FLOWSERVE

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

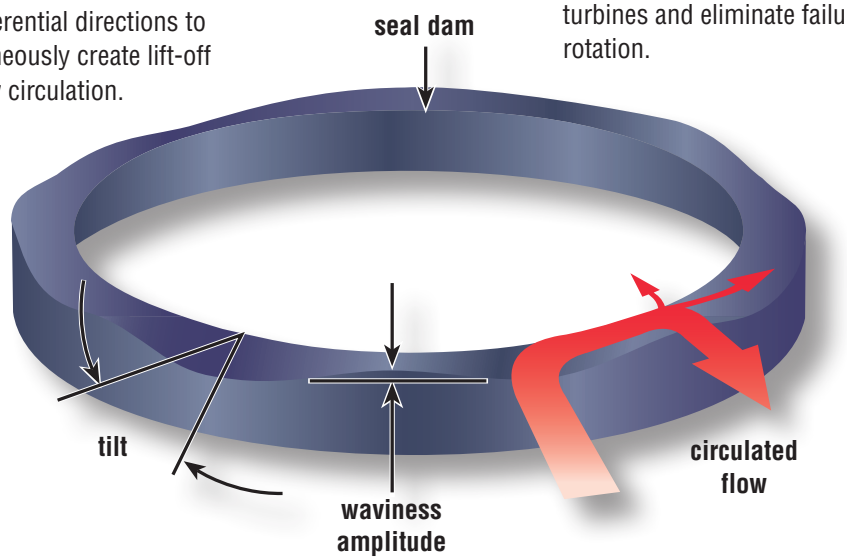
Conventional dry gas seals applied to steam turbine applications can fail prematurely due to clogging of grooved face patterns, thermal distortions, and hang-up problems of dynamic secondary sealing elements.

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.

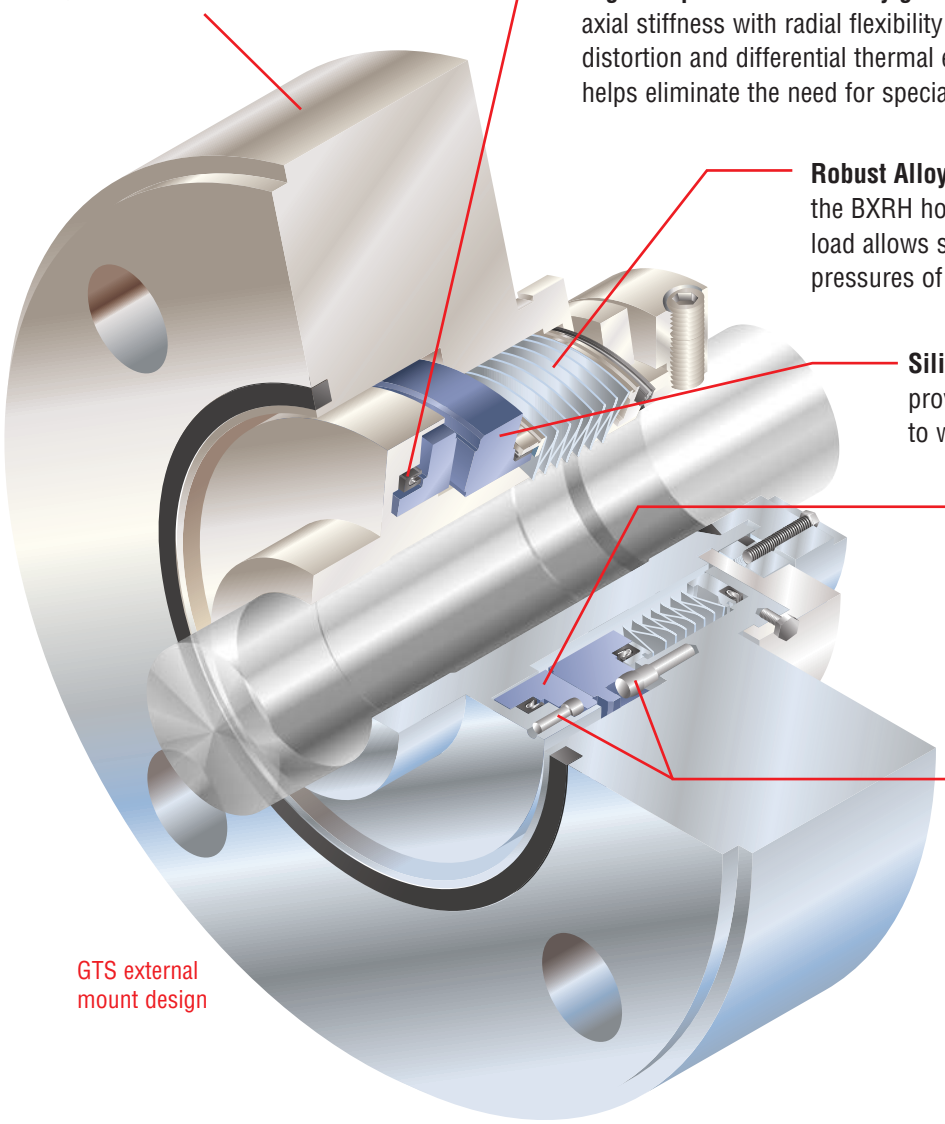
High temperature secondary gasket provides high axial stiffness with radial flexibility to absorb thermal distortion and differential thermal expansion which helps eliminate the need for special sleeve geometry.

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

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

Operating Parameters

Products	Steam (saturated and superheated) Hot Condensate
Maximum Speed	7000 rpm higher speeds with review by Flowserve Technical Services
Minimum Slow Roll Speed	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)
Seal Chamber Pressure	0 - 20 bar (0 - 300 psi)
Seal Chamber Temperature	up to 343°C (650°F)

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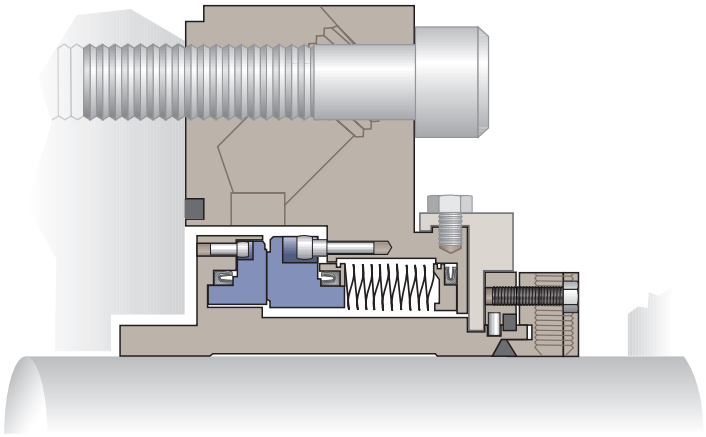
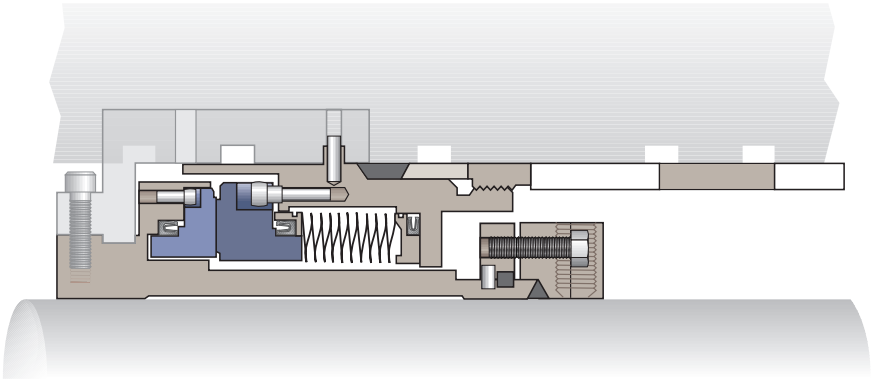
GTS external mount arrangement



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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To find your local Flowserve representative
and find out more about Flowserve Corporation,
visit www.flowserve.com

USA and Canada
Kalamazoo, Michigan USA
Telephone: 1 269 381 2650
Telefax: 1 269 382 8726

Europe, Middle East, Africa
Roosendaal, The Netherlands
Telephone: 31 165 581400
Telefax: 31 165 554590

Asia Pacific
Singapore
Telephone: 65 6544 6800
Telefax: 65 6214 0541

Latin America
Mexico City
Telephone: 52 55 5567 7170
Telefax: 52 55 5567 4224