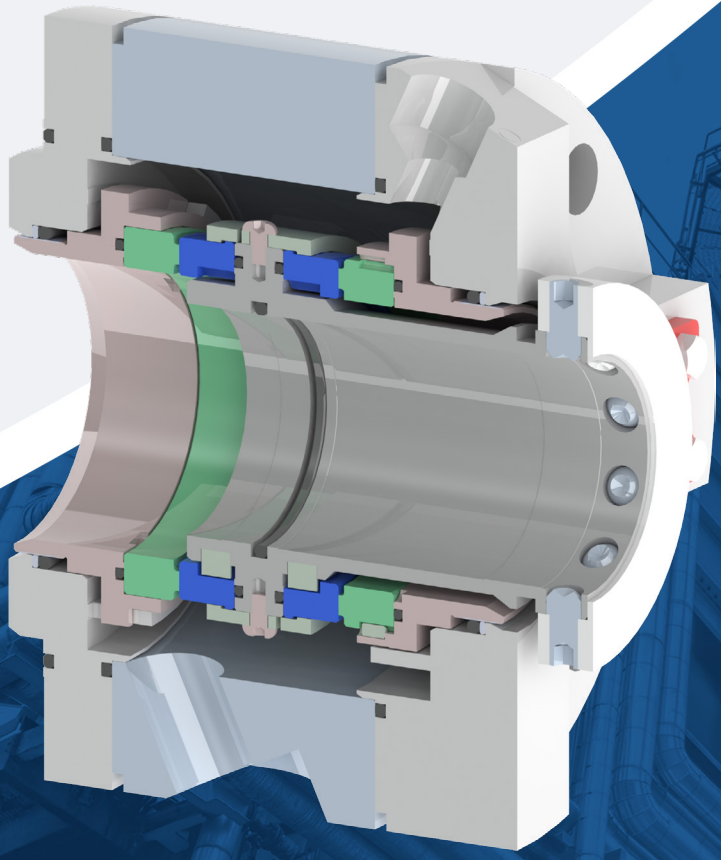
flexaseal
ENGINEERED SEALS AND SYSTEMS, LLC

API Product Catalog

For Oil, Gas, and Other High-Duty Industries



SEALS.
SYSTEMS.
SOLUTIONS.
AT YOUR SPEED.™

www.flexaseal.com

INNOVATION SINCE 1983

Design, Manufacturing, Repair, and Service

Flexaseal supplies mechanical seals and seal support systems in the API market all over the world. We are knowledgeable in the specific challenges of emission controls, high pressures, speeds, and temperatures as well as sealing toxic, corrosive, and flammable products.

OUR CAPABILITIES INCLUDE:

- Engineered cartridge & component seals.
- Mixer/agitator seals.
- Gas seals.
- Welded metal bellows up to 1,500 psi (103 bar).
- Single and dual cartridge seals.
- The world's first split cartridge mechanical seal.
- Heavy-duty slurry seal.
- API repair and reliability improvements.
- Reverse engineering.
- Competitor repair and exchange programs.
- Complete seal repair services available at our factory service centers and authorized repair locations throughout the world.

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CYCLONE SEPARATOR

GLOSSARY OF TERMINOLOGY

These definitions should be used as reference only.

For a complete guide of all API terminology and specifications, please consult API Standard 682 Fourth Edition, May 2014.

API: American Petroleum Institute

ASME: American Society of Mechanical Engineers

ARRANGEMENT: Defines mechanical seal layout and support system parameters. Simple cartridge seal installation.

- **ARRANGEMENT 1:** One seal per cartridge assembly.
- **ARRANGEMENT 2:** Two seals per cartridge assembly; space between the seals is below seal chamber pressure.
- **ARRANGEMENT 3:** Two seals per cartridge assembly; space between the seals is pressurized by an external source to a pressure higher than the seal chamber pressure.

CATEGORY: Defines the dimensional parameters of the pump seal chamber design and the corresponding allowable operating ranges and limitations.

- **CATEGORY 1:** ASME B73.1 & B73.2 seal chamber specifications (non-API 610). -40 °F to 500 °F (-40 °C to 260 °C), 0 psi to 300 psi (0 bar to 20 bar).
- **CATEGORY 2:** API 610 seal chamber specifications -40 °F to 750 °F (-40 °C to 399 °C), 0 psi to 600 psi (0 bar to 41 bar).
- **CATEGORY 3:** API 610 (or equal) seal chamber specifications with mandatory qualification testing and documented seal design -40 °F to 750 °F (-40 °C to 399 °C), 0 psi to 600 psi (0 bar to 41 bar).

TYPE: Defines the mechanical seal design. All three types listed below must be a balanced cartridge design mounted inside the seal chamber.

- **TYPE A:** Pusher seal with multi-spring design. Secondary seal design - elastomeric O-rings.
- **TYPE B:** Metal bellows seal. Preferred bellows material - Alloy C-276, secondary seal design - elastomeric O-rings.
- **TYPE C:** Metal bellows seal. Preferred stationary design; bellows material - Alloy 718, secondary seal design - flexible graphite.

MATERIALS OF CONSTRUCTION

- **SEAL FACES:** Carbon, Antimony-Impregnated Carbon, Sintered Silicon Carbide, Graphite-Loaded Silicon Carbide, Reaction-Bonded Silicon Carbide, Ni-B Tungsten Carbide.
- **WELDED METAL BELLOWS:** Alloy C-276, Alloy 718, AM350HT.
- **SECONDARY SEALING:** Viton®, Ethylene Propylene, Aflas®, Buna, Neoprene, Perfluorelastomers, Flexible Graphite.

Other materials available upon request and design approval.

STYLE 53A

API

STYLE 53A

Rotating Metal Bellows Cartridge Seal

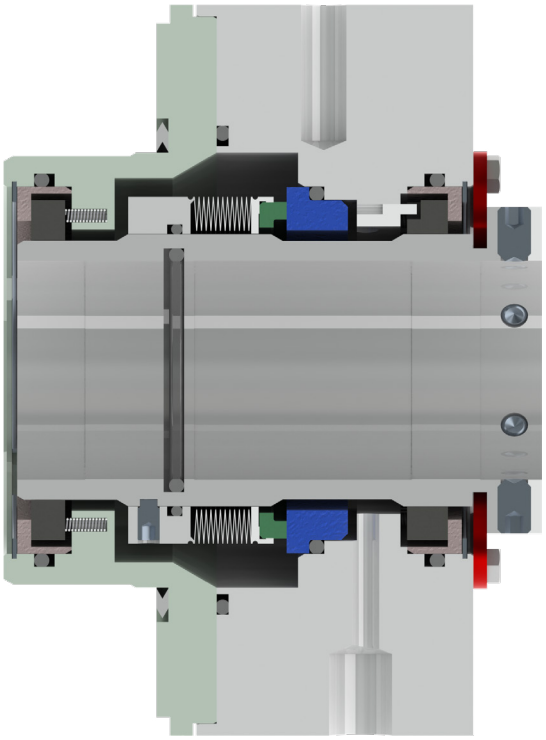
FOR MEDIUM TEMPERATURE AND DIRTY CRITICAL SERVICES

The Flexaseal Style 53 cartridge seal is specifically designed for ruggedness and durability to withstand higher temperature or dirty services The rotating bellows is self-cleaning for greater reliability in dirty services.

Multiple bellows materials available based on process conditions and fluids. Double-ply bellows designs for higher pressures.

Static elastomers throughout for elimination of O-ring abrasion and energized face hang-up.

The Style 53 cartridge seal is uniquely customizable to your specific application requirements. API 682 Compliant options are also available.



MATERIALS OF CONSTRUCTION

Faces	Antimony Impregnated Carbon, Nickel Bound Tungsten Carbide, Sintered Silicon Carbide, Graphite Loaded Silicon Carbide
Welded Bellows	AM350HT, Inconel 718™, Hastelloy C276™. Single- and double-ply bellows options available.
Gland Bushings	Bronze, Carbon
Lantern Ring	PTFE
Standard Metallurgy	316 SS with low-expansion Alloy 42 retainer. Other material options available, please consult Flexaseal.

OPERATING PARAMETERS

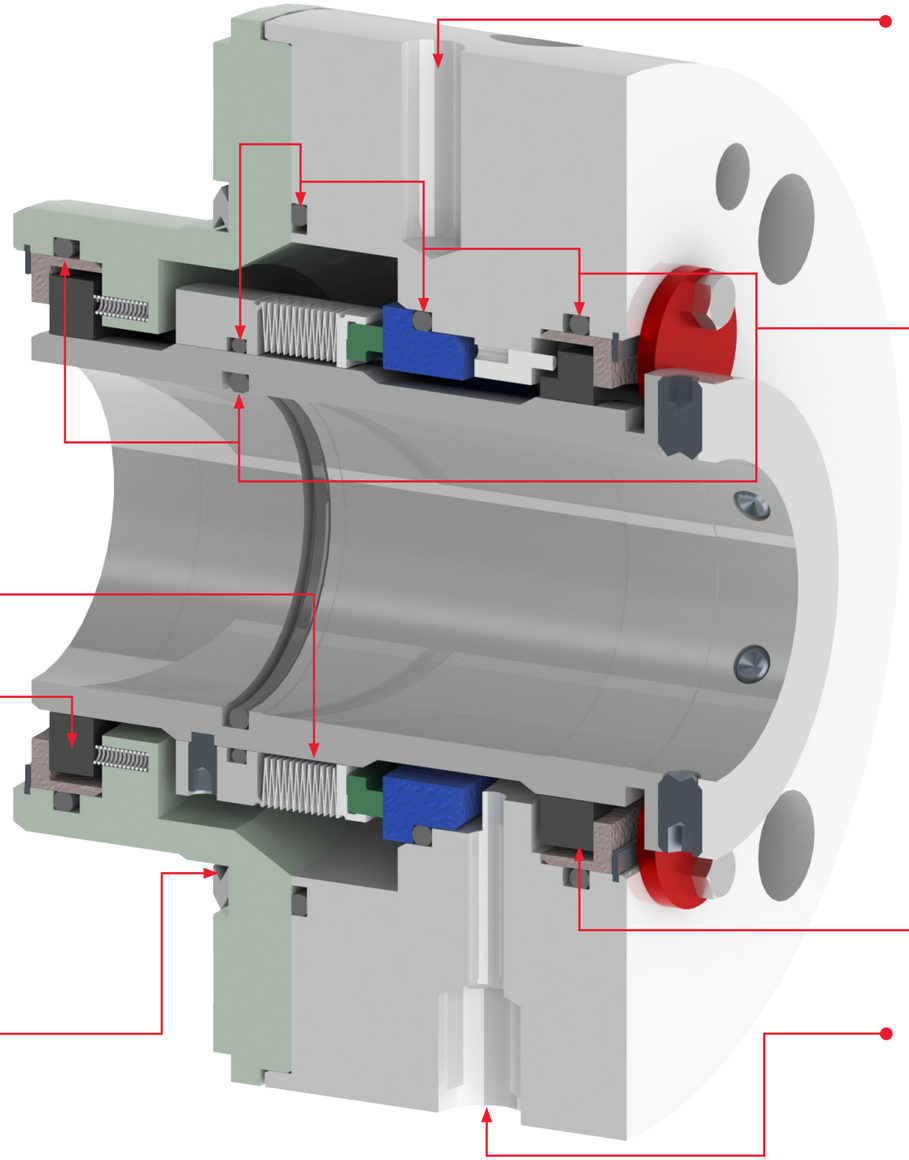
Max Temperature	500 °F (288 °C)
Max Pressure	600 psi (41 bar)
Max Speed	4,500 fpm (23 m/s)

*Max temperature / pressure / speed indicate operating extremes independently and do not imply the seal will function at these extremes at the same time. Contact Flexaseal if in doubt.

STYLE 53A

Type B | Category 1 & 2 Contacting Wet Seals

ARRANGEMENT 1



Flush, vent, drain, and quench ports standard.

All static elastomers for elimination of O-ring abrasion and energized face hang-up.

Proven high-performance nesting ripple bellows design.

Double-ply bellows option available for higher pressure applications.

Optional inboard floating bushing for enhanced particulate control.

Optional outboard floating, fixed, or segmented bushing for leakage control.

Piloted gland with confined gasket to prevent blow out or extrusion.

Flush, vent, drain, and quench ports standard.

STYLE 58A

API

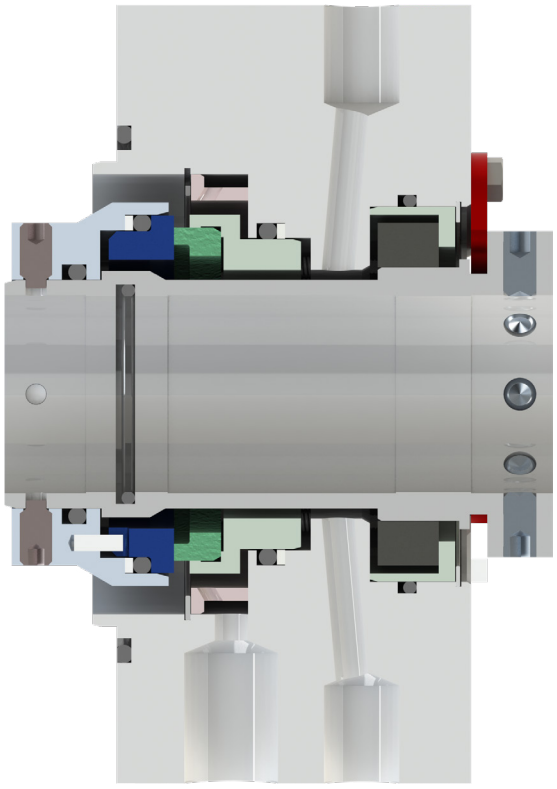
STYLE 58A

Heavy-Duty Stationary Multi-Spring Single Cartridge Seal

FOR HIGH-PRESSURE APPLICATIONS

The Flexaseal Style 58A single cartridge seal is specifically designed for ruggedness and durability to withstand high-pressure applications. Design elements include a piloted gland to positively center the seal assembly, as well as a metal-to-metal confined gland gasket which prevents blow-out or extrusion of the gland packing.

The Style 58A cartridge is uniquely customizable to your specific pump and application requirements. API 682-compliant options are also available.



MATERIALS OF CONSTRUCTION

Faces	Premium Grade Resin and Antimony Impregnated Carbons; Nickel Bound Tungsten Carbide; Sintered and Graphite-Loaded Silicon Carbide
Elastomers	FKM, EPDM, TFEP, Buna, Neoprene, Perfluoroelastomers
Metal Parts	316 and 17-4 Stainless Steel Other options available: Super Duplex Stainless Steel, Alloy C-276
Springs	Alloy C-276

OPERATING PARAMETERS

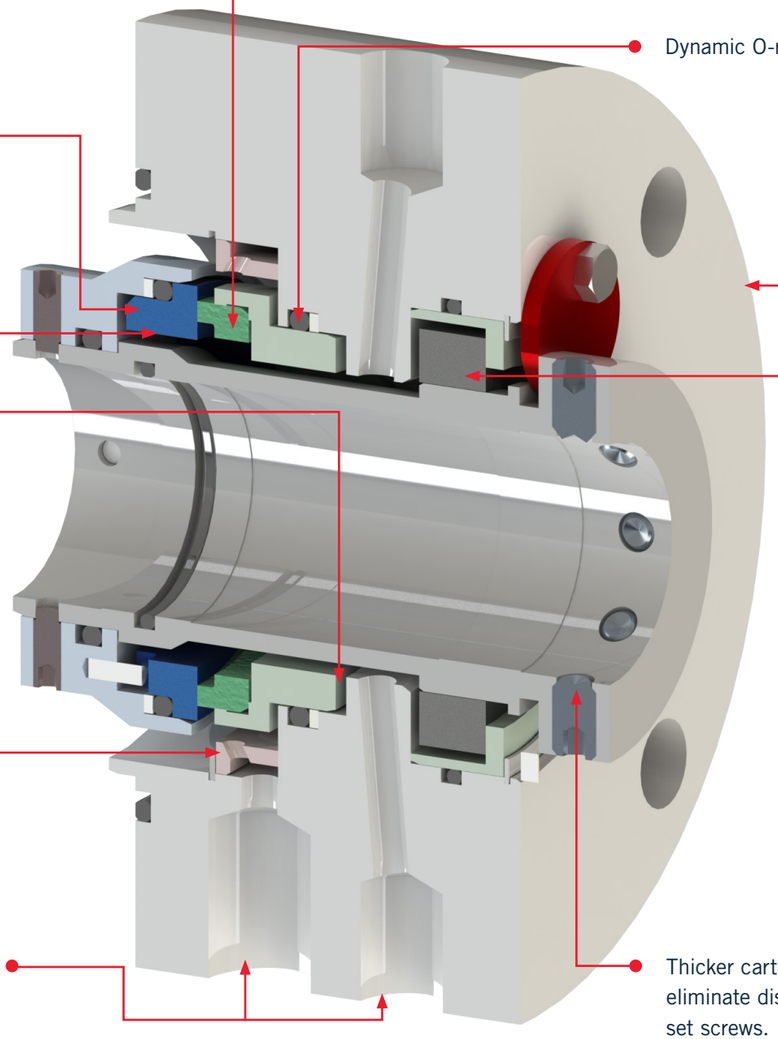
Max Temperature	550 °F (290 °C)
Max Pressure	1,200 psi (80 bar)
Max Speed	10,000 fpm (50 m/s)

*Max temperature / pressure / speed indicate operating extremes independently and do not imply the seal will function at these extremes at the same time. Contact Flexaseal if in doubt.

STYLE 58A

Type A | Category 1 & 2 Contacting Wet Seals

ARRANGEMENT 1



Stationary design for maximum face alignment.

Dynamic O-ring moves on a clean surface.

Robust and reliable seal face drive.

Hydraulically-balanced.

Springs located out of product to prevent clogging and hang-up.

Gland options may be designed to include any combination of flush, quench, and drain connections. Glands are supplied with a throttle bushing for increased seal performance and added safety.

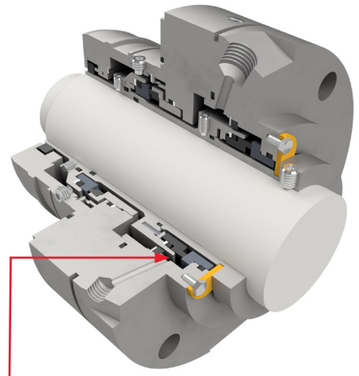
Carbon floating bushing option available.

- Rugged high-pressure construction.
- API 682 Type A Arrangement 1 available.

Multi-point injection feature available which ensures maximum uniformity of cooling around the entire circumference of the sealing faces, thus eliminating face distortion due to uneven cooling. Ideal for boiler feed and light hydrocarbon services which tend to flash.

Gland NPT connections 1/2" NPT for process side and 3/8" NPT for atmospheric side to help prevent improper piping assembly.

Thicker cartridge sleeve construction to eliminate distortion due to tightening of set screws.



FCSA dry running secondary containment seal available.

STYLE 59A

API

STYLE 59A

Robust Rotating Multi-Spring Single Cartridge Seal

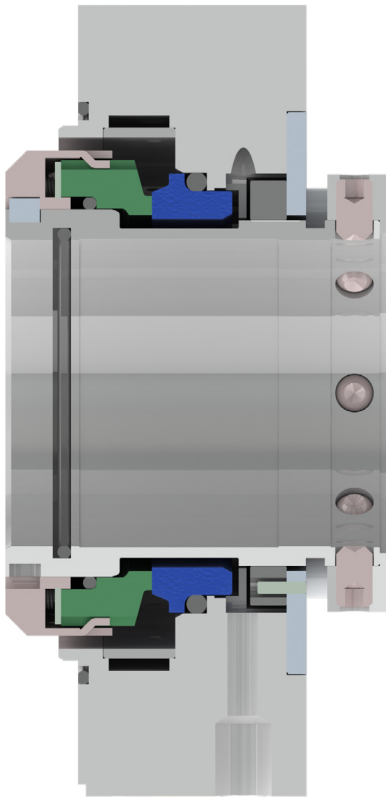
FOR API 682 APPLICATIONS

The Flexaseal Style 59A is designed specifically to conform to API 682 Category 2 applications for midstream and downstream oil and gas installations.

The Style 59A features a piloted gland to ensure concentricity with installed equipment.

FEA-optimized face geometry ensures proper balance and prevents point loading with lower friction during operation, which results in longer service life and reliability.

The 59A is also available with contacting and non-contacting secondary sealing. The Flexaseal FC seal (available as 59A/FC) provides decades of proven operational reliability as a contacting secondary seal. The Flexaseal FGSA (available as 59A/FGSA) is our containment lift-off design for API applications that require a non-contacting secondary seal.



MATERIALS OF CONSTRUCTION

Faces	Premium Grade Resin and Antimony Impregnated Carbons; Nickel Bound Tungsten Carbide; Sintered and Graphite-Loaded Silicon Carbide
Elastomers	FKM, EPDM, TFEP, Buna, Neoprene, Perfluoroelastomers
Metal Parts	316 and 17-4 Stainless Steel Other options available: Super Duplex Stainless Steel, Alloy C-276
Springs	Alloy C-276

OPERATING PARAMETERS

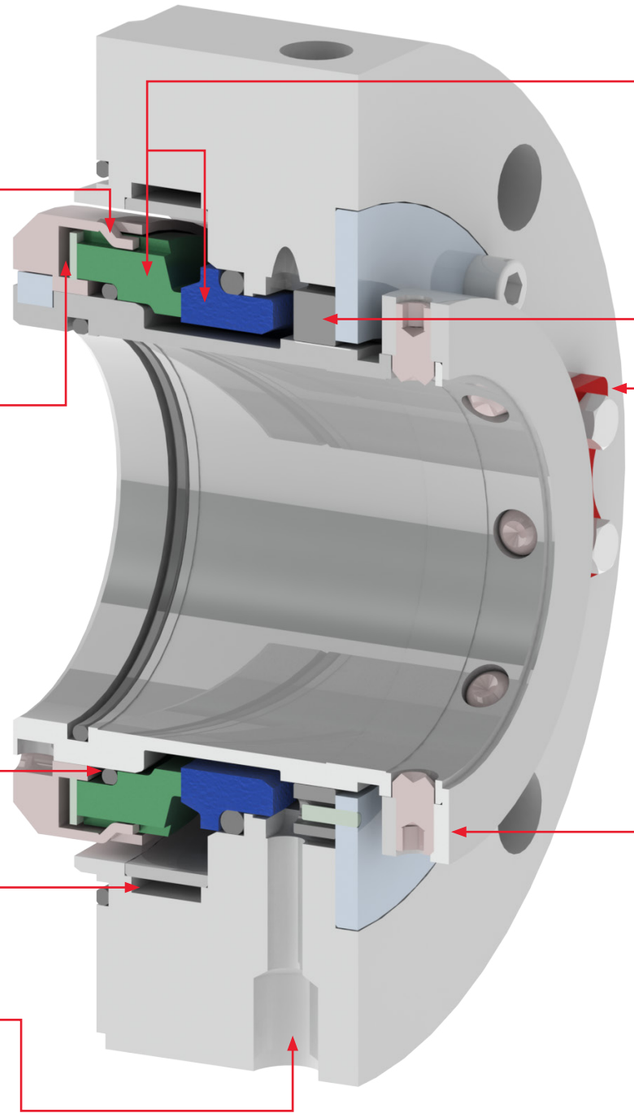
Max Temperature	400 °F (204 °C)
Max Pressure	1,200 psi (83 bar)
Max Speed	4,500 fpm (23 m/s)

*Max temperature / pressure / speed indicate operating extremes independently and do not imply the seal will function at these extremes at the same time. Contact Flexaseal if in doubt.

STYLE 59A

Type A | Category 2 & 3 Contacting Wet Seals

ARRANGEMENT 1



Tang-Drive System for reliable face torque transfer and reduced O-ring hang-up.

Heavy-Duty Springs to mitigate process debris clogging and reduce spring quantity.

Dynamic O-Ring protected from process fluid debris.

Circumferential Flush System to evenly distribute cooling flush flow around the seal faces.

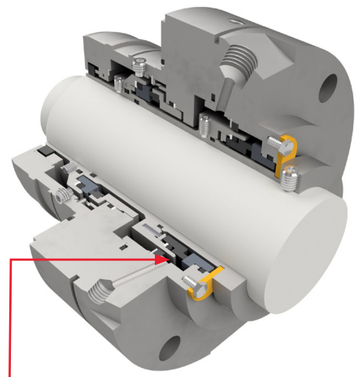
Standard API 682 gland connections.

Oversized Monolithic Seal Faces for superior heat dissipation and durability.

Convertible Outboard Bushing for fixed, floating and segmented designs to allow for all types of secondary leakage capture.

Large Retained Setting Clips for easy seal installation and removal. Setting clips are always with the seal.

Removable Drive Collar for enhanced repairability.



FCSA dry running secondary containment seal available.

STYLE 63A / 66A

API

STYLE 63A / 66A

Stationary and Rotating Metal Bellows Cartridge Seal

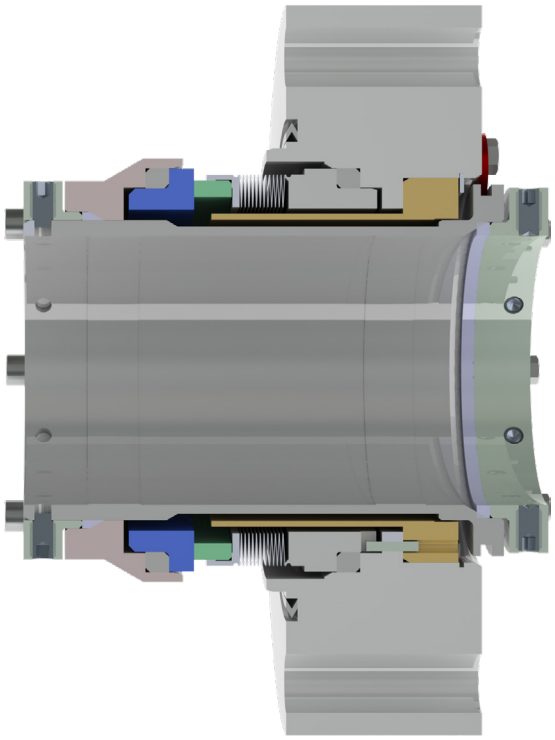
FOR HIGHER TEMPERATURE AND DIRTY CRITICAL SERVICES

The Flexaseal Style 63A/66A cartridge seal is specifically designed for ruggedness and durability to withstand higher temperature or dirty services. The Style 63A features a stationary bellows unit for superior performance in applications that require higher shaft runout or large assembly tolerances. The Style 66 is a rotating bellows unit for enhanced solids handling.

Standard Inconel 718™ bellows units for wide temperature and process fluid compatibility.

Grafoil packing throughout allows for operating temperatures up to 800 °F (427 °C), while improving reliability by eliminating the dynamic secondary sealing element.

The Style 63A/66A cartridge seal is uniquely customizable to your specific application requirements. API 682 compliant options are also available.



MATERIALS OF CONSTRUCTION

Faces	Antimony Impregnated Carbon, Nickel Bound Tungsten Carbide, Sintered Silicon Carbide, Graphite Loaded Silicon Carbide
Welded Bellows	AM350HT, Alloy 718. Single- and double-ply bellows options available.
Gland Bushings	Bronze, Carbon
Lantern Ring	PTFE
Standard Metallurgy	316 SS with low-expansion Alloy 42 retainer. Other material options available, please consult Flexaseal.

OPERATING PARAMETERS

Max Temperature	800 °F (427 °C)
Max Pressure	300 psi (20 bar)
Max Speed	**Style 63:** 10,000 fpm (50 m/s) **Style 66:** 4,500 fpm (22 m/s)

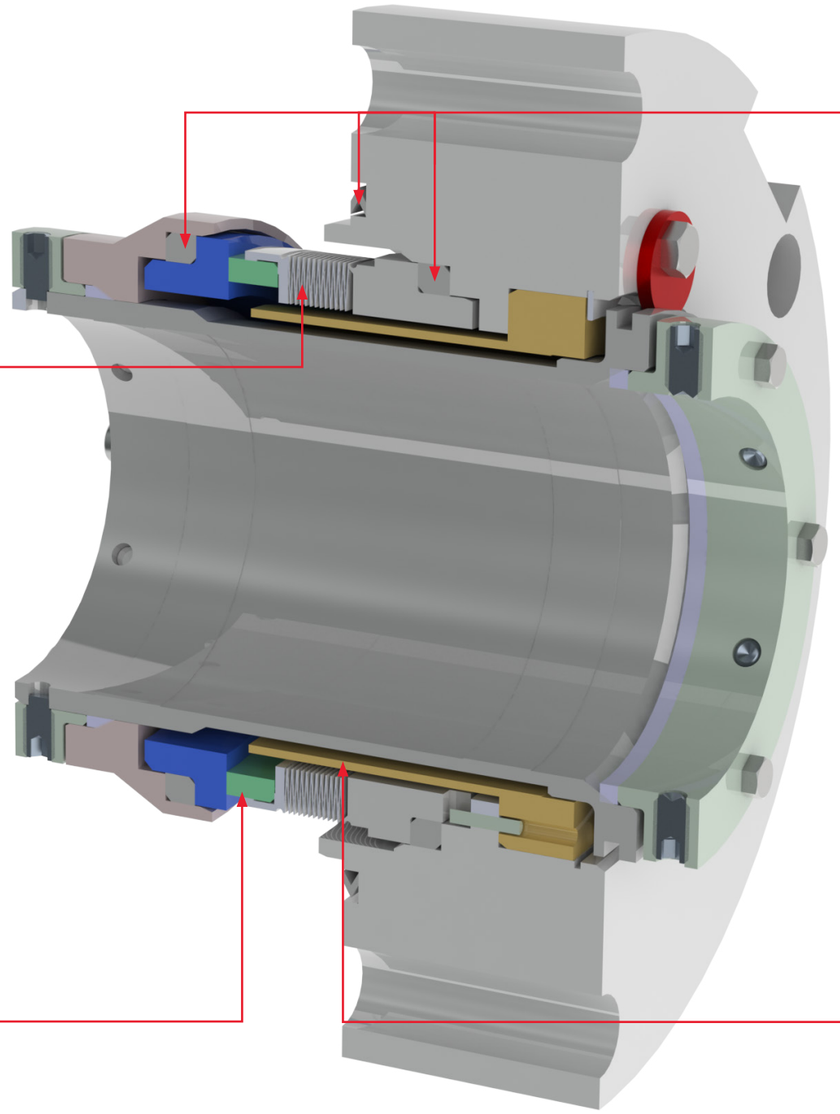
*Max temperature / pressure / speed indicate operating extremes independently and do not imply the seal will function at these extremes at the same time. Contact Flexaseal if in doubt.

STYLE 63A / 66A

Type C | Category 1 & 2 Contacting Wet Seals

ARRANGEMENT 1

Style 63: Stationary welded metal bellows cartridge.
Style 66: Rotating welded metal bellows cartridge.



- Easy cartridge seal installation.
- Proven high-performance nesting ripple bellows design.
- Gland design with flush, quench, and drain connections and throttle bushing.
- Upgradeable to include any of the extensive array of API 682 design specifications such as a piloted gland with a metal-to-metal confined gland gasket, specific sleeve thicknesses, surface finishes, and throttle bushing clearances.
- Low expansion alloy face retainer.
- High-temperature static grafoil packing throughout seal.
- Standard AM350 heat-treated bellows; Alloy 718 heat-treated bellows option available.
- Double-ply welded bellows available for higher pressures.
- Carbon floating bushing option available. (*Not shown)*
- Bronze steam deflector option available to assist various API 682 plans in eliminating coking buildup on the bellows assemblies.

STYLE HPPS

API

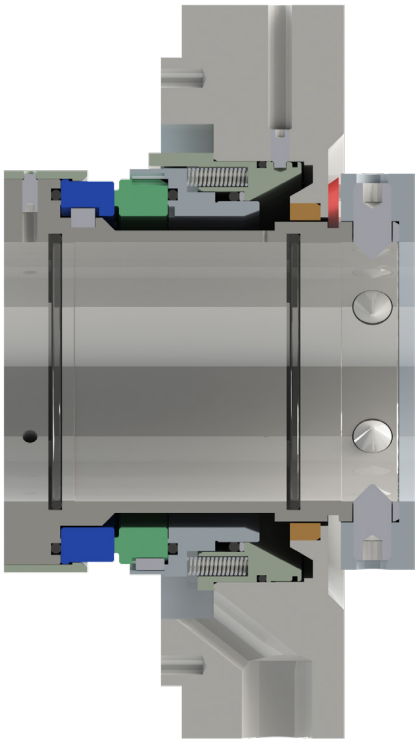
STYLE HPPS

Single Extreme High-Pressure, High-Duty Pusher Seal

HIGH-PRESSURE SINGLE STATIONARY MULTI-SPRING

The Style HPPS seal is designed for exceptional reliability in demanding applications, such as high-pressure, high-speed, and viscous services. This balanced stationary multispring cartridge seal features robust drive mechanisms and advanced seal face technology, optimized to handle high-torque loads and ensure lasting performance.

- Versatile across industries: ideal for oil and gas, petrochemical, and power generation.
- High-torque, high-speed: engineered for extreme torque loads and rapid surface speeds, perfect for high-energy pumps in challenging environments.
- API 682 conforming: this field-proven design meets or exceeds API 682 standards, assuring performance, safety, and reliability.



MATERIALS OF CONSTRUCTION

Rotary Faces	Silicon Carbide, Diamond Coating
Stationary Faces	Proprietary FlexSiCG (Siliconized Carbon/Graphite), Diamond Coating
Springs	Hastelloy C276™
Metal Parts	316 Stainless Steel, Alloy 255, Hastelloy C276™
O-Rings	Fluoroelastomers, EPDM, TFEP, Perfluoroelastomers

OPERATING PARAMETERS

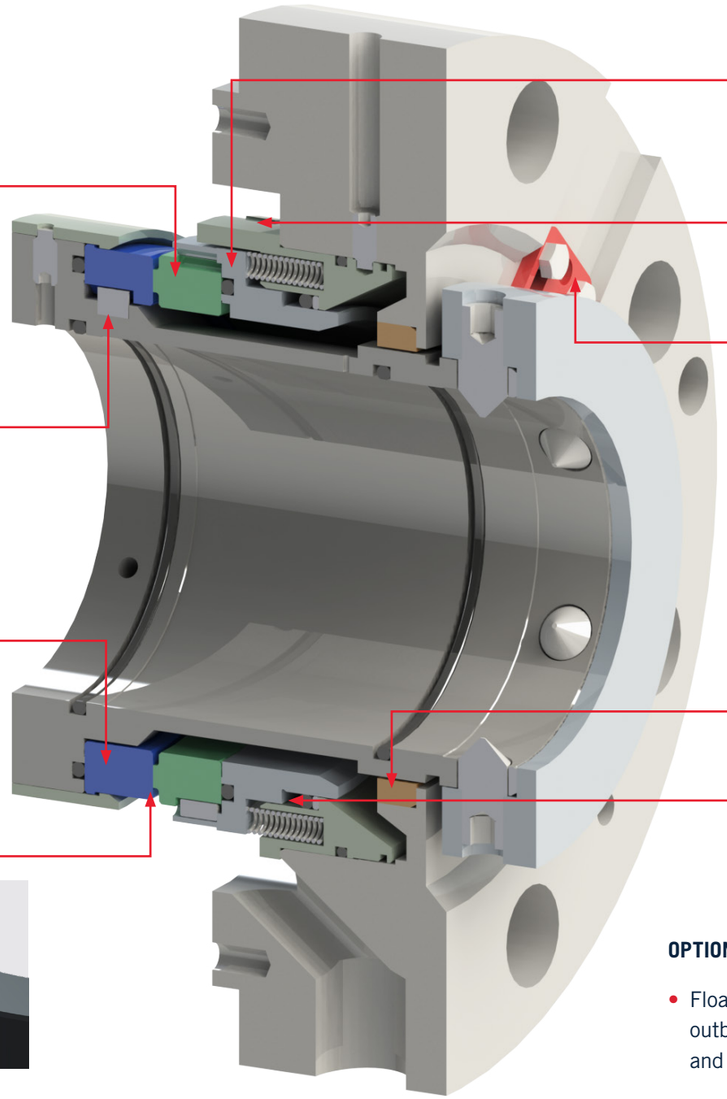
Max Temperature	550 °F (290 °C)
Max Pressure	2,000 psi (138 bar)
Max Speed	10,000 fpm (50 m/s)

*Max temperature / pressure / speed indicate operating extremes independently and do not imply the seal will function at these extremes at the same time. Contact Flexaseal if in doubt.

STYLE HPPS

Type A | Category 2 & 3 Contacting Wet Seals

ARRANGEMENT 1

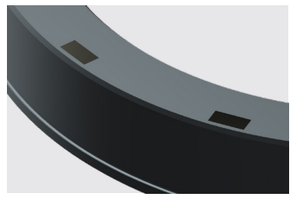


Premier Primary Ring Material FlexSiCG, siliconized carbon/graphite, combines the self-lubricating capabilities of carbon/graphite with rigidity and wear resistance of silicon carbide.

Unique Mating Ring Key-Drive mechanism evenly distributes drive forces and prevents point-loads, which can cause deformation and fracturing.

Near-Zero Face Deformation Under Load with FEA-optimized robust seal face geometry ensures the lubricating film is never pinched.

Lubrication Enhancing Laser-Etched Features on the mating ring amplify film load support, which significantly improves reliability in thin fluids like light hydrocarbons and high-temperature water.



High-Peripheral Speeds are achievable with robust stationary design.

Metal-to-Metal Torque Transfer to flexible stationary element eliminates wear-induced seal hang-up.

Large Retained Setting Clips for easy seal installation and removal. Setting clips are always with the seal.

Fixed Bronze Disaster Bushing

Coated and Ground Dynamic O-Ring Surface prevents fretting wear from operational vibration.

OPTIONAL APPLICATION-SPECIFIC FEATURES:

- Floating carbon bushing inboard and/or outboard for seal isolation from process and leakage containment.
- Radial or axial pumping ring for Plan 23 circulation in hot processes.
- Multi-point flush injection for distributed cooling and vapor bubble elimination.
- Style CPH outboard non-contacting containment seal for emissions control with API Plan 72/75/76.

STYLE HPCS

API

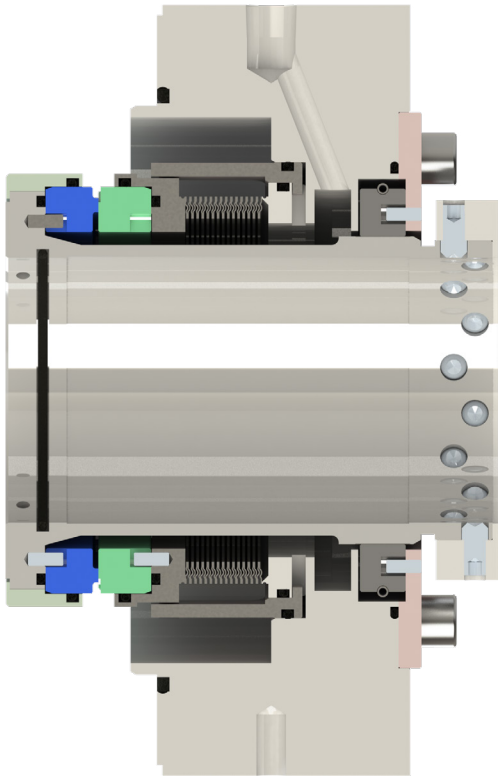
STYLE HPCS

Triple-Ply Welded Metal Bellows Cartridge Seal

FOR HIGH-PRESSURE CRUDE OIL APPLICATIONS

Now there is a true high-pressure bellows solution for one of the toughest oil and gas pipeline challenges: sealing crude oil under high pressures. Flexaseal brings its state-of-the-art, engineered edge welded metal bellows knowledge and capabilities to this demanding service.

- API 682-compliant design is heavy-duty with a long sealing life and easy repairability.
- Exclusive triple-ply welded bellows technology operates in pressures up to 1,500 psi (103 bar) while accommodating significant axial movement.
- FLEXdrive Torsional Drive System uses a drive lug design to positively drive rotating seal components and eliminates torsion loads on the face energizing elements.
- Available STEALTH Proactive Seal Health Monitoring System Sensor technology for remote equipment monitoring.



MATERIALS OF CONSTRUCTION

Seal Faces	Sintered Silicon Carbide
Elastomers	FKM standard, other materials upon request
Bellows	Inconel 718™
Metallurgy	316 Stainless Steel
Bushing	Bronze, Carbon

OPERATING PARAMETERS

Max Temperature	180 °F (82 °C)
Max Pressure	1,500 psi (103 bar)
Max Speed	3,500 RPM

Registered Trademarks: Inconel 718™

*Max temperature / pressure / speed indicate operating extremes independently and do not imply the seal will function at these extremes at the same time. Contact Flexaseal if in doubt.

STYLE HPCS

Type B | Category 1 & 2 Contacting Wet Seals

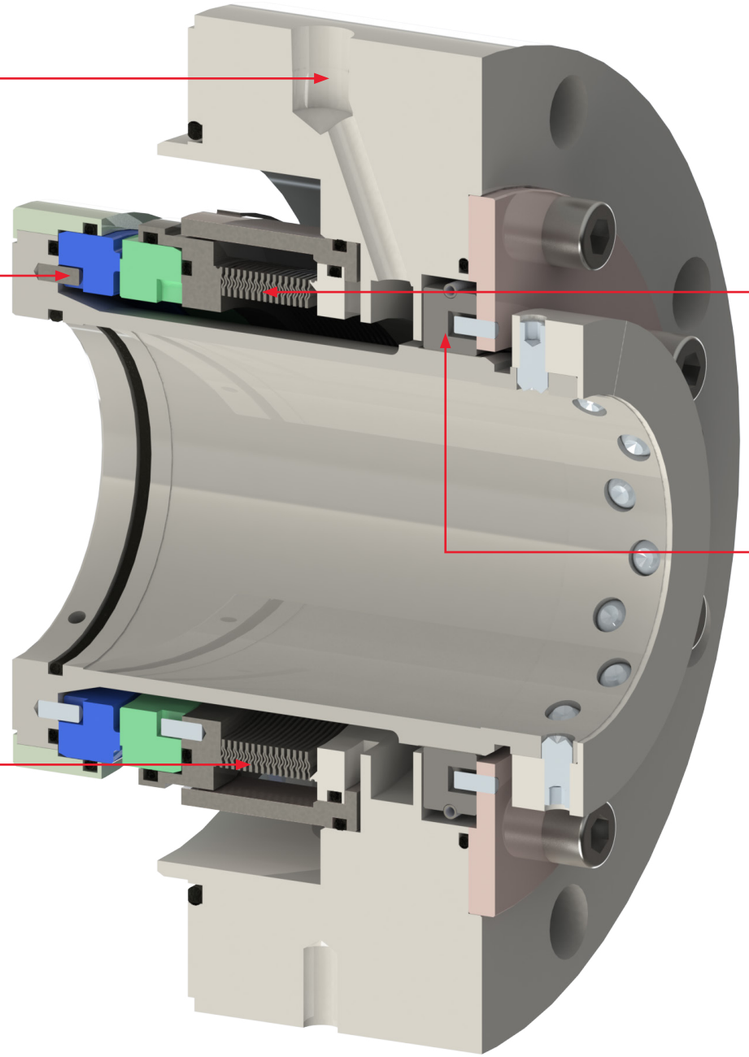
ARRANGEMENT 1

Flush, vent, drain, and quench ports standard.

Drive lug design to positively drive rotating seal components and eliminate torsion loads on the face energizing elements.

API 682-compliant design is heavy-duty with a long sealing life and easy repairability.

Proven high-performance nesting triple bellows design.



Exclusive triple-ply welded bellows technology operates in pressures up to 1500 psi while accommodating significant axial movement.

Choose from three (3) standard secondary bushing arrangements to accommodate Plans 65A and 66A.

All secondary seals are static, eliminating dynamic O-ring wear and damage.

STYLE 78A / 78HT

API

STYLE 78A / 78HT

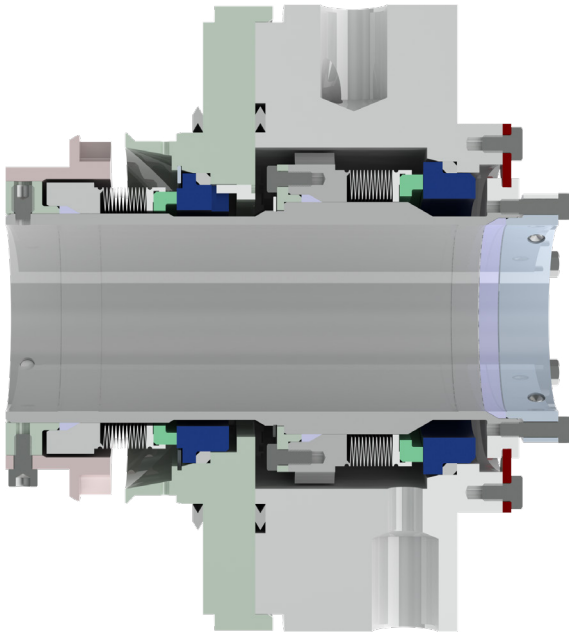
Heavy-Duty Rotating Metal Bellows Cartridge Seal

FOR HIGHER TEMPERATURE AND DIRTY CRITICAL SERVICES WHERE LEAKAGE MUST BE COMPLETELY CONTAINED

The Flexaseal Style 78 tandem cartridge seal is specifically designed for ruggedness and durability to withstand higher temperature or dirty services where leakage and emissions must be completely contained. Design elements include retained faces to allow for pressurized or unpressurized barrier systems, rotating metal bellows for self-cleaning and pilot gland to positively center the seal.

Style 78 is available in either an API 682 conforming (78A) design or a High Temperature (78HT) design with static O-rings or with Grafoil Packing. This allows for operating temperatures up to 800 °F (427 °C), while improving reliability by eliminating the dynamic secondary sealing element.

The Style 78 cartridge seal is uniquely customizable to your specific application requirements.



MATERIALS OF CONSTRUCTION

Rotary Faces	Carbon, Nickel Bound Tungsten Carbide, Silicon Carbide
Stationary Faces	Silicon Carbide
Inboard Bellows	Hastelloy C276™, AM 350 Stainless Steel, Inconel 718™
Outboard Bellows	AM 350 Stainless Steel, Inconel 718™
Metal Parts	316 Stainless Steel, Hastelloy C276™
O-Rings	Viton®, Ethylene Propylene, AFLAS**, Perfluoroelastomer, Teflon Jacketed Viton®***

OPERATING PARAMETERS

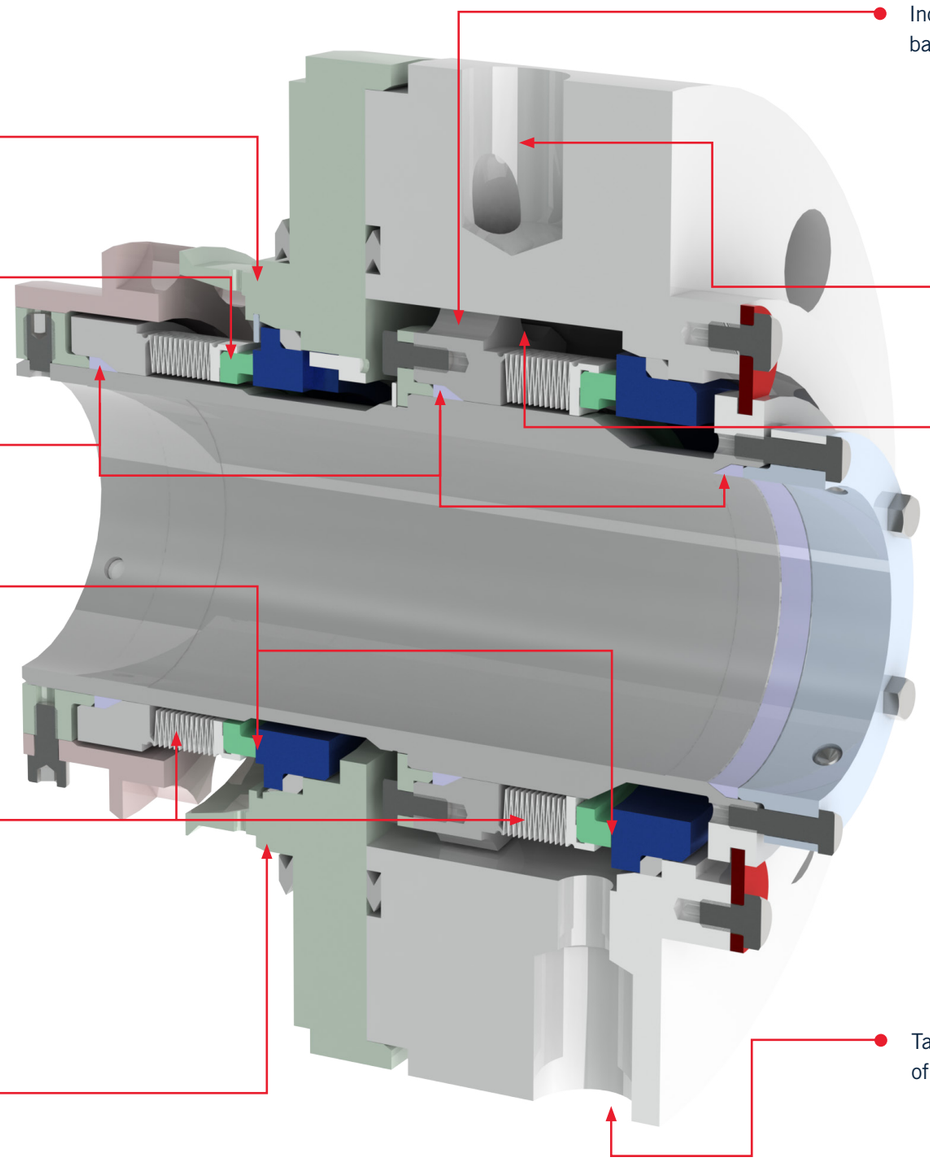
Max Temperature	800 °F (427 °C)
Max Pressure	**Inboard** – 300 psi (20 bar) **Outboard** – 250 psi (17 bar)
Max Speed	4,500 fpm (22 m/s)

*Max temperature / pressure / speed indicate operating extremes independently and do not imply the seal will function at these extremes at the same time. Contact Flexaseal if in doubt.

STYLE 78A / 78HT

Type B | Category 1 & 2 Contacting Wet Seals

ARRANGEMENT 2/3



Shrouded face design for added protection.

Retained faces eliminate troublesome drive pins.

Static secondary sealing elements throughout.

Tandem design maintains product and barrier/buffer fluid on the outside diameter of the inboard and outboard seals, respectively, for increased safety and heat dissipation.

Self-cleaning nesting ripple bellows action with heat-treated bellows for high-temperature services.

Double-ply bellows feature is available for higher pressures.

Piloted gland for centering seal on equipment and long-term stability in service.

Incorporated pumping rings improves cooling of barrier fluid.

Standard flush, vent, and drain connections.

Seal support system can be operated in a pressurized (barrier) or unpressurized (buffer) state, depending upon application requirements.

Fits standard pumps without modification.

Hydraulically-balanced design.

Tangential connections maximizes flow of barrier fluid.

STYLE 79A

API

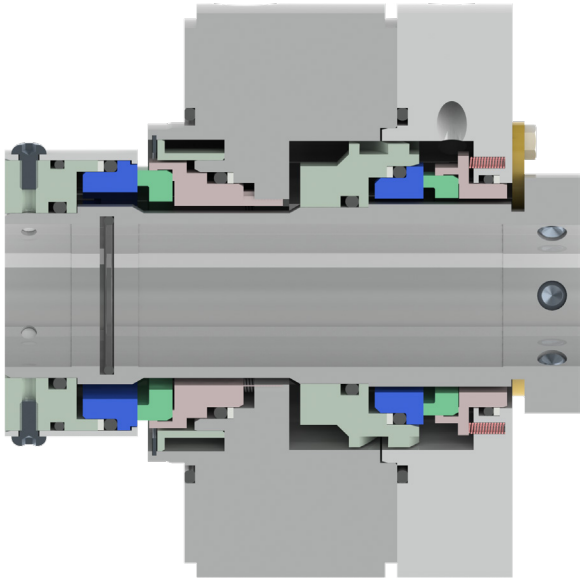
STYLE 79A

Heavy-Duty Stationary Tandem Multi-Spring Single Cartridge Seal

FOR CRITICAL SERVICES WHERE LEAKAGE MUST BE COMPLETELY CONTAINED

The Flexaseal Style 79 tandem cartridge seal is specifically designed for ruggedness and durability to withstand services where leakage and emissions must be completely contained. Design elements include retained faces to allow for pressurized or unpressurized barrier systems, stationary design for maximum runout compensation and pilot gland to positively center the seal.

The Style 79 cartridge seal is uniquely customizable to your specific application requirements. API 682 Compliant options are also available.



MATERIALS OF CONSTRUCTION

Rotary Faces	Silicon Carbide
Stationary Faces	Carbon, Silicon Carbide, Tungsten Carbide
Springs	Hastelloy C276™
Metal Parts	316 Stainless Steel
O-Rings	Viton®, Ethylene Propylene, AFLAS, Perfluoroelastomer

OPERATING PARAMETERS

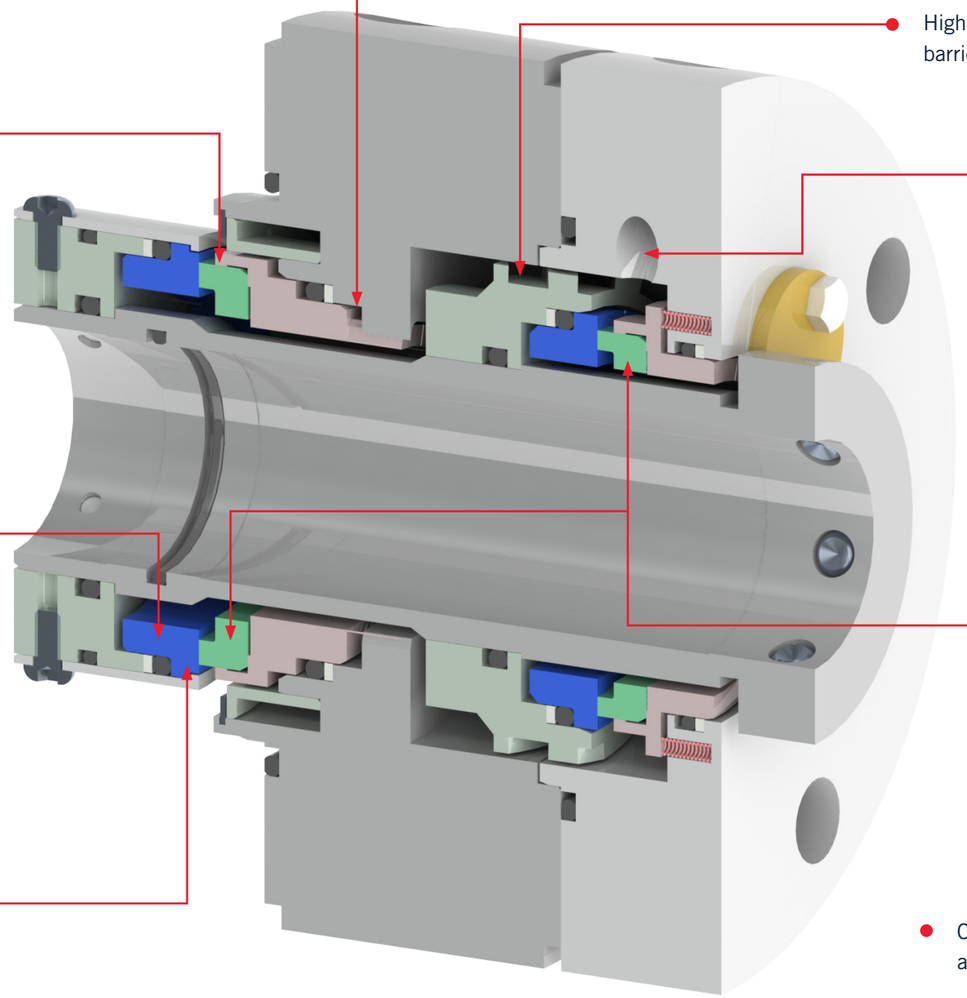
Max Temperature	400 °F (204 °C)
Max Pressure	1,200 psi (83 bar)
Max Speed	4,500 fpm (22 m/s)

*Max temperature / pressure / speed indicate operating extremes independently and do not imply the seal will function at these extremes at the same time. Contact Flexaseal if in doubt.

STYLE 79A

Type A | Category 1 & 2 Contacting Wet Seals

ARRANGEMENT 2/3



Springs are out of the product.

High-flow pumping ring improves circulation of barrier fluid.

Retained faces eliminate troublesome drive pins.

Tangential porting maximizes barrier/buffer fluid flow for better heat transfer.

- Designs for most challenging mixer, agitator and reactor applications.

- Can be operated in pressurized or non-pressurized state.

Hydraulically-balanced design.

Stationary design for enhanced runout and alignment compensation.

- Can be easily adapted to satisfy high-pressure applications or extreme runout.

Double-balanced inboard face allows for reverse pressures in upset conditions.

- Cartridges for the critical, toxic and fugitive emission applications where single seals are not acceptable.

STYLE 80A

API

STYLE 80A

Rotating Multi-Spring Tandem Cartridge Seal

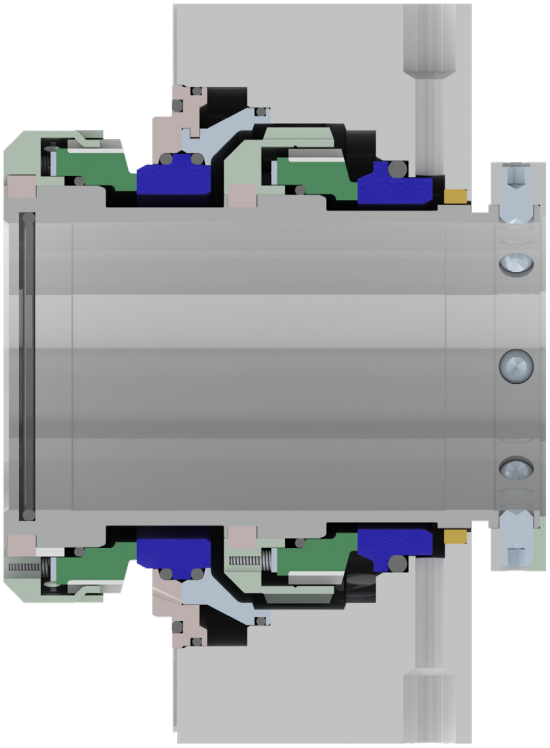
FOR API 682 APPLICATIONS

The Flexaseal Style 80A is designed specifically to conform to API 682 Category 2 applications for midstream and downstream oil and gas applications where a pressurized dual or unpressurized tandem arrangement is desired.

The Style 80A is a robust cartridge seal ideally suited for light hydrocarbon (specific gravity > 0.5) service, benzene, toluene, lubricating fluids, gasolines, VOC's, and other hazardous organic compounds.

Refineries and other petrochemical sites will benefit from the optimized face combinations and pumping ring for effective heat dissipation and thermal transfer.

Other applications can include chemicals such as caustics, amines, gasolines, and other petrochemicals.



MATERIALS OF CONSTRUCTION

Rotary Faces	Carbon, Silicon Carbide, Tungsten Carbide
Stationary Faces	Silicon Carbide
Springs	Hastelloy C276™
Metal Parts	316 Stainless Steel
O-Rings	Viton®, Ethylene Propylene, AFLAS, Perfluoroelastomer

OPERATING PARAMETERS

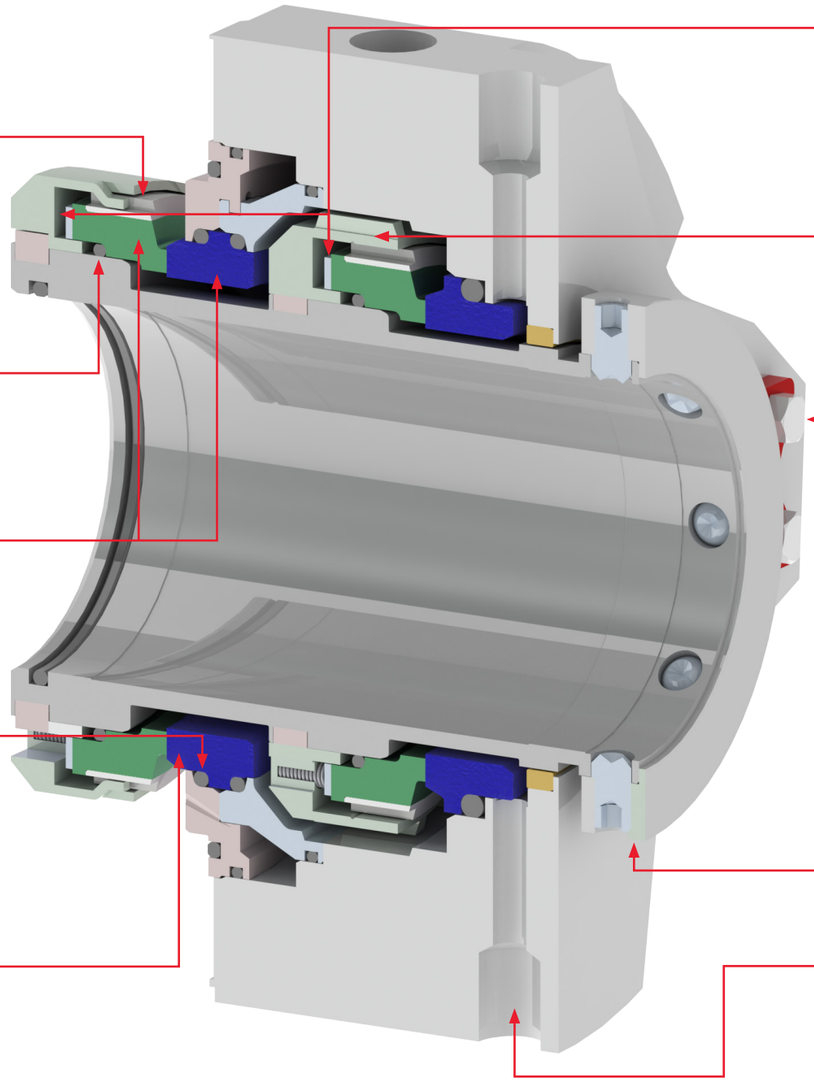
Max Temperature	400 °F (204 °C)
Max Pressure	1,200 psi (83 bar)
Max Speed	4,500 fpm (23 m/s)

*Max temperature / pressure / speed indicate operating extremes independently and do not imply the seal will function at these extremes at the same time. Contact Flexaseal if in doubt.

STYLE 80A

Type A | Category 2 & 3 Contacting Wet Seals

ARRANGEMENT 2



Heavy-Duty Springs to mitigate process debris clogging and reduce spring quantity.

Tang-Drive System for reliable face torque transfer and reduced O-ring hang-up.

Optimized Pumping Ring for higher barrier fluid flow and better seal cooling.

Dynamic O-Ring protected from process fluid debris.

Large Retained Setting Clips for easy seal installation and removal. Setting clips are always with the seal.

Oversized Monolithic Seal Faces in premium material options for superior heat dissipation and durability.

Cushion-Mounted Primary Seat to increase reliability in harsh services.

Removable Drive Collar for enhanced repairability.

Retained Seal Faces for pressurized barrier systems.

Standard API 682 gland connections.

STYLE 90A

API

STYLE 90A

Rotating Multi-Spring Dual Cartridge Seal

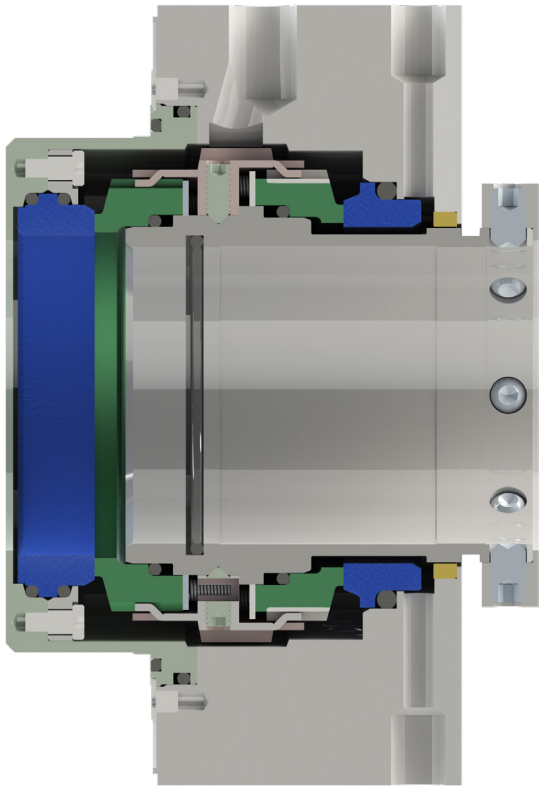
FOR API 682 APPLICATIONS

The Flexaseal Style 90A is designed specifically to conform to API 682 Category 2 applications for midstream and downstream oil and gas applications where a pressurized dual arrangement is desired.

The Style 90A is a dual pressurized cartridge seal that is ideally suited for light hydrocarbon (specific gravity > 0.5) service and other hazardous process streams.

Refineries and other chemical/petrochemical sites will benefit from the optimized faces and pumping ring for effective tracking and heat dissipation.

Other applications can include chemicals such as caustics, amines, gasolines, and other petrochemicals.



MATERIALS OF CONSTRUCTION

Rotary Faces	Carbon, Silicon Carbide, Tungsten Carbide
Stationary Faces	Silicon Carbide
Springs	Hastelloy C276™
Metal Parts	316 Stainless Steel
O-Rings	Viton®, Ethylene Propylene, AFLAS, Perfluoroelastomer

OPERATING PARAMETERS

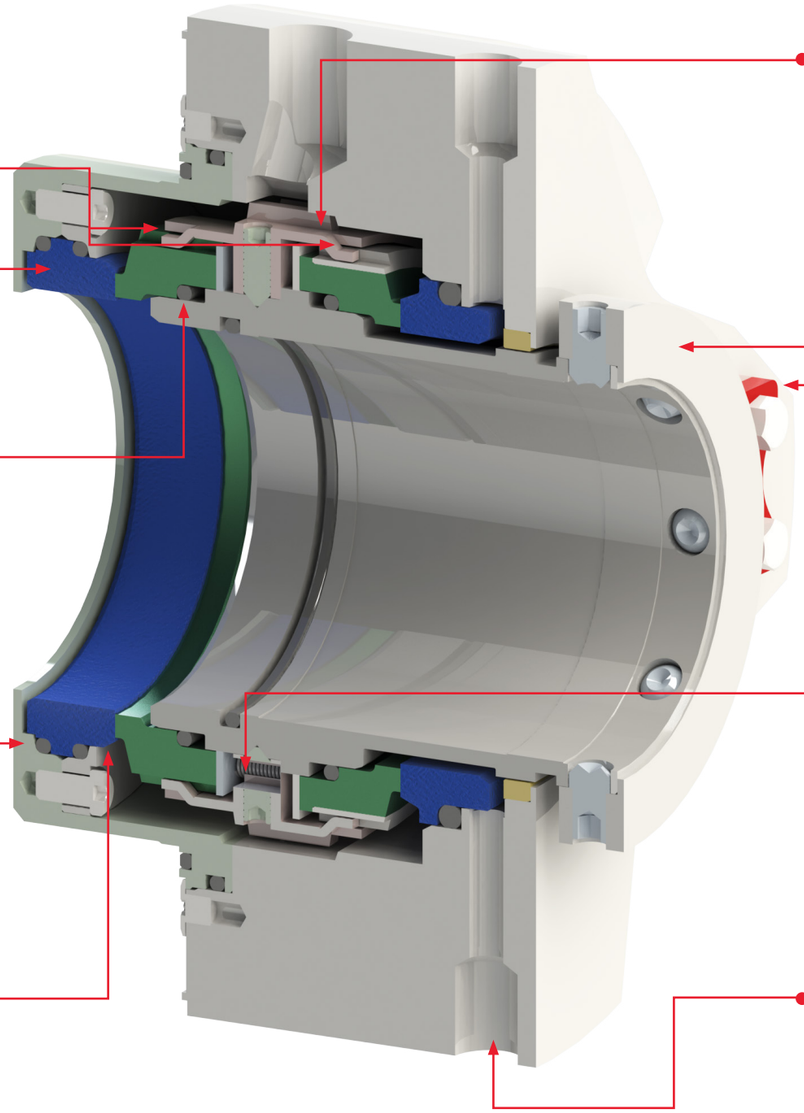
Max Temperature	400 °F (204 °C)
Max Pressure	1,200 psi (83 bar)
Max Speed	4,500 fpm (23 m/s)

*Max temperature / pressure / speed indicate operating extremes independently and do not imply the seal will function at these extremes at the same time. Contact Flexaseal if in doubt.

STYLE 90A

Type A | Category 2 & 3 Contacting Wet Seals

ARRANGEMENT 3



Tang-Drive System for reliable face torque transfer and reduced O-ring hang-up.

Cushion-Mounted Primary Seat to increase reliability in harsh services.

Dynamic O-Ring protected from process fluid debris.

Retained Seal Faces for pressurized barrier systems.

OD Pressure Design for enhanced solids handling, barrier fluid distribution and seal reliability.

Optimized Pumping Ring for higher barrier fluid flow and better seal cooling.

Removable Drive Collar for enhanced repairability.

Large Retained Setting Clips for easy seal installation and removal. Setting clips are always with the seal.

Heavy-Duty Springs to mitigate process debris clogging and reduce spring quantity.

Standard API 682 gland connections.

STYLE HPPD

API

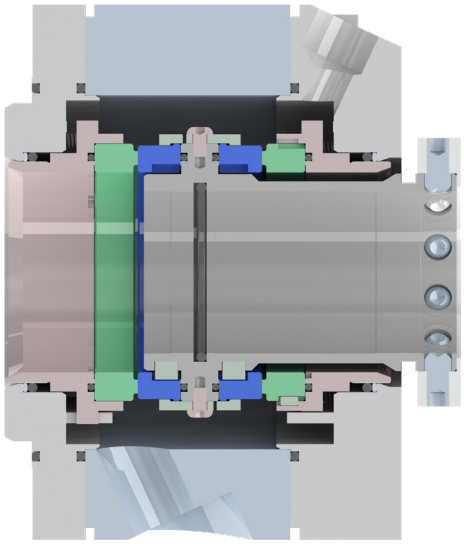
STYLE HPPD

High-Pressure Face-to-Face Dual Stationary Multi-Spring Cartridge Seal

FOR HIGH-PRESSURE PROCESS DUTIES AND ZERO-EMISSION REQUIREMENTS

The Style HPPD seal is designed for exceptional reliability in demanding applications, such as high-pressure, high-speed, and hazardous services. This seal style addresses the challenges of sealing high-pressure process fluids in refinery, pipeline, and power generation industries where zero-emissions are required.

- Versatile across industries: ideal for oil and gas, petrochemical, and power generation.
- Adaptable to process needs: the configurable Arrangement 3 platform can be designed for use with a pressurized API Plan 54 system or a suitable API Plan 53 when equipped with our high-performance pumping ring.
- High-torque, high-speed: engineered for extreme torque loads and rapid surface speeds, perfect for high-energy pumps where zero emissions are required.



Typical Flush Plans: 54/53B/53C

MATERIALS OF CONSTRUCTION

Rotary Faces	Silicon Carbide, Diamond Coating
Stationary Faces	Proprietary FlexSiCG (Siliconized Carbon/Graphite), Diamond Coating, Carbon
Springs	Hastelloy C276™
Metal Parts	316 Stainless Steel, Alloy 255, Hastelloy C276™
O-Rings	Fluoroelastomers, EPDM, TFEP, Perfluoroelastomers

OPERATING PARAMETERS

Max Temperature	550 °F (290 °C)
Max Pressure	2,000 psi (138 bar)
Max Speed	12,000 fpm (61 m/s)
Max Barrier Pressure	1,500 psi (103 bar)
Min Barrier Pressure Above Process	30 psi (2 bar)

*Max temperature / pressure / speed indicate operating extremes independently and do not imply the seal will function at these extremes at the same time. Contact Flexaseal if in doubt.

STYLE HPPD

Type A | Category 2 & 3 Contacting Dry Seals

ARRANGEMENT 3

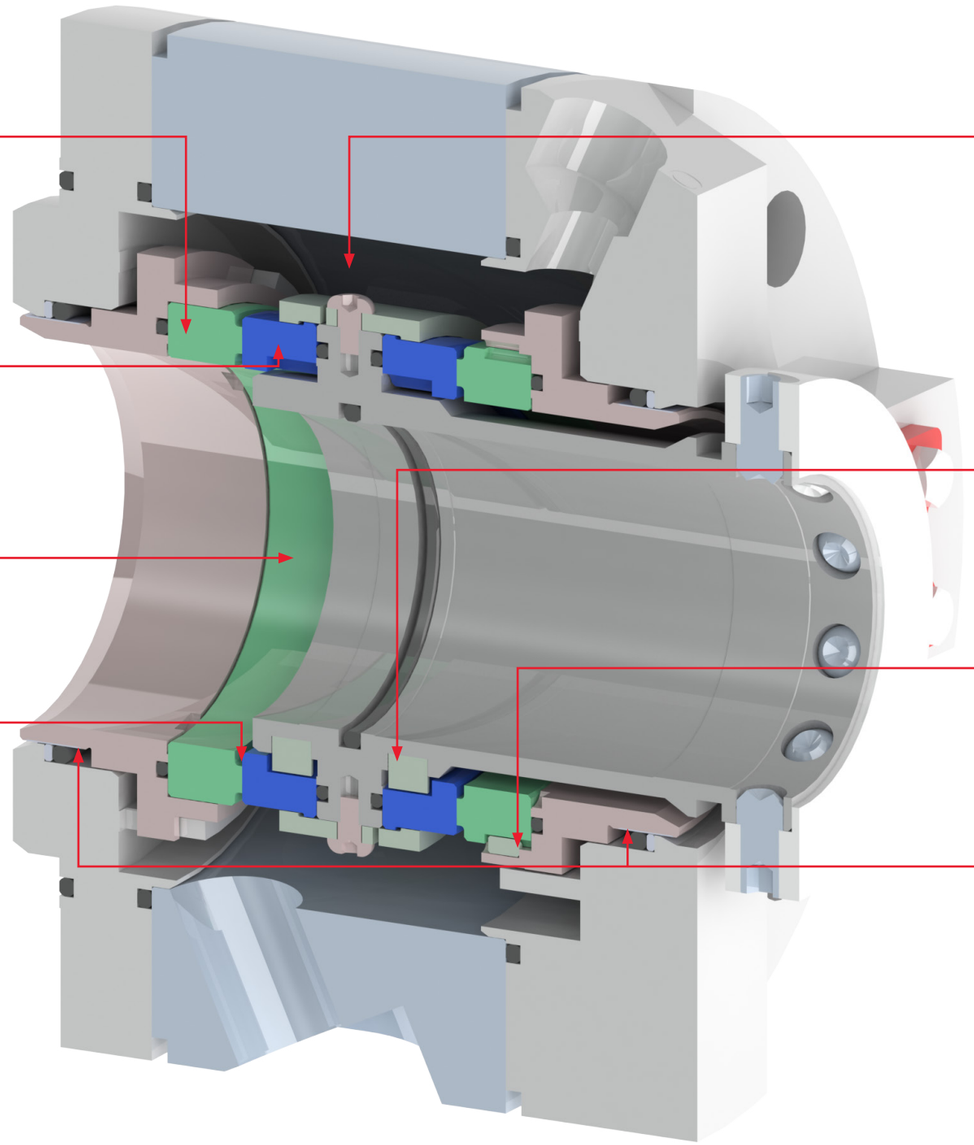
Premier Primary Ring Material FlexSiCG, siliconized carbon/graphite, combines the self-lubricating capabilities of carbon/graphite with rigidity and wear resistance of silicon carbide.

Reaction Bonded Silicon Carbide Mating Rings take advantage of unique tribological properties to improve lubricity at the interface.

Near-Zero Face Deformation Under Load with FEA-optimized robust seal face geometry ensures the lubricating film is never pinched.

Lubrication Enhancing Laser-Etched Features on the mating ring amplify film load support, which significantly improves reliability in thin fluids like light hydrocarbons and high-temperature water.

Separate Inboard and Outboard Mating Rings mechanically and thermally isolate inboard and outboard seals from each other. Safety is improved over designs with a common mating ring.



Large Volume Barrier Fluid Cavity for thermal management in high-pressure applications.

Stationary Design allows for high-peripheral speed operation.

Unique Mating Ring Key-Drive mechanism evenly distributes drive forces and prevents point-loads, which can cause deformation and fracturing.

Metal-to-Metal Torque Transfer to flexible stationary element eliminates wear-induced seal hang-up.

Coated and Ground Dynamic O-Ring Surface prevents wear from fretting and ensures smooth long-term operation.

TAILORED SOLUTIONS WITH CUSTOMIZABLE FEATURES FOR ENHANCED RELIABILITY

- Radial or axial pumping ring for barrier fluid circulation without an external pump.

STYLE HPPTL

API

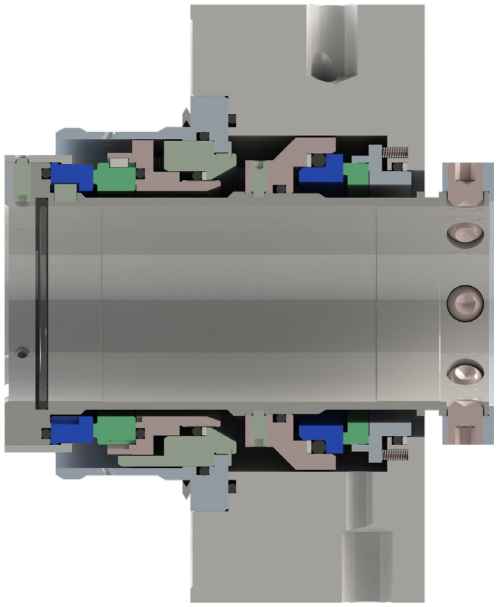
STYLE HPPTL

High-Pressure Tandem Dual Stationary Multi-Spring Cartridge Seal

FOR HIGH-PRESSURE PROCESS DUTIES WITH MINIMIZED EMISSIONS

The Style HPPTL seal is designed for exceptional reliability in NGL and other light hydrocarbon applications, where a double seal arrangement is required and buffered seal support is provided from an appropriate API 682 Plan 52.

- Versatile across industries: ideal for oil and gas, petrochemical, and power generation.
- When sealing light hydrocarbons, a heavy-duty buffered double seal reduces your emissions to atmosphere and provides the security of an outboard seal in the case of an inboard failure.
- Ideally arranged for support from either API Plan 52 buffer fluid with an optional Plan 72 sweep to flare, or barrier fluid pressures up to 300 psig (20.7 bar) where one of Plans 53A/53B/53C can be used.
- High-torque, high-speed: engineered for extreme torque loads and rapid surface speeds, perfect for high-energy pumps where limited emissions are desired.



Typical Flush Plans: 52/53A/53B/53C

MATERIALS OF CONSTRUCTION

Rotary Faces	Silicon Carbide, Diamond Coating
Stationary Faces	Proprietary FlexSiCG (Siliconized Carbon/Graphite), Diamond Coating, Carbon
Springs	Hastelloy C276™
Metal Parts	316 Stainless Steel, Alloy 255, Hastelloy C276™
O-Rings	Fluoroelastomers, EPDM, TFEP, Perfluoroelastomers

OPERATING PARAMETERS

Max Temperature	550 °F (290 °C)
Max Pressure	2,000 psi (138 bar)
Max Speed	4,500 fpm (23 m/s)
Max Barrier Pressure	1,500 psi (103 bar)
Min Barrier Pressure Above Process	30 psi (2 bar)

*Max temperature / pressure / speed indicate operating extremes independently and do not imply the seal will function at these extremes at the same time. Contact Flexaseal if in doubt.

STYLE HPPTL

Type A | Category 2 & 3 Contacting Wet Seals

ARRANGEMENT 3

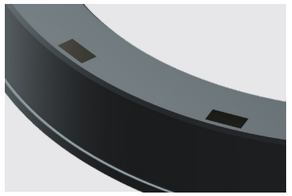
Premier Primary Ring Material FlexSiCG, siliconized carbon/graphite, combines the self-lubricating capabilities of carbon/graphite with rigidity and wear resistance of silicon carbide.

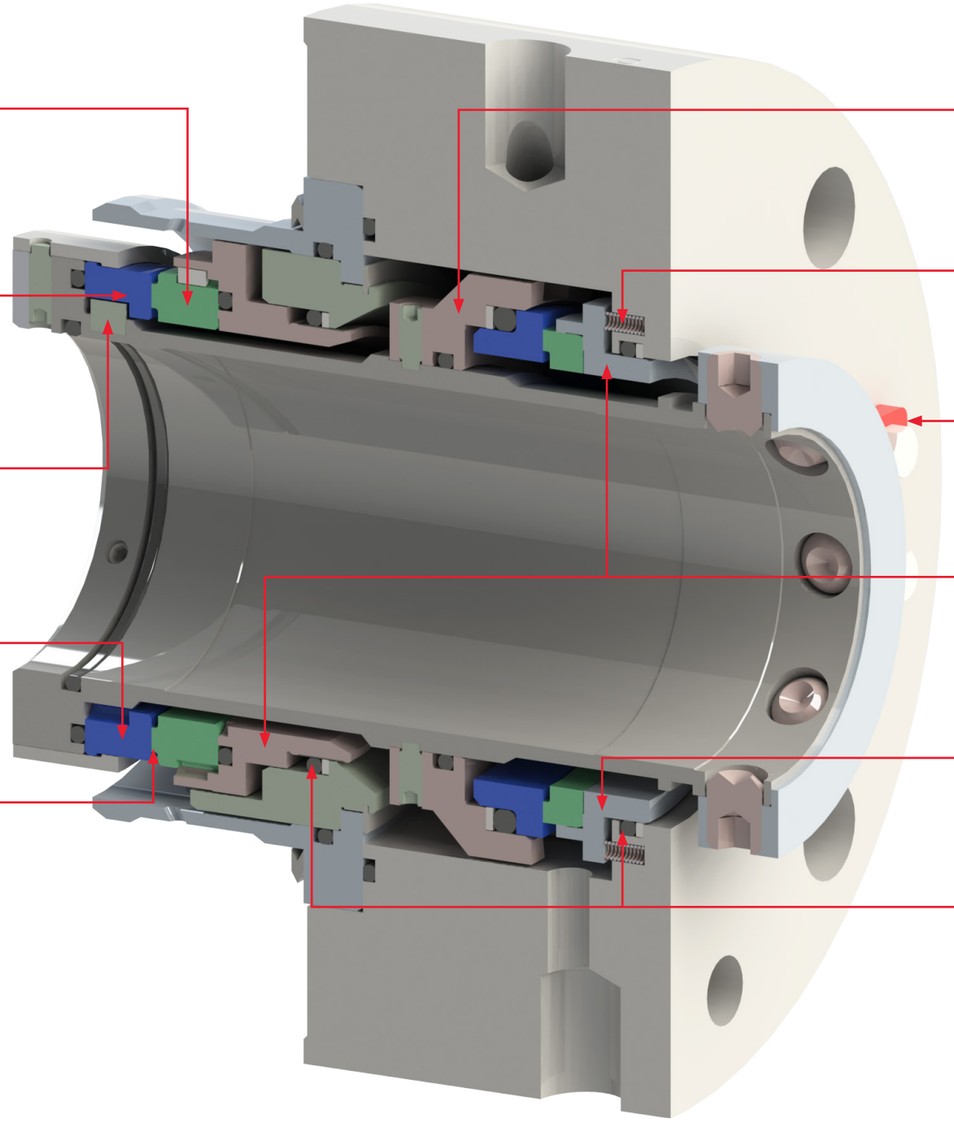
Reaction Bonded Silicon Carbide Mating Rings take advantage of unique tribological properties to improve lubricity at the interface.

Unique Mating Ring Key-Drive mechanism evenly distributes drive forces and prevents point-loads, which can cause deformation and fracturing.

Near-Zero Face Deformation Under Load with FEA-optimized robust seal face geometry ensures the lubricating film is never pinched.

Lubrication Enhancing Laser-Etched Features on the mating ring amplify film load support, which significantly improves reliability in thin fluids like light hydrocarbons and high-temperature water.





High-Flow Pumping Ring improves circulation of buffer or barrier fluid.

Outboard Springs remain clean in buffer/barrier fluid.

Large Retained Setting Clips for easy seal installation and removal. Setting clips are always with the seal.

Stationary Design allows for high-peripheral speed operation and enhanced runout compensation.

Shrunk-Fit Retainer strengthens carbon seal ring for high-pressure containment.

Coated and Ground Dynamic O-Ring Surface prevents fretting wear and smooth long-term operation.

STYLE FCSA

STYLE FCSA

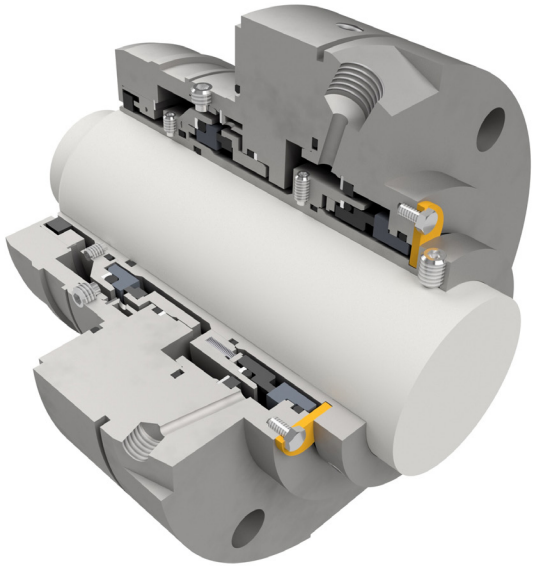
Dry-Running Secondary Containment Seal

FOR SAFE FLUID CONTAINMENT & ENVIRONMENTAL EMISSION CONTROL

In certain processes, dangerous and volatile fluids require additional precautions to protect personnel, ensure safe operation, and prevent downtime. The Flexaseal Multi-Spring Fluid Containment Seal (FCSA) has been specifically designed as an economical option for applications where the highest level of safety and environmental control is necessary. The FCS Seal allows monitoring of any primary seal leakage and functions as a secondary containment seal in the event of primary seal failure.

The FCSA Seal is a contacting, dry-running pusher seal which can be added to most of Flexaseal's single cartridge options, including:

- Style 58 Heavy-Duty API Stationary Multi-Spring Cartridge Seal
- Style 53A API Rotating Welded Metal Bellows Cartridge Seal
- Style SMS Stationary Multi-Spring Cartridge Seal
- Style RB Rotating Welded Metal Bellows Cartridge Seal



Utilizing the FCSA secondary seal design in conjunction with API 682 Plan 72, 75, or 76 eliminates the cost and maintenance of installing a dual seal with an API 682 Plan 52 buffer system.

MATERIALS OF CONSTRUCTION

Faces	Silicon Carbide
Elastomers	Carbon, Silicon Carbide, Tungsten Carbide
Metallurgy	Hastelloy C276™
Springs	316 Stainless Steel

OPERATING PARAMETERS

Max Temperature	500 °F (288 °C) using high-temperature elastomers
Max Pressure	Gas-lubricated: 10 psi (0.7 bar) Liquid-lubricated: 300 psi (20.7 bar), dynamic Liquid-lubricated: 600 psi (41.4 bar), static
Max Speed	10,000 fpm (50 m/s)

*Max temperature / pressure / speed indicate operating extremes independently and do not imply the seal will function at these extremes at the same time. Contact Flexaseal if in doubt.

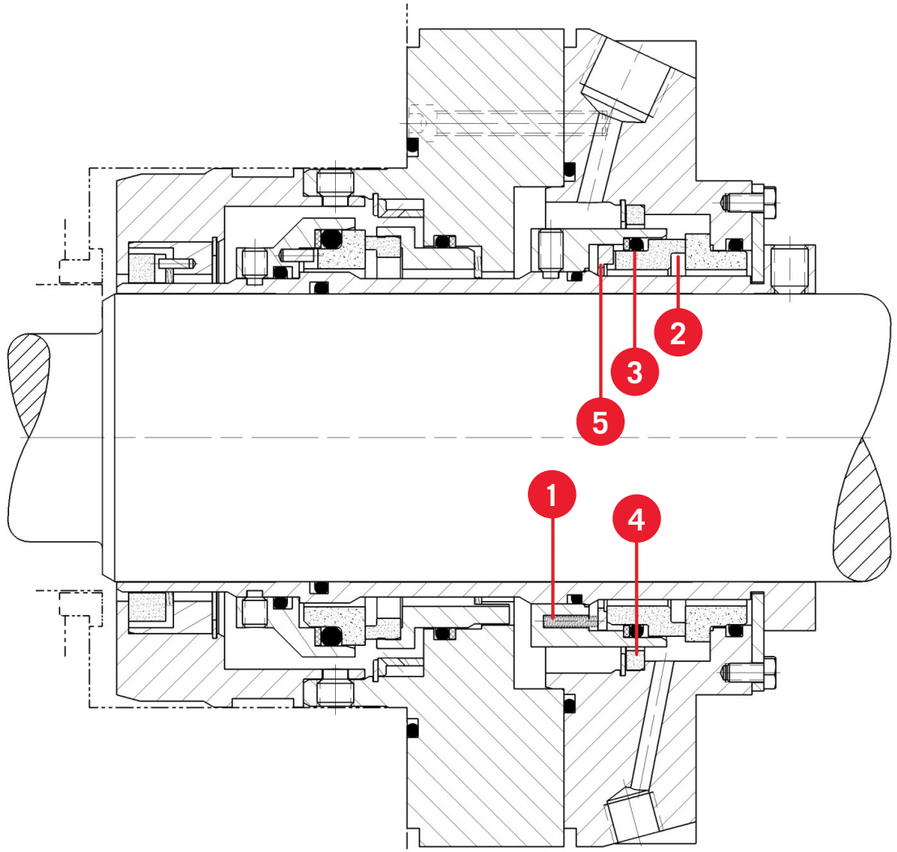
STYLE FCSA

Design Features & Benefits

AS SHOWN WITH A STYLE 58 / FCSA CARTRIDGE SEAL

1. Lightly loaded seal face minimizes wear and face temperature during operation.
2. Extended seal face has long wear life.
3. Balanced seal design minimizes heat generation and power consumption, guaranteeing stable operation under worst-case containment conditions.
4. Isolation bushing keeps normal inboard seal leakage away from the FCSA seal portion.
5. Dynamic drive ring prevents pin-wear hang up.

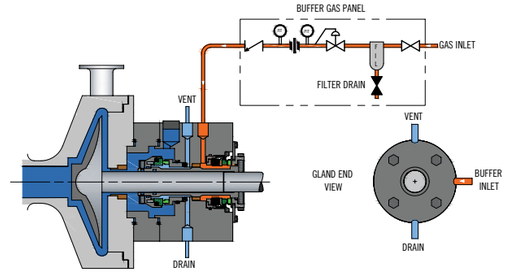
Most commonly used with API Plans 72 and 76



FOR USE WITH:

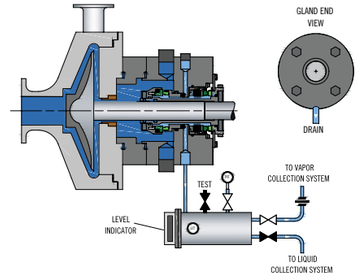
PLAN 72

Externally supplied buffer gas maintained at a pressure less than the seal chamber pressure.



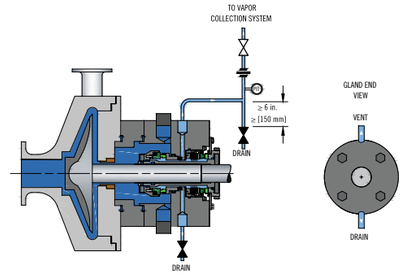
PLAN 75

Leakage collection system for condensing or mixed phase leakage with a contacting containment seal.



PLAN 76

Vent for non-condensing leakage with a contacting containment seal.



STYLE CPH

API

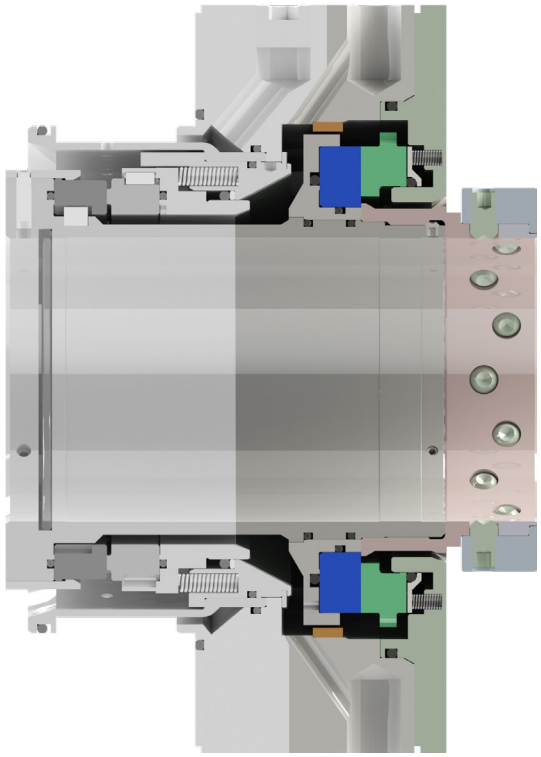
STYLE CPH

Dry-Running, Non-Contacting Containment Gas Seals

FOR SECONDARY CONTAINMENT, MINIMIZING PROCESS EMISSIONS AND SIMPLIFYING EXTERNAL SYSTEMS

Flexaseal Style CPH seals are non-contacting dry gas seals designed to provide secondary vapor containment and full pressure wet backup seals in high-duty applications like light hydrocarbons, crude oil, and other hazardous services.

- Optimized bi-directional laser-etched liftoff patterns maintain the non-contacting gas seal, reducing wear and power consumption.
- Designed to meet stringent emissions standards for light hydrocarbons and other hazardous products when supported with Plan 72/76 vapor containment systems, directing leakage to flare.
- Functions as a backup wet seal when primary containment fails, ensuring operational safety, even under high-pressure leakage.
- Can operate effectively as a single seal for blowers, turbines, and vertical sump pumps, where dry-running and low emissions are required.



MATERIALS OF CONSTRUCTION

Rotary Faces	Silicon Carbide
Stationary Faces	Antimony Impregnated Carbon/ Graphite
Springs	Hastelloy C276™
Metal Parts	316 Stainless Steel, Alloy 255, Hastelloy C276™
O-Rings	Fluoroelastomers, EPDM, TFEP, Perfluoroelastomers

OPERATING PARAMETERS

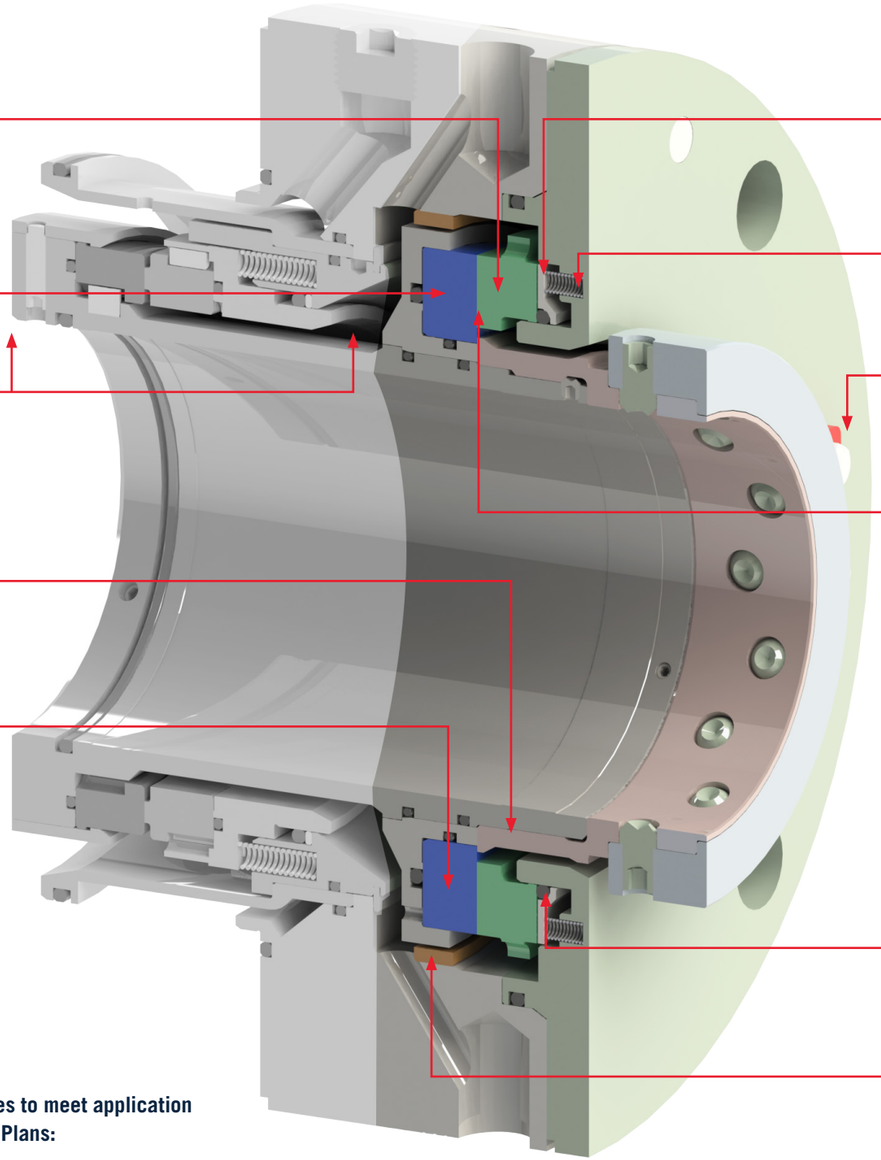
Max Temperature	250 °F (121 °C)
Typ. Operating Pressure	0–15 psi (0–1 bar)
Max Containment Pressure	2,500 psi (172 bar)
Max Speed	6,000 fpm (30.5 m/s)

*Max temperature / pressure / speed indicate operating extremes independently and do not imply the seal will function at these extremes at the same time. Contact Flexaseal if in doubt.

STYLE CPH

Type A | Category 2 & 3 Contacting Dry Seals

ARRANGEMENT 2



Premier Primary Ring Material antimony impregnated carbon/graphite primary rings are robustly designed to contain high-pressure leakage in the event of inboard seal failure.

Sintered Silicon Carbide mating rings.

Adaptable to API Single Seals as a leakage containment and backup seal solution.

Flexaseal Style HPPS shown here.

Two-Piece Sleeve Design withstands extreme thrust loads for reliability under strain.

Near-Zero Face Deformation under load with FEA-optimized robust seal face geometry.

The Style CPH leakage containment solution can be incorporated to the following seal styles:

- Style HPPS
- Style 58A
- Others as developed

Style CPH seals can be configured with optional support features to meet application specific requirements, including the following API 682 Support Plans:

- Plan 72
- Plan 75
- Plan 76

High-Peripheral Speeds are achievable with robust stationary design.

Canted Coil Springs center sensitive components for smooth operation.

Large Retained Setting Clips for easy seal installation and removal. Setting clips are always with the seal.

Precision Laser-Etched Grooves generate bi-directional liftoff in the sealing interface, ensuring non-contacting operation at low pressures. Liftoff pad geometry allows for the gas to enter, build pressure/liftoff, and exit, reducing overall gas consumption.

Ultra-Polished Dynamic O-Ring Surfaces and backup ring design minimize O-ring parasitic drag for a fast seal response to changing conditions.

Fixed Clearance Bronze Containment Bushing isolates the CPH seal from vent and drain ports when a buffer gas is used to dilute process emissions.

SEAL SUPPORT SYSTEMS

SEAL SUPPORT SYSTEMS

Systems Designed for Reliability

Choosing the correct seal support system for your application – whether liquid or gas, extreme temperatures, abrasives, or other volatile conditions – is crucial for system reliability. Support system designs can include barrier or buffer fluid reservoirs, filtration systems, heat exchangers, and/or gas panels. Flexaseal Engineered Seals and Systems has the expertise to guide you in selecting the best option for your sealing challenge.

LUBE OIL SYSTEMS | page 64

Built-to-spec in conformance with as well as API 614, extend equipment life by controlling the pressure and temperature of lubricating oils and seal barrier fluids.

BARRIER FLUID RESERVOIRS | page 66

For dual pressurized and tandem unpressurized seal support systems. Available for API 682 Plans 52, 53A/B/C.

HEAT EXCHANGERS | page 68

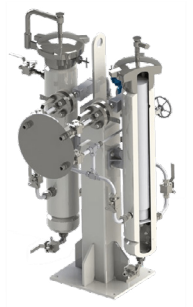
Conforming with API 682 Flush Plans 21, 23, and 55.

- **ShellCool** water-cooled systems with removable head and bundle for easy maintenance.
- **TurboCool** air-cooled systems eliminate the need for cooling water.

SEAL SUPPORT SYSTEMS

GAS SUPPORT PANELS | page 74

For dual seal configurations using buffer or barrier gases, such as API 682 Plans 72 and 74 and in conjunction with Plans 75 and 76.



FILTRATION SYSTEMS | page 78

The M12 system's duplex filter design allows for continuous flow during transfer to a new filter. For use with API 682 Flush Plan 12.

CYCLONE SEPARATORS | page 80

To remove abrasives, compatible with API 682 Plan 31.

BUILT TO SPEC | **MADE IN HOUSTON, TX**

Flexaseal Seal Support Systems are designed and are compliant with industry standards including API 610, 614, 682, and 692, ASME VIII and ASME B31.3.

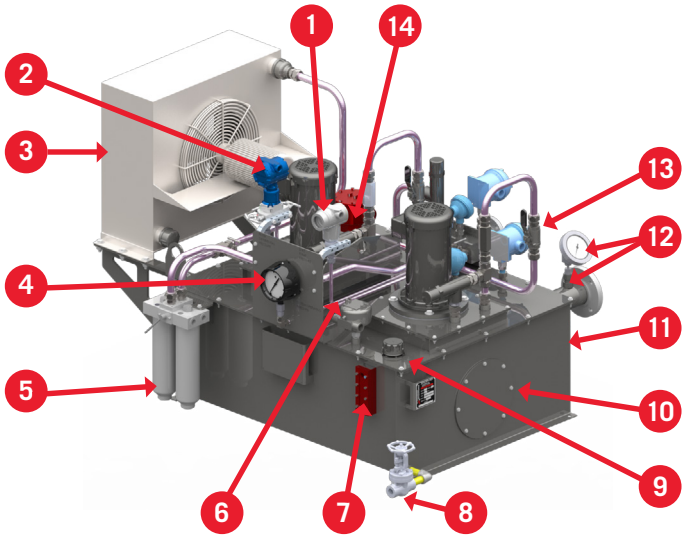
MP600 SERIES

Dual Pump Design

STANDARD DELIVERY: 8 WEEKS

FEATURES:

- Configured for ease of maintenance.
- Reduces lubrication piping and facilitates pump maintenance.
- Ful-flo pump protection and system pressure control valves.
- Top entry heating element:
  - Eliminates requirement to drain reservoir for heating element replacement.
  - Mitigates flooding of heater control head associated with side entry design.



1. Temperature indicating transmitter to monitor supply side lube oil.
2. Differential pressure indicating transmitter to monitor filter status.
3. Reservoir-mounted air-cooled heat exchanger.
4. Single point system monitoring instrument panel.
5. Dual spin-on filter elements with integral transfer valve.
6. Consolidated plumbing design for ease of maintenance and critical component changeability.
7. Easy view sight glass for unit filling.
8. Sloped bottom low point drain.
9. Removable reservoir lid construction for “clean out” maintenance.
10. Two removable “clean out” covers for reservoir inspection, sloped bottom.
11. 40-gallon usable fluid capacity reservoir with internal stilling tube for degassing of return fluid.
12. Return fluid temperature indicator and RTD.
13. Single point disconnect capability allowing ease of removable pump motor assemblies.
14. Top-mounted heater assembly.

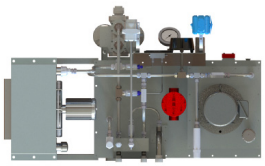
MP600 SERIES

Single Pump Design

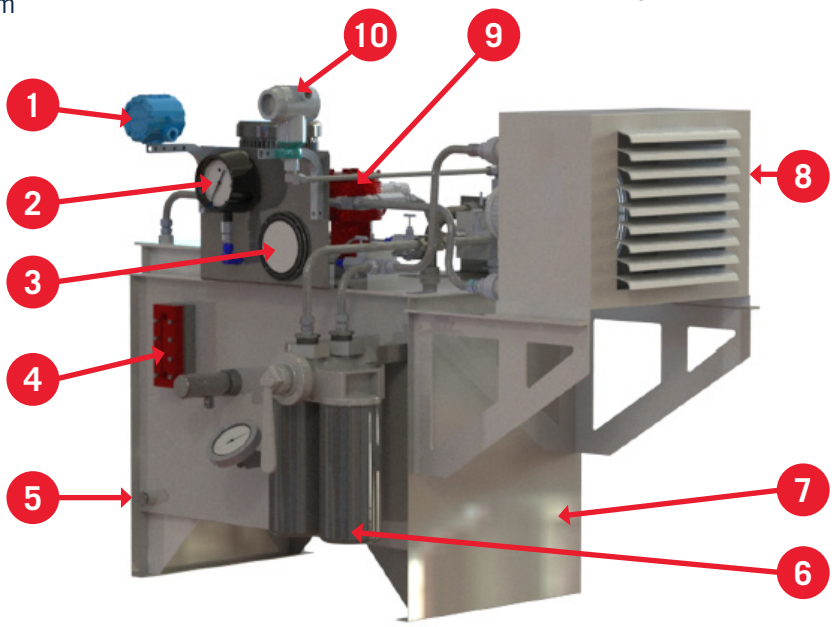
STANDARD DELIVERY: 8 WEEKS

FEATURES:

- Compact design.
- Configured for ease of maintenance.
- Ful-flo pump protection and system pressure control valves.



TOP VIEW



1. Temperature indicating transmitter to monitor supply side lube oil.
2. Single point system monitoring instrument panel.
3. Differential filter pressure gauge.
4. Easy view sight glass for unit filling.
5. Sloped bottom low point drain.
6. Dual spin-on filter elements with integral transfer valve.
7. 40-gallon usable fluid capacity reservoir with internal stilling tube for degassing of return fluid.
8. Reservoir-mounted air-cooled heat exchanger.
9. Top-mounted heater assembly.
10. Pressure indicating transmitter.

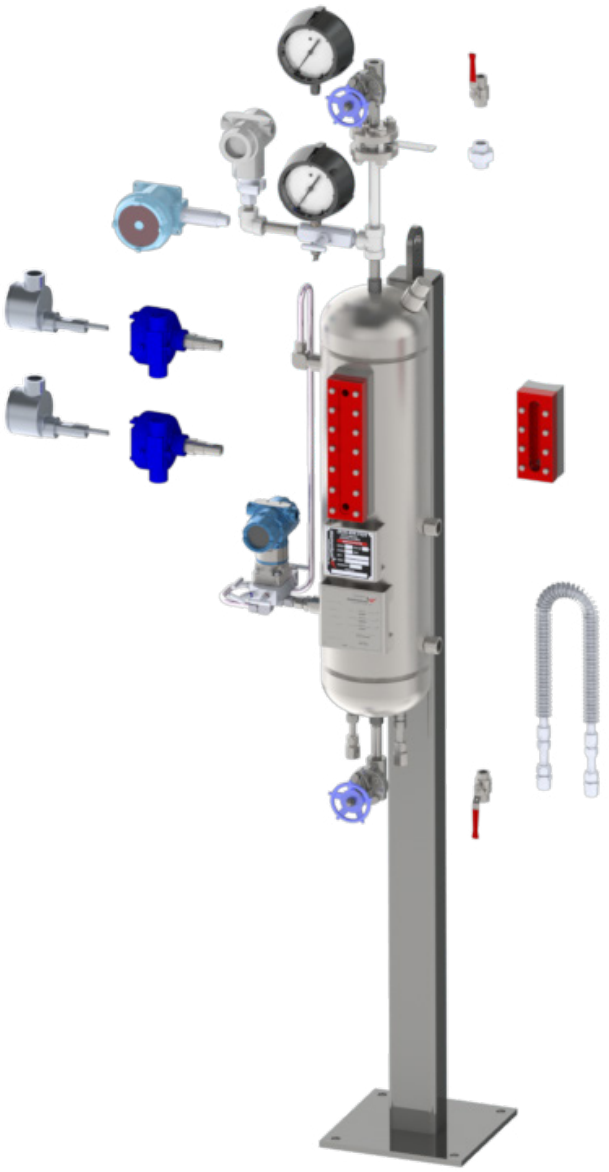
MP50 SERIES

MP52 & MP53A

LIQUID BUFFER / BARRIER FLUID

STANDARD DELIVERY: 4–6 WEEKS

MP52 supports liquid buffer fluid for a containment seal chamber that is at a pressure less than the primary seal chamber pressure. MP53A supplies a liquid barrier fluid to the dual seal assembly at a higher pressure than the seal chamber.



FEATURES:

- System designed to ASME code Section VIII Div. I, Section IX Weld Procedures.
- ASME U stamp available National Board DFAR compliant materials.
- Designed to MAWP of pump.
- Removable head available.

APPLICATION:
API 682 PLAN 52
API 682 PLAN 53A

MP50 SERIES

MP53B

PRESSURIZED BARRIER WITH BLADDER ACCUMULATOR

External barrier fluid pressurized by a bladder accumulator. Supplies clean barrier fluid to the dual seal at a pressure greater than the seal chamber.

FEATURES:

- U stamp accumulator standard.
- 5-10 gallon capacity.
- Air or water cooled available.
- Integral barrier fluid make up pump.

APPLICATION:
API 682 PLAN 53B

MP53C

PRESSURIZED BARRIER WITH PISTON ACCUMULATOR

External barrier fluid pressurized by a piston accumulator. Supplies clean barrier fluid to the dual seal at a pressure greater than the seal chamber.

FEATURES:

- Integral head porting eliminates pigtail design.
- U stamp coded vessel design.
- Magnetic level indication available.

APPLICATION:
API 682 PLAN 53C

53B ACCUMULATOR

53B NATURAL CONVECTION

53C

MP20 SERIES

TurboCool

High-Performance Air Cooled Heat Exchanger Process Applications

STANDARD DELIVERY: 2–4 WEEKS

FEATURES:

1. Self-venting design for easy commissioning.
2. Double wrap, finned tubing for increased cooling surface area.
3. High-performance, CFD-optimized heat exchanger cowling.
4. Aluminum blower impeller and housing for extended service life and corrosion resistance.
5. Heavy-duty centrifugal blower. Air flow rate matched to specific process conditions.
6. Available inlet filter for reduced heat exchanger maintenance due to fouling.
7. Standard NEMA or IEC motor frames.
8. Eliminates cooling water.

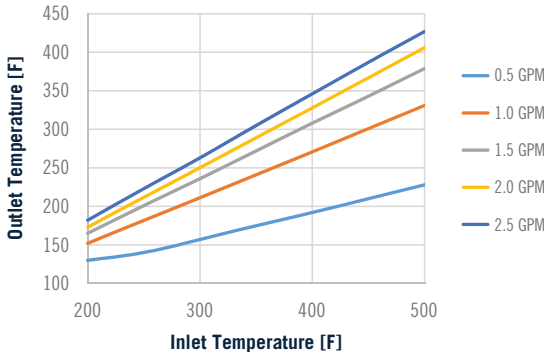
APPLICATION:
API FLUSH PLAN 21
API FLUSH PLAN 23
API FLUSH PLAN 55

MP20 SERIES

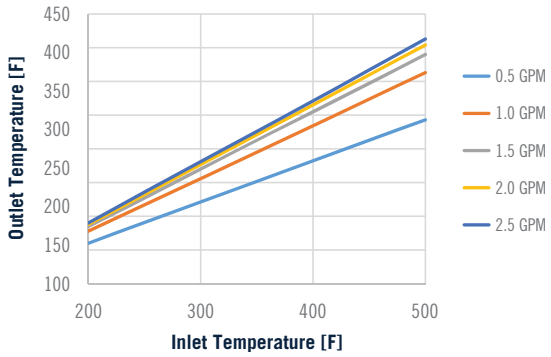
Performance Curves

MAWP: 2,215 PSI AT 750 °F | TEMPERATURE: UP TO 750 °F

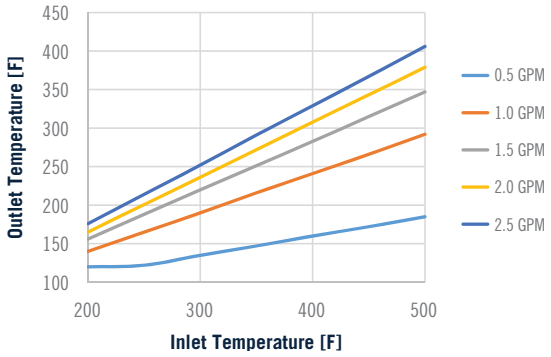
MODEL S [650 CFM] – OIL



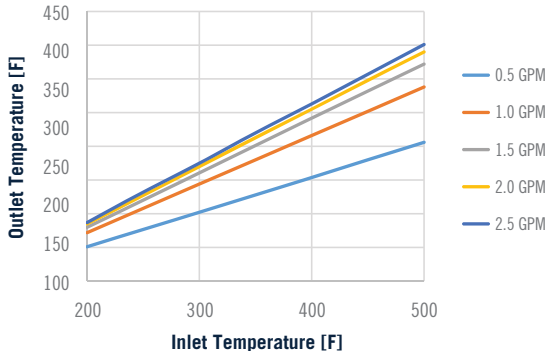
MODEL S [650 CFM] – WATER



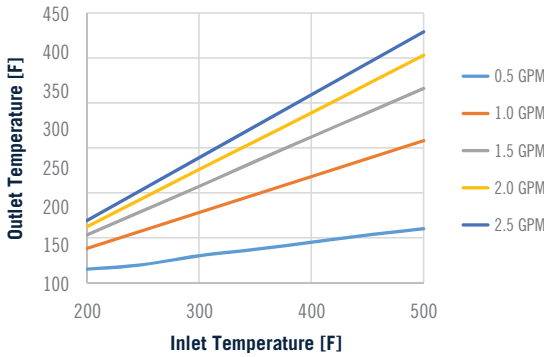
MODEL M [1000 CFM] – OIL



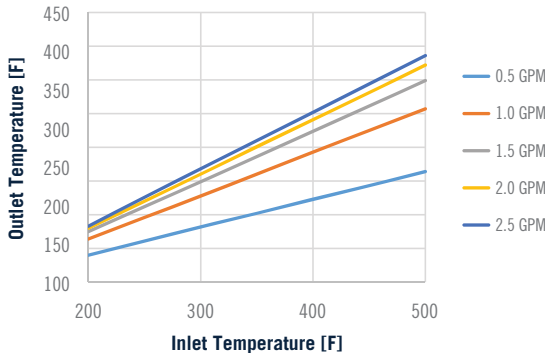
MODEL M [1000 CFM] – WATER



MODEL L [1500 CFM] – OIL



MODEL L [1500 CFM] – WATER



The information provided is to be used as a selection guide only. Each application should be reviewed in detail as specific properties of process fluids and environmental variables may have a significant effect on cooler performance. Information subject to change without notice.

MPLC

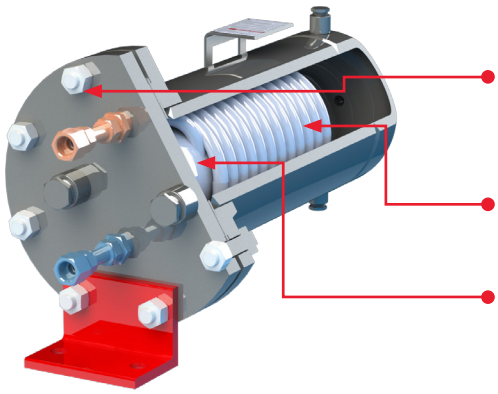
Optimize Performance, Ensure Reliability

STANDARD DELIVERY: 2–4 WEEKS

The ShellCool heat exchanger is a top-of-the-line solution for process/barrier fluids in seal applications. The ShellCool heat exchanger system can be applied with API 682 conforming Flush Plans 21, 22, 23, 41, 53B, 53C, 54, and 55.

The ShellCool heat exchanger provides exceptionally effective cooling and lubrication to critical mechanical seal components, eliminating common failures from high process temperatures and friction.

Our heat exchanger will keep your processing equipment operating longer with fewer failures and requires almost no maintenance. Protect your investment with ShellCool to save time and money for your plant.



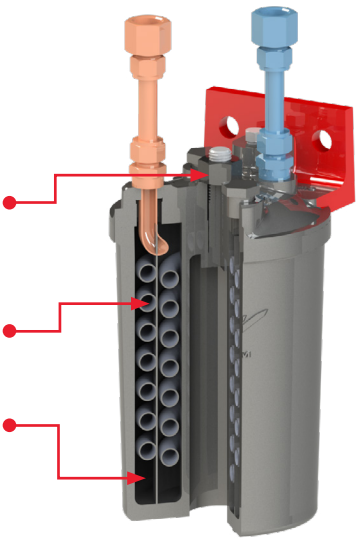
Sizes for Any Application
Mini, M, and XL

Easy Maintenance
Removable Head and Bundle
Mini available with flanged connection

Better Cooling
Double-Wrap Tubing

High-Performance Features
Internal baffle for improved HX

Optional ASME U Stamp Available



SHELLCOOL M & XL

SHELLCOOL MINI

MPLC

Specifications

MATERIALS OF CONSTRUCTION

Shell	CS*, 304L, 316L, per spec
Tube	316L*, CS, 304L, exotics including Inconel or Hastelloys
Bracket	CS
Fittings	316L or to match tube material
Gasket (M, XL)	Spiral Wound Flexitallic CGI
O-Rings (Mini)	FKM Standard, FFKM Available

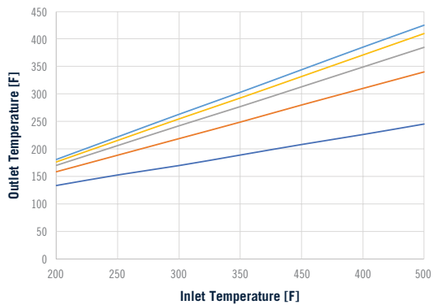
*Standard materials, others available by request.

OPERATING PARAMETERS

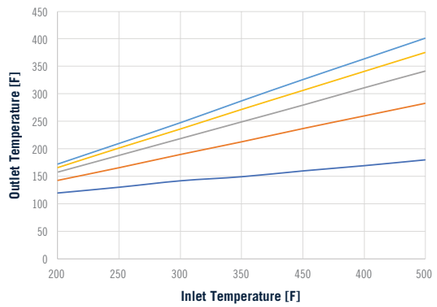
Coolant Media	Water or 50/50 Ethylene Glycol/Water
Temperature	700 °F (370 °C) max inlet
Coolant Flowrate (API 682)	M & XL: 9–14 GPM (0.55-0.90 L/s) Mini: 4–6 GPM (0.25-0.40 L/s) NOT TO EXCEED 5–8 FT/S VELOCITY IN ALL CASES
Tube Working Pressure	M & XL: 1,500 psi (103 bar) @ max temp Mini: 3,072 psi (212 bar) @ max temp

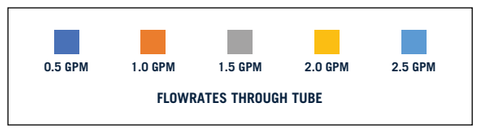
Performance Curves

SHELLCOOL MINI – OIL



SHELLCOOL MINI – WATER

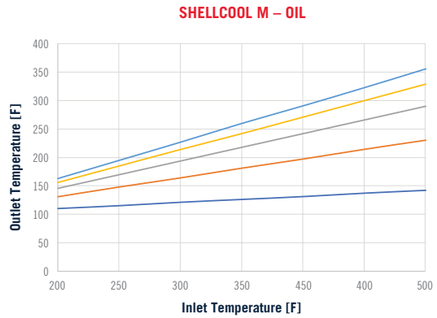




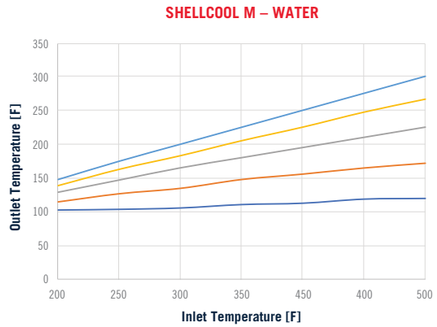
MPLC

Performance Curves [continued]

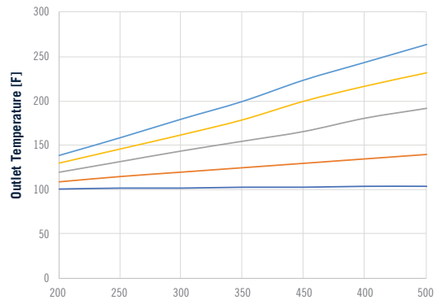
SHELLCOOL M – OIL



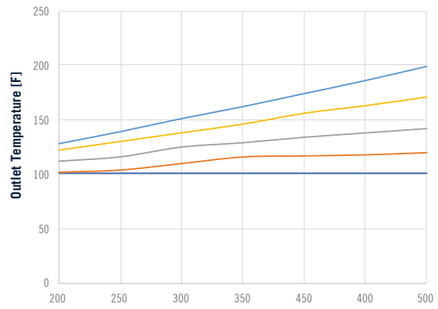
SHELLCOOL M – WATER



SHELLCOOL XL – OIL



SHELLCOOL XL – WATER



NOTE: All curves modeled with 90 °F (32 °C) coolant at flowrate operating parameters specified. The information provided is to be used as a selection guide only. Each application should be reviewed in detail as specific properties of process fluids and environmental variables may have a significant effect on cooler performance. Information subject to change without notice.


flexaseal
ENGINEERED SEALS AND SYSTEMS, LLC

MP60 SERIES

MP65

API 682 PLAN 65
STANDARD DELIVERY: 4–6 WEEKS

The MP65 system is a Primary Seal Condition Monitoring Unit that aligns with API 682 Piping Plan 65. This system will detect excessive leakage from the primary seal and warn the operator and is designed to be used on process fluids that are condensing and relatively non-hazardous.

FEATURES:

- Vessel or box designs.
- 304SS standard construction boxes for long field life.
- Bolted head for easy clean out on vessel designs.
- Remote-mounted level gauge on vessel designs.
- Integrated overflow system.
- Many instrumentation options based on user preference.
- Full API 610 and 682 compliance (latest edition).
- Canadian CRN available.
- ASME U Stamp available.

MP70 SERIES

MP72

API 682 PLAN 72

STANDARD DELIVERY: 4–6 WEEKS

The MP72 system is a Primary Seal Condition Monitoring Unit that aligns with API 682 Piping Plan 72. The system is designed to inject buffer gas behind the primary seal to sweep and dilute volatile emissions. This system is also intended to operate in tandem with API 682 Piping Plans 75 or 76.

FEATURES:

- A simple vertical, self-venting design.
- Single or dual 72 system.
- Vertical stand mounting for a small footprint and little panel obstruction.
- Low-vibration mounting blocks.
- Fewer pressure joints for lower emissions.
- API Plan 72/76 combination options available.
- Full API 610 and 682 compliance (latest edition).
- Canadian CRN available.
- Panel-mounted design available.

MP72 PANEL-MOUNTED

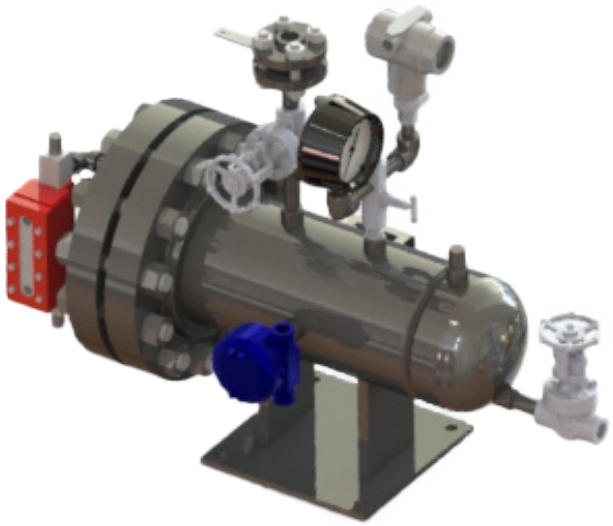
MP72 STAND-MOUNTED

MP70 SERIES

MP75

API 682 PLAN 75
STANDARD DELIVERY: 4–6 WEEKS

The MP75 system is a Primary Seal Condition Monitoring Unit that aligns with API 682 Piping Plan 75. It is designed to collect primary seal leakage as well as Plan 72 buffer gas. The system will detect excessive leakage from the primary seal and warn the operator. The API 682 Piping Plan 75 is designed to be used on process fluids that are condensing or non-condensing.



FEATURES:

- Heavy-duty vessel designed in accordance with ASME Section VIII.
- Bolted head for easy clean out.
- Remote-mounted level gauge.
- Vertical stand mounting for a small footprint.
- API Plan 72/75/76 combination options available.
- Full API 610 and 682 compliance (latest edition).
- Canadian CRN available.
- ASME U Stamp available.

MP70 SERIES

MP76

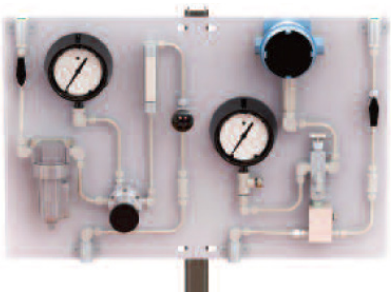
API 682 PLAN 76

STANDARD DELIVERY: 4–6 WEEKS

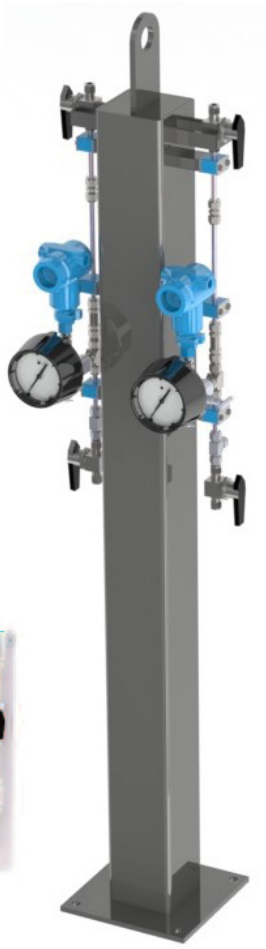
The MP76 is a Primary Seal Condition Monitoring Unit that aligns with API 682 Piping Plan 76. This leakage collection system is for an unpressurized dual, dry-running containment seal in noncondensing applications and uses a vent connection to direct vapor leaks from the inboard seal of a dual containment seal. The MP76 series may be used with a Plan 72 buffer gas, and ensures very low (or even zero) process emissions from outboard containment seals.

FEATURES:

- A simple vertical, self-venting design.
- Single or dual 76 system.
- Vertical stand mounting for a small footprint and little panel obstruction.
- Low-vibration mounting blocks.
- Fewer pressure joints for lower emissions.
- API Plan 72/76 combination options available.
- Full API 610 and 682 compliance (latest edition).
- Canadian CRN available.
- Panel-mounted design available.



MP76 PANEL-MOUNTED



MP76 STAND-MOUNTED

MP12 SERIES

Highflow Series

API 682 PLAN 12

STANDARD DELIVERY: 6 WEEKS

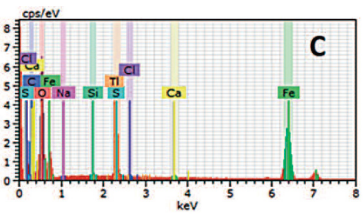
The Flexaseal MP12 Series aligns with API 682 Plan 12. The duplex filter design used in the MP12 unit allows for continuous flow during transfer to a new filter. Our filter bodies are designed per ASME section VIII, Division 1. The inlet and outlet connections terminate at a manifold for a clean installation.

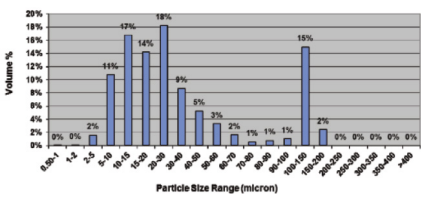
FEATURES:

- Up to 75 GPM flush rate.
- Dual cartridge, “Hot Swap” system.
- 316SS cored filter for high-pressure stability.
- Clean Delta P as low as 0.5 psi.
- Low-cost filter replacement with fixed core units.
- Low-rise mount for lower vibration.
- Fewer pressure joints for lower emissions.
- Easy filter maintenance in the field.
- Davit designs available for easy head removal.
- Designed per ASME Section VIII.
- ASME U Stamp available.

EXPERIENCE EXCESSIVE FILTER FOULING

We can provide filtrated particulate analysis.





MP12 SERIES

Highflow Series

SYSTEM FEATURES:

- Duplex filter design for uninterrupted flow during transfer to the new filter.
- 316 SS filter core, capable of 75 psi differential pressure, is threaded into filter body and remains installed reducing filter costs.
- Two closure designs are available: 1. Flange bolted with a spiral wound gasket or 2. ACME threaded cap with an O-ring seal. Lifting davits are available for both closure designs.
- Filter bodies are designed per ASME section VIII, Division 1.
- ASME U stamp available on request, National Board registered. Filter bodies constructed from stainless to carbon steel, per your requirements. Lifting eye provided.
- Flow and pressure instrumentation provided by industry leaders, such as Rosemount Transmitters and Hedland Flow Meters.
- 3/4" tubing and ball valves, 316 SS. Fittings and valves are Swagelok or per your request.
- The inlet and outlet connections terminate at a manifold for a clean installation.
- The top view footprint is 30" x 30" typical, 50" height.

FILTER FEATURES:

- Borosilicate glass microfiber filter media used because no other element works as efficiently or gathers as many particles as the Borosilicate.
- 3 or 10 micron filter element, absolute rated.
- Beta Ratio – 5,000 Efficiency – 99.98%
- Mass Flux = Mass Flow per unit area

EXAMPLE

MP12:
20 gpm flush / 40 sq. ft. filter area = **0.5 flux**

OTHER SYSTEMS:
20 gpm flush / 0.8 sq. ft. filter area = **25 flux**

The lower the flux, the longer the filter life.

- O-ring sealed filter to filter housing for positive sealing and ease of maintenance.
- The filters incorporate a handle on the top and replacement simply requires lifting the filter off of the O-ring sealing surface/core element.
- The Borosilicate element holds much more particulate than cellulose media filters, which are nominally rated 60 to 98% of the rated pore size. Fewer filter changes and absolute filtration to the rated pore size.
- Low filter cost and longer life cycles, with better filtration offers low cost of ownership and value.

CYCLONE SEPARATOR

STANDARD DELIVERY: IN-STOCK

When an external source of clean fluid is not available or economical to use for a seal flush plan, a Flexaseal Cyclone Separator may be the answer. Cyclone separators efficiently remove abrasive media from a pump's discharge, circulating the resulting clean fluid back into the seal chamber to cool the seal faces.

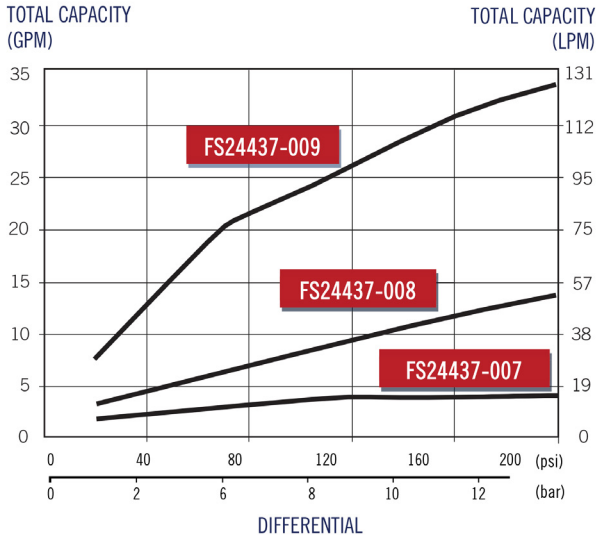
The simple construction of the Flexaseal Cyclone Separator utilizes a one-piece pressure casing, eliminating the temperature and pressure constraints imposed by bolted and gasketed casing cover designs.

When properly installed, the FAS Cyclone Separator provides lower pipe stress when inline mounted, improves circulation, and reduces temperature at the seal faces, all while offering operating pressures up to 3,000 psi / 207 bar.

How a cyclone separator operates is affected by many factors, and the following process should be used as a selection guideline.

APPLICATION:
API 682 PLAN 31
API 682 PLAN 41

CYCLONE SEPARATOR



1. Determine the maximum and minimum acceptable clean circulation flow rates using the seal manufacturer's information.
2. Establish the required total capacity of the cyclone separator using the following formula: Clean Flow Rate x 1.4 = Total Capacity (GPM or LPM)
3. Calculate available differential pressure using the following formula:
   Pump Discharge Pressure – Stuffing Box Pressure = Differential Pressure
4. On the chart to the left, locate the intersection of the lines corresponding to total capacity and differential pressure. Choose the cyclone separator model with a flow rate greater than the required minimum.

MATERIALS OF CONSTRUCTION

Seal Faces	Sintered Silicon Carbide
Elastomers	FKM standard Other materials upon request
Bellows	Inconel 718™
Metallurgy	316 Stainless Steel
Bushing	Bronze, Carbon

OPERATING PARAMETERS

Max Temperature	180 °F (82 °C)
Max Pressure	1,500 psi (103 bar)
Max Speed	3,600 rpm
Max Shaft Sizes	5.50" (139.7mm)

NOTES

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Scan Code for Branch and Service Locations

OUR CORE VALUES

At Flexaseal, we're more than a provider – we're your partner. We listen to your story, identify your problem, and solve it with an effective Flexaseal solution. We're committed to providing you with the best sealing solutions in the world.