



## ***GTS Series Seals for steam turbines***

The most reliable steam seal in the industry



***Experience In Motion***

The advanced GTS seal is designed to handle real world steam applications providing the benefits of a mechanical seal in sealing steam turbines.



## Designed to succeed in steam turbine applications

### The GTS seal advantage

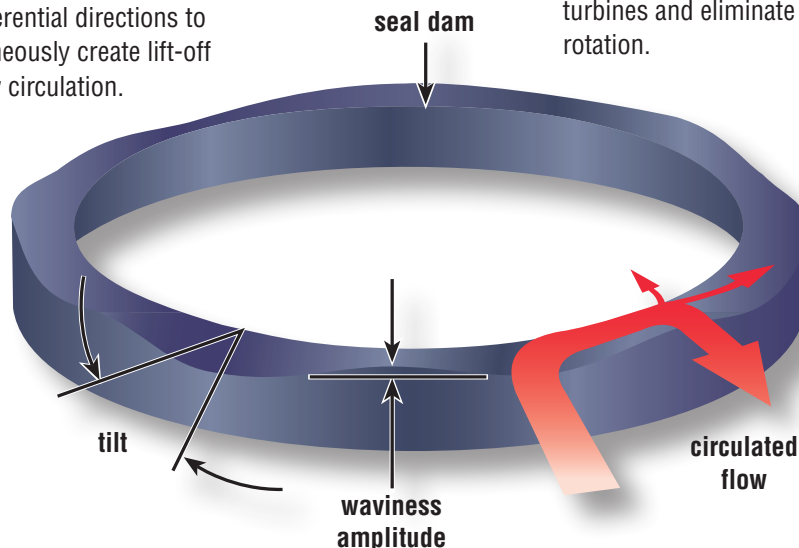
Conventional dry gas seals applied to steam turbine applications can fail prematurely due to clogging of grooved face patterns, thermal distortions, and hang-up problems of dynamic secondary sealing elements.

Flowserve expended considerable effort developing a mechanical seal that is especially designed for steam turbine applications. The result is the GTS seal, which brings the benefits of mechanical seals to steam turbines such as:

- Significant energy savings
- Virtually no contamination of bearing oil resulting in enhanced MTBF of the turbine
- Elimination of hazardous “steam clouds” which improves plant safety

### Wavy face dynamics

Unique wavy face technology tapers the seal face in both the radial and circumferential directions to simultaneously create lift-off and flow circulation.



### Bellows design helps eliminate secondary seal problems

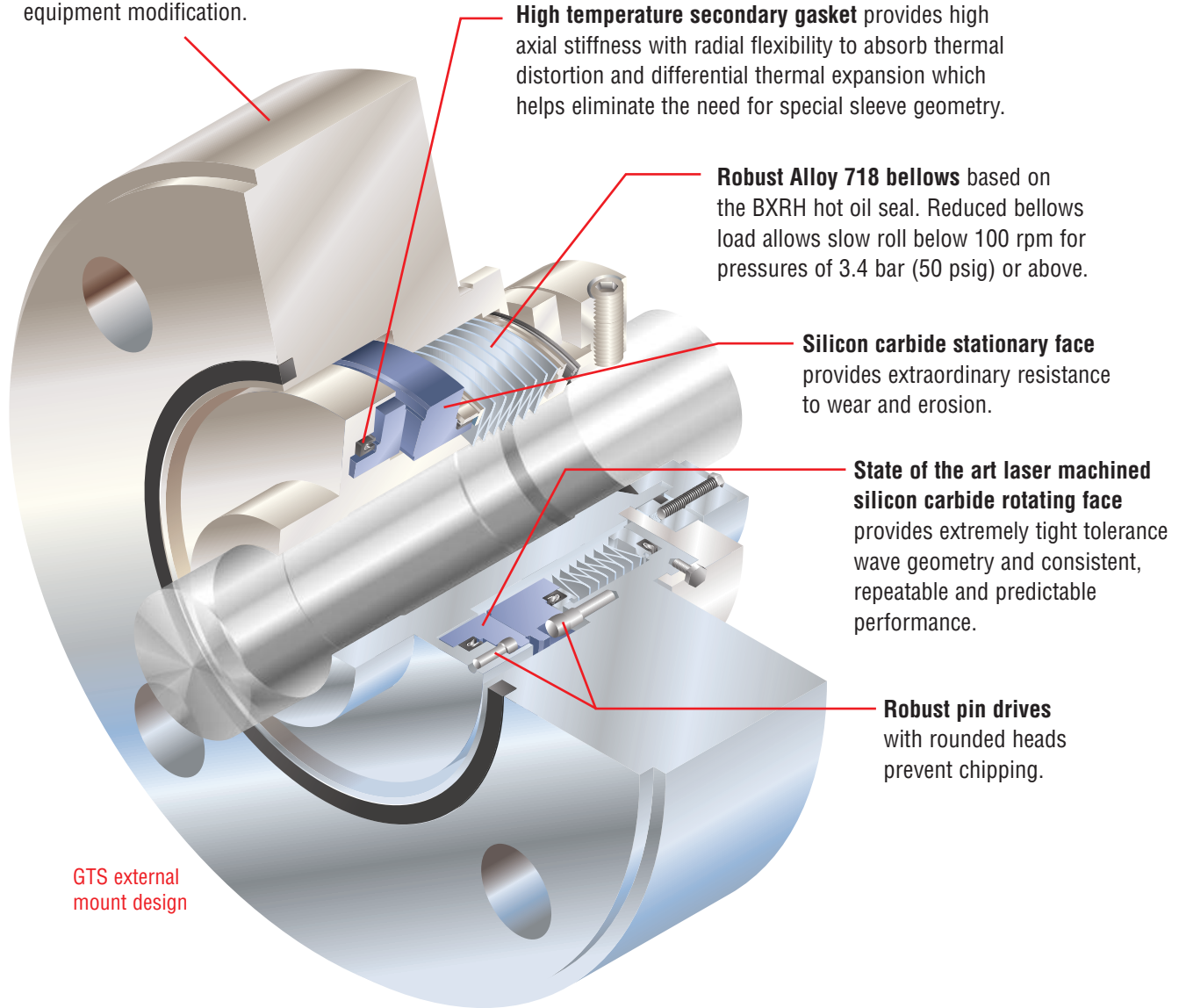
Alloy 718 bellows helps eliminate dynamic secondary sealing element hang-up problems traditionally experienced in lightly loaded pusher seal designs which require a dynamic O-ring.

### Precision Face Technology Waves

Laser-applied wavy face technology creates a gas film barrier between the seal faces to provide non-contacting, low drag, and low energy consumption performance.

- Smooth wave texture is self-cleaning to resist contamination or fouling in low quality steam.
- A positive sealing dam regulates steam leakage to atmosphere while maintaining the minimal clearance to prevent seal face wear.
- Sinusoidal waves allow bi-direction operation to simplify installation on double-ended turbines and eliminate failures from reverse rotation.

**Internal and external mount seal glands** are available for easy retrofits of existing steam turbines with no or minimum equipment modification.



**High temperature secondary gasket** provides high axial stiffness with radial flexibility to absorb thermal distortion and differential thermal expansion which helps eliminate the need for special sleeve geometry.

**Robust Alloy 718 bellows** based on the BXRH hot oil seal. Reduced bellows load allows slow roll below 100 rpm for pressures of 3.4 bar (50 psig) or above.

**Silicon carbide stationary face** provides extraordinary resistance to wear and erosion.

**State of the art laser machined silicon carbide rotating face** provides extremely tight tolerance wave geometry and consistent, repeatable and predictable performance.

**Robust pin drives** with rounded heads prevent chipping.

GTS external mount design

### Materials of Construction

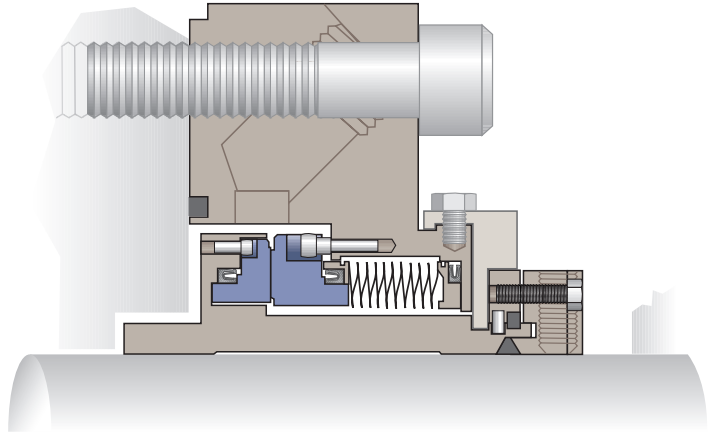
<b>Sleeve and Drive Collar</b>	416 Stainless Steel
<b>Gland</b>	416 Stainless Steel
<b>Rotating Face</b>	Silicon Carbide
<b>Stationary Face</b>	Silicon Carbide
<b>Seat Gasket / Rotating Face Gasket</b>	Composite
<b>Bellows Assembly</b>	Alloy 718
<b>Labyrinth Bushing optional</b>	Carbon or Aluminum depending on design

### Operating Parameters

<b>Products</b>	Steam (saturated and superheated) Hot Condensate
<b>Maximum Speed</b>	7000 rpm higher speeds with review by Flowsolve Technical Services
<b>Minimum Slow Roll Speed</b>	3 m/s (10 fps) for pressures less than 3.4 bar (50 psig) No minimum speed for pressure greater than 3.4 bar (50 psig)
<b>Seal Chamber Pressure</b>	0 - 20 bar (0 - 300 psi)
<b>Seal Chamber Temperature</b>	up to 343°C (650°F)



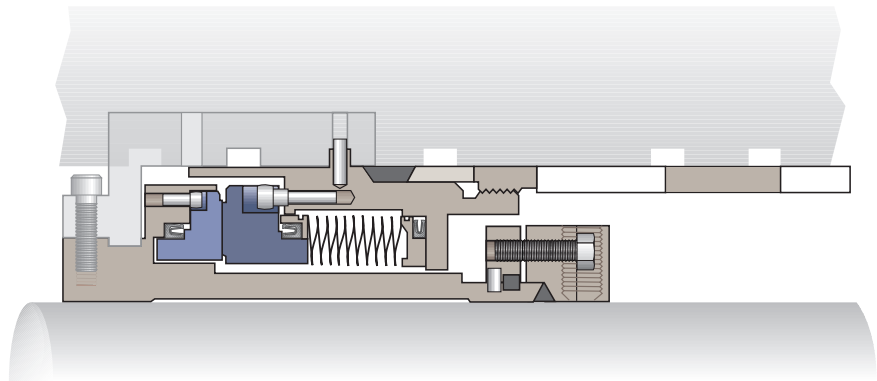
## GTS external mount arrangement



### Standard Sizes

Basic seal	Maximum shaft
2875	60.3mm (2.375")
3250	69.8mm (2.750")
4125	88.9mm (3.500")
5000	111.1mm (4.375")
6000	133mm (5.250")
8000	181mm (7.125")

## GTS internal mount arrangement



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