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Division

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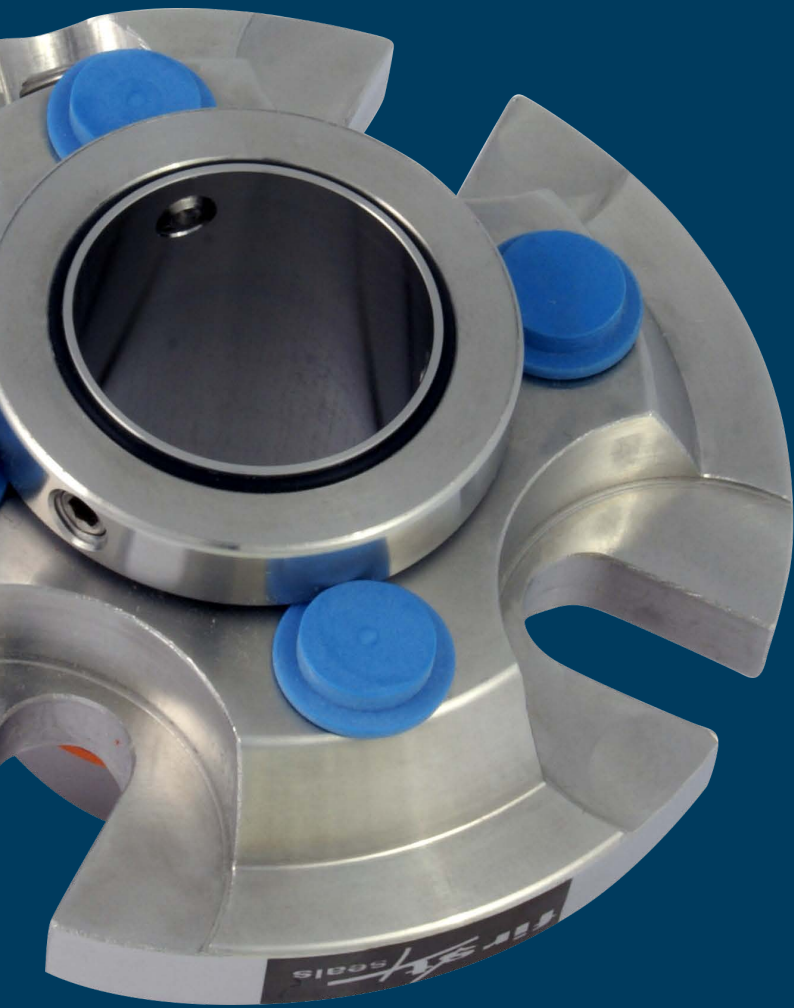
Single Rotary

**Environmental
Cartridge Mechanical Seals
301[™] and 303A[™] Series**

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single rotary mechanical cartridge seals

The balanced cartridge seal design uses less power and therefore less fossil fuels to drive it than is required by standard unbalanced seals and only 20% of the power requirement of pump packing.

As leakage is eliminated, corrosion problems to pump, bearing and pump room are all greatly reduced.

All packing must leak to survive, whereas seals should be leak free. This reduces environmental contaminants and disposal costs.

301™ Range

single rotary mechanical cartridge seals

the green issue

The 301™ series including 301A™ and 301B™ are designed with a Carbon restriction bush which is hydraulically loaded upon seal failure and acts to restrict product leakage to the environment.

Also incorporated into the 301B™ version is a drain port to take away product leakage to a safe area to be disposed of or recycled.

The 301C™ cartridge seal incorporates a back-up seal to reduce fugitive emissions of noxious products into the environment.

301™ cartridge seals can be fully refurbished with most parts being "re-used"



301 series - technical specification

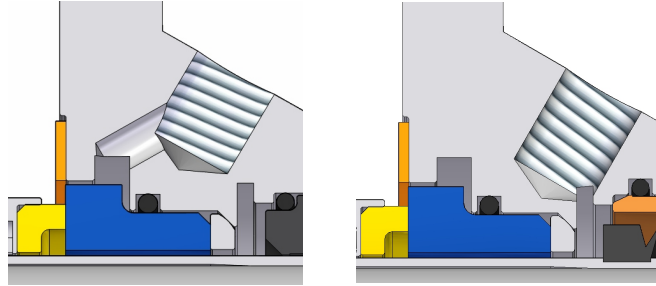
metal parts	316 Stainless Steel as standard, other materials also available.	stationary	Alumina Ceramic, Silicon Carbide or Tungsten Carbide available as standard.
springs	Alloy 276	temperature limits	-30°C to 260°C (-22°F to 500°F) dependent upon specified elastomer and system configuration.
o-rings	Viton® (Fluorocarbon) or Ethylene Propylene (EPR) as standard. Aflas®, Kalrez® and other elastomers available to order.	pressure limits	711mm HG Vacuum to 30 Bar (-28" HG - 440 PSI). (301D™ 2 Bar maximum buffer pressure. For higher pressure refer to 302™).
rotary face	Carbon, Silicon Carbide or Tungsten Carbide as standard. Antimony Carbon available on request.		

As the conditions of use are outside the control of first4seals, the information contained within this brochure is given in good faith but without warranty. The above temperature and pressure limits are individual maximum values for SOFT/HARD seal face combinations only. The values are provided for guidance only and are intended for use by suitably qualified application engineers. It is recommended that all users contact the first4seals Technical Department for advice on any new application.

environmental control options

Flush
(301A™, 301B™ & 301C™ only)
The flush connection allows the pumped fluid to be circulated from pump discharge to the seal, from seal to pump suction, or into the product from a higher pressure external source. If the flush port is not to be used it must be sealed with a 1/4" BSP plug.

Quench and Drain
(301B™, 301C™ & 301D™ only)
Connections allow control of the environment around the seal by quenching the seal and providing a drain for both quench media and seal leakage.

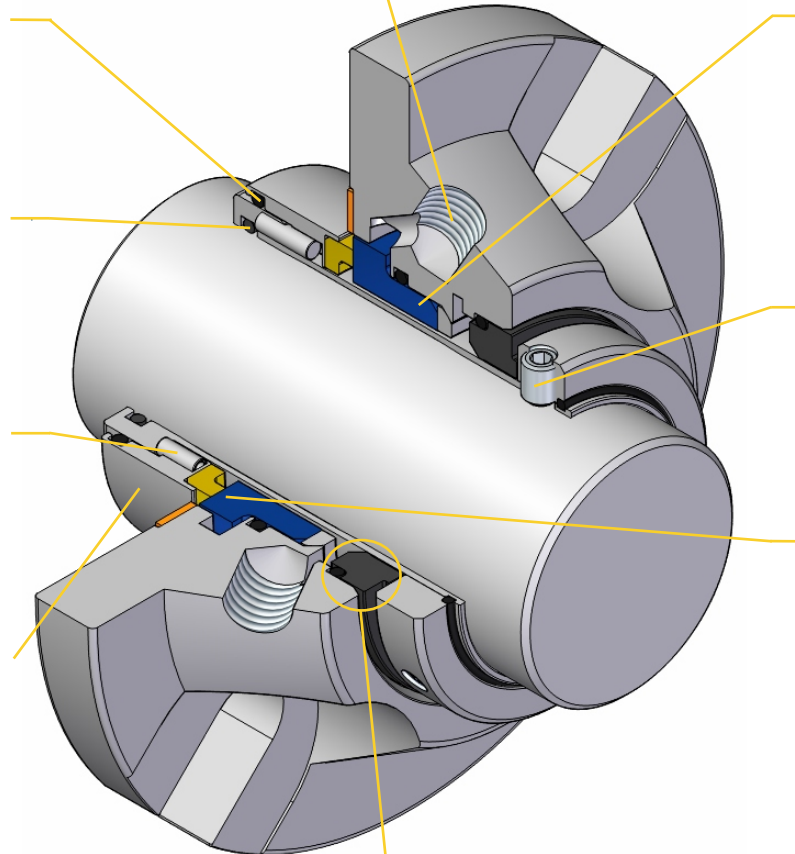


Anti clog
The dynamic o-ring moves onto a clean area as seal faces wear. Components remain free for longer seal life.

No fretting of pump shaft
The seal internal o-ring is static on the shaft and guaranteed never to fret the pump shaft or sleeve.

Springs out of fluid
The Alloy 276 springs are not in the process fluid where they could corrode or clog and so remain effective for the whole of the seal life.

Low turbulence wetted parts
The smooth contours of the wetted surfaces create very little turbulence within the seal cavity for longer lasting seal components in abrasive media use.

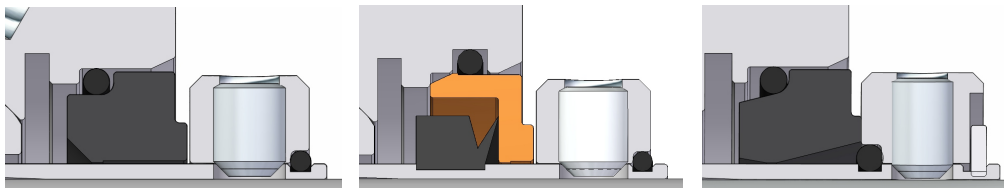


Self aligning stationary
The patented self aligning stationary eliminates fretting and spring fatigue, ensures good alignment of seal faces and provides a good 'heat sink' for cooler running with heightened face lubricity.

External clamping
The seal is automatically set to correct working length with the external drive screws. No measuring or clips are required.

Balanced
The seal is hydraulically balanced to achieve optimum face loading for high pressure capability and provide cooler running for longer seal life.

external options



Restriction bush
(301™, 301A™, 301B™ only)
The Carbon restriction bush serves three purposes: to centre the gland on the shaft, to set the seal to the correct working length and to restrict leakage when the seal eventually wears out. The bush is passive until the leaking product pressure hydraulically loads it restricting emissions to the environment.

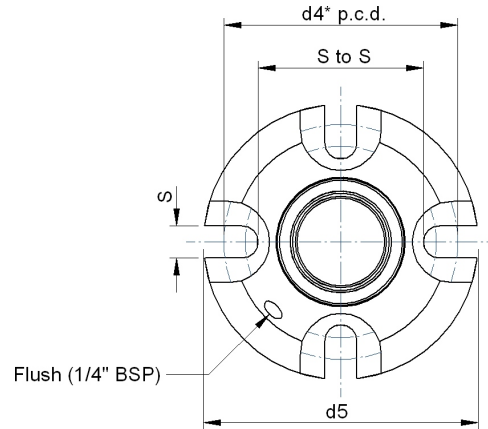
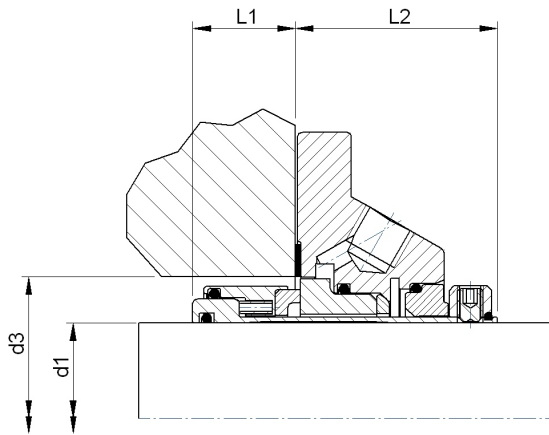
External lip seal
(301C™ only)
A conical lip seal (0.1bar/1.5psi) allows a low pressure convection tank to be added, which protects the faces from crystallisation, vacuum and dry running.

Buffer fluid seal (301D™ only)
An external low pressure (2bar / 30psi) seal designed to retain the buffer fluid and provide effective environmental control after internal seal failure. The seal also sets the correct working length and centres the gland during installation.

301™ Range

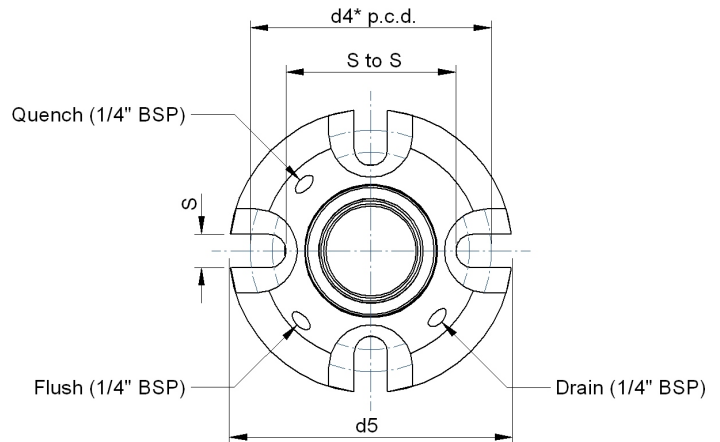
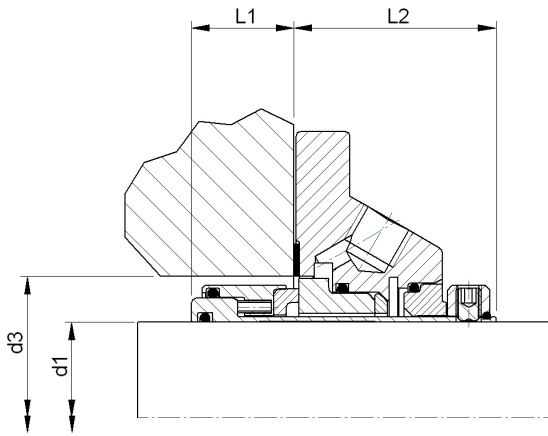
301A™ dimensional information

4 bolt fixing. Supplied with Flush port.



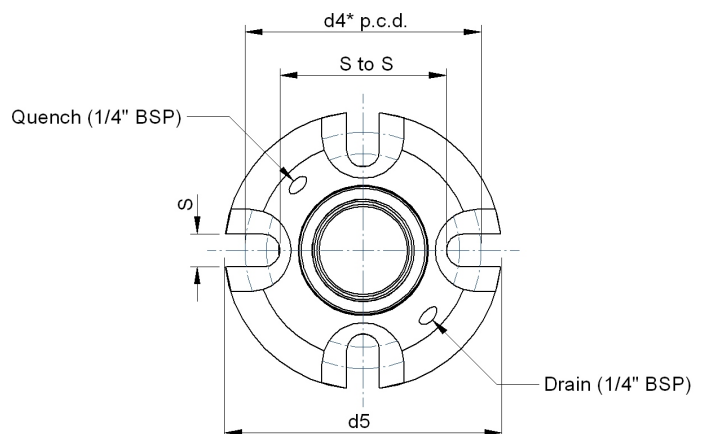
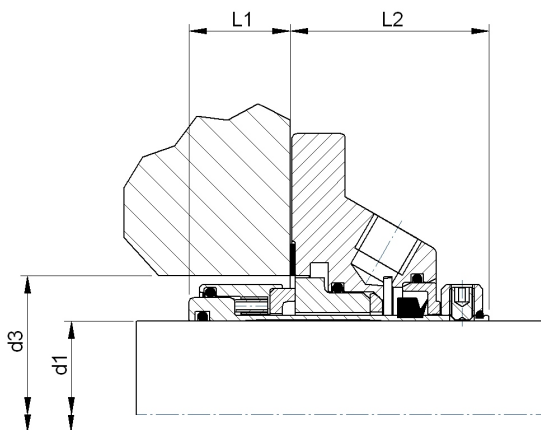
301B™ dimensional information

4 bolt fixing.
Supplied with Quench, Drain & Flush ports.



301C™ dimensional information

4 bolt fixing. Supplied with Quench & Drain ports.



301™ series - size chart

d1	d3		d4*pcd		d5	L1	L2	S to S	S
Metric	S/B I.D. Min	S/B I.D. Max	Min	Max	Gland O.D.	Inboard length	Outboard length	Slot to Slot	Slot Width
16	35.0	38.7	55.0	70.0	80.0	25.4	41.5	45.0	10.0
18	38.0	41.7	58.0	75.0	85.0	25.4	41.5	48.0	10.0
20	38.0	41.7	58.0	75.0	85.0	25.4	41.5	48.0	10.0
22	41.0	43.7	60.0	80.0	90.0	25.4	41.5	50.0	10.0
25	44.0	47.7	66.0	85.0	95.0	25.4	41.5	54.0	12.7
28	47.0	50.7	69.0	85.0	100.0	25.4	41.5	57.0	12.7
30	50.0	53.7	72.0	95.0	105.0	25.4	41.5	60.0	12.7
33	50.0	53.7	72.0	95.0	105.0	25.4	41.5	60.0	12.7
35	54.0	57.7	76.0	95.0	110.0	25.4	41.5	64.0	12.7
38	57.2	66.7	85.0	100.0	120.0	25.4	46.6	73.0	15.8
40	60.3	66.7	85.0	100.0	120.0	25.4	46.6	73.0	15.8
43	63.5	74.7	94.0	115.0	135.0	25.4	46.6	81.0	15.8
45	63.5	74.7	94.0	115.0	135.0	25.4	46.6	81.0	15.8
48	66.7	74.7	94.0	115.0	135.0	25.4	46.6	81.0	15.8
50	69.9	85.7	105.0	130.0	150.0	25.4	46.6	92.0	15.8
53	73.0	85.7	105.0	130.0	150.0	25.4	46.6	92.0	15.8
55	76.2	90.5	110.0	145.0	165.0	25.4	46.6	97.0	15.8
58	76.2	90.5	110.0	145.0	165.0	25.4	46.6	97.0	15.8
60	79.4	90.5	110.0	145.0	165.0	25.4	46.6	97.0	15.8
63	85.7	103.2	126.0	150.0	175.0	27.2	55.9	110.0	17.5
65	88.9	103.2	126.0	150.0	175.0	27.2	55.9	110.0	17.5
70	92.0	103.2	126.0	150.0	175.0	27.2	55.9	110.0	17.5
75	98.4	120.7	143.0	165.0	190.0	27.2	55.9	127.0	17.5
80	101.5	120.7	143.0	165.0	190.0	27.2	55.9	127.0	17.5
85	107.9	129.7	156.0	175.0	200.0	27.2	55.9	136.0	20.6
90	114.3	145.7	171.0	196.0	215.0	27.2	55.9	152.0	20.6
95	117.5	145.7	171.0	196.0	215.0	27.2	55.9	152.0	20.6
100	130.0	155.7	181.0	211.0	230.0	27.2	61.1	162.0	25.4
105	133.0	155.7	181.0	211.0	230.0	27.2	61.1	162.0	25.4
110	139.7	164.7	190.0	221.0	240.0	27.2	61.1	171.0	25.4
115	142.9	164.7	190.0	221.0	240.0	27.2	61.1	171.0	25.4
120	149.2	174.7	201.0	231.0	250.0	27.2	61.1	181.0	25.4
125	155.6	181.0	201.0	231.0	250.0	27.2	61.1	181.0	25.4

d1	d3		d4*pcd		d5	L1	L2	S to S	S
Imperial	S/B I.D. Min	S/B I.D. Max	Min	Max	Gland O.D.	Inboard length	Outboard length	Slot to Slot	Slot Width
0.625	1.378	1.522	2.165	2.756	3.150	1.000	1.634	1.772	0.394
0.750	1.496	1.640	2.283	2.953	3.346	1.000	1.634	1.890	0.394
0.875	1.614	1.719	2.362	3.150	3.543	1.000	1.634	1.969	0.394
1.000	1.732	1.875	2.598	3.346	3.740	1.000	1.634	2.125	0.500
1.125	1.850	1.994	2.717	3.346	3.937	1.000	1.634	2.244	0.500
1.250	1.969	2.112	2.835	3.740	4.134	1.000	1.634	2.362	0.500
1.375	2.126	2.270	2.992	3.740	4.331	1.000	1.634	2.520	0.500
1.500	2.252	2.625	3.346	3.937	4.724	1.000	1.835	2.875	0.622
1.625	2.374	2.625	3.346	3.937	4.724	1.000	1.835	2.875	0.622
1.750	2.500	2.939	3.701	4.528	5.315	1.000	1.835	3.189	0.622
1.875	2.626	2.939	3.701	4.528	5.315	1.000	1.835	3.189	0.622
2.000	2.752	3.375	4.134	5.118	5.906	1.000	1.835	3.625	0.622
2.125	2.874	3.375	4.134	5.118	5.906	1.000	1.835	3.625	0.622
2.250	3.000	3.562	4.331	5.709	6.496	1.000	1.835	3.812	0.622
2.375	3.126	3.562	4.331	5.709	6.496	1.000	1.835	3.812	0.622
2.500	3.374	4.062	4.961	5.906	6.890	1.071	2.201	4.312	0.689
2.625	3.500	4.062	4.961	5.906	6.890	1.071	2.201	4.312	0.689
2.750	3.622	4.062	4.961	5.906	6.890	1.071	2.201	4.312	0.689
2.875	3.748	4.750	5.630	6.496	7.480	1.071	2.201	5.000	0.689
3.000	3.874	4.750	5.630	6.496	7.480	1.071	2.201	5.000	0.689
3.125	3.996	4.750	5.630	6.496	7.480	1.071	2.201	5.000	0.689
3.250	4.122	5.104	6.142	6.890	7.874	1.071	2.201	5.354	0.811
3.375	4.248	5.104	6.142	6.890	7.874	1.071	2.201	5.354	0.811
3.500	4.374	5.104	6.142	6.890	7.874	1.071	2.201	5.354	0.811
3.625	4.500	5.734	6.732	7.717	8.465	1.071	2.201	5.984	0.811
3.750	4.626	5.734	6.732	7.717	8.465	1.071	2.201	5.984	0.811
3.875	4.748	5.734	6.732	7.717	8.465	1.071	2.201	5.984	0.811
4.000	5.118	6.128	7.126	8.307	9.055	1.071	2.406	6.378	1.000
4.125	5.236	6.128	7.126	8.307	9.055	1.071	2.406	6.378	1.000
4.250	5.374	6.128	7.126	8.307	9.055	1.071	2.406	6.378	1.000
4.375	5.500	6.482	7.480	8.701	9.449	1.071	2.406	6.732	1.000
4.500	5.626	6.482	7.480	8.701	9.449	1.071	2.406	6.732	1.000
4.625	5.752	6.482	7.480	8.701	9.449	1.071	2.406	6.732	1.000
4.750	5.874	7.125	7.913	9.094	9.843	1.071	2.406	7.375	1.000
4.875	6.000	7.125	7.913	9.094	9.843	1.071	2.406	7.375	1.000
5.000	6.126	7.125	7.913	9.094	9.843	1.071	2.406	7.375	1.000

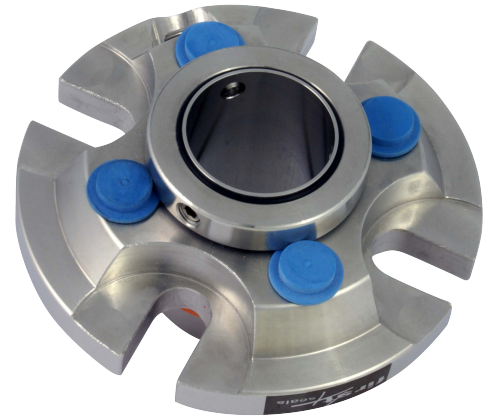
*Based on the largest bolt diameter (specials can be produced)

the green issue

303A™ cartridge seals can be fully refurbished, most parts being “re-used”.

application

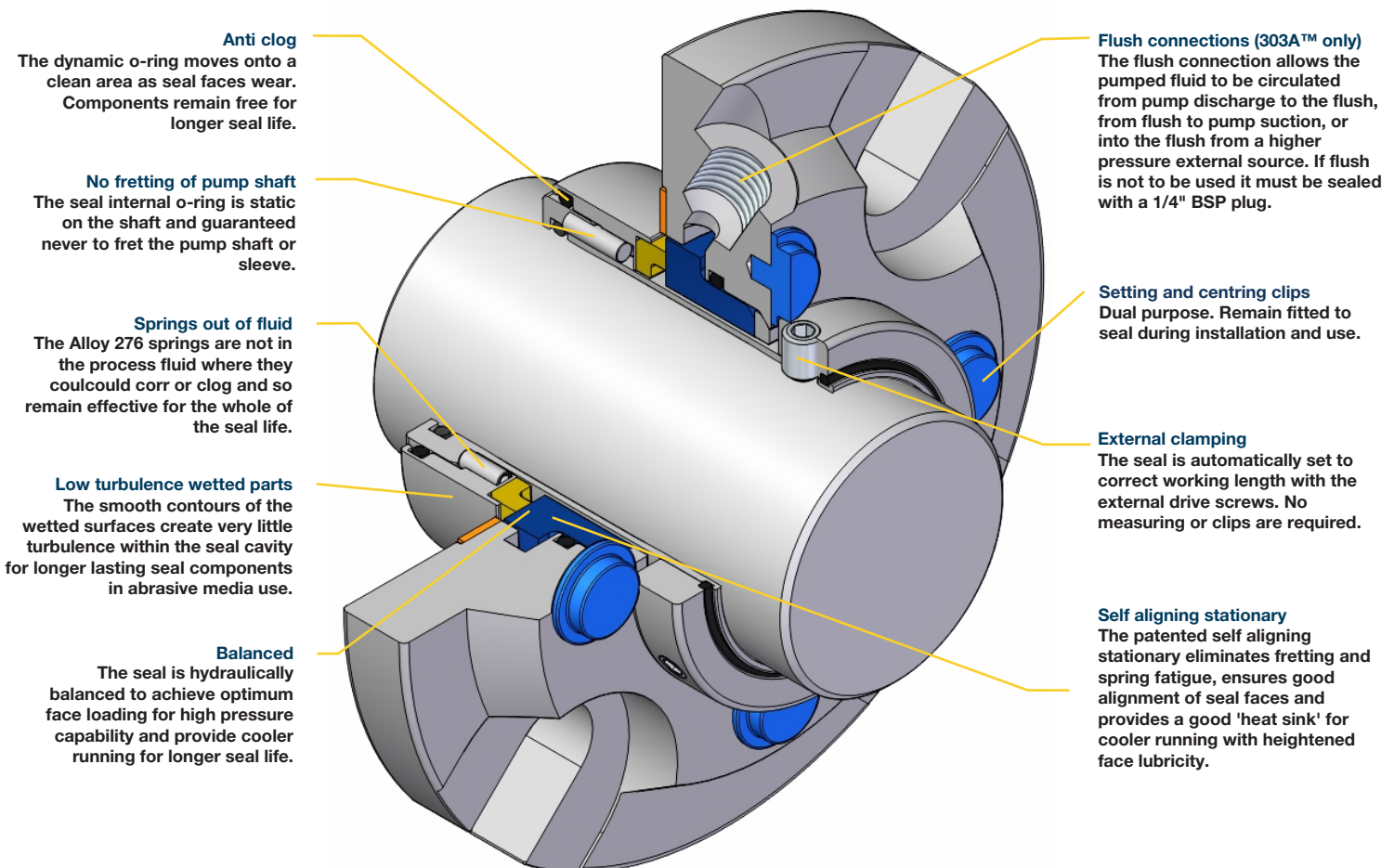
Designed as a compact single cartridge seal to fit most pump installations, the 303A™ is an excellent general purpose sealing solution and includes a flush connection as standard.



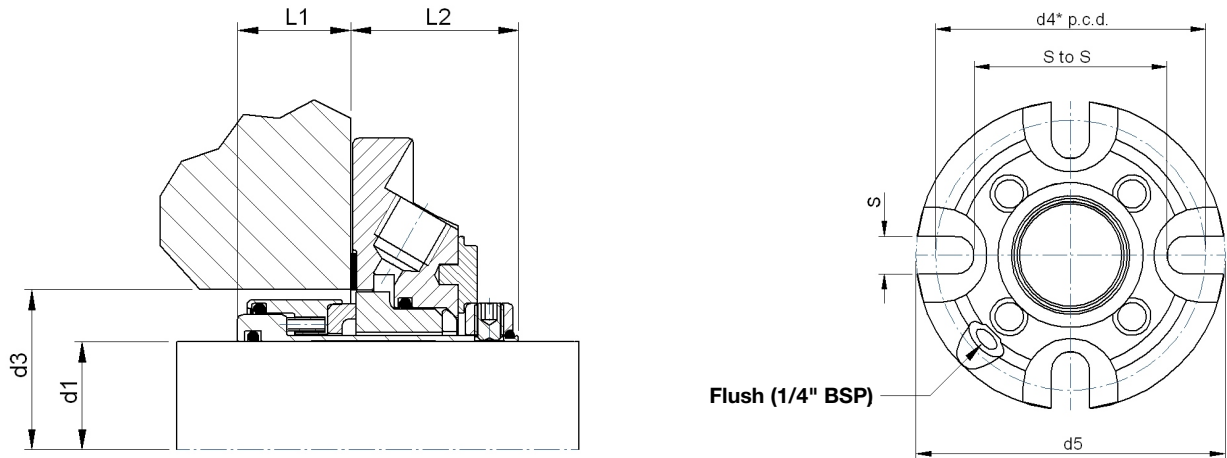
303A™ series - technical specification

metal parts	316 Stainless Steel as standard, other materials also available.	stationary	Alumina Ceramic, Silicon Carbide or Tungsten Carbide available as standard.
springs	Alloy 276	temperature limits	-30°C to 260°C (-22°F to 500°F) dependent upon specified elastomer and system configuration.
o-rings	Viton® (Fluorocarbon) or Ethylene Propylene (EPR) as standard. Aflas®, Kalrez® and other elastomers available to order.	pressure limits	711mm HG Vacuum to 30 Bar (-28" HG - 440 PSI).
rotary face	Carbon, Silicon Carbide or Tungsten Carbide as standard. Antimony Carbon available on request.		

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303A™ series - size chart



d1	d3		d4*pcd		d5	L1	L2	S to S	S
Metric	S/B I.D. Min	S/B I.D. Max	Min	Max	Gland O.D.	Inboard length	Outboard length	Slot to Slot	Slot Width
16	32.0	38.7	55.0	70.0	80.0	23.2	33.4	45.0	10.0
18	34.0	40.7	57.0	72.0	82.0	23.2	33.4	47.0	10.0
19	35.0	41.7	59.0	75.0	85.0	23.2	33.4	48.0	10.0
20	36.0	41.7	59.0	75.0	85.0	23.2	33.4	48.0	10.0
22	38.0	45.7	62.0	80.0	90.0	23.2	33.4	52.0	10.0
24	40.0	48.7	67.0	83.0	95.0	23.2	33.4	55.0	12.7
25	41.0	48.7	67.0	83.0	95.0	23.2	33.4	55.0	12.7
28	44.0	50.7	69.0	88.0	100.0	23.2	33.4	57.0	12.7
30	46.0	53.7	72.0	90.0	102.0	23.2	33.4	60.0	12.7
32	48.0	55.7	74.0	93.0	105.0	23.2	33.4	60.0	12.7
33	49.0	55.7	74.0	93.0	105.0	23.2	35.2	60.0	12.7
35	51.0	61.7	80.0	98.0	110.0	23.2	35.2	68.0	12.7
38	58.0	66.7	87.0	106.0	120.0	23.2	35.2	73.0	15.8
40	60.0	66.7	87.0	106.0	120.0	23.2	35.2	73.0	15.8
43	63.0	74.7	95.0	116.0	130.0	23.2	35.2	81.0	15.8
45	65.0	74.7	95.0	116.0	130.0	23.2	35.2	81.0	15.8
48	68.0	81.7	102.0	126.0	140.0	23.2	37.2	88.0	15.8
50	70.0	81.7	102.0	126.0	140.0	23.2	37.2	88.0	15.8
53	73.0	85.7	107.0	136.0	150.0	23.2	37.2	92.0	15.8
55	75.0	85.7	107.0	136.0	150.0	23.2	37.2	92.0	15.8
58	78.0	91.7	112.0	146.0	160.0	23.2	37.2	98.0	15.8
60	80.0	91.7	112.0	146.0	160.0	23.2	37.2	98.0	15.8
63	86.0	103.7	128.0	159.0	175.0	27.2	42.2	110.0	17.5
65	89.0	103.7	128.0	159.0	175.0	27.2	42.2	110.0	17.5
68	92.0	103.7	128.0	159.0	175.0	27.2	42.2	110.0	17.5
70	92.0	103.7	128.0	159.0	175.0	27.2	42.2	110.0	17.5
75	99.0	120.7	145.0	174.0	190.0	27.2	42.2	127.0	17.5
80	102.0	120.7	145.0	174.0	190.0	27.2	42.2	127.0	17.5

d1	d3		d4*pcd		d5	L1	L2	S to S	S
Imperial	S/B I.D. Min	S/B I.D. Max	Min	Max	Gland O.D.	Inboard length	Outboard length	Slot to Slot	Slot Width
0.625	1.260	1.522	2.165	2.756	3.150	0.913	1.315	1.772	0.394
0.750	1.378	1.640	2.323	2.953	3.346	0.913	1.315	1.890	0.394
0.875	1.496	1.797	2.441	3.150	3.543	0.913	1.315	2.047	0.394
1.000	1.614	1.915	2.638	3.268	3.740	0.913	1.315	2.165	0.500
1.125	1.772	2.112	2.835	3.543	4.016	0.913	1.315	2.362	0.500
1.250	1.890	2.191	2.913	3.661	4.134	0.913	1.315	2.441	0.500
1.375	2.008	2.427	3.150	3.858	4.331	0.913	1.386	2.677	0.500
1.500	2.283	2.624	3.425	4.173	4.724	0.913	1.386	2.874	0.622
1.625	2.402	2.703	3.504	4.370	4.921	0.913	1.386	2.953	0.622
1.750	2.559	2.939	3.740	4.567	5.118	0.913	1.386	3.189	0.622
1.875	2.677	3.215	4.016	4.961	5.512	0.913	1.465	3.465	0.622
2.000	2.756	3.215	4.016	4.961	5.512	0.913	1.465	3.465	0.622
2.125	2.913	3.375	4.213	5.354	5.906	0.913	1.465	3.625	0.622
2.250	3.071	3.608	4.409	5.748	6.299	0.913	1.465	3.858	0.622
2.375	3.150	3.608	4.409	5.748	6.299	0.913	1.465	3.858	0.622
2.500	3.386	4.081	5.039	6.260	6.890	1.071	1.661	4.331	0.689
2.625	3.504	4.081	5.039	6.260	6.890	1.071	1.661	4.331	0.689
2.750	3.622	4.081	5.039	6.260	6.890	1.071	1.661	4.331	0.689
2.875	3.740	4.750	5.709	6.850	7.480	1.071	1.661	5.000	0.689
3.000	3.898	4.750	5.709	6.850	7.480	1.071	1.661	5.000	0.689
3.125	4.016	4.750	5.709	6.850	7.480	1.071	1.661	5.000	0.689

*Based on the largest bolt diameter (specials can be produced)

first4seals product range

single spring seals



component seals



MV™ single rotary cartridge seals



301™/303A™ single rotary cartridge seals



302™ double rotary cartridge seals



f4s100™ single stationary cartridge seals



f4s200™ double stationary cartridge seals



seal support systems



THIS DOCUMENT IS DESIGNED TO PROVIDE DIMENSIONAL DATA AND IS NOT AN INDICATION OF AVAILABILITY FROM STOCK. SOME DESIGNS MAY BE SUBJECT TO MINIMUM ORDER QUANTITIES AND MANUFACTURING LEAD TIMES.



FM61505

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