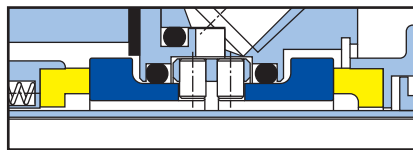




CDSA™ Range of Double Cartridge Mechanical Seals

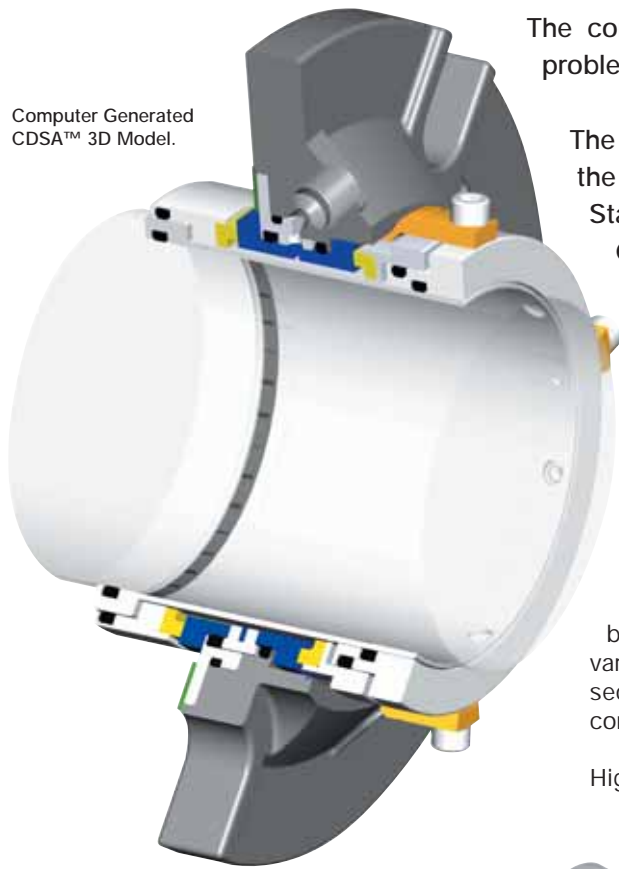


- UNIQUE SELF-ALIGNING INBOARD AND OUTBOARD SEAL FACES
- MODULAR CONSTRUCTION FOR MAXIMUM ADAPTABILITY
- UNIQUE PATENTED BI-METAL DESIGN
- INDEPENDENT SEAL FACE DESIGN
- DOUBLE OR TANDEM SEAL PROTECTION
- DOUBLE PRESSURE BALANCED ROTARIES

CDSA™ - high performance sealing solution

Containment of hazardous process fluids requires the use of a double seal. Concern over emission control, health and safety issues and adequate back-up protection, intensifies the need for careful specification of the sealing system.

Computer Generated
CDSA™ 3D Model.



The corrosive nature of some hazardous liquids compounds the problem with the need for exotic "corrosion resistant" metallurgies.

The CDSA™ cartridge double mechanical seal forms the basis of the engineered sealing system. The standard seal unit is 316 Stainless Steel with Carbon, Tungsten Carbide and Silicon Carbide faces, available with Viton®, Aflas®, EPR and Kalrez® elastomers. This fundamental design is changed through modular component options to suit the requirements of the specific application.

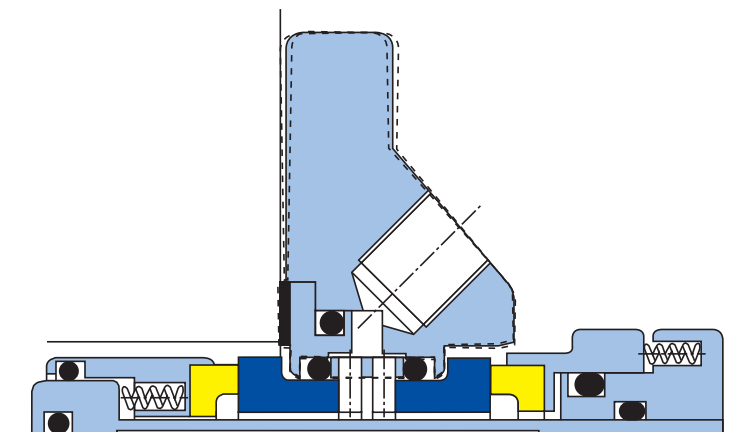
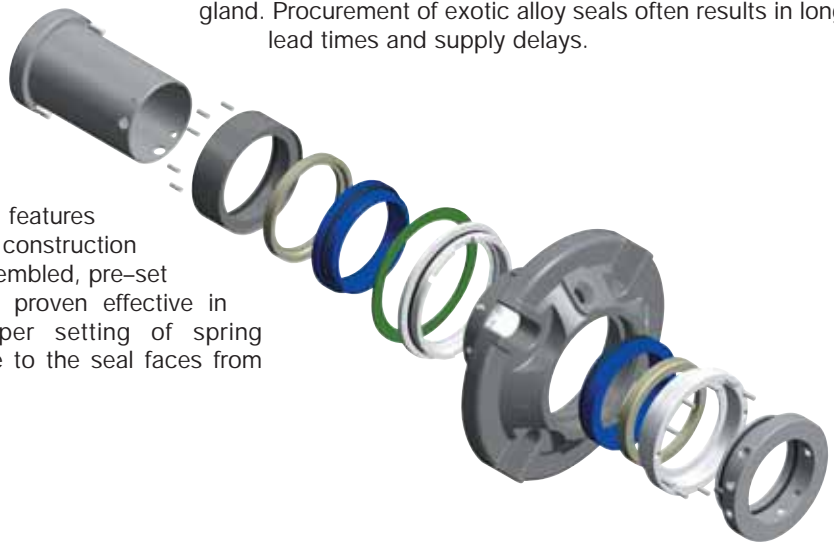
Modular Construction

A modular component system is ideal for a flexible engineered approach to each application. Process chemicals have diverse characteristics and one basic seal configuration fails to cover the broad range of possible applications. The need for exotic wetted alloys, various seal face combinations, alternate 'O' ring compounds, differential secondary fluid pressures, temperature control and barrier fluid containment systems are some of the design parameters encountered.

Highly corrosive applications aggressively attack Stainless Steel. Corrosion is usually limited to the wetted components; namely the inboard rotary, a portion of the shaft sleeve and a section of the gland. Procurement of exotic alloy seals often results in long lead times and supply delays.

Proven Design Features

The basic seal incorporates two proven design features that enhance leak-free performance; cartridge construction and self-aligning faces. Cartridge seals are assembled, pre-set at the factory and tested. This method has proven effective in reducing installation errors due to improper setting of spring compression, radial misalignment and damage to the seal faces from excessive handling.



Self Aligning Faces.

The second proven design feature, self-aligning faces, ensures that both the inboard and outboard faces remain square (90°), to the rotating shaft. The unique "universal joint" concept means each face remains flat across a broad pressure range. Resistance to pin shear stress during operation is achieved with heavy duty radially mounted anti-rotation pins. A spring loaded internal rotary centrifuges solids away from the seal faces, resisting clogging from process fluids with a high solids content.



CNC Controlled Co-ordinate Measuring Machine.

Performance Documentation

The CDSA™ engineered double seal has been designed to seal a large range of process conditions from standard parts and application performance can be greatly enhanced by this modular specification. As process variables change, this modular component approach gives the end user the opportunity to change internal parts of the seal, for improved sealing performance of the new process conditions.

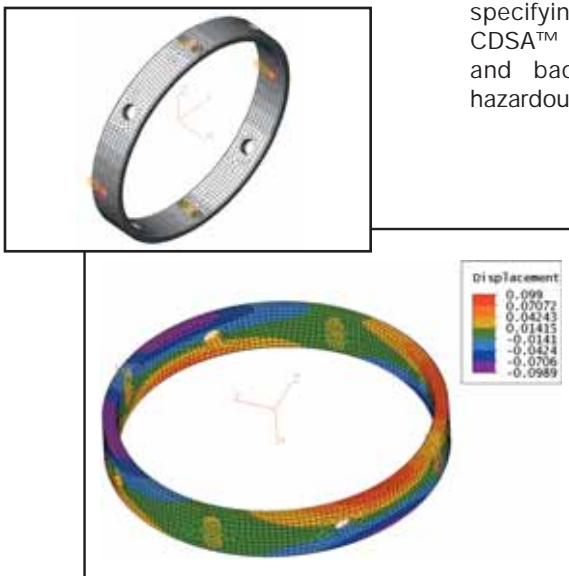
All cartridge mechanical seals receive an individual serial number, which is etched on the seal during the final hydrostatic pressure test. Gland identification and corresponding labelling on the seal box provide positive identification of every cartridge mechanical seal.

The identification program provides support to the end user as equipment database information is gathered. Matching the cartridge seal serial number to the equipment can help to correlate actual application performance, as well as being a reference for traceability and test results.

The CDSA™ cartridge double seal addresses the unique characteristics of each application. Total adaptability results in maximum control in specifying the correct seal. The CDSA™ provides ultimate flexibility and back-up protection for the hazardous process fluid application.



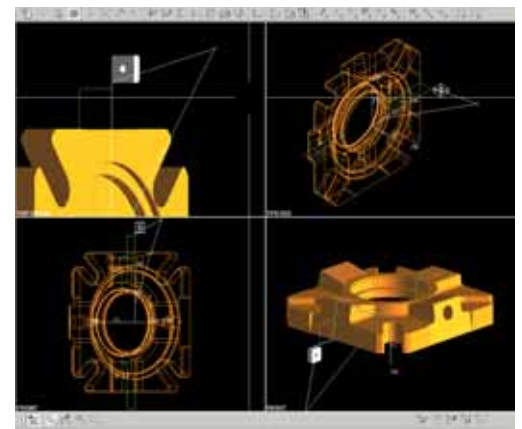
Advanced seal testing on an API 682 specification test rig.



3D Finite Element Analysis review showing displacement of the pivot ring due to the pressure created by the faces and the gland insert.

Finite Element Analysis and Design

With the aid of Finite Element Analysis (FEA), AESSEAL® designed a unique “universal joint self-aligning system”. Modelling the effects of temperature, pressure and rotational shear stress were just a few of the considerations. A rigid back-up ring with radially mounted pins behind the stationary provides compensation for angular misalignment, offering higher pressure capabilities and optimum protection against anti-rotation pin shear stress. In addition, the spring loaded rotary centrifuges solids away from the seal face and resists clogging, increasing the effectiveness of the seal in slurries and some abrasives. Faces remain flat, square to the shaft and suspended solids are prevented from crossing the flat seal faces.



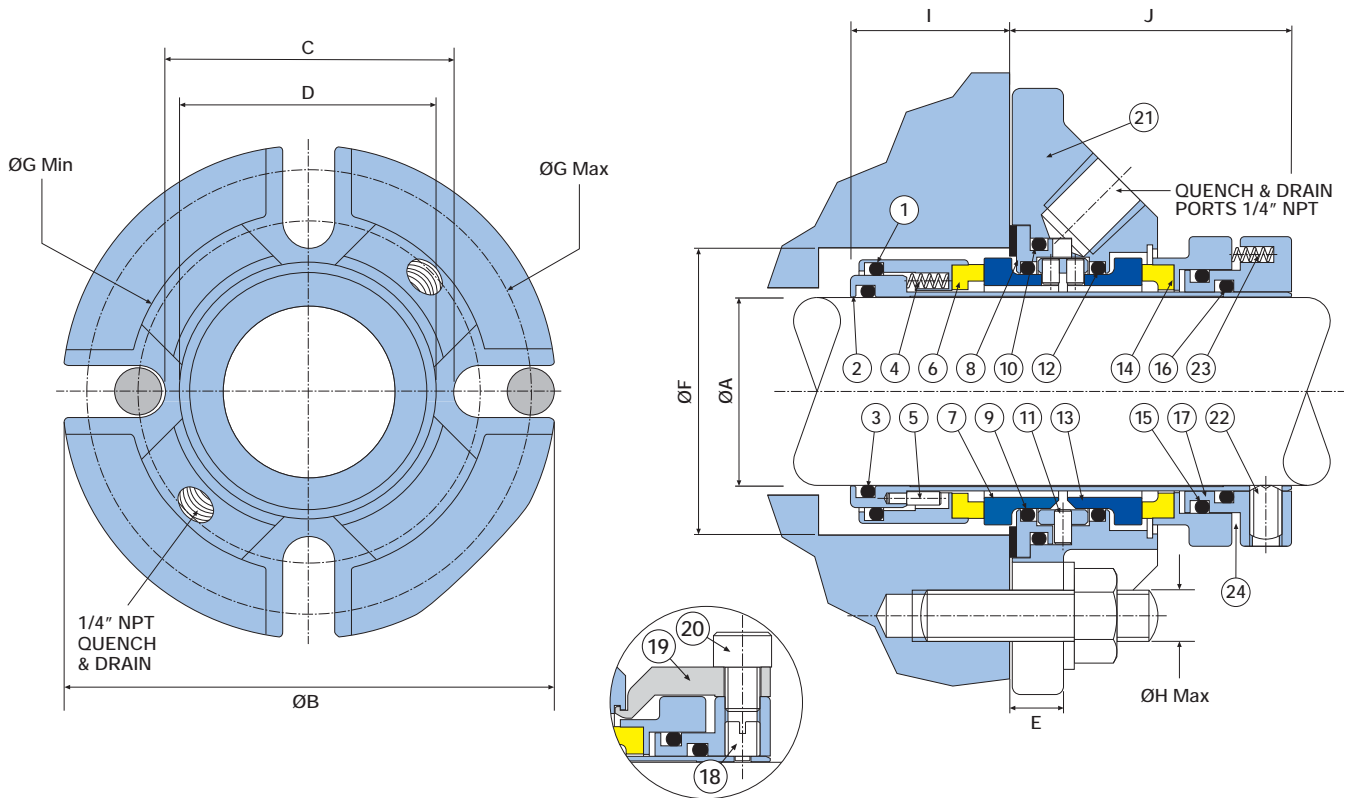
Integrated CAM Programming.

Product Development

Innovation in product development illustrates one aspect of the company. The manufacturing organization at AESSEAL® supports design developments through an integrated CAD/CAM environment. Computer aided manufacturing consistently carries the design improvement through to the finished product. Certification of the process to ISO 9001 standards provides the end user with confidence. The combination of Quality Assurance, proven design features, cartridge construction and self-aligning faces extends seal performance.

CDSA™ Range - cross section

Sizes available: 1.000" - 5.000" (24mm - 125mm)



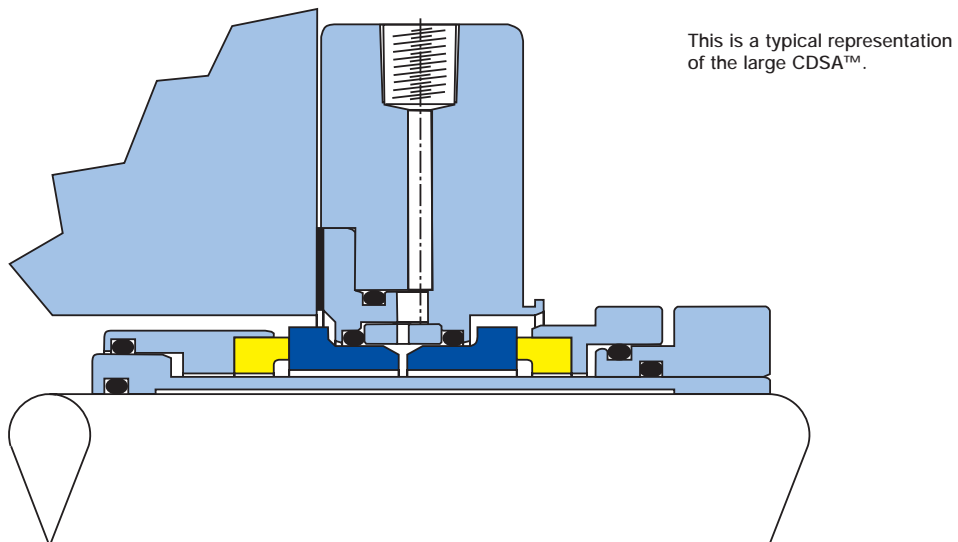
Item	Description	Material	Item	Description	Material
1	Rotary O Ring	Viton® / EPR / Kalrez® / Aflas®	13	External Stationary Face	SiC / Ceramic** / TC
2	Sleeve	316L Stainless Steel	14	Rotating Face	316L SS - Carbon / TC / SiC*
3	Sleeve O Ring	Viton® / EPR / Kalrez® / Aflas®	15	External Rotary O Ring	Viton® / EPR / Kalrez® / Aflas®
4	Springs	Alloy 276	16	Clamp Ring O Ring	Viton® / EPR / Kalrez® / Aflas®
5	Rotating Drive Pins	Stainless Steel	17	Clamp Ring	316L Stainless Steel
6	Rotary Face	316L SS - Carbon / TC / SiC*	18	Anti-Tamper Screws	Stainless Steel
7	Internal Stationary Face	SiC / Ceramic** / TC	19	Centering Clips	Metal
8	Gland Insert	316L Stainless Steel	20	Clip Screws	Stainless Steel
9	Internal Stat O Ring	Viton® / EPR / Kalrez® / Aflas®	21	Gland	316 Stainless Steel
10	Insert O Ring	Viton® / EPR / Kalrez® / Aflas®	22	Drive Screws	Stainless Steel
11	Pivot Ring	316L Stainless Steel	23	Springs	Alloy 276
12	External Stat O Ring	Viton® / EPR / Kalrez® / Aflas®	24	Rotary Drive Pins (not shown)	Stainless Steel

*Limited availability above 4.000" (100mm) - contact AESSEAL® for more information.
 **Limited availability above 3.000" (75mm) - contact AESSEAL® for more information.

Item 5 is an integral part of Item 2.
 Item 24 is an integral part of Item 17.

Large CDSA™ - cross section

Sizes available: 5.125" - 12.000" (130mm - 300mm)



CDSA™ Range - size charts

CDSA™ Range - Dimensional Information (inches)

A	B	C	D	E	ØFMin	ØFMax	ØGMin	ØGMax	ØHMax	I	J
1.000	4.125	2.125	1.937	0.519	1.625	1.937	2.687	3.562	1/2	1.281	2.062
1.125	4.250	2.250	2.063	0.519	1.750	2.062	2.812	3.617	1/2	1.281	2.062
1.250	4.375	2.375	2.187	0.519	1.875	2.187	2.937	3.812	1/2	1.281	2.062
1.375	4.375	2.500	2.312	0.519	2.000	2.250	3.062	3.812	1/2	1.281	2.062
1.500	5.000	2.812	2.562	0.644	2.250	2.375	3.375	4.437	1/2	1.312	2.125
1.625	5.000	2.812	2.562	0.644	2.375	2.500	3.375	4.437	1/2	1.312	2.125
1.750	5.500	3.187	2.812	0.644	2.500	2.750	3.750	4.937	1/2	1.312	2.125
1.875	5.500	3.187	2.812	0.644	2.625	2.875	3.750	4.937	1/2	1.312	2.125
2.000	6.000	3.562	3.063	0.644	2.750	3.000	4.125	5.437	1/2	1.380	2.125
2.000-AC	5.250	3.450	3.035	0.644	2.750	3.000	4.000	4.750	1/2	1.380	2.125
2.125	6.000	3.562	3.063	0.644	2.875	3.125	4.125	5.437	1/2	1.380	2.125
2.250	6.500	3.812	3.312	0.644	3.000	3.250	4.500	5.812	5/8	1.380	2.125
2.375	6.500	3.812	3.312	0.644	3.125	3.375	4.500	5.812	5/8	1.380	2.125
2.500	7.000	4.312	3.812	0.769	3.375	3.625	5.000	6.312	5/8	1.500	2.375
2.625	7.000	4.312	3.812	0.769	3.500	3.750	5.000	6.312	5/8	1.500	2.375
2.750	7.000	4.312	3.812	0.769	3.625	3.875	5.000	6.312	5/8	1.500	2.375
2.875	7.500	4.937	4.250	0.769	3.750	4.125	5.625	6.812	5/8	1.500	2.375
3.000	7.500	4.937	4.250	0.769	3.875	4.250	5.625	6.812	5/8	1.500	2.375
3.125	7.500	4.937	4.250	0.769	4.000	4.375	5.625	6.812	5/8	1.500	2.375
3.250	8.000	5.312	4.625	0.769	4.125	4.500	6.125	7.187	3/4	1.500	2.375
3.375	8.000	5.312	4.625	0.769	4.250	4.625	6.125	7.187	3/4	1.500	2.375
3.500	8.000	5.312	4.625	0.769	4.375	4.750	6.125	7.187	3/4	1.500	2.375
3.625	8.500	5.937	5.000	0.769	4.500	5.000	6.750	7.687	3/4	1.500	2.375
3.750	8.500	5.937	5.000	0.769	4.625	5.125	6.750	7.687	3/4	1.500	2.375
3.875	8.500	5.937	5.000	0.769	4.750	5.250	6.750	7.687	3/4	1.500	2.375
4.000	9.000	6.625	5.375	0.769	4.875	5.500	7.437	8.187	3/4	1.500	2.375
4.125	9.000	6.625	5.375	0.769	5.125	5.875	7.437	8.187	3/4	1.500	2.375
4.250	9.000	6.625	5.375	0.769	5.125	5.875	7.437	8.187	3/4	1.500	2.375
4.375	9.500	7.000	5.750	0.769	5.375	6.250	7.812	8.687	3/4	1.500	2.375
4.500	9.500	7.000	5.750	0.769	5.375	6.250	7.812	8.687	3/4	1.500	2.375
4.625	10.000	7.345	6.125	0.769	5.625	6.625	8.312	9.062	7/8	1.500	2.375
4.750	10.000	7.345	6.125	0.769	5.625	6.625	8.312	9.062	7/8	1.500	2.375
4.875	10.000	7.345	6.125	0.769	5.875	6.625	8.312	9.062	7/8	1.500	2.375
5.000	10.000	7.345	6.125	0.769	5.875	6.625	8.312	9.062	7/8	1.500	2.375

Seal sizes from 5.125" to 12.000" are designed to suit specific equipment using modular components. Note: Seal sizes 6.125" and above are supplied without a pivot ring. Contact AESSEAL® technical department for dimensional information and availability.

"Factory repair program is available".
"Replacement seal kits are available".

CDSA™ Range - Dimensional Information (mm)

A	B	C	D	E	ØFMin	ØFMax	ØGMin	ØGMax	ØHMax	I	J
24	104.8	54.0	49.2	13.2	40.0	46.0	67.0	90.5	12	32.5	52.4
25	104.8	54.0	49.2	13.2	41.0	49.0	67.0	90.5	12	32.5	52.4
28	108.0	57.2	52.4	13.2	44.0	52.3	70.3	93.6	12	32.5	52.4
30	111.0	60.4	55.6	13.2	46.0	55.5	73.5	96.8	12	32.5	52.4
32	111.0	60.4	55.6	13.2	48.0	55.5	73.5	96.8	12	32.5	52.4
33	111.0	60.4	55.6	13.2	49.0	55.5	73.5	96.8	12	32.5	52.4
35	111.0	63.5	58.8	13.2	51.0	57.5	76.6	96.8	12	32.5	52.4
38	127.0	71.5	65.0	16.4	57.2	60.3	85.7	114.3	12	33.3	54.0
40	127.0	71.5	65.0	16.4	58.0	60.4	85.7	114.3	12	33.3	54.0
43	127.0	71.5	65.0	16.4	61.0	63.5	85.7	114.3	12	33.3	54.0
45	139.7	81.0	71.4	16.4	63.5	69.9	95.3	127.0	12	33.3	54.0
48	139.7	81.0	71.4	16.4	66.7	73.0	95.3	127.0	12	33.3	54.0
50	139.7	81.0	71.4	16.4	68.0	73.0	95.3	127.0	12	33.3	54.0
53	152.4	90.5	77.8	16.4	71.0	76.2	104.8	139.7	12	35.0	54.0
55	152.4	90.5	77.8	16.4	74.0	79.4	104.8	139.7	12	35.0	54.0
58	165.1	96.8	84.1	16.4	76.2	82.5	114.3	149.2	16	35.0	54.0
60	165.1	96.8	84.1	16.4	79.4	85.7	114.3	149.2	16	35.0	54.0
63	177.8	109.5	96.8	19.6	85.8	92.1	127.0	160.3	16	38.1	60.3
65	177.8	109.5	96.8	19.6	88.9	95.3	127.0	160.3	16	38.1	60.3
68	177.8	109.5	96.8	19.6	92.1	98.4	127.0	160.3	16	38.1	60.3
70	177.8	109.5	96.8	19.6	92.1	98.4	127.0	160.3	16	38.1	60.3
75	190.5	125.4	108.0	19.6	98.5	108.0	142.9	173.0	16	38.1	60.3
80	190.5	125.4	108.0	19.6	101.6	111.1	142.9	173.0	16	38.1	60.3
85	203.2	135.0	117.5	19.6	108.0	117.5	155.6	182.5	20	38.1	60.3
90	215.9	150.8	127.0	19.6	114.3	127.0	171.5	195.2	20	38.1	60.3
95	215.9	150.8	127.0	19.6	117.5	130.2	171.5	195.2	20	38.1	60.3
100	228.6	168.3	136.5	19.6	123.9	139.7	189.0	208.0	20	38.1	60.3
105	228.6	168.3	136.5	19.6	130.1	149.2	189.0	208.0	20	38.1	60.3
110	241.3	177.8	146.2	19.6	136.5	158.8	198.4	220.6	20	38.1	60.3
115	254.0	186.6	155.8	19.6	142.9	168.3	211.1	230.2	22	38.1	60.3
120	254.0	186.6	155.8	19.6	142.9	168.3	211.1	230.2	22	38.1	60.3
125	254.0	186.6	155.8	19.6	149.2	168.3	211.1	230.2	22	38.1	60.3

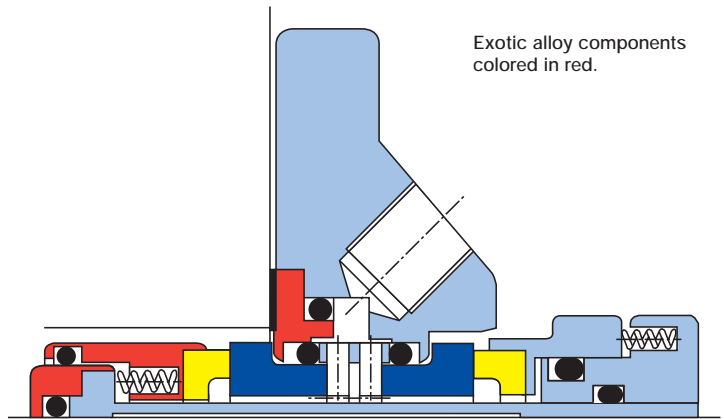
Seal sizes from 130mm to 300mm are designed to suit specific equipment using modular components. Note: Seal sizes 155mm and above are supplied without a pivot ring. Contact AESSEAL® technical department for dimensional information and availability.

Bi-Metal CDSA™ - double cartridge mechanical seal

AESSEAL® has designed an innovative “bi-metal” exotic alloy seal. Alloy 20, Alloy 276, Alloy 400 and Titanium grade 2 are inventoried in popular modular wetted component sizes. Any additional commercially available special alloys are made to order. These special alloy parts are fitted to the standard Stainless Steel components. The use of a neutralizing barrier fluid protects the secondary Stainless Steel parts that are not exposed to the process fluid during normal operation.

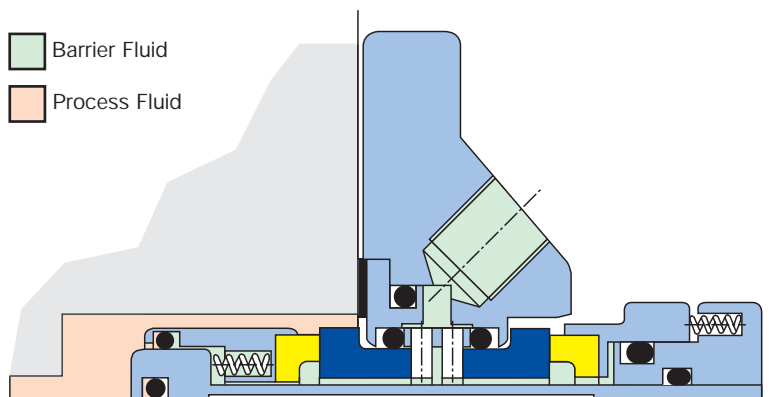
Availability and flexibility of design meets the special demands of the corrosive fluid containment market. Variations to the seal specification can be accomplished by selecting from many different options. Seal faces are offered in any combination of Silicon Carbide, Tungsten Carbide and Carbon, both inboard and outboard.

Alternate ‘O’ ring compounds in Aflas®, Ethylene Propylene and Kalrez® are available.



The standard CDSA™ design works as a double seal with either a higher or lower barrier fluid pressure differential, when compared to the process fluid pressure.

CDSA™ - double cartridge mechanical seal



Barrier Fluid

The barrier fluid pressure should not normally be more than 15 psig (1 barg) above the stuffing box pressure.

Higher Pressure Barrier Fluid

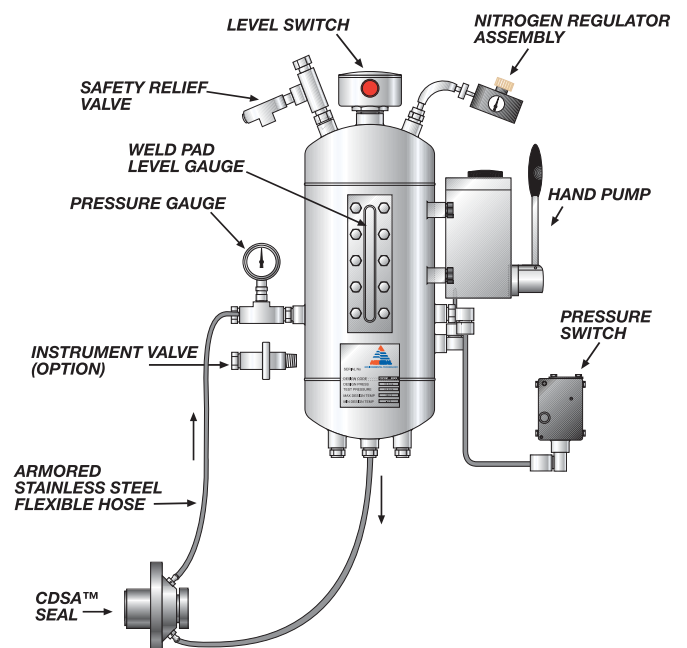
A barrier fluid pressure which is higher than the stuffing box pressure, prevents the pumped product from entering the barrier fluid system and ultimately leaking to atmosphere.

Lower Pressure Barrier Fluid

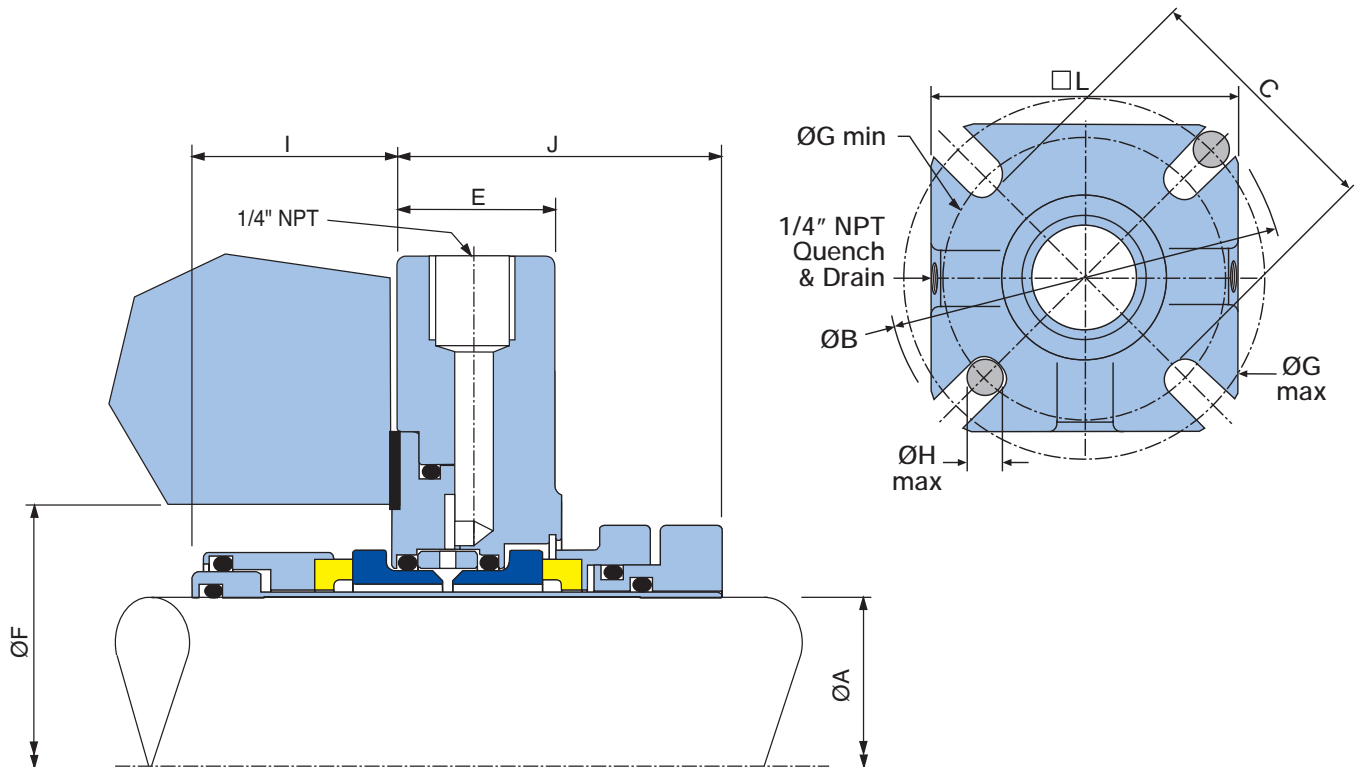
When used at a lower pressure than the stuffing box condition, the barrier fluid can serve as a coolant, provide lubrication for dry running conditions, or help to prevent the build-up of crystallized particles at the internal seal faces.

Back-up Containment System

Convection tanks provide a closed-loop containment system with a pressurized barrier fluid. Tank options with internal cooling coils enhance the temperature control at the seal on critical duties. Use of ASME coded vessels and assistance with layout specifications maximizes back-up protection.



ANSI+ CDSA™ - gland designs to suit ANSI+ pumps



ANSI+ CDSA™ - ANSI+ Gland format Dimensional Information (inches)

A	B	C	E	F Min	F Max	G Min	G Max	H Max	I	J	□L
1.125	5.000	3.188	1.000	2.625	2.850	3.750	4.250	0.500	1.250	2.000	3.990
1.375	5.375	3.438	1.000	2.875	3.100	4.000	4.625	0.500	1.250	2.000	4.240
1.750	6.750	4.438	0.644	3.500	4.100	5.000	6.000	0.500	1.350	2.000	5.480
1.875	6.750	4.438	0.644	3.625	4.100	5.000	6.000	0.500	1.350	2.000	5.480
2.125	7.625	4.688	0.644	3.875	4.225	5.375	6.687	0.625	1.437	2.000	6.230
2.500	8.250	5.438	0.644	4.500	5.100	6.125	7.312	0.625	1.500	2.187	6.730
2.625	8.250	5.438	0.644	4.625	5.100	6.125	7.312	0.625	1.500	2.187	6.730
2.750	8.250	5.438	0.644	4.625	5.100	6.125	7.312	0.625	1.500	2.187	6.730

Minimum bolt circle based on bolt size shown.

Environmental Control Systems for the CDSA™

In addition to a vast range of mechanical seals, AESSEAL® has a specialized systems division dedicated to the design and manufacture of a comprehensive range of seal support packages for double mechanical seals. These support systems range from Thermosyphon systems, SWFF-TF™, FLOWTRUE™ and AES-15™ to the fully featured forced circulation system PUMPPAC™ for use on oil and water applications.

SWFF-TF™



FLOWTRUE™



AES-15™



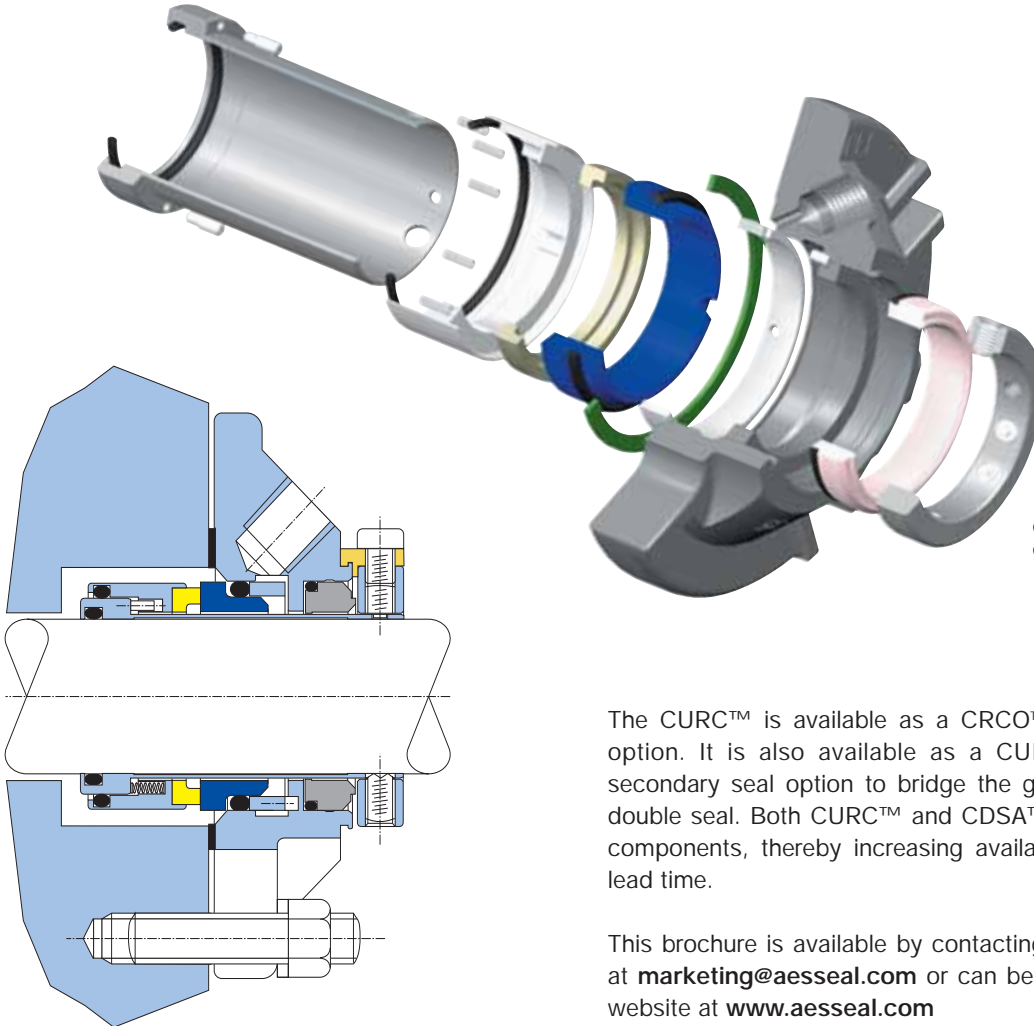
PUMPPAC™



The systems above are compatible with a wide selection of barrier and buffer fluid media. They are supplied pre-assembled with all necessary components and fittings. On site inventory costs are reduced by modular system construction.

CURC™ - single cartridge mechanical seal

The CDSA™ range of double cartridge mechanical seals is designed to complement the CURC™ range of cartridge single mechanical seals. Available from 1.000" to 5.000" (24mm to 125mm) and available in sizes up to 12.000" (300mm). The CURC™ incorporates patented self-aligning faces.



CURC™ Exploded CAD 3D Model.

The CURC™ is available as a CRCO™ which includes a lip seal option. It is also available as a CURE™ which incorporates a secondary seal option to bridge the gap between a single and a double seal. Both CURC™ and CDSA™ products employ modular components, thereby increasing availability and reducing product lead time.

This brochure is available by contacting the Marketing Department at marketing@aes seal.com or can be downloaded by visiting our website at www.aes seal.com

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.



INVESTOR IN PEOPLE



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

- GUARD YOUR EQUIPMENT
- WEAR PROTECTIVE CLOTHING



WARNING

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ALL SIZES ARE SUBJECT TO MANUFACTURING TOLERANCES. WE RESERVE THE RIGHT TO MODIFY SPECIFICATIONS AT ANY TIME.