AESSEAL®
ENVIRONMENTAL TECHNOLOGY

Product Range

the AESSEAL® group of companies

designers and manufacturers of mechanical seals, bearing protectors, seal support systems and gland packing which maximize rotating equipment uptime.

www.aesseal.com

Customer Service

Customers buy from AESSEAL® not just because of our superb products but because of our exceptional performance; 99.45% on-time delivery:

- One global delivery performance standard
- In our industry, inventory = service. AESSEAL® holds inventory so customers don't need to
- With up to six months stock we can guarantee exceptional delivery performance and give our customers exceptional turnaround times, saving you time and money
- A modular product range, with over 10 million permutations, ensures AESSEAL® can supply the right solution for your application, where you want it, when you want it

Our philosophy, like our ordering process, is simple: we'll do whatever it takes to deliver, wherever and whenever it's needed.

Our aim is to consistently exceed expectation and meet even the most complex briefs and challenging lead times.

By listening with enthusiasm and responding with understanding and care, we're aiming to deliver such exceptional service that customers need never consider an alternative source of supply.

> **Custom-engineered products** account for over 56% of our business and we have the design and manufacturing infrastructure to deliver them **fast**.

Contents

This brochure provides a brief overview of our extensive inventoried product range.

> Over 10 million inventoried standard product permutations **plus custom-engineered solutions.**

"AESSEAL® water management systems contribute to water savings of over 95 Billion litres / 25 Billion Gallons per year!"

Global

Customer service is provided from 235 locations in 104 countries, including 9 manufacturing and 44 repair locations, with more than 300 customer service representatives who visit industrial plants every day.

Don't take our word for it...

Canada

"We were frustrated by 5 failures on the same application within a year. AESSEAL had an engineer on site the same afternoon to install a solution. The application has achieved over 2 years running time and AESSEAL are now the mill-wide preferred supplier for mechanical seals."

USA

"AESSEAL's ownership in the equipment is exceptional, as is its communication system. Our failure rate and reliability risks from seal failures have steadily declined. They provide maintenance and reliability with valuable information on the MTBF of the equipment."

USA

"From 2,000 suppliers we gave one Innovation Award – to AESSEAL. Their innovative software tracks their products and enhances the performance at our facility where we work alongside AESSEAL staff."

Portugal

"Late Friday is not a great time to identify a serious seal problem. But AESSEAL immediately got down to us and worked through the issues. They're now consulting for us on other plant equipment, improving MTBF. A real full service partner!"

France

"'We had a critical situation on a bitumen screw pump where four complex API type seals were required within three days. Philippe Olivier mobilized the entire design and production team at AESSEAL who delivered the solution within extreme deadlines. Magnifique!'"

Italy

"Our previous supplier indicated that it was impossible to better two months' performance on an application. AESSEAL implemented a solution that has been running for over 15 months without problems and are now a key supplier for the entire plant."

Germany

"I was delighted by the way the engineer at AESSEAL reacted so fast to a broken bearing housing problem. It happened at 08:00hrs on a Sunday, and he measured up, opened up their workshop and we were running again on the Monday. AESSEAL jump immediately… Great service."

Malaysia

"We in KTSB believe AESSEAL is reliable, dependable and above all a company that conducts its business with a high level of integrity."

Thailand

"'To hand carry 2 seals from UK to Thailand for us truly makes us believe your company is living to the motto of 'Experience the Exceptional.'"

South Africa

"With continuous breakdowns on a specific train of pumps used to pump a distance of over 1km we contacted AESSEAL to highlight our problem and they responded straight away by installing seal and support system solutions, which eradicated our issues. We were so impressed with the performance that we gave them a second train and hope to convert many more with AESSEAL!"

South Africa

"At our Glucose refinery we are not customers of AESSEAL but partners. With our input and AESSEAL's technical skills and reliable service, problem mechanical seals are a thing of the past."

Turkey

"The frequency of shaft packing damage was a problem in the lime progressive pump section. At AESSEAL they invested time to provide a technical solution in planning and on site installation. Before long they became our preferred seal supplier."

Australia

"A heavy-duty dual slurry seal is not easy to find over the Christmas period – but the AESSEAL guys gave up their public holiday to build one from scratch. They are always available to me, a great facility."

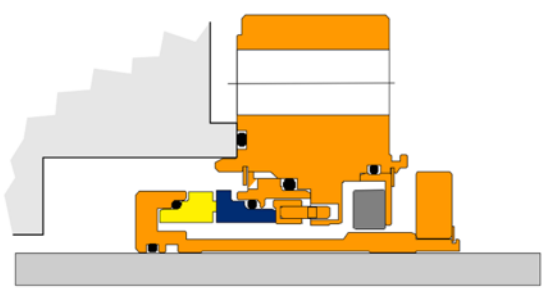
Modular Seal Design

Our modular seal design enables more seals to be built from less inventory, meaning we can provide shorter lead times and have greater availability.

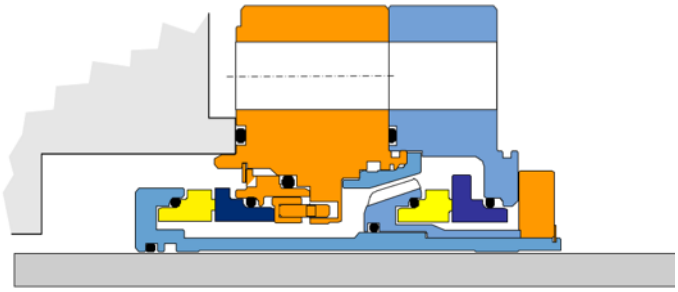
The modular concept is applied to our component and cartridge seals, as well as our seal support systems and enables us to provide the best customer service in our industry.

The illustration opposite shows an example of how our modular design works for just four seals in practice. Starting with a simple component seal (SAI), 3 of the 4 components used in this seals are used in some of our most popular seals CURC (single seal) and CDSA (dual seal). In addition the following seals can be made from the same basic components, SCUSI, CRCO, CURE and FIDC.

The following example illustrates how an API single seal could be simply build as an API dual seal

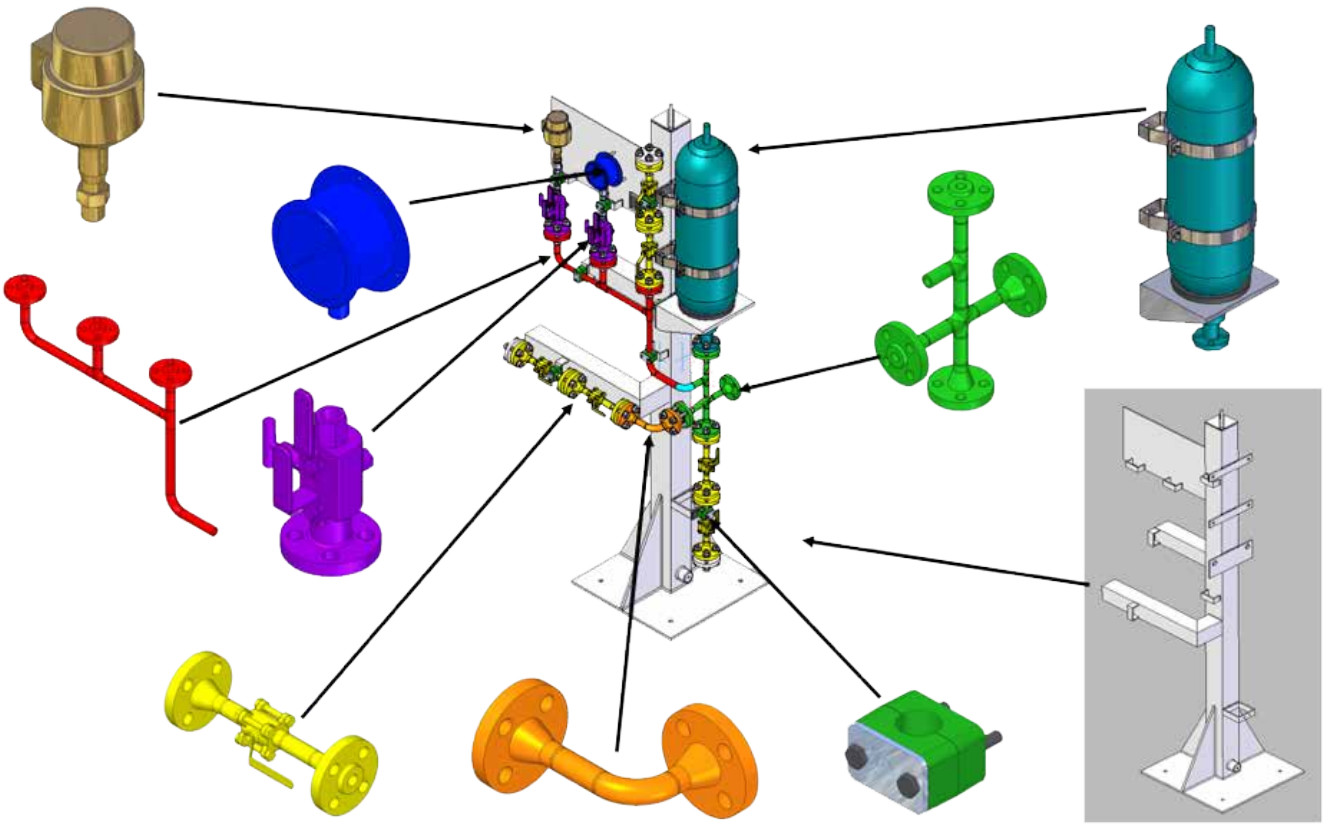


API Single Seal



API Double

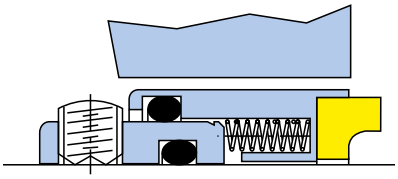
Complex systems also adopt the same strategy



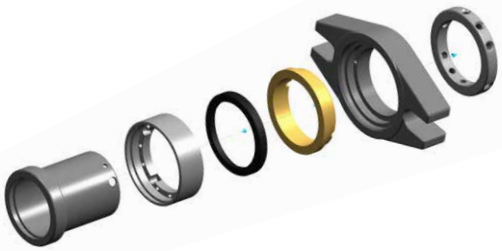
Example: API Plan 53B System

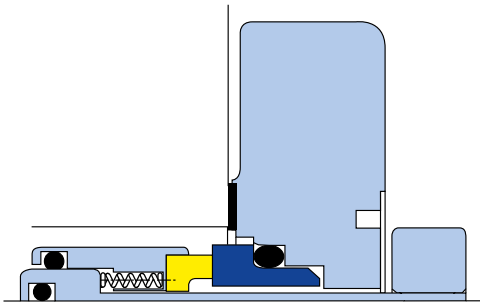
AESSEAL Modular Concept

SAI™

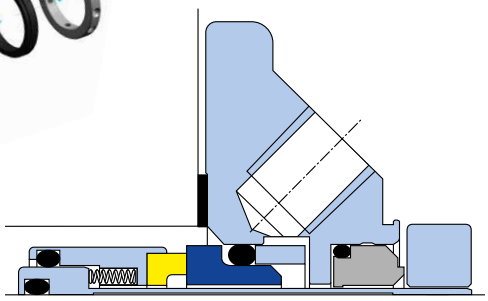


Convertor II™

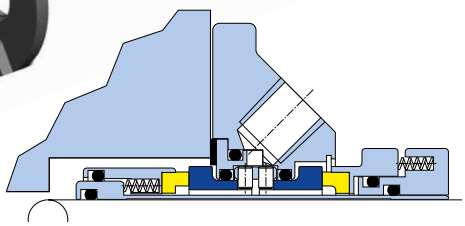




CURC™



FIDC™

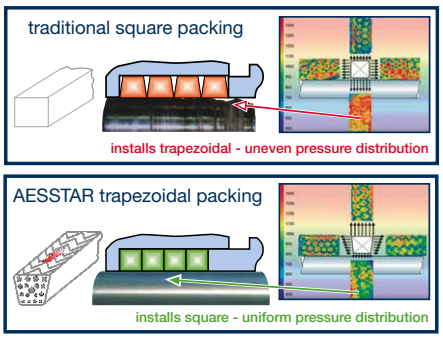


> The AES modular concept enables more seal combinations to be built from less inventory, meaning more availability and shorter lead times.

Gland Packing

AESSTAR packing range offers high sealability and better compression distribution

Design benefits include low energy consumption, less shaft wear and heat generation, more efficient running, less adjustment and maintenance time.



Style 275 / 275TP SLURRYSTAR

- e-PTFE / graphite packing with para-Aramid corner protects against abrasives
- Extrusion-resistant packing with improved heat conductivity
- Safe and universal packing for abrasive media

Style 366 / 366TP GRAPHOSTAR

- Universal plantwide use in static and dynamic applications
- High temperature resistance, excellent heat transfer rates
- Extrusion stability through carbon corner reinforcement

Style 380 / 380TP CARBOSTAR

- Volume stable, non shrinking
- Excellent heat transfer when running with higher shaft speeds
- Suitable for medium abrasive products

Style 728 / 728TP PAPERSTAR HS

- Clean packing with excellent heat conductivity. Designed to seal abrasive products
- Recommended shaft surface hardness: HRC 35
- Porosity filling coating increases density and protects the packing in crystallizing mediums.

Style 745TP FOODSTAR HS

EU& FDA COMPLIANT

- 'White packing' means no product contamination
- Wide chemcial resistance and excellent heat conductivity
- Increased lifetime due to mechanical resistance and outstanding heat conductivity

Style 770 / 770TP PULPSTAR

- e-PTFE / graphite packing with PTFE corner reinforcement and pore-filler
- Minimal wear allows packing to be used on non-hardened sleeves
- Universal resistance against solvents, acids, caustics and crystallising products

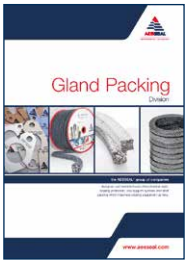
Style 789TP PROSTAR

- Highest practical standardization possibilities
- Reduced wear through special 'running track' reinforcement
- High cross section density and compactness, still elastic and flexible

Style 795 / 795TP UNISTAR

- Very good thermal conductivity
- Does not harden in use allowing easy removal
- Excellent chemical resistance

For more information please see the product literature or visit:
www.aesseal.com/packing



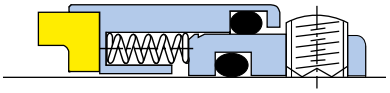
PACKING

Component Seals

AESSEAL® has a comprehensive range of component seals for all applications. Some of the more popular designs are shown below.

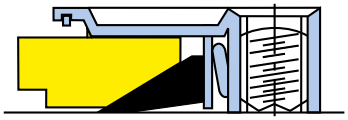
SAI™ — Internal Balanced Mechanical Seal

- Non-shaft-fretting design to reduce cost of equipment overhaul
- Maximizes seal life in suspensions and liquids such as slurries given the smooth non-clogging profile (springs out of the product)
- Hydraulically balanced seal-face
- Premium drive integrity (milled metallic lug drive)
- Sizes available from 0.750” to 6.000” (18mm - 155mm)



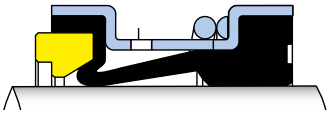
M0xU Range — Internal Monolithic Face Mechanical Seal

- Available with a hydraulically balanced or unbalanced seal-face
- Non-clipped, multiple spring design
- PTFE wedge or elastomer shaft seal options
- Available in 12 generic forms, covering shaft sizes 0.750” to 4.000” (20mm - 100mm)



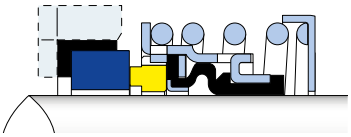
B09xU Range — Internal Bellows Mounted Mechanical Seal

- Outer diameter of the B0-U rotary allows it to fit within DIN bores as standard
- Single coil spring design with bi-directional shaft rotation feature
- Available in 3 generic forms, covering shaft sizes 0.375” to 4.000” (10mm - 100mm)



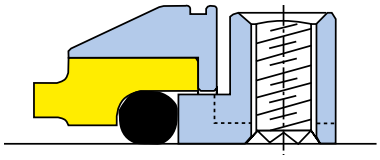
P0xU Range — Internal Single Coil Spring Mechanical Seal

- One of the most commonly used component seal designs globally
- Single coil spring design with bi-directional shaft rotation feature
- Positive face drive mechanism
- Available in 9 generic forms, covering shaft sizes 0.375” to 3.000” (10mm - 75mm)

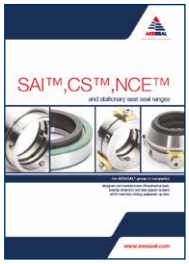


CS™ / CSC™ Range — External Seal with Non-Metallic Parts

- External seal with hydraulically balanced seal-face
- Non-metallic wetted parts for use in chemical applications
- Supplied clipped and pre-set to working length
- Available with collet drive for use with hardened or non-metallic sleeves
- Sizes available from 0.625” to 4.000” (20mm - 100mm)

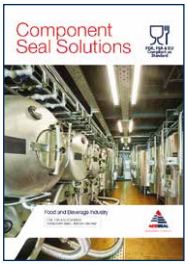


For more information please see the product literature or visit:
www.aesseal.com/component



SAICSNCESEAT

S-SPRING



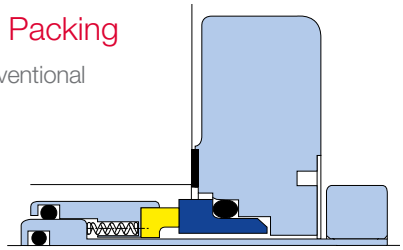
F&B-comp

Single Cartridge Rotary Seals

All of the following feature:

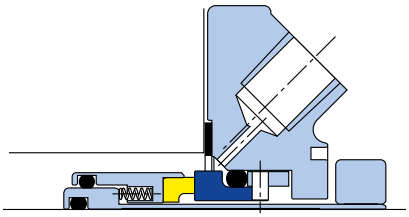
- Hydraulically balanced seal-face technology for reduced power consumption
- Non-clogging rotaries and non-shaft-fretting elastomers
- Multiple spring and positive set screw shaft drive

Convertor II™ — Cartridge Seal Designed to Replace Packing



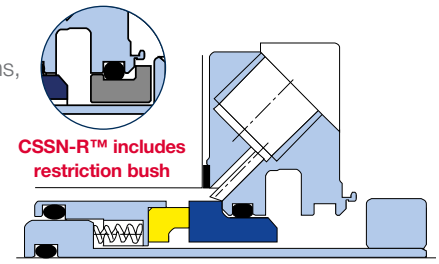
- Cartridge seal designed to replace two-part component seals and conventional packing arrangements
- Short external length
- Compact gland for use on applications with limited space
- Sizes available from 1.000” to 4.000” (24mm - 100mm)

SCUSI™ — Short Cartridge Seal



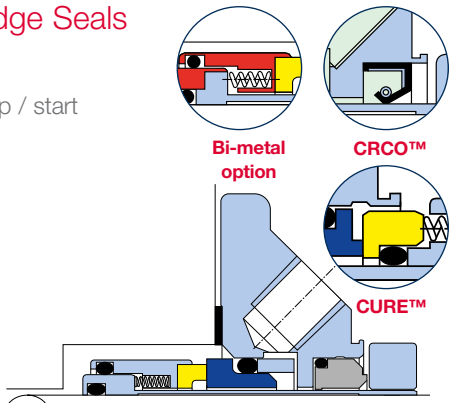
- Has Flush port as standard for cooling or venting to maximize seal life
- Self-aligning stationary face, maximizing seal life
- Stationary face with radial locating pins minimizes damage in stop / start applications and viscous fluids
- Sizes available from 1.000” to 2.750” (24mm - 70mm)

CSSN™ and CSSN-R™ — Single Cartridge Seals



- Modular range of cartridge mechanical seals for general applications, supplied with Quench, Flush and Drain ports as standard
- Optional modular restriction bush (CSSN-R™) supports Plan 62
- Sizes available from 1.000” to 3.500” (24mm - 85mm) in standard and ANSI Plus gland formats larger sizes termed CSS™

CURC™, CRCO™ and CURE™ — Single Cartridge Seals



- Self-aligning stationary face, maximizing seal life
- Stationary face with radial locating pins minimizes damage in stop / start applications and viscous fluids
- Quench, Flush and Drain ports for cooling or heating options to maximize seal life
- Sizes available from 1.000” to 5.000” (24mm - 125mm) in standard and ANSI Plus gland formats
- Bi-metal option — Exotic Alloy wetted components for maximum versatility at minimum price premium

For more information please see the product literature or visit: www.aesseal.com/single

CII

SCUSI

CSS/CDP/A

CURC

Single Cartridge Stationary Seals

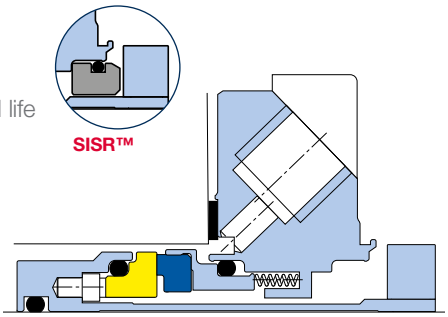
All the following feature:

- Hydraulically balanced seal-face technology for reduced power consumption
- Non-shaft-fretting sleeve elastomer and positive set screw shaft drive
- Multiple spring seal-face loading
- Stationary design is suitable for high speed applications

SISS™ and SISR™ — Single Stationary Seals

Modular range of stationary cartridge mechanical seals for general applications in all industry sectors.

- High-integrity drive design features for improved reliability and seal life
- Supplied with Quench, Flush and Drain ports as standard
- Optional modular restriction bush (SISR™) supports Plan 62 allowing control of the seal environment, maximizing seal life
- Sizes available from 1.000” to 3.375” (24mm - 85mm) in standard and ANSI Plus gland formats

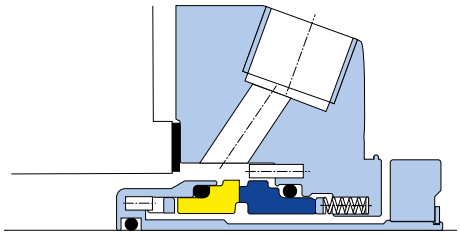


SISR™

SMSS™ — Single Monolithic Stationary Seal

A single cartridge stationary seal with modular monolithic seal-faces.

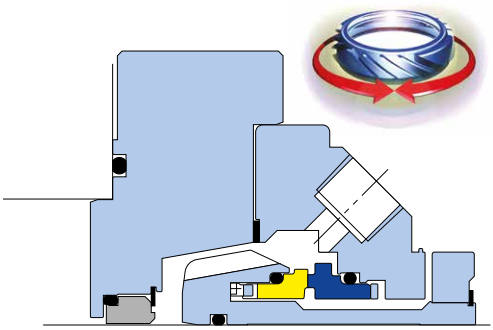
- Monolithic seal-faces provide maximum face stability in high pressure and high temperature applications improving seal life
- Seal-face drive over large contact area minimizing damage to faces in stop / start applications and viscous fluids
- Large 3/8” NPT ports maximize cooling and extend seal life
- Short inboard axial length
- Sizes available from 1.000” to 5.000” (24mm - 125mm) in standard and ANSI Plus gland formats



SMSS23™ — Plan 23 Single Stationary Seal

A single cartridge stationary seal with integral Plan 23.

- Extremely effective Plan 23 with bi-directional integral pumping ring
- Ideal for boiler feed and boiler circulation duties
- Integral inboard restriction bush configuration, adapted to suit the equipment
- Total solution available including heat exchanger
- Sizes available on request. Please contact AESSEAL®



For more information please see the product literature or visit:
www.aesseal.com/single

DISP&SISS

SMSS

SMSS23

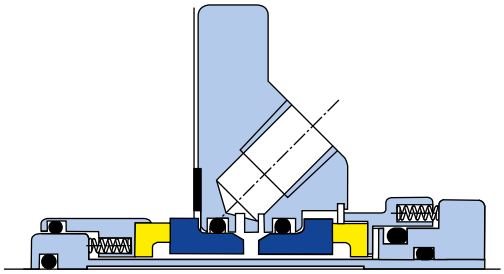
Double Cartridge Rotary Seals

All the following feature:

- Hydraulically balanced seal-face technology for reduced power consumption
- Non-shaft-fretting sleeve elastomer and positive set screw shaft drive
- Independent seal-face design to enhance safe containment of process fluid in the event of damage to any individual sealing element
- Multiple spring seal-face loading

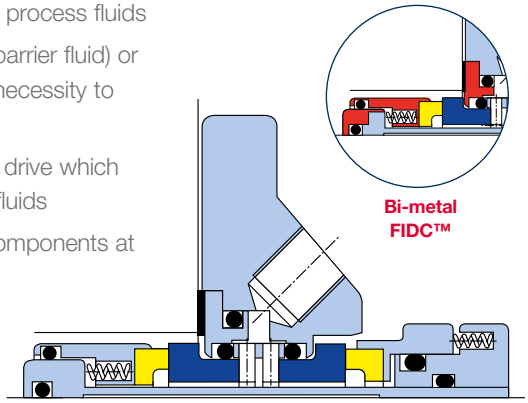
CDPN™ — Cartridge Double Seal

- Modular range of cartridge double mechanical seals for general applications
- Supplied with Quench, Flush and Drain ports as standard
- Sizes available from 1.000” to 3.500” (24mm - 85mm) in standard and ANSI Plus gland formats larger sizes termed CDP™



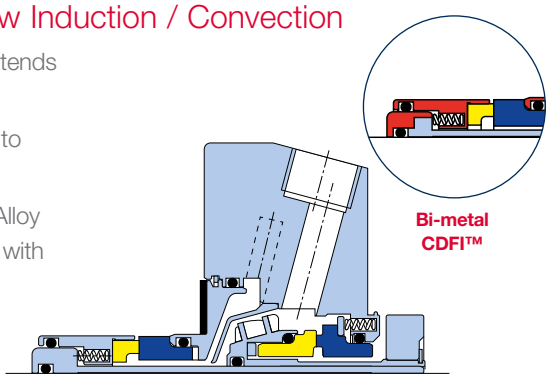
FIDC™ — Cartridge Mounted Double Seal

- This modular seal is ideal for the containment of hazardous process fluids
- Flexible design allows use as a double seal (high pressure barrier fluid) or tandem seal (low pressure barrier fluid) which reduces the necessity to inventory two designs of seals
- Self-aligning stationary seal-faces with radial contacting pin drive which minimizes damage in stop / start applications and viscous fluids
- Bi-metal FIDC™ option also includes Exotic Alloy wetted components at minimum price premium for use with corrosive chemicals
- Sizes available from 1.000” to 5.000” (24mm - 125mm) in standard and ANSI Plus gland formats larger sizes up to 12.000” (300mm) available on request



CDFI™ / CDFC™ — Cartridge Double Flow Induction / Convection

- Integral deflector guides barrier fluid under faces and extends seal life
- Incorporates highly effective bi-directional pumping ring to maximize barrier flow and increase seal life
- Bi-metal CDFI™ / CDFC™ options also include Exotic Alloy wetted components at minimum price premium for use with corrosive chemicals
- Sizes available from 1.125” to 5.000” (28mm - 125mm) in standard and ANSI Plus gland formats



For more information please see the product literature or visit:
www.aesseal.com/double

CSS/CDP/A

FIDC

CDFI/CDFC

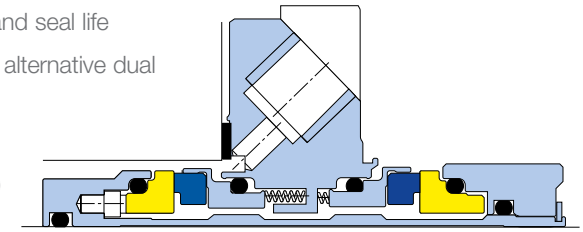
Double Cartridge Stationary Seals

All the following feature:

- Hydraulically double balanced seal-face technology for reduced power consumption with the ability to withstand pressure fluctuations
- Non-shaft-fretting sleeve elastomer and positive set screw shaft drive
- Independent seal-face design to enhance safe containment of process fluid in the event of damage to any individual sealing element
- Multiple spring seal-face loading with hydraulic pressure balanced for improved reliability and seal performance
- Stationary design is suitable for high speed applications

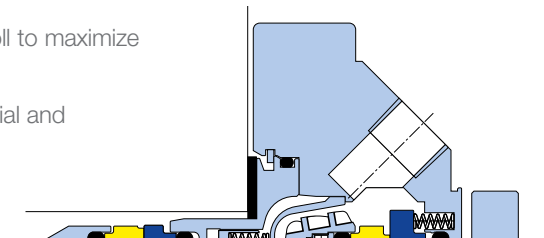
DISP™ — Double Stationary Seal with Flow Inducer

- Efficient bi-directional pumping circulates barrier fluid for effective seal-face cooling and extended seal life
- High-integrity drive design features improve reliability and seal life
- Thin radial faces reduce heat generation compared to alternative dual balanced designs
- Supplied with Quench, Flush and Drain ports
- Sizes available from 1.000” to 3.375” (24mm - 85mm) in standard and ANSI Plus gland formats



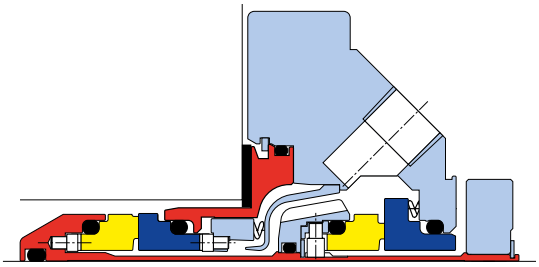
DMSF™ / DMSC™ — Double Monolithic Stationary Flow / Convection

- Monolithic seal-faces provide maximum face stability in high temperature applications improving seal life
- Seal-face drive over large contact area prevents damage to faces in stop / start applications and viscous fluids
- Incorporates a highly effective bi-directional pumping scroll to maximize cooling and increase seal life
- Large 3/8” NPT seal gland ports maximize cooling potential and extend seal life
- Integral deflector guides cooling barrier fluid to the most essential areas and extends seal life
- Sizes available from 1.000” to 5.000” (24mm - 125mm) in standard and ANSI Plus gland formats



Exotic DMSF™ / DMSC™

- Exotic DMSF™ / DMSC™ option also includes Exotic Alloy wetted components at minimum price premium for use with corrosive chemicals
- Sizes available from 1.000” to 5.000” (24mm - 125mm) in standard and ANSI Plus gland formats



For more information please see the product literature or visit:
www.aesseal.com/double

DISP&SISS

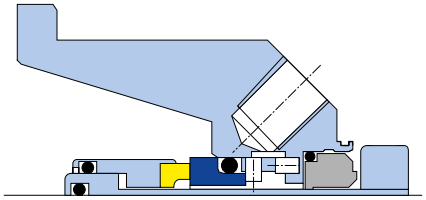
DMSF

Progressive Cavity Pump Seals

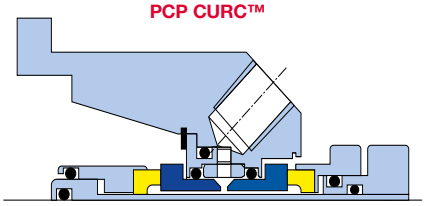
PCPS™ Range – Progressive Cavity Pump Seals

Over 1,500 PCP designs available to suit all major PCP manufacturers including Mono, Robbins & Myers, Netzsch, PCM, Seepex, Orbit and many more.

- Available in single or double seal options
- No pump modification necessary, reducing cost of conversion
- Components are modular to standardize seal ranges
- Big bore flared housing maximizes cooling and lubrication, increasing seal life and prevents clogging



PCP CURC™



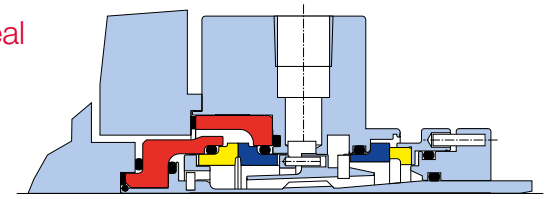
PCP CDSA™

Non-Metallic Seals for Chemical Pumps

- Non-metallic wetted components in Silicon Carbide for use with corrosive chemicals
- Non-shaft-fretting design to reduce cost in equipment overhaul
- Cartridge design for ease of installation
- Hydraulically balanced seal-faces
- Incorporates pumping ring to maximize cooling and increase seal life with a directed barrier fluid flow path to both sets of seal-faces

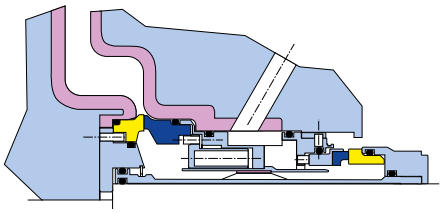
FI-DSNM-R™ — Non-Metallic Cartridge Seal

The FI-DSNM-R™ is designed to suit the Richter (ITT-Goulds), PCK and SCK non-metallic process pumps. This unique cartridge design eliminates the OEM ceramic sleeve.



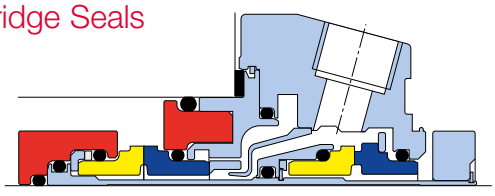
LSEAL™ — Non-Metallic Cartridge Seal

The LSEAL™ is designed to suit the Flowserve Polychem 'L' series, Group I and Group II non-metallic process pumps. This unique cartridge design simplifies installation and impeller adjustment.



DSNM™ and FI-DSNM™ — Non-Metallic Cartridge Seals

The DSNM™ is designed to suit the Flowserve Polychem 'S' series non-metallic process pump.



For more information please see the product literature or visit:
www.aesseal.com/seals

PCP

FIDSNMR

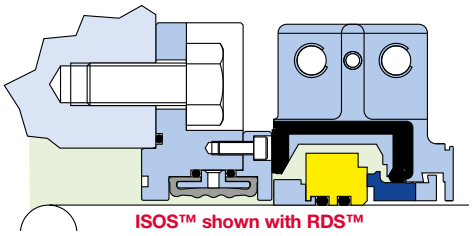
LSEAL

Radially Divided Seals

RDSX™ — Radially Divided Seal

The RDSX™ eliminates the need to remove or strip equipment for seal replacement. The unique design makes it the quickest to install two part seal currently available in the market place.

- Precision lapped rotary seal-face provides industry leading separation technology and predictable sealing
- External wear indicator assists preventative maintenance
- Hydraulically balanced seal-faces for reduced seal-face loading, maximizing seal life and allowing for vacuum service capability
- Minimum parts to assemble
- Self-aligning stationary face
- Sizes available from 2.875” to 8.000” (75mm - 200mm)



ISOS™ shown with RDS™

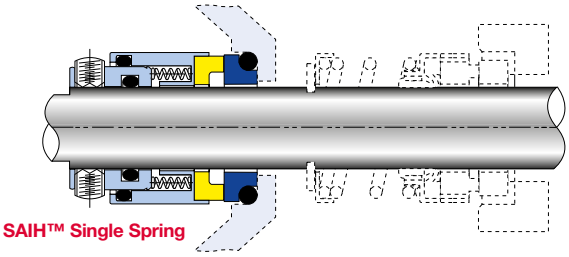
ISOS™ — Inflatable Shut-Off Seal

- Eliminates the need for pump or mixer shut-off valves when changing a seal
- Fitted between the pump and seal it allows quicker and easier changing of the mechanical seal with no need to drain equipment

Submersible Pump Seals

SAIH™ to suit Hidrostal

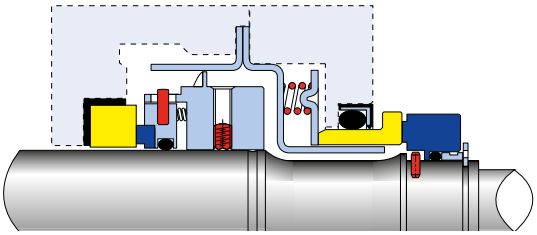
AESSEAL® has a wide range of seals to suit many submersible pumps from manufacturers including: Flygt®, Grindex®, Emu, ABS, Sarlin, Hidrostal and many more.



SAIH™ Single Spring

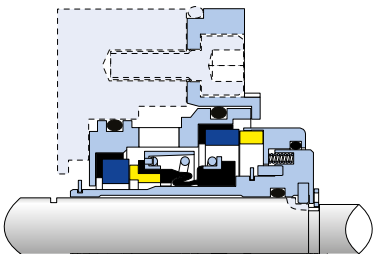
T05™ Series — Replacement Seals to suit Flygt® and Grindex® Pumps

- Easy to install because it is pre-set
- No pump modifications necessary
- No special fitting tools required
- No plastic parts
- Stainless steel metal parts
- Many seals in the range utilize monolithic seal-faces
- Significant cost savings possible



T05VC™ Series — Replacement Seals to suit Flygt® and Grindex® Pumps

- Easily installed, unitized plug in double mechanical seal
- No pump modifications necessary
- Stainless steel metal construction (no plastic parts)
- Robust design
- Competitive pricing
- Easy to disassemble and re-assemble
- Non-shaft-fretting design

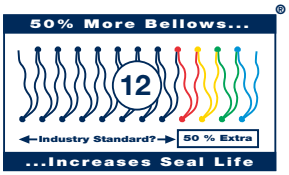


For more information please see the product literature or visit:
www.aesseal.com/seals

RDSX

S-SPRING

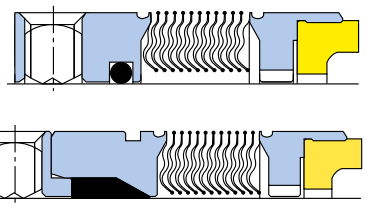
Metal Bellows Seals



With 50% more bellows than the industry standard (12 instead of 8) there is less stress on each convolution in the bellows stack which helps increase seal life. AESSEAL® standard bellows material, Alloy 276, has superior mechanical and corrosion resistance properties than other industry standard bellows materials such as 300 series Stainless Steel or Alloy 20. The hydraulically balanced bellows unit is available in a variety of different material options with either elastomer or graphite packing sealing rings.

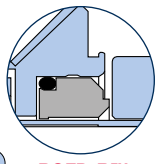
BSAI™ and BSAIG™ — Bellows Component Seals

- Short working length suitable for BS EN 12756 (formerly DIN 24960) housings
- Suitable for limited space applications
- Hydraulically balanced for reduced seal-face loading which maximizes seal life and allows for vacuum service capability
- Sizes available from 1.000” to 5.000” (24mm to 125mm)

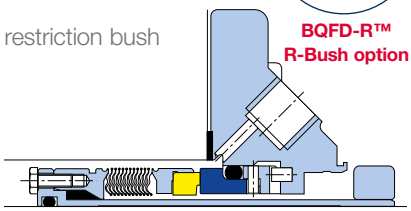


BQFD™, BQFD-R™ and BSIV-N™ — Bellows Single Cartridge Seals

- Cartridge design for reliable installation
- Hydraulically balanced for reduced seal-face loading which maximizes seal life and allows for vacuum service capability
- The BQFD™ range has Quench, Flush and Drain ports with optional restriction bush (BQFD-R™)
- BQFD™ sizes available from 1.000” to 5.000” (24mm to 125mm)
- BSIV-N™ sizes available from 1.000” to 3.500” (24mm to 85mm) in standard and ANSI Plus gland formats - larger sizes termed BSIV™

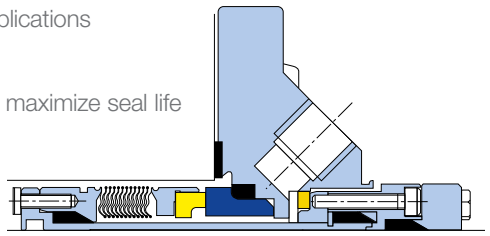


BQFD-R™
R-Bush option



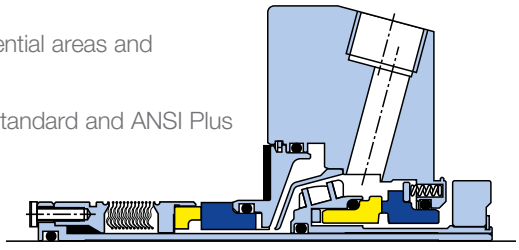
BSFG™ — Bellows Single Full Graphite Cartridge Seal

- Full graphite seal for high temperature or corrosive chemical applications
- Fits pumps with thin radial seal chamber cross-sections
- Quench, Flush and Drain ports for cooling or heating options to maximize seal life
- Cartridge design for ease of installation
- Sizes available from 1.000” to 4.000” (24mm to 100mm) in standard and ANSI Plus gland formats



BDFI™ / BDTP™ — Bellows Double Flow Induced Designs

- Incorporates pumping ring to maximize cooling and increase seal life
- Large 3/8” ports maximize cooling and extend seal life
- Integral deflector guides cooling barrier fluid to the most essential areas and extends seal life
- Sizes available from 1.000” to 5.000” (24mm to 125mm) in standard and ANSI Plus gland formats
- BDTP™ (not shown) is a double cartridge seal with metal bellows inboard and outboard



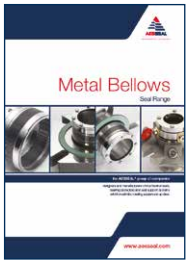
For more information please see the product literature or visit:
www.aesseal.com/bellows

BSAI

BQFD

BSFG

BDFI/BDFC



BELLOWS

AESSEAL®
ENVIRONMENTAL TECHNOLOGY

$8.5m annual saving from a $0.75m investment

By installing Plan 52 dual seals in our customer's high pressure LPG pipeline pumping stations, we improved reliability and saved $8.5M of gas a year.

Our technology has been successfully applied to a wide range of API applications, and we will increase reliability on your upstream, downstream and petrochemical applications.

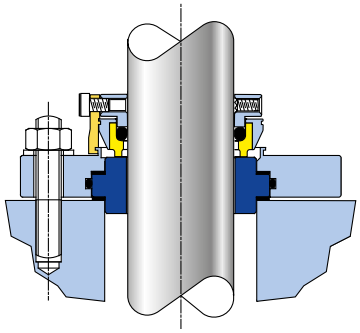
Seals for Mixers, Agitators and Reactors

AESSEAL® offers a complete product range to seal Mixers, Agitators and Reactors.

- Hydraulically balanced for reduced seal-face loading which maximizes seal life and allows for vacuum service capability
- Unitized design for ease of installation
- Non-fretting-design to reduce cost in equipment overhaul
- Modular designs for improved versatility

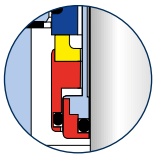
ESM™ Range — External Seal For Mixers

- Flange manufactured to suit OEM dimensions
- Collet drive option available for soft or hard shafts
- Sizes available from 1.000” to 2.625” (25mm - 65mm) for other sizes please contact AESSEAL®

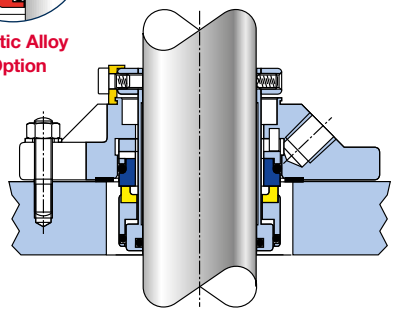


CSM™ — Cartridge Single for Mixers

- Single cartridge seal
- Can accept radial movement up to 0.062” (1.5mm)
- Can be used on mixers with long overhanging shafts
- Suitable for top entry agitator service and vapour applications
- Exotic alloy wetted parts available for use with corrosive chemicals
- Sizes available from 1.000” to 5.000” (24mm - 125mm) in standard and ANSI Plus gland formats larger sizes up to 12.000” (300mm) available on request

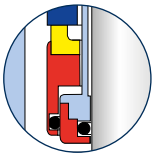


Exotic Alloy Option

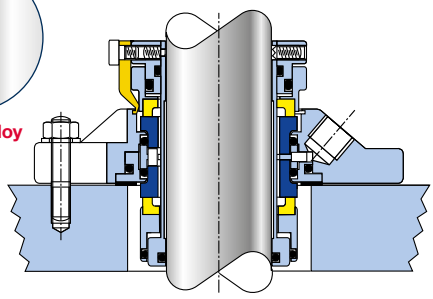


CDM™ — Cartridge Double for Mixers

- Dual cartridge seal
- Can be used on mixers with long overhanging shafts
- Can accept radial movement up to 0.062” (1.5mm)
- Exotic alloy wetted parts available for use with corrosive chemicals
- Sizes available from 1.000” to 5.000” (24mm - 125mm) in standard and ANSI Plus gland formats larger sizes up to 12.000” (300mm) available on request

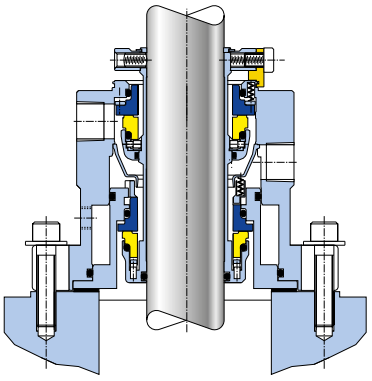


Exotic Alloy Option



CDMSC™ — Canister Double Monolithic Stationary Convection

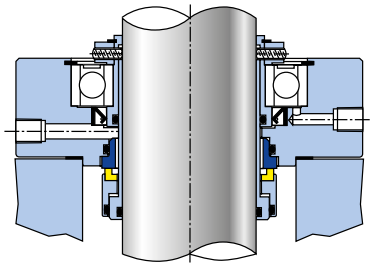
- Monolithic seal-faces provide maximum face stability in high pressure and high temperature applications improving seal life
- Large contact area of seal-face drive prevents damage to faces in stop / start applications and viscous fluids
- Large internal clearances to maximize seal cooling or heating, extending seal life
- Can accept greater radial movement than many competitor seals
- Offered with an integral cooling or heating jacket which improves the seal environment and extends seal life
- Sizes available from 1.250” to 8.000” (30mm - 200mm)



Seals for Mixers, Agitators and Reactors

CSWIB™ (Mixmaster I™)

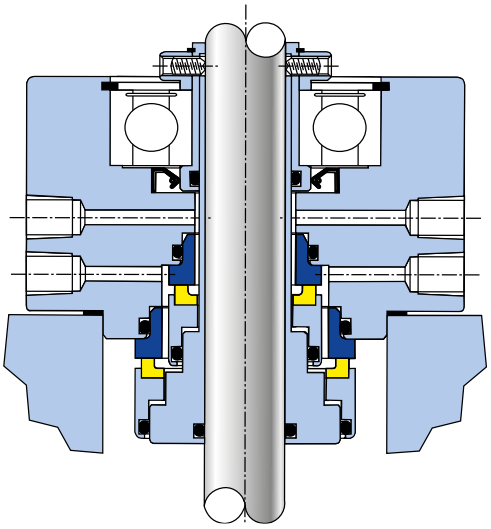
CSWIB-Cartridge Single with Integral Bearing



- Designed for agitators and mixers
- Fitted with an integral bearing to stabilize shaft and seal-faces
- Ideal for use on mixers with long overhanging shafts
- Quench and Drain ports can provide cooling or heating to maximize seal life in arduous applications

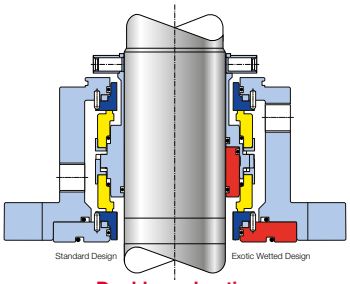
DSWIB™ (Mixmaster II™)

DSWIB-Double Seal with Integral Bearing

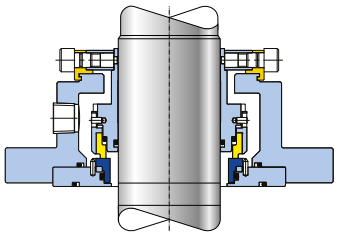


SCMS™ Mixer Seal — Short Canister Mixer Seal

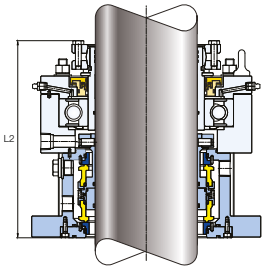
- Available for ATEX /IECEx applications Zones 0/20, 1/21, 2/22
- Double and Single Seal for both modern and mature mixer designs
- Suitable for both top or side entry applications
- Available with wet or dry running faces
- Reduced height - ideal in situations where space is limited
- Dual Balanced Design - maintains containment through a range of process fluctuations
- Fail safe protection - Independent seal face loading using unique common multi-spring design (Patent Pending)
- Accommodates up to 4mm of radial (T.I.R.) movement (size dependant)
- Self Adjusting Axial Movement Compensation - common multi-spring design maintains precise face loading to both sets of seal faces (Double Seal Only)
- Monolithic seal faces (Double Seal Only)
- Available with optional modular bearing assembly
- Optional water cooled mounting flange to extend ATEX limits
- Engineered solutions available



Double seal option



Single seal option



Shaft Clamping with bearing option has taper lock clamp as standard

For more information please see the product literature or visit:
www.aesseal.com/mixer

CDMSC

SCMS

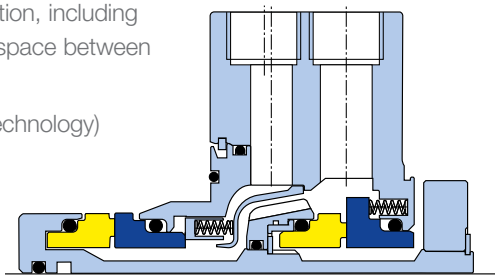
MIXER

Oil, Gas and Petrochemical Seals

Having supplied the Hydrocarbon processing and associated industry sectors since the early 1990s, AESSEAL® has a proven track record of extending equipment life, reducing expenditure on seals and optimizing inventory levels for customers in 104 countries.

CAPI™ Type A, B and C Category I Single and Dual Seals

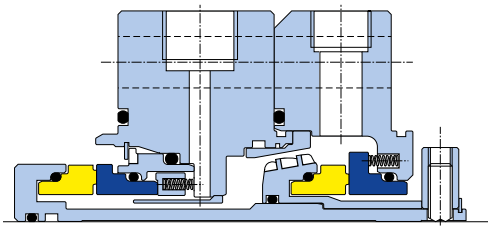
- Employs qualification tested API 682 technology
- Thin cross-section (TXS) seal designs for mature asset installation, including API 610, 5th Ed. with a 0.500" (12mm) radial cross-sectional space between the shaft and seal chamber
- Robust and reliable seal-face drive (Patented Floating Drive Technology) reduces high-stress points at equipment start-up
- Probably the most compact single and dual API cartridge seals on the market which employ API 682 qualified technology
- All sizes available from 1.000" to 5.000" (24mm - 125mm)



AESSEAL® CAPI-TXS™ Type A Dual Seal

CAPI™ Type A Category II and III Single and Dual Seals

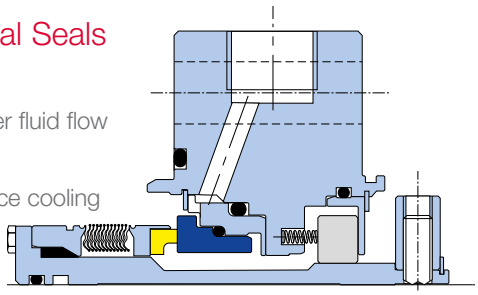
- Qualification tested to API 682
- Stationary flexible element offered as standard for improved pusher design performance as outlined in API 682 Section 6.1.1.5. Rotary design is available on request
- Multi-port Flush design offered as standard for optimum seal-face cooling
- World-leading bi-directional pumping ring performance with 0.062" (1.5mm) radial clearance between rotor and stator; conforming with API 682 Section 8.6.2.3 **without compromise**
- All sizes available from 0.750" to 4.375" (20mm - 110mm)



AESSEAL® CAPI™ Type A Dual Seal

CAPI™ Type B Category II and III Single and Dual Seals

- Qualification tested to API 682
- Effective seal-face heat dissipation achieved by a directed barrier fluid flow path, irrespective of shaft rotational direction
- Multi-port Flush design offered as standard for optimum seal-face cooling
- 12 edge-welded bellows convolutions as standard
- All sizes available from 0.750" to 4.375" (20mm - 110mm)

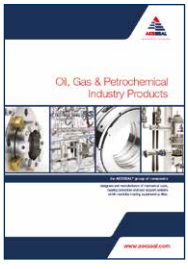


AESSEAL® CAPI™ Type B Single Seal

Bellows Convolution Materials:
Alloy 718, AM350 and Alloy 276 as standard

Seal-Face Holder Materials:
Alloy 42, Alloy 625, 316L S/S and Alloy 276 as standard

For more information please see the product literature or visit:
www.aesseal.com/seals



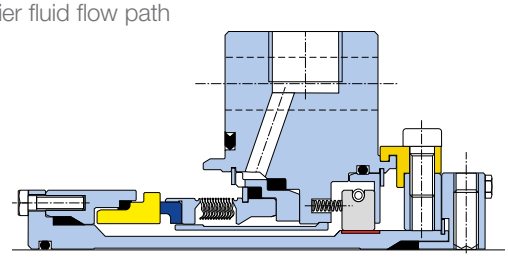
CAPIMAIN

PIPINGPLAN

Oil, Gas and Petrochemical Seals

CAPI™ Type C Single and Dual Seals

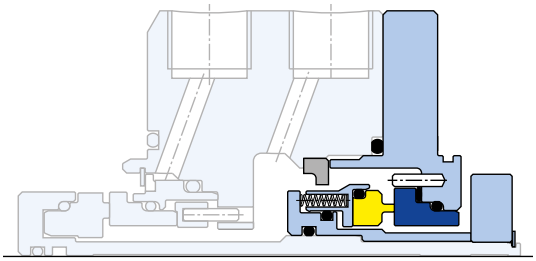
- Qualification tested to API 682
- World-leading bi-directional pumping ring performance with 0.062" (1.5mm) clearance between rotor and stator, conforming with API 682 Section 8.6.2.3 **without compromise**
- Effective seal-face heat dissipation achieved by directed barrier fluid flow path in both single and dual designs
- Segmented floating containment bush operates on a hard plated cartridge sleeve as standard (single seal)
- Identical seal-face technology employed at the inboard and outboard positions (dual seal)
- All sizes available from 0.750" to 4.375" (20mm - 110mm)



AESSEAL® CAPI™ Type C Single Seal

CAPI™ Containment Seals

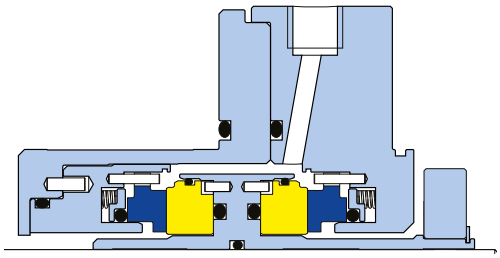
- Containment seal technology that exceeds the requirements of API 682 Ed 3, Section 4.2 and ISO 21049
- High heat dissipation properties due to the AESSEAL® close-coupled technology supplied in a robust, short working length pusher design
- Eliminates the need for liquid barrier systems
- Isolation bushing available
- Modular design to all Type A, B and C configurations
- Contacting and non-contacting design
- Bi-directional option available
- All sizes available from 0.750" to 3.625" (20mm - 90mm) larger sizes available on application



AESSEAL® CAPI™ Type A Containment Seal

CAPI-74™ — Face-to-Face Dual Pressurised Dry Gas Seal for Pumps

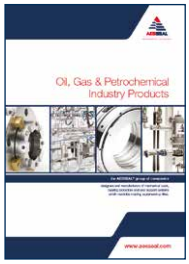
- A non-contacting seal primarily designed for API 610 pumps which require seals to API 682 standard
- Non-contacting spiral groove face technology
- Bi-directional option available
- **Zero** process emissions
- Low running costs
- Specially engineered variants available on request



Bi-directional

Uni-directional

For more information please see the product literature or visit:
www.aesseal.com/seals



CAPIMAIN

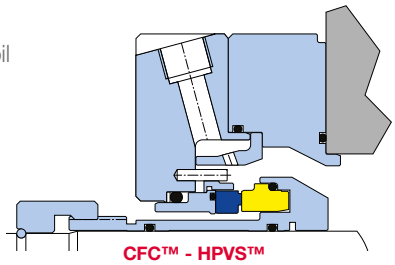
PIPINGPLAN

High Pressure Seals

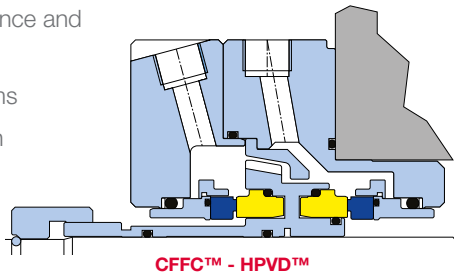
CFC™ / HPVS™ and CFFC™ / HPVD™

These robust seals are designed for use on difficult applications including oil pipeline pumping, water injection and boiler feed duties.

- High speeds – Stationary multi-spring design for even face loading
- High pressures – Robust seal-faces minimize the effects of pressure distortion
- Monolithic seal-faces – maintain flatness under temperature fluctuations
- Axial displacement capacity to accommodate machine build tolerance and differential thermal expansion
- Seal-face design optimized using FEA and hydrodynamic algorithms
- Seal-face loading factory set and statically tested prior to despatch
- Sculpted lug drive – for improved torque transmission
- Compact and robust design – allows seal to be fitted on close bearing centre pumps



CFC™ - HPVS™



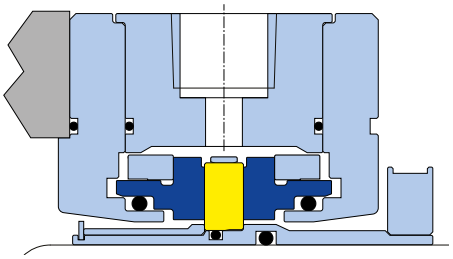
CFFC™ - HPVD™

Pump Dry Gas Seals

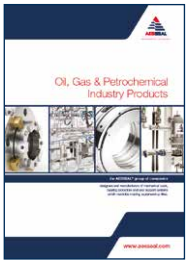
The advantages of sealing pumps with dual pressurised dry gas seals are becoming widely recognized throughout industry. AESSEAL® has developed a range of pump dry gas seals to suit every application.

UDGS™ — Universal Dry Gas Seal for Pumps

- Non-contacting spiral groove face technology
- Long life with low power consumption
- Externally mounted and suitable for ISO 5199 and ANSI pumps
- Can be adapted to fit other types of rotating equipment
- **Zero** process emissions
- Low running costs



For more information please see the product literature or visit:
www.aesseal.com/gas



CAPIMAIN

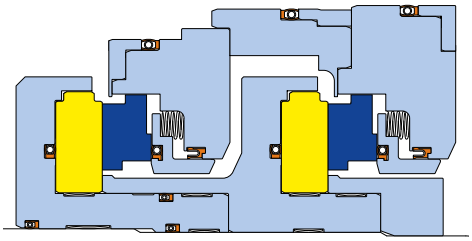
Compressor Dry Gas Seals

AESSEAL® produces compressor dry gas seals in all configurations, incorporating a number of unique features which combine enhanced performance with increased life.

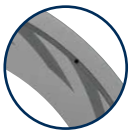
Both uni-directional and bi-directional designs are available and can be backed up by one of our range of separation seals.

CCS™ — Conventional Compressor Seal

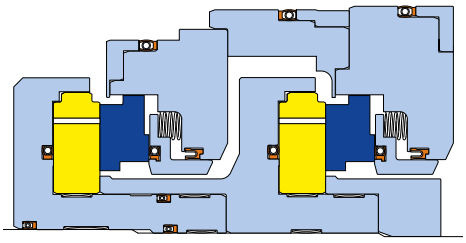
- Supplied in 410 stainless steel as standard with exotic alloy options on request
- Available with Silicon Carbide seats as standard. Tungsten Carbide and Silicon Nitride seats available on request. Mating faces available in Carbon and synthetic diamond coated Silicon Carbide
- 'O' ring and spring energized polymer versions available
- Designs available as single, double, tandem or tandem with intermediate labyrinth, for increased integrity
- Fully shrouded seats adopted as standard
- Bi-directional seal designs also available

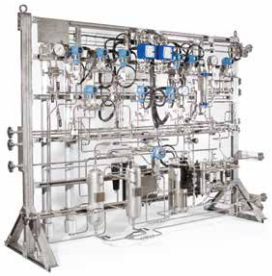


HHCS™ — Hydrostatic and Hydrodynamic Compressor Seal



- Unique, patented DualDam™ compressor dry gas seal technology offers robust protection for the sealing surfaces during start-up, coastdown, slow roll and upset conditions
- Supplied in 410 stainless steel as standard with exotic alloy options on request
- Available with Silicon Carbide seats as standard. Silicon Nitride seats available on request. Mating faces available in Carbon and synthetic diamond coated Silicon Carbide
- Capable of withstanding unintentional reverse rotation
- 'O' ring and spring energized polymer versions available
- Designs available as tandem or tandem with intermediate labyrinth for increased integrity
- Fully shrouded seats adopted as standard
- Bi-directional seal designs also available



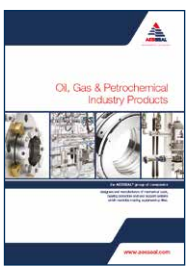


Compressor Dry Gas Seal Support Systems

High quality compressor dry gas seal support systems engineered to customer requirements for all seal configurations and applications. Each AESSEAL® gas conditioning system contains the key API modules plus various enhancements derived from our own field experience, to ensure the highest degree of compressor dry gas seal reliability and longevity.

For every application AESSEAL® performs a detailed phase analysis in-house to determine the required level of gas conditioning.

For more information please see the product literature or visit:
www.aesseal.com/gas-seal



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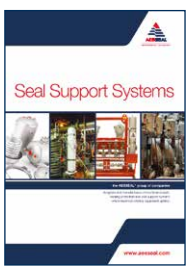
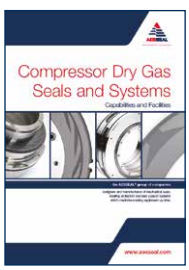


SYSPROD



TURBO

Industry Expertise

Our products are in demand worldwide, and across all industry sectors.

Wherever we supply, the story is the same: our sealing technology delivers increased reliability, demonstrated by increased mean time between failure. Today we are working with an impressive portfolio of customers, in all industry sectors.

Oil & Gas

Our competitive, and continuing, advantage in this sector comes from offering innovative solutions with measurable value. You'll find more detail about us on our website: www.aesseal.com/oil-gas

Power Generation

AESSEAL® is probably the only global seal solution provider who can address all the seal issues in this market. To find out more please visit: www.aesseal.com/power

Mining & Minerals

AESSEAL® mining solutions are designed to handle the most arduous applications. To find out more please visit: www.aesseal.com/mining

Pulp & Paper

AESSEAL® has introduced a range of innovative, patented products to meet the vast range of demands of the pulp and paper and paper-recycling industries. To find out more please visit: www.aesseal.com/paper

Chemical & Pharmaceutical

AESSEAL® has developed innovative new sealing solutions to the myriad challenges of these industries. To find out more please visit: www.aesseal.com/chemical

Food & Beverage

AESSEAL® has inventoried solutions to suit many types of equipment found in this industry and has proven expertise in the processes. To find out more please visit: www.aesseal.com/food

Construction

AESSEAL® construction solutions are designed to handle the most challenging applications. To find out more please visit: www.aesseal.com/construction

Marine

AESSEAL® supplying reliable sealing solutions for all your on-board needs. To find out more please visit: www.aesseal.com/marine

Bio / Ethanol

AESSEAL® is a market-leader in this industry with over 4,000 seal installations and 2,500 system installations. To find out more please visit: www.aesseal.com/bio-ethanol

Water & Waste Water

AESSEAL® has sealing technology solutions, with proven-reliability, for each stage of the process. To find out more please visit: www.aesseal.com/water

Metal & Glass-Working

AESSEAL® has a range of sealing technologies to increase reliability for all stages of metal processing and glass manufacturing. To find out more please visit: www.aesseal.com/metal

Automotive

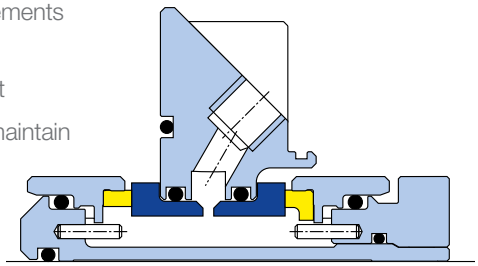
AESSEAL® supplies reliable mechanical seal technology and systems that increase uptime of pump equipment to help companies achieve higher quality. To find out more please visit: www.aesseal.com/automotive

Industry Specific Designs

AESSEAL® offers a wide range of products, both standard and standard-plus designs for specific requirements for individual industries. Examples of a few specialist products are shown below.

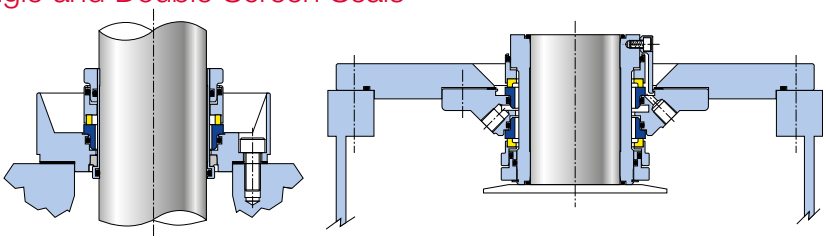
CDPH™ — Double Seal for Heavy-Duty Slurries

- Double mechanical seal is designed to meet the arduous requirements of heavy duty slurry applications
- Stationary faces are oversized to allow for more radial movement
- Large ports and increased radial clearances enable the seal to maintain a stable fluid film for extended seal life
- Metal parts are much more heavy duty
- Exotic metal parts are available to resist corrosion and erosion



IASC™ / IADC™ — Single and Double Screen Seals

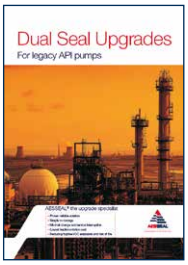
Standard AESSEAL® screen seals are available to suit many of the popular screen models including Voith, Impco, Hooper, Valmet and Andritz.



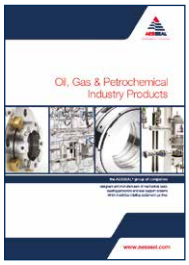
Many more industry specific product offerings available.

You can find details on all of these brochures on our web site at: www.aesseal.com or request them from our marketing department by email at: marketing@aesseal.com

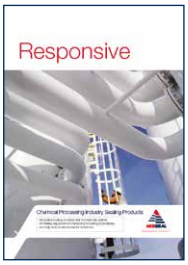
For more information please see the product literature or visit: www.aesseal.com/industry



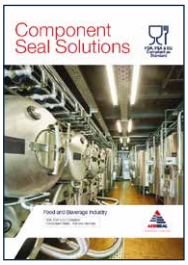
APIUP



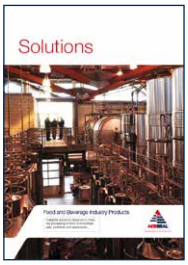
CAPIMAIN



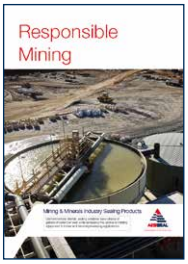
CHEMICAL



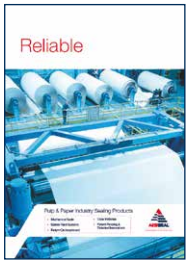
F&B-comp



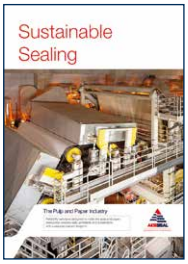
F&B



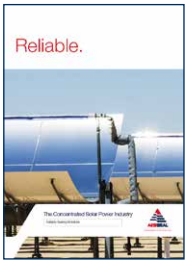
M&M



PPG



PulpPaper



SOLAR

SYSGUIDE

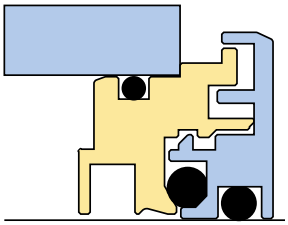
Bearing Protectors

Eliminate the causes of over 50% of bearing failures with the LabTecta® IP66 and IP69k-certified bearing protectors.

Research* shows that water and solids contamination causes 52% of bearing failures. Good bearing protection can eliminate these failures.

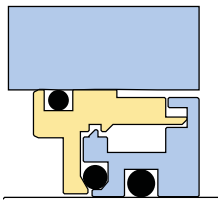
LabTecta®OP— Labyrinth Bearing Seal

- IP66 AND IP69K Certified (the highest third-party certified bearing protector in the world, as laboratory tested against the Ingress Protection Code)
- Non-contacting Labyrinth Bearing Protector ideally suited for high shaft speed or marginal lubrication applications
- Available with full ATEX certification, complying with ATEX directive 2014/34/EU (Group II equipment, Categories 2 & 3)
- Sizes available from 0.750” to 5.875” (16mm - 145mm)



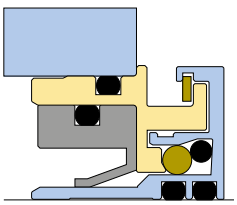
LabTecta®M — Engineered Bearing Protection for Electric Motors

- Labyrinth keeps water, dust & contaminants out, improving bearing life
- Water Expulsion Port further protects against water ingress
- Non-wearing eliminates shaft wear in operation
- Can be supplied with a grounding ring (LabTecta®MG) for VFD motors
- Sizes available from 0.750” to 5.875” (16mm - 145mm)



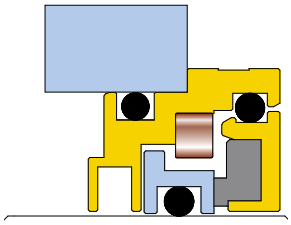
LabTecta®66FS — for Sealing Oil Flooded Bearing Chambers

- Maintenance-free - No routine maintenance required
- Suitable for old or worn shafts
- Multi-tiered labyrinth - Keeps water, dust & contaminants out
- ATEX certification available
- Sizes available from 0.750” to 5.875” (16mm - 145mm)



MagTecta-S™ — Magnetic Face Seal Design

- Hybrid labyrinth and advanced magnetic face sealing technology for double protection
- Compact housing will fit the majority of lip seal cavities without the need for modification of equipment
- Sizes available from 0.750” to 5.875” (16mm - 145mm)



Designs for Pillow Blocks, Steam Turbines, axial shaft movement, split seal and larger shaft sizes are available on request.

For more information please see the product literature or visit:
www.aesseal.com/bearings

BPMAIN

LAB-OP

LAB-M

MAGTECS

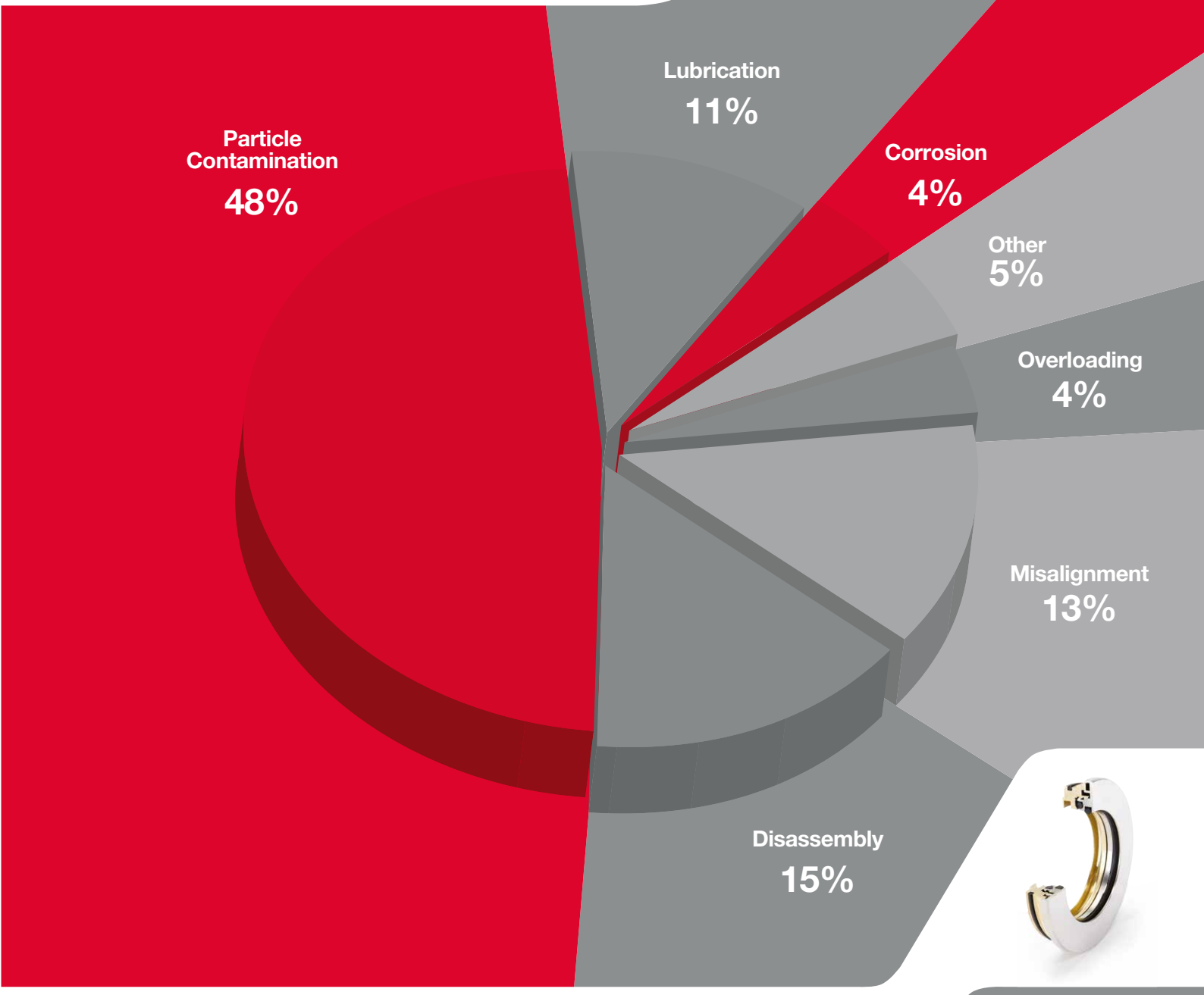
* Bloch, Heinz; “Pump Users Handbook: Life Extension” 2011.

AESSEAL®
ENVIRONMENTAL TECHNOLOGY

Eliminate 52% of bearing failures

A major study into equipment reliability has shown 52% of all bearing failures are due to particle contamination and corrosion caused by water contamination.

The LabTecta® bearing protection range can reduce bearing oil contamination from 83% to 0.0003% significantly reducing bearing failure, which represents 20.8% of all rotating equipment failures.



Experience the exceptional – contact your local representative to see how we can help you. Full details at: **www.aesseal.com**

Seal Support Systems

AESSEAL® offers a wide range of innovative and modular seal support systems to complement its mechanical seal designs. A selection of these is shown below.

There are seal support system solutions available for all of the API Piping Plans. The API Piping Plan book shows standardized flushing piping arrangements that are widely used in the industry. Please contact AESSEAL® Systems Division for further details. Tel: +44 (0)28 9266 9966, Email: systems@aesseal.com

SWFF-TF™ — Flow Fuse™ Water Management System

- **Flow sensing shut off valve —** Protects the process from barrier fluid contamination upon seal upset or failure
- **Water regulator —** Maintains water level and pressure which reduces due to normal seal operation
- **Automatic reset facility —** Protects the mechanical seal from running dry during process upsets
- **Thermal relief valve —** Maintains system operating pressure by automatically relieving in the event of thermal expansion

SW Range (SW2™ and SW3™) — Water Management Systems

- **Environmentally friendly —** Utilizes water as barrier fluid and connects directly to plant water supply (or AESSEAL® FDU auto top up)
- **Provides huge water savings —** AESSEAL® Water Management Technology can save 6.3 Million litres / 1.7 Million US gallons of water per pump per year!
- **Regulates the plant water line pressure —** Can be set at 1 bar / 15psi above stuffing box pressure and automatically replenishes lost water and re-sets barrier fluid pressure if there is a mechanical seal upset

SP Range (SP1™ - SP3™) — Gas Pressurised Barrier Fluid Systems

- **304 SS vessel construction —** Bead blast finish, suitable for a wide range of arduous environments
- **Integral weld pad level gauge —** Gives a visual indication of the system barrier fluid
- **Available with cooling coil —** Enables greater cooling capabilities

AES28™ — API Compliant Oil or Water Seal Support System

- **316 SS vessels —** Suitable for a wide range of arduous environments
- **API 682 compliant —** Designed in accordance with ASME VIII Div. 1 & PED 2014/68/EU standards and carry the UKCA & CE markings
- **Cooling coil as standard —** Additional cooling available for high heat applications
- **Modular design —** A number of intrinsically safe and EEXD flame proof instrumentation option can be fitted

Easyclean™ — Pressure Systems Can Be Offered For SW or SP Systems

- **Customer effective solution** — Designed for the Pharmaceutical, Food & Beverage sectors
- **Quick release clamp** — Enables instant internal vessel inspection without the need to remove from point of installation, simply clean and flush out the vessel to remove any build-up of dirt or debris
- **Fully accessible** — Avoids expensive time-consuming internal system inspection and extended plant process downtime, eliminating the need for use of specialized endoscopic equipment

PP/01™ — High Performance Forced Oil Circulation System

- **API Plan 54 forced circulation system** — Maximizes barrier fluid heat dump potential
- **Enhanced modular design enabling use on multiple high end applications** — The PUMPPAC™ can be installed in a variety of ATEX 'zoned' environments utilizing specific ATEX instrumentation
- **Various cooling options available** — Integral water cooler / air blast cooler, mounted as one interconnected unit

FDU™ — Fluid Distribution Unit

- **Independent pressurized fluid supply system** — Removes the expense of piping a pressurized clean water supply to a new area of the plant
- **Reduced energy consumption** — The system can be operated intermittently to reduce energy costs via dead-ended piping

API Plan 53B — Welded System

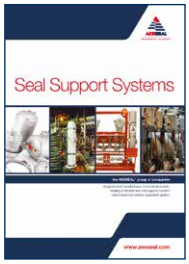
- **Pipework is constructed from 316 stainless steel** — Offering resistance to a range of arduous environments, and is fully API 682 compliant.
- **Robust and sturdy design** — With earthing boss for safe electrical earthing of the system
- **Paintwork suitable for on & offshore** — Grit blasted, four layered epoxy paint protection suitable for most environments

API Plan 53B — Compression Fitting

- **Modular design** — A wide range of assembly options available covering all required instrumentation and cooling options, capable of operating in any hazardous environments
- **Quick turnaround** — Utilizes high quality compression fittings for exacting manufacturing repeatability
- **User friendly** — Simple quick replacement and interchangeability of all parts. Instrumentation can be maintained or replaced without the need to stop production, reducing any enforced downtime costs. No welding required

For more information please see the product literature or visit: **www.aesseal.com/systems**

PIPINGPLAN



SYSPROD

Company Overview

AESSEAL® is a leading global specialist in the design and manufacture of mechanical seals, bearing protectors and seal support systems. With operations in six continents, AESSEAL® is one of the world's largest suppliers of mechanical seals, achieving growth through exceptional customer service and innovative products that provide real customer benefits.

For every seal developed by AESSEAL®, we use state-of-the-art computational facilities and numerical tools to design and optimize seal performance prior to manufacture and testing. These tools include Predictive Software Code developed in-house, Finite Element Analysis (FEA) and Computational Fluid Dynamics (CFD). Our numerical tools are used for seal design, performance optimization, special product application and troubleshooting. In combination with an extensive test program the result is world-leading technology that keeps your equipment running longer.

Over 7% of annual sales revenue has been reinvested in R&D over several decades. This has almost certainly led to the most advanced range of sealing technology available globally.

Environment

- we are BS EN ISO 14001 certified on three continents
- we save in excess of 25 billion US gallons (95 billion litres) of water for customers each year
- our products reduce harmful emissions and energy consumption
- we encourage environmental improvements from our suppliers

Community

- we promote engineering and other core subjects in local schools and communities
- we mentor students of all ages and abilities
- we actively improve the quality of life for under-privileged and disadvantaged groups
- we promote the use of foreign languages in schools

The AESSEAL mechanical seal test facilities are probably the most technically advanced in Europe.

Computer-controlled test bays can be programmed to validate seal designs to any pre-determined cyclic pressure, temperature and shaft speed configuration. Take a three-minute tour by visiting **www.aesseal.com/en/resources/video/journey-a-seal**

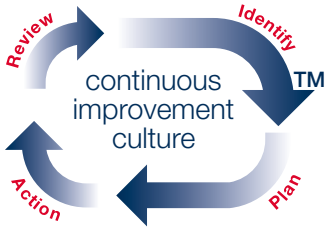
Research & Development Test Facilities

Shaft Speed: Up to 45,000 rpm

Pressure: Up to 5,000 psig (350 barg)

Temperature: Up to 536ºF (280ºC)

- Flashing and Non-Flashing Hydrocarbons
- Caustics, Water and Hot Oil
- Volatile Organic Compounds



Ethical

- we reject all types of corruption
- we promote equal opportunities
- we invest in regions of economic deprivation
- we communicate with our stakeholders in their native language

Health & Safety

- we are ISO 45001 certified
- we aim to reduce noise pollution and manual handling operations
- we are committed to the Five S's (sorting, straightening, shining, standardizing, and sustaining)
- we have a company-wide unlimited budget for any safety-related issue

AESSEAL®

ENVIRONMENTAL TECHNOLOGY

To experience the exceptional, please contact your local representative. Discover full details on our website:

www.aesseal.com

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For further information and safe operating limits contact our technical specialists at the locations below.

THE QUEEN'S AWARDS FOR ENTERPRISE: INNOVATION 2021

THE QUEEN'S AWARDS FOR ENTERPRISE: SUSTAINABLE DEVELOPMENT 2022

AESSEAL plc is certified to:

ISO 9001, ISO 14001, ISO/IEC 20000, ISO/IEC 27001, ISO/TS 29001, ISO 37001, ISO 45001 & ISO 50001

Use double mechanical seals with hazardous products.

Always take safety precautions:

WARNING

- **Guard your equipment**
- **Wear protective clothing**

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