

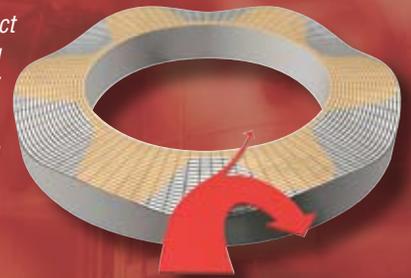
*GTSP seals are dual pressurized, high temperature metal bellows gas seals for the hottest process pumps found in refinery and hydrocarbon services. Utilizing Flowserve's exclusive bi-directional wavy face topography, GTSP seals pressurized with dry steam or nitrogen are specially engineered to drive exceptional, long-term equipment reliability and lower energy consumption.*

### **Features Precision Face Topography**

*Wavy face technology separates the seal faces so there is no seal face wear*

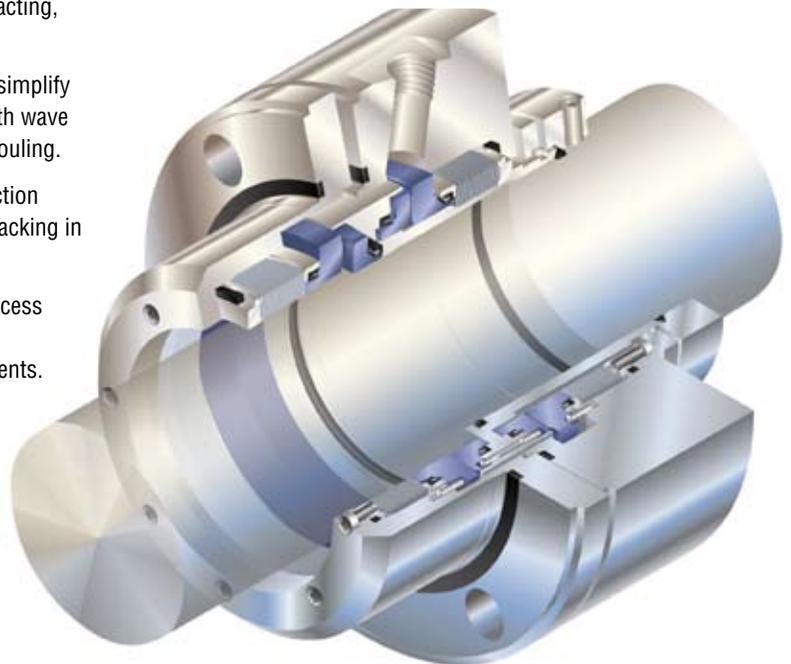
*Recirculation effect minimizes fouling for high reliability*

*Low gas consumption and low speed lift-off*



### **Features and Benefits**

- Dual pressurized gas seal design eliminates process leakage and coking problems in a compelling economic design that avoids liquid barrier-related seal issues.
- Laser-applied wavy face technology creates a gas film barrier between the seal faces to provide non-contacting, low drag, low energy consumption performance.
- Sinusoidal waves allow bi-directional operation to simplify installation on double-ended pumps and the smooth wave texture is self-cleaning to resist contamination or fouling.
- Alloy 718 welded metal bellows assembly construction offers the highest resistance to stress corrosion cracking in high temperature, sulfuric-laden services.
- Designed to operate without cooling and at full process temperature, the cartridge seal tolerates high axial overtravel during pump warm-up or thermal transients.
- Spring-energized graphite (SEG) seals absorb differential thermal expansion to maintain flat seal faces and low steam leakage rates.
- Qualification tested per API 682 Type C requirements for 3NC-FF designs, GTSP seals are suited for hot hydrocarbons such as hot oils, gas oils, asphalt and heat transfer fluids.



### Operating Parameters

Process Pressure	Up to 19.0 bar (250 psi)
Barrier Pressure	Up to 20.7 bar (300 psi)
Temperature	Up to 427°C (800°F)
Surface Speed	Up to 46 m/s (150 fps)
Shaft Sizes	50.8 to 104.8 mm (2.000 to 4.125 inch)

### Materials of Construction

Bellows Assemblies	Alloy 718
Rotating Faces	Silicon Carbide
Stationary Faces	Silicon Carbide
Gaskets	Flexible Graphite
Metal Components	316 Stainless Steel, Alloy C-276 416 Stainless Steel

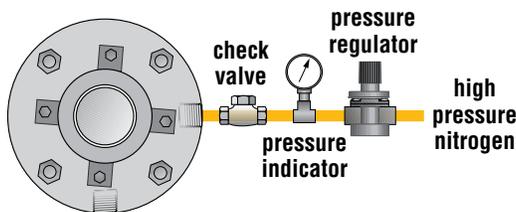
**GTSP seals are easier to install and maintain than liquid barrier seals and operate at a fraction of the energy cost.**

Wavy face GTSP gas seals eliminate the energy requirements from circulating, cooling and churning a liquid barrier along with significantly less heat generation and torque at the seal faces. Liquid dual seals consume at least 10 times more energy than GTSP seals, not including liquid seal costs associated with barrier fluid maintenance or an inboard seal flush. A plan 74 pressurized supply system simply injects clean gas dead-ended into the GTSP barrier port. Dry steam is a first choice in hot hydrocarbon services and a reliable supply is typically available nearby, simplifying setup time with minimal connection expense.

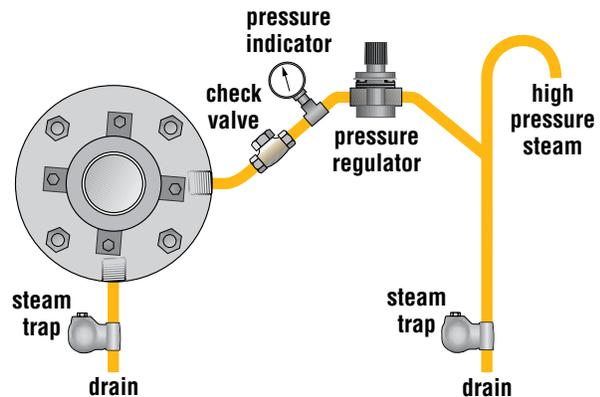
**Contact Flowserve for expert technical support on the design, installation and operation of GTSP gas barrier seals and systems.**

### Plan 74 Minimum System Requirements

#### Nitrogen Barrier



#### Steam Barrier



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