standard Upstream Pumping seals. Using one of these systems eliminates the need to design a custom system, saving costs, making operation simple and minimizing space requirements.

It is available in two versions:

Reservoir System (GS-USP-R)

Includes a reservoir of stored barrier fluid.



Direct Connect System (GS-USP-D)

Omits the reservoir and connects the seal directly to the water supply.



Materials of Construction

Seal Components	Materials	
Description	Standard	Options
Seal Faces	SiC vs. SiC (Inboard Seal) SiC vs. Carbon (Outboard Seal)	-
O-rings	PTFE EPDM	Viton
Metals	AISI 329 316 Stainless Steel	Titanium Alloy 20 Hastelloy
Springs	Nimonic Steel	-
Gland Gasket	Expanded PTFE	-



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