

PART OF A FAMILY
OF PRODUCTS
AWARDED THE
QUEENS AWARD FOR
ENTERPRIZE:
INNOVATION

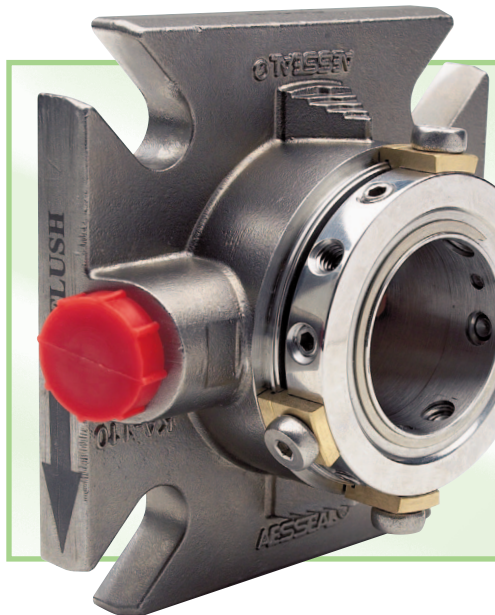


THE QUEEN'S AWARDS
FOR ENTERPRIZE:
INNOVATION
2006 - 2009



ENVIRONMENTAL TECHNOLOGY

SMSS™ Cartridge Single Mechanical Seal



- **PATENTED DESIGN**
- **CARTRIDGE SEAL**
- **STATIONARY DESIGN**
- **MONOLITHIC SEAL FACES**
- **TANGENTIAL FLUSH PORTS**

SMSS™ - high performance sealing solution

AESSEAL® is one of the leading global specialists in the design and manufacture of Mechanical Seals, Support Systems, Bearing Protectors and Shaft Packing.



The AESSEAL plc Group Headquarters, Rotherham, UK

Designing, manufacturing and distributing precision engineered mechanical seals and associated products. The company sets new standards in performance, reliability, cost and service.

Service has been the key to AESSEAL® success and is at the core of the company purpose statement:

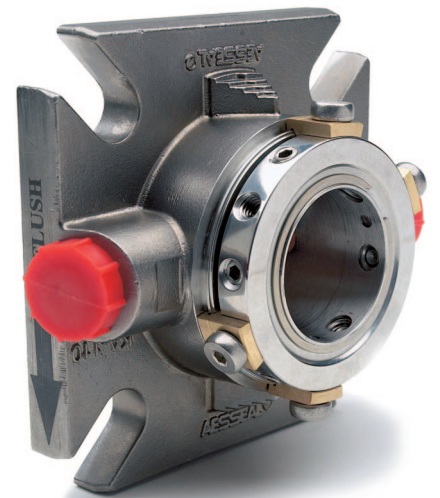
“To give our customers such exceptional service that they need never consider alternative sources of supply.”

Our innovative products are continually improving through design excellence, this helps us achieve superior performance in a very competitive industry.

Industry leading modular design is proven to decrease costs and increase equipment up-time.

Following the success of the DMSF™ and after an extensive development period, the AESSEAL® SMSS™ range of single cartridge mechanical seals builds on the universal and highly successful CURC™ range.

The SMSS™ is not a replacement for the CURC™ range. The unique SMSS™ design features extend the range of applications that can be sealed by AESSEAL® products.



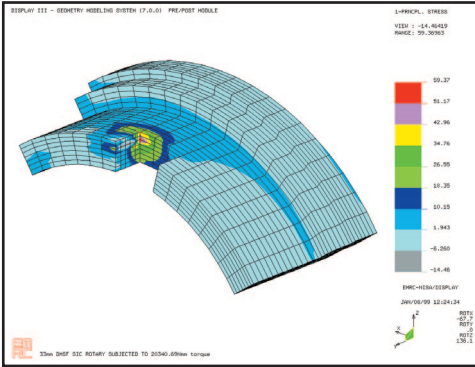
The SMSS™ was extensively tested at different temperatures on various seal sizes with different face combinations. Results showed it outperformed similar products in its class in many different areas.

The SMSS™ is part of the AESSEAL® modular sealing system. This combined with extensive inventory levels ensure that ANY standard SMSS™ in any size or material combination is available for immediate despatch.



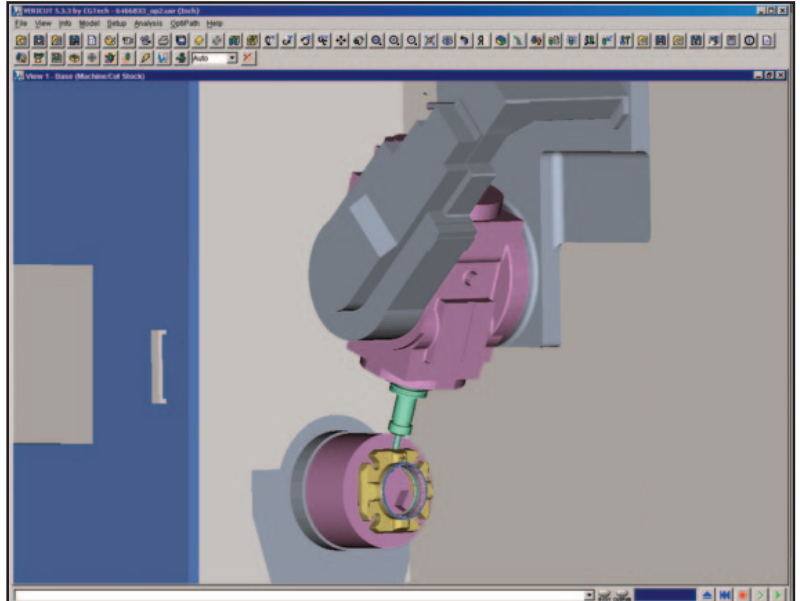
Extensive AESSEAL® test facilities

SMSS™ - design and development

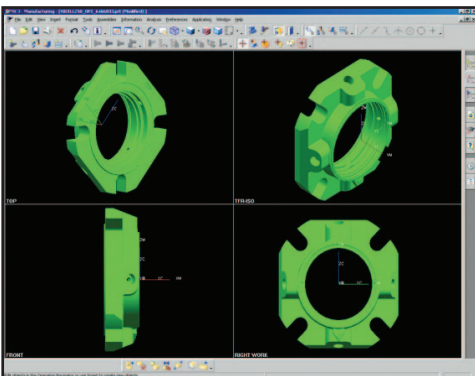


Finite Element Analysis Computer Simulation

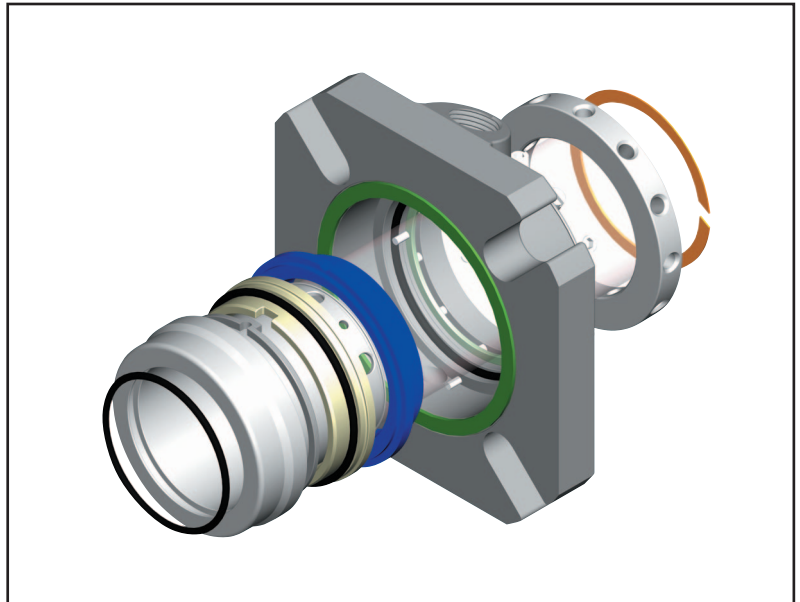
Thorough design simulation using Computer Aided Engineering (CAE) and Finite Element Analysis (FEA) was conducted prior to physical tests. This computer evaluation helped to increase the reliability of the prototypes and reduce the seal development time.



SMSS™ Simulation of Multi-axis Machining



Manufacturing Verification Animation

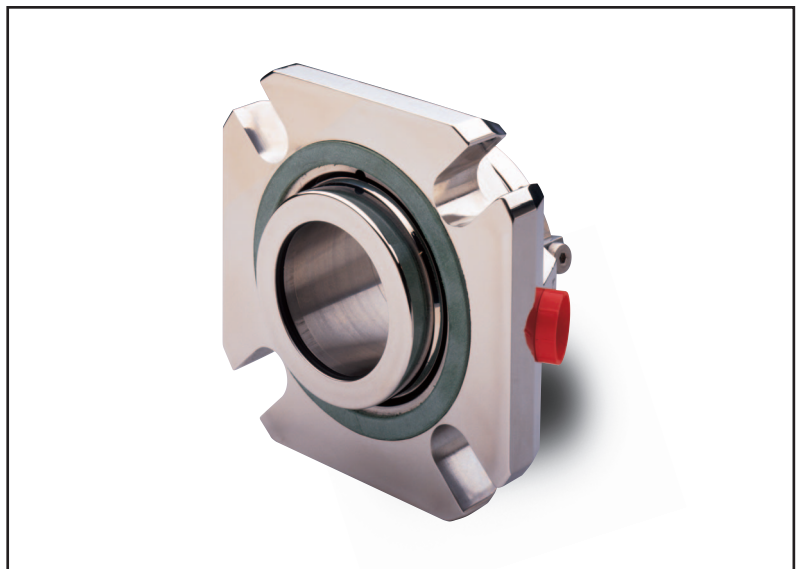


SMSS™ 3D Shaded Model

This world class product is achieved with the use of state of the art manufacturing methods and equipment, ensuring that the technically sophisticated design is produced to exacting standards.



One of several AESSEAL® manufacturing facilities



SMSS™ Finished Seal

SMSS™ - design features

The AESSEAL® range of single cartridge mechanical seals has been specifically designed to eliminate some of the main causes of premature mechanical seal failure.

The small SMSS™ design includes the following features;

a. Monolithic Seal Faces

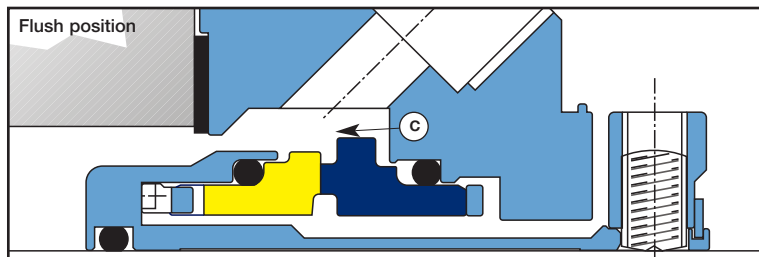
All seal faces are of monolithic construction and therefore are less likely to face rotate in high or low temperature applications.

b. Seal Face Drive Mechanism

Finite Element Analysis has been used to optimize seal face drive. Precise, solid machined drive lugs reduce drive slop between the drive ring and seal face. This is beneficial on equipment start-up / shut-down when using brittle monolithic face materials such as Silicon Carbide or Carbon.

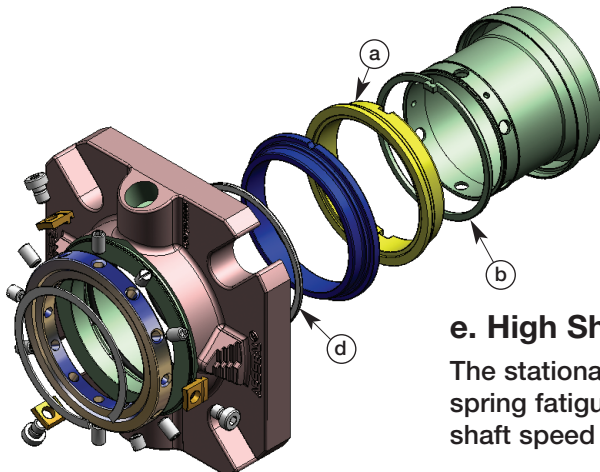
c. Optimized Seal Environment

All environmental control ports are 3/8" NPT, helping to maximize the cooling effect. Two flush ports, positioned directly over the seal faces, provide the option of tangential flushing irrespective of shaft rotational direction.



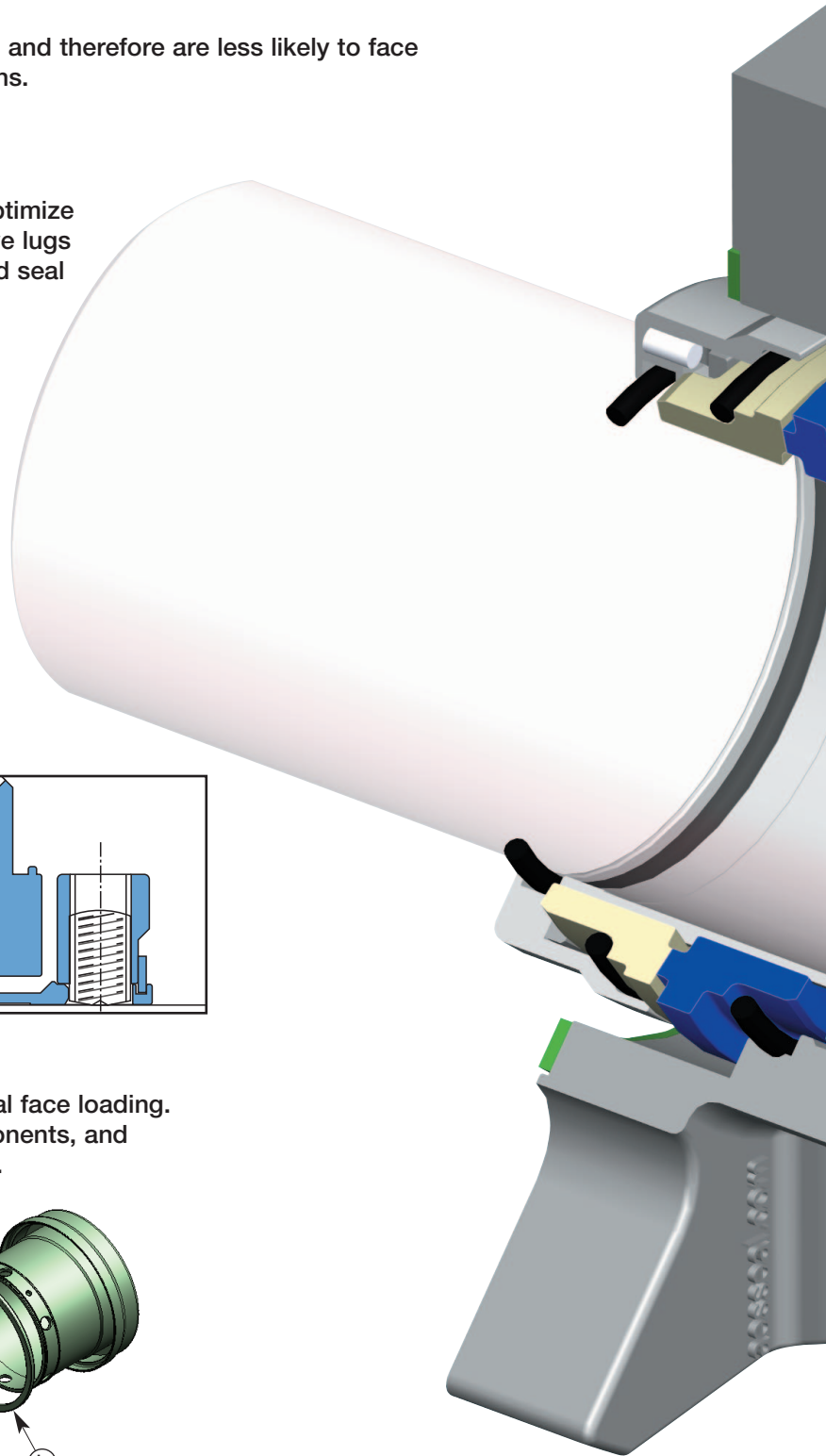
d. Optimized Seal Face Loading

The multi-spring design ensures uniform seal face loading. In addition all springs act on metallic components, and therefore cannot damage or chip seal faces.



e. High Shaft Speed Applications

The stationary seal construction helps to minimize spring fatigue for optimum performance on high shaft speed applications.



Like the small range, the range of large SMSS™ seals has been specifically designed to enhance mechanical seal performance.

The large SMSS™ design includes the following features;

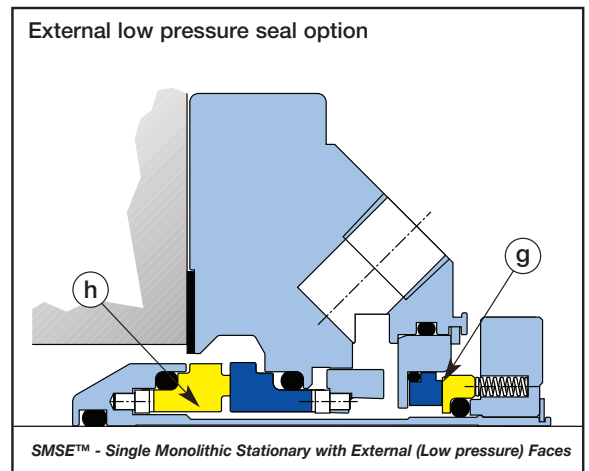
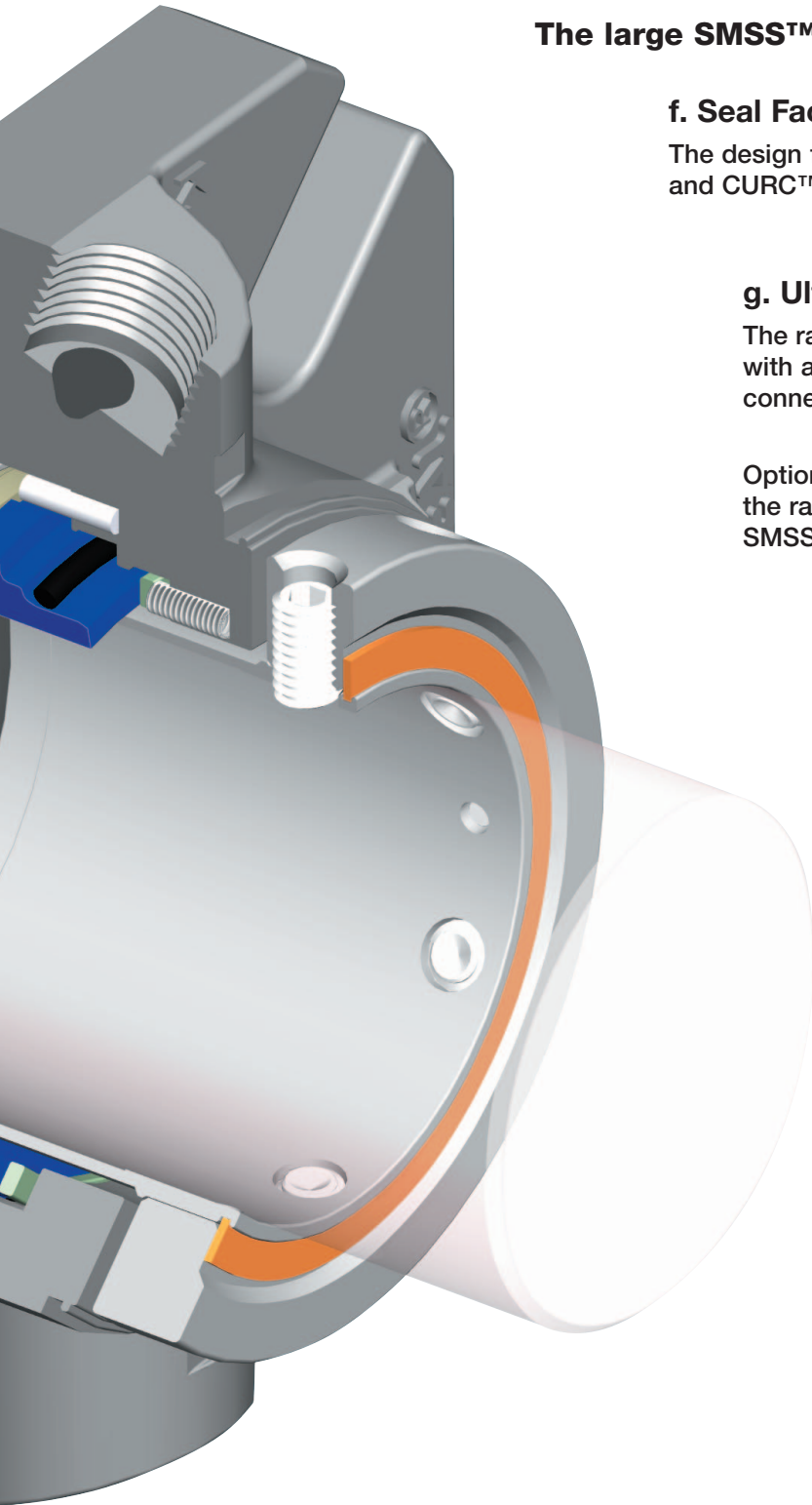
f. Seal Face Design

The design for the SMSS™ seal employs many standard DMSF™ and CURC™ components thereby maximizing modularity.

g. Ultimate Flexibility

The range of large SMSS™ seals is offered as standard with an external restriction bush and quench & drain connections.

Optional low pressure external seal faces (SMSE™) extend the range of applications which may be sealed by the SMSS™ family of products.



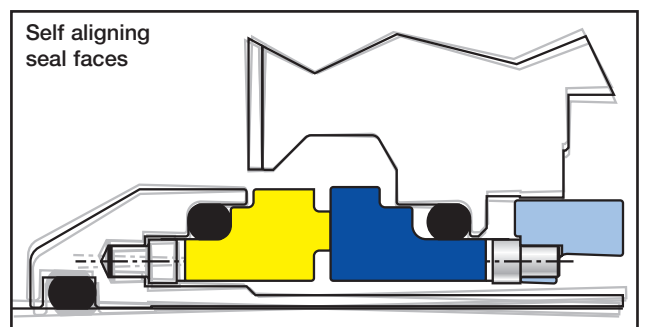
h. Heat generation

Achieving technical performance whilst maximizing modularity is a prime objective in the design of all AESSEAL® products.

All SMSS™ seals are supplied with “thin” inboard seal faces. This reduces heat generation at the seal faces and minimizes the heat load on the seal cooling / flushing system.

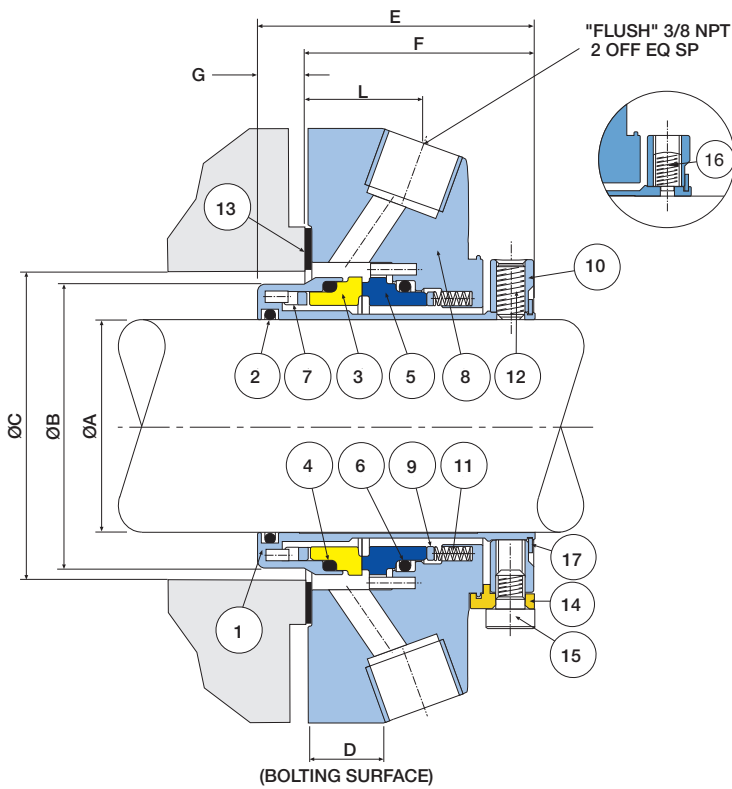
i. Self Aligning Stationary Seal Faces

The stationary seal face is spring loaded which compensates for angular mis-alignment between the shaft and the housing.

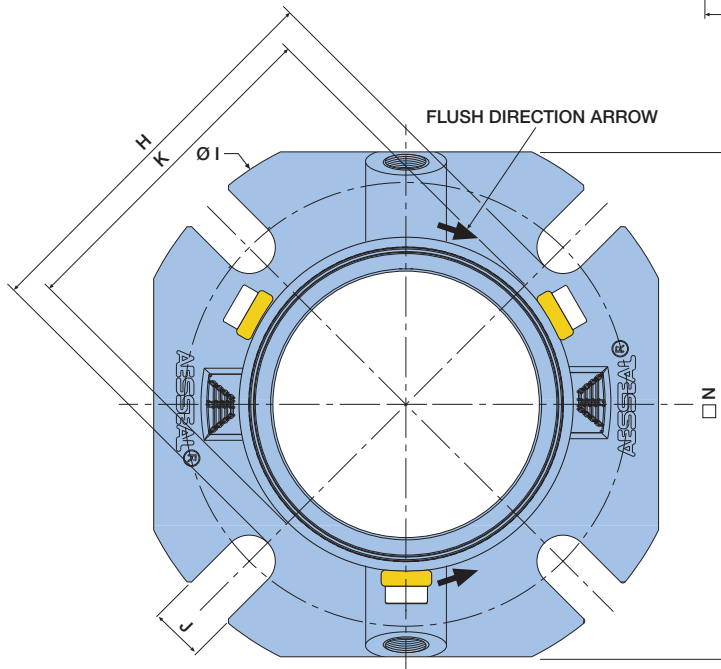
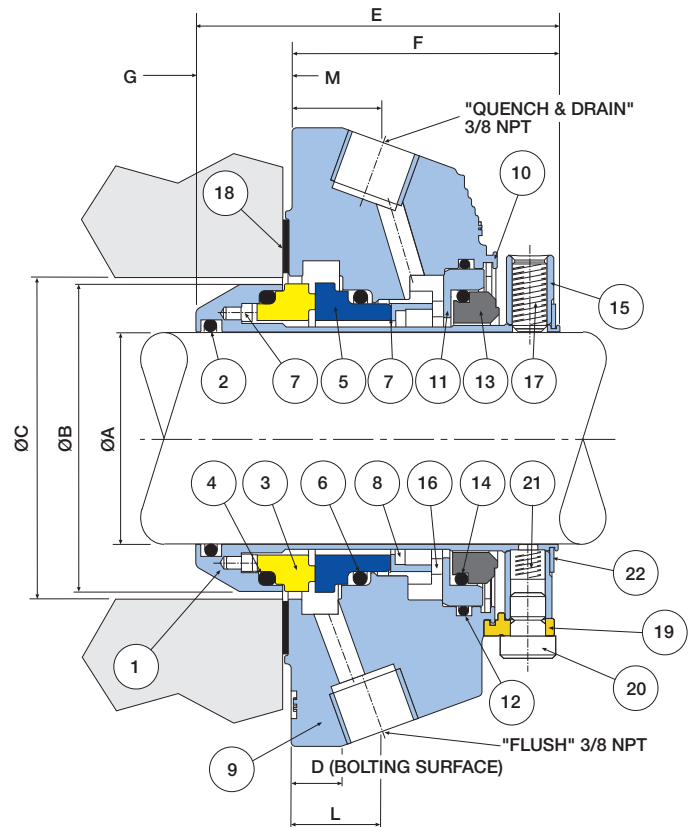


SMSS™ - technical information

24mm-70mm / 1.000"-2.750"



75mm-125mm / 2.875"-5.000"



The SMSS™ is available as an externally mounted cartridge seal (CSMSS™) for applications which have inboard length or radial space restrictions. Contact AESSEAL® for further information.

EXOTIC ALLOY SEALS

Contact AESSEAL® for availability of Exotic Alloy options.

materials of construction and size charts - 24mm-70mm / 1.000"-2.750"

Item	Description	Material
1	Sleeve	316L SS
2	Sleeve O Ring	Viton® / EPR / Kalrez® / Aflas®
3	Rotary Face	SiC / TC
4	Rotary Face O Ring	Viton® / EPR / Kalrez® / Aflas®
5	Stationary Face	Carbon / SiC / TC
6	Stationary Face O Ring	Viton® / EPR / Kalrez® / Aflas®
7	Drive Ring	316L SS
8	Gland	316 SS
9	Spring Plate	316L SS
10	Clamp Ring	316L SS
11	Springs	Alloy 276
12	Drive Screws	Stainless Steel
13	Gasket	AF1 / GFT
14	Setting Clips	Brass
15	Setting Clip Screws	Stainless Steel
16	Anti-tamper Screws	Stainless Steel
17	External Circlip	Stainless Steel



Standard ISO / ANSI Box Bore

Seal Size	ØA	ØB	ØC		D	E	F	G	H	ØI	J	K	L	N
			Min	Max										
24.0	24.0	38.0	40.0	48.0	11.9	55.7	45.7	10.0	61.0	105.0	14.0	51.0	20.5	99.0
25.0	25.0	39.0	41.0	51.0	11.9	55.7	45.7	10.0	61.0	105.0	14.0	51.0	20.5	101.6
28.0	28.0	42.6	44.0	54.0	11.9	55.7	45.7	10.0	65.0	111.0	14.0	55.5	20.3	99.0
30.0	30.0	44.1	46.0	54.0	11.9	55.7	45.7	10.0	64.6	105.0	14.0	56.4	20.3	97.8
32.0	32.0	47.1	49.0	57.0	14.0	55.7	45.7	10.0	66.5	105.0	14.0	59.5	21.2	99.0
33.0	33.0	47.1	49.0	57.0	14.0	55.7	45.7	10.0	66.5	105.0	14.0	59.5	21.2	99.0
35.0	35.0	49.0	51.0	59.0	13.2	55.7	45.7	10.0	68.5	111.0	14.0	61.5	21.5	104.1
38.0	38.0	52.9	57.0	70.0	16.0	57.6	47.6	10.0	80.7	135.0	14.0	70.7	24.6	114.3
40.0	40.0	54.8	59.0	70.5	16.0	57.6	47.6	10.0	80.7	135.0	14.0	70.7	24.6	114.3
43.0	43.0	56.1	61.0	70.5	15.5	57.6	47.6	10.0	80.7	135.0	14.0	70.7	20.5	114.3
45.0	45.0	59.3	64.0	75.0	16.0	57.6	47.6	10.0	83.7	139.0	14.0	75.7	24.3	117.5
48.0	48.0	62.4	66.6	75.0	16.0	57.6	47.6	10.0	83.7	139.0	14.0	75.7	24.3	117.5
50.0	50.0	65.3	70.0	78.0	16.0	57.6	47.6	10.0	87.6	150.0	17.5	79.0	24.3	124.5
53.0	53.0	68.8	73.0	87.0	15.5	57.6	47.6	10.0	97.0	150.0	17.5	85.0	22.5	136.5
55.0	55.0	68.8	73.0	87.0	15.5	57.6	47.6	10.0	97.0	150.0	17.5	85.0	22.5	136.5
58.0	58.0	72.0	76.2	92.0	16.0	57.6	47.6	10.0	102.4	164.5	17.5	88.7	24.6	139.7
60.0	60.0	75.2	80.0	92.0	16.0	57.6	47.6	10.0	102.4	164.5	17.5	88.7	24.6	139.7
63.0	63.0	78.3	83.0	98.5	16.0	57.6	47.6	10.0	108.7	171.0	17.5	96.1	23.7	147.4
65.0	65.0	81.5	86.0	98.5	16.0	57.6	47.6	10.0	108.7	171.0	17.5	96.1	23.7	147.4
70.0	70.0	84.7	89.0	100.0	16.0	57.6	47.6	10.0	111.9	180.5	17.5	98.3	24.3	152.4
1.000	1.000	1.538	1.625	2.000	0.469	2.194	1.800	0.394	2.401	4.134	0.551	2.008	0.807	3.900
1.125	1.125	1.678	1.750	2.125	0.469	2.194	1.800	0.394	2.559	4.375	0.551	2.183	0.800	4.000
1.250	1.250	1.853	1.875	2.250	0.551	2.194	1.800	0.394	2.618	4.134	0.551	2.340	0.835	3.900
1.375	1.375	1.932	2.000	2.312	0.520	2.194	1.800	0.394	2.697	4.375	0.551	2.418	0.846	4.100
1.500	1.500	2.084	2.250	2.750	0.630	2.269	1.875	0.394	3.177	5.315	0.551	2.783	0.970	4.500
1.625	1.625	2.209	2.375	2.750	0.610	2.269	1.875	0.394	3.177	5.315	0.551	2.783	0.807	4.500
1.750	1.750	2.334	2.500	2.937	0.630	2.269	1.875	0.394	3.297	5.475	0.551	2.982	0.957	4.625
1.875	1.875	2.459	2.625	2.937	0.630	2.269	1.875	0.394	3.297	5.475	0.551	2.982	0.957	4.625
2.000	2.000	2.569	2.750	3.062	0.630	2.269	1.875	0.394	3.450	5.906	0.689	3.108	0.970	4.900
2.125	2.125	2.709	2.875	3.437	0.610	2.269	1.875	0.394	3.821	5.906	0.689	3.346	0.970	5.375
2.250	2.250	2.834	3.000	3.625	0.630	2.269	1.875	0.394	4.030	6.475	0.689	3.493	0.970	5.500
2.375	2.375	2.959	3.125	3.625	0.630	2.269	1.875	0.394	4.030	6.475	0.689	3.493	0.970	5.500
2.500	2.500	3.084	3.250	3.875	0.630	2.269	1.875	0.394	4.280	6.725	0.689	3.785	0.933	5.800
2.625	2.625	3.209	3.375	3.875	0.630	2.269	1.875	0.394	4.280	6.725	0.689	3.785	0.933	5.800
2.750	2.750	3.334	3.500	3.937	0.630	2.269	1.875	0.394	4.405	7.100	0.689	3.871	0.957	6.000

Large ISO / ANSI Plus Box Bore

Seal Size	ØA	ØB	ØC		D	E	F	G	H	ØI	J	K	L	□N
			Min	Max										
35.0	35.0	49.0	73.0	77.8	12.5	55.7	45.7	10.0	87.6	136.5	14.0	64.7	18.0	108.0
1.125	1.125	1.678	2.625	2.750	0.529	2.194	1.800	0.394	3.199	5.000	0.551	2.232	0.807	3.990
1.375	1.375	1.932	2.875	3.062	0.492	2.194	1.800	0.394	3.449	5.375	0.551	2.549	0.707	4.250
1.750	1.750	2.459	3.500	4.000	0.644	2.269	1.875	0.394	4.449	6.750	0.551	3.035	0.941	5.480
1.875	1.875	2.459	3.500	4.000	0.644	2.269	1.875	0.394	4.449	6.750	0.551	3.035	0.941	5.480
2.125	2.125	2.709	3.875	4.187	0.733	2.269	1.875	0.394	4.661	7.600	0.689	3.285	0.855	6.205
2.500	2.500	3.209	4.500	4.812	0.703	2.269	1.875	0.394	5.411	8.225	0.689	3.785	0.935	6.705
2.625	2.625	3.209	4.500	4.812	0.703	2.269	1.875	0.394	5.411	8.225	0.689	3.785	0.935	6.705

materials of construction and size charts - 75mm-125mm / 2.875"-5.000"

Item	Description	Material
1	Sleeve	316L SS
2	Sleeve O Ring	Viton® / EPR / Kalrez® / Aflas®
3	Rotary Face	Carbon / TC / SiC
4	Rotary Face O Ring	Viton® / EPR / Kalrez® / Aflas®
5	Stationary Face	SiC / TC
6	Stationary Face O Ring	Viton® / EPR / Kalrez® / Aflas®
7	Drive Pin	Stainless Steel
8	Spring Plate	316L SS
9	Gland	316 SS
10	Snap Ring	Stainless Steel
11	Spool Carrier	316L SS
12	Spool Carrier O Ring	Viton® / EPR / Kalrez® / Aflas®
13	Restriction Bush	Carbon
14	Restriction Bush O Ring	Viton® / EPR / Kalrez® / Aflas®
15	Clamp Ring	316L SS
16	Internal Springs	Alloy 276
17	Drive Screws	Stainless Steel
18	Gasket	AF1 / GFT
19	Setting Clips	Brass
20	Setting Clip Screws	Stainless Steel
21	Anti-tamper Screws	Stainless Steel
22	External Circlip	Stainless Steel

Standard ISO / ANSI Box Bore

Seal Size	ØA	ØB	ØC		D	E	F	G	H	ØI	J	K	L	M	N
			Min	Max											
75.0	75.0	98.0	101.6	117.5	25.8	83.5	63.5	20.0	131.4	189.3	17.5	115.3	23.0	36.1	169.4
80.0	80.0	104.4	108.0	127.0	25.8	83.5	63.5	20.0	131.4	201.9	21.0	115.3	23.0	36.1	169.4
85.0	85.0	107.6	111.1	127.0	25.8	83.5	63.5	20.0	142.5	201.9	21.0	124.8	23.0	36.1	182.1
90.0	90.0	113.9	117.5	136.5	25.8	83.5	63.5	20.0	152.0	214.6	21.0	134.4	23.0	36.1	194.8
95.0	95.0	117.1	120.0	136.5	25.8	83.5	63.5	20.0	152.0	214.6	21.0	134.4	23.0	36.1	194.8
100.0	100.0	123.4	127.0	139.7	25.8	83.5	63.5	20.0	155.2	227.3	21.0	137.5	23.0	36.1	207.5
105.0	105.0	129.8	133.4	152.4	25.8	83.5	63.5	20.0	168.0	240.0	21.0	150.2	23.0	36.1	216.2
110.0	110.0	136.1	139.7	152.4	25.8	83.5	63.5	20.0	168.0	240.0	21.0	150.2	23.0	36.1	216.2
115.0	115.0	142.5	146.1	165.1	25.8	83.5	63.5	20.0	180.6	252.7	24.0	162.9	23.0	36.1	235.7
120.0	120.0	142.5	146.1	165.1	25.8	83.5	63.5	20.0	180.6	252.7	24.0	162.9	23.0	36.1	235.7
125.0	125.0	148.8	152.4	165.1	25.8	83.5	63.5	20.0	180.6	252.7	24.0	162.9	23.0	36.1	235.7
2.875	2.875	3.735	3.875	4.625	1.015	3.286	2.500	0.786	5.173	7.450	0.689	4.539	0.906	1.423	6.670
3.000	3.000	3.860	4.000	4.625	1.015	3.286	2.500	0.786	5.173	7.450	0.689	4.539	0.906	1.423	6.670
3.125	3.125	3.985	4.125	4.625	1.015	3.286	2.500	0.786	5.173	7.450	0.689	4.539	0.906	1.423	6.670
3.250	3.250	4.110	4.250	5.000	1.015	3.286	2.500	0.786	5.611	7.950	0.827	4.914	0.906	1.423	7.170
3.375	3.375	4.235	4.375	5.000	1.015	3.286	2.500	0.786	5.611	7.950	0.827	4.914	0.906	1.423	7.170
3.500	3.500	4.360	4.500	5.000	1.015	3.286	2.500	0.786	5.611	7.950	0.827	4.914	0.906	1.423	7.170
3.625	3.625	4.485	4.625	5.375	1.015	3.286	2.500	0.786	5.986	8.450	0.827	5.289	0.906	1.423	7.670
3.750	3.750	4.610	4.750	5.375	1.015	3.286	2.500	0.786	5.986	8.450	0.827	5.289	0.906	1.423	7.670
3.875	3.875	4.860	5.000	5.500	1.015	3.286	2.500	0.786	6.111	8.950	0.827	5.414	0.906	1.423	8.170
4.000	4.000	4.860	5.000	5.500	1.015	3.286	2.500	0.786	6.111	8.950	0.827	5.414	0.906	1.423	8.170
4.125	4.125	5.110	5.250	6.000	1.015	3.286	2.500	0.786	6.611	9.450	0.827	5.914	0.906	1.423	8.510
4.250	4.250	5.110	5.250	6.000	1.015	3.286									

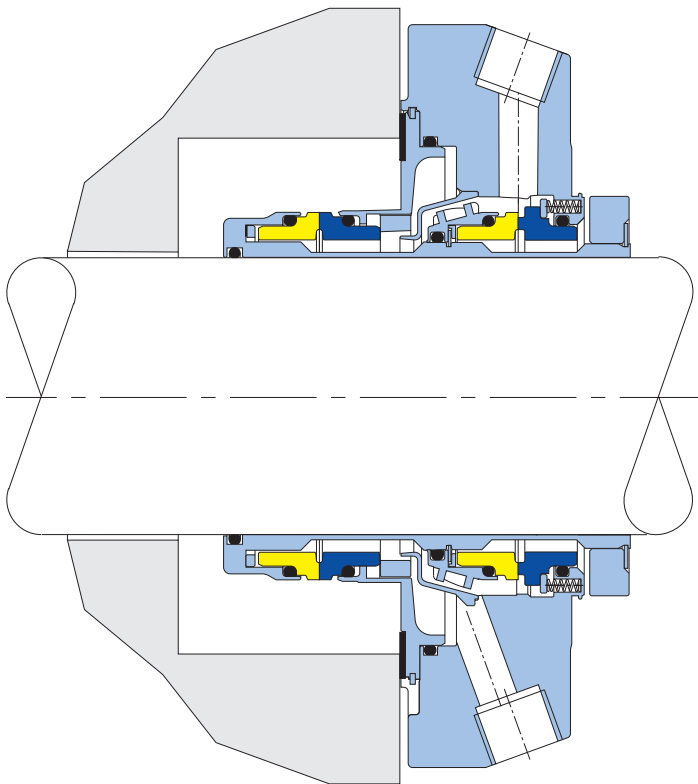
DMSF™ - Double Monolithic Stationary Flow

The SMSS™ range of Single Monolithic Stationary seals is complemented by the DMSF™.

Available from 1.000" to 6.000" (24mm to 150mm), the patented DMSF™ stationary design includes double balanced seal faces designed to withstand barrier & process pressure fluctuations.

The DMSF™ is supplied with a highly efficient integral bi-directional pumping ring and deflector arrangement, which circulates and directs barrier fluid to the critical places within the seal.

Both SMSS™ and DMSF™ products employ modular components, thereby increasing availability and reducing product lead time.



Above: Bi-directional pumping ring



THIS DOCUMENT IS DESIGNED TO PROVIDE DIMENSIONAL INFORMATION AND AN INDICATION OF AVAILABILITY.
FOR FURTHER INFORMATION AND SAFE OPERATING LIMITS CONTACT OUR TECHNICAL SPECIALISTS AT THE LOCATIONS BELOW.



USE DOUBLE MECHANICAL SEALS WITH HAZARDOUS PRODUCTS. ALWAYS TAKE SAFETY PRECAUTIONS:

- GUARD YOUR EQUIPMENT
- WEAR PROTECTIVE CLOTHING



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