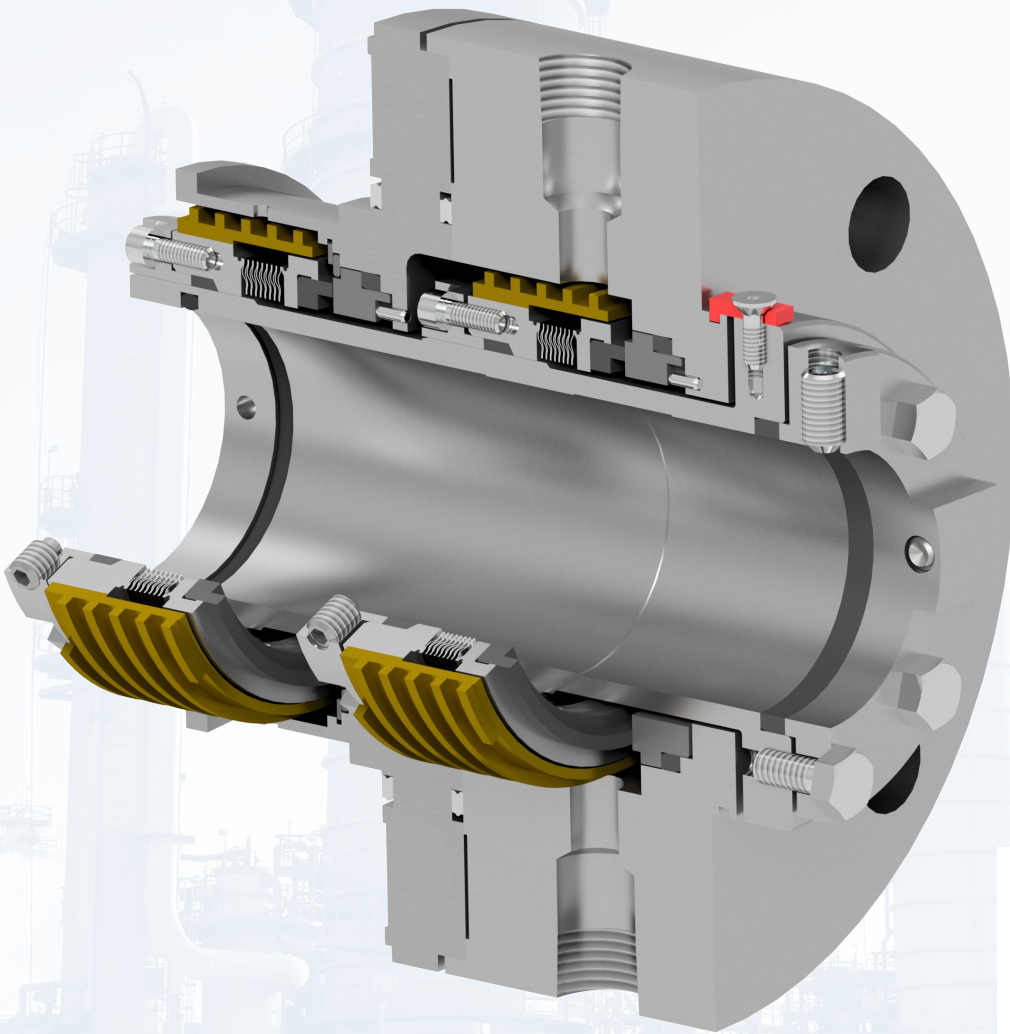


682C Series Seals

*API 682 Type C high-temperature
metal bellows seals*



DESCRIPTION

PPC's 682C Series of cartridge seals are a complete line of high temperature seals meeting the criteria of the Type C design under API Standard 682, completely manufactured by us at our corporate facility in Baton Rouge, LA. These designs are balanced, internally mounted cartridge non-pusher seals with a flexible metal bellows element and static graphite secondary sealing members. Designed as Category 2 seals per API 682, these designs are fully compatible with API 610 pumps.

Per the latest API 682 publication, the standard seal design features a stationary flexible element (metal bellows) for Arrangement 1 (single) seals. Under the API Standard, the seals are applicable to process temperatures up to 750 °F (400 °C), although engineered designs may be suitable for even greater temperatures.

682C Series seals may be provided in all three API Arrangements (single, tandem, double), and may be configured to suit individual applications. Various performance increasing design features are available, including:

- Integrated circulation devices for improved seal heat removal and optimum performance
- Quench baffles used with an external quench (Plan 62) to prevent the accumulation of hydrocarbon byproducts (coking)

682C SERIES SEALS & ARRANGEMENTS

ULTRASEAL 780 & 789 CARTRIDGE SEALS

The Ultraseal 780 cartridge seal is PPC's standard high-temperature bellows design and is utilized in applications where O-rings cannot be used due to elevated operating temperatures. Flexible graphite used as secondary sealing members is resistant to heat and aggressive chemicals. The Ultraseal 789 seal indicates a special design or feature over PPC's standard Ultraseal 780 bellows design. The Ultraseal 780 and 789 are available in the following API 682 configurations:

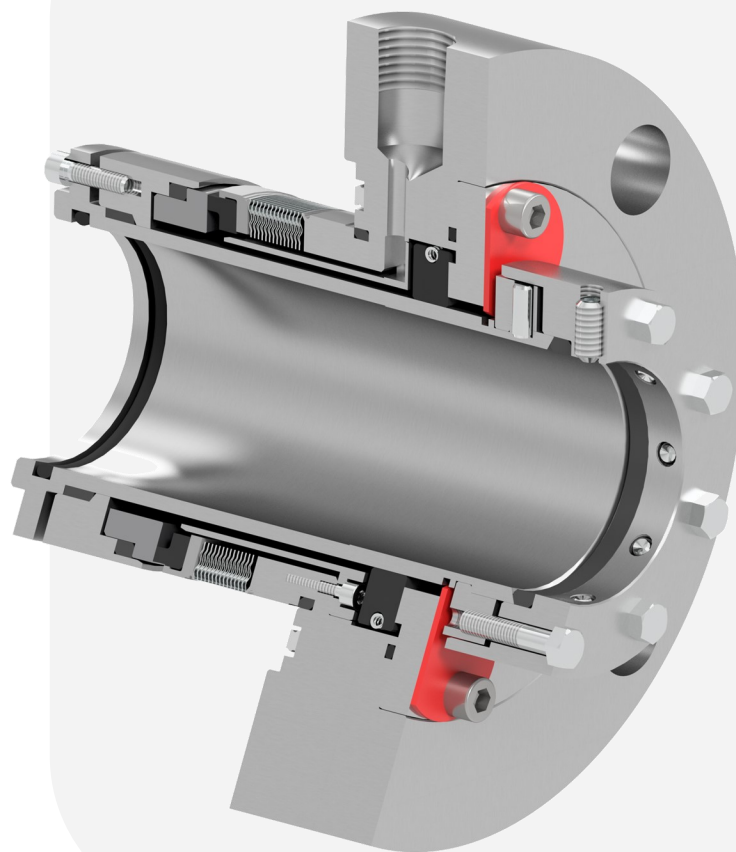
- Arrangement 1 (single), Arrangement 2 (tandem), Arrangement 3 (double)
- Contacting wet (CW) seal, Containment seal (CS)

ULTRASEAL 289 CARTRIDGE SEAL

The Ultraseal 289 cartridge seal is PPC's stationary high-temperature bellows design. A stationary bellows element provides performance benefits when used in coking services, and is the default design according to API Standard 682 for Arrangement 1, Type C seals. The Ultraseal 289 is available in the following API 682 configurations:

- Arrangement 1 (single), Arrangement 3 (double)
- Contacting wet (CW) seal

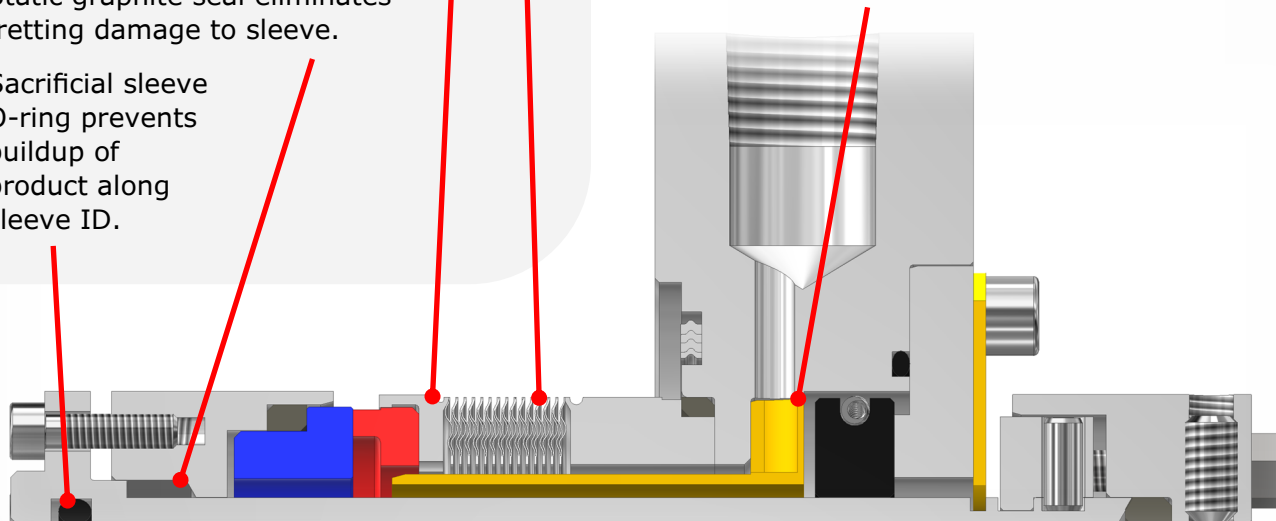
Ultraseal 289 Cartridge Seal



ULTRASEAL 289 SEAL FEATURES

- Metal bellows eliminates hang-up concerns from dynamic O-ring.
- Double-ripple nesting bellows design provides even face loading with excellent pressure handling capabilities.
- Engineered high-temperature insert holder design provides uniform pressure on insert to maintain face flatness, even in extreme conditions.
- Static graphite seal eliminates fretting damage to sleeve.
- Sacrificial sleeve O-ring prevents buildup of product along sleeve ID.

- When applicable, pumping ring is added to the seal rotary unit to provide forced circulation of product for Plan 23 arrangements and barrier/buffer fluid for dual seal arrangements.
- Stationary bellows designs available for improved performance in hot oil services.
- For single seal arrangements, steam quench baffles may be integrated to improve cooling and coking resistance.



Ultraseal 289 Single Cartridge Seal Arrangement 1, Contacting Wet (1CW-FL) seal

ULTRASEAL 780/789/289 OPERATING CONDITIONS

Seal Chamber Pressure: Up to 300 psig (20 bar g)
Dependent on size, speed, and sealed fluid properties

Process Temperature: -100 to 850 °F (-73 to 454 °C)
Contact PPC for applications above 700 °F

Surface Speed: Up to 4500 fpm (23 m/s)

Size Availability: Shaft sizes 0.750" to 3.750" for cartridge designs

Contact PPC for specific applications outside these parameters

Metallurgy: 316 SS
Other materials available, including Duplex SS, Alloy C-276 & Titanium

Seal Face Options:	Standard	Optional
	Carbon (Metal-filled) Reaction Bonded Silicon Carbide	Carbon (Resin-filled) Tungsten Carbide, Nickel Bound Sintered Silicon Carbide Graphite Loaded Sint. Silicon Carbide Diamond-treated Sint. Silicon Carbide

Secondary Seals: GRAFOIL® flexible graphite packing
Spiral-wound gland gaskets (graphite-filled 304/316 SS)

Metal Bellows: Alloy C-276, Alloy 718 (Standard per API 682), AM-350 SS
Low-expansion Alloy 36/42 insert holders

GRAFOIL® is a registered trademark of Graftech Inc.

APPLICATIONS

- Asphalt/Bitumen
- Asphaltene
- Crude Handling & Treatment
- Heat Transfer Fluids
- Hydrocracking
- Delayed Coking
- AGO & VGO
- Distillation
- Heavy Oils
- Tar/Pitch



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