FLOWSERVE®

Flow Solutions Division

GTS Seal for Steam Turbines





The most reliable steam seal in the industry, designed for real world applications.

The GTS steam seal - a simple design for easy retrofits of existing

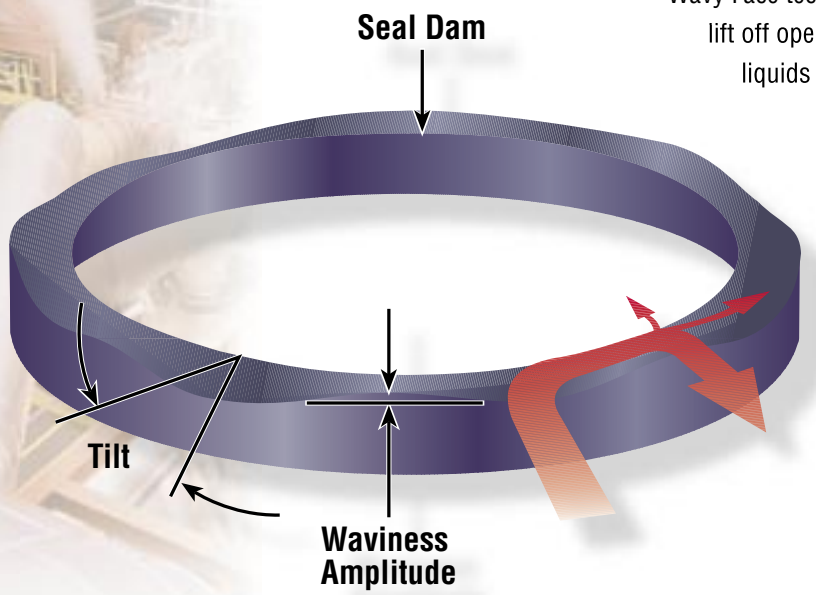
The advanced GTS is designed to handle real world steam applications to provide real benefits of a mechanical seal in sealing steam turbines.

Conventional dry gas seals applied to steam turbine applications can fail prematurely due to clogging of grooved face patterns, sleeve 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, providing the real benefits of a mechanical seal in sealing 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

Superior Wavy Face Technology



Wavy Face technology gives a mechanical seal non-contacting lift off operation in real world applications yet can also seal liquids under upset conditions.

- Able to recover from upset conditions because there are no conventional face grooves to clog.
- The Wavy Face design incorporates a positive sealing dam that operates without face contact, hence, no wear.
- Bi-directional operating capability improves interchangeability and reduces installation and operation errors.

The most reliable steam seal in the indu



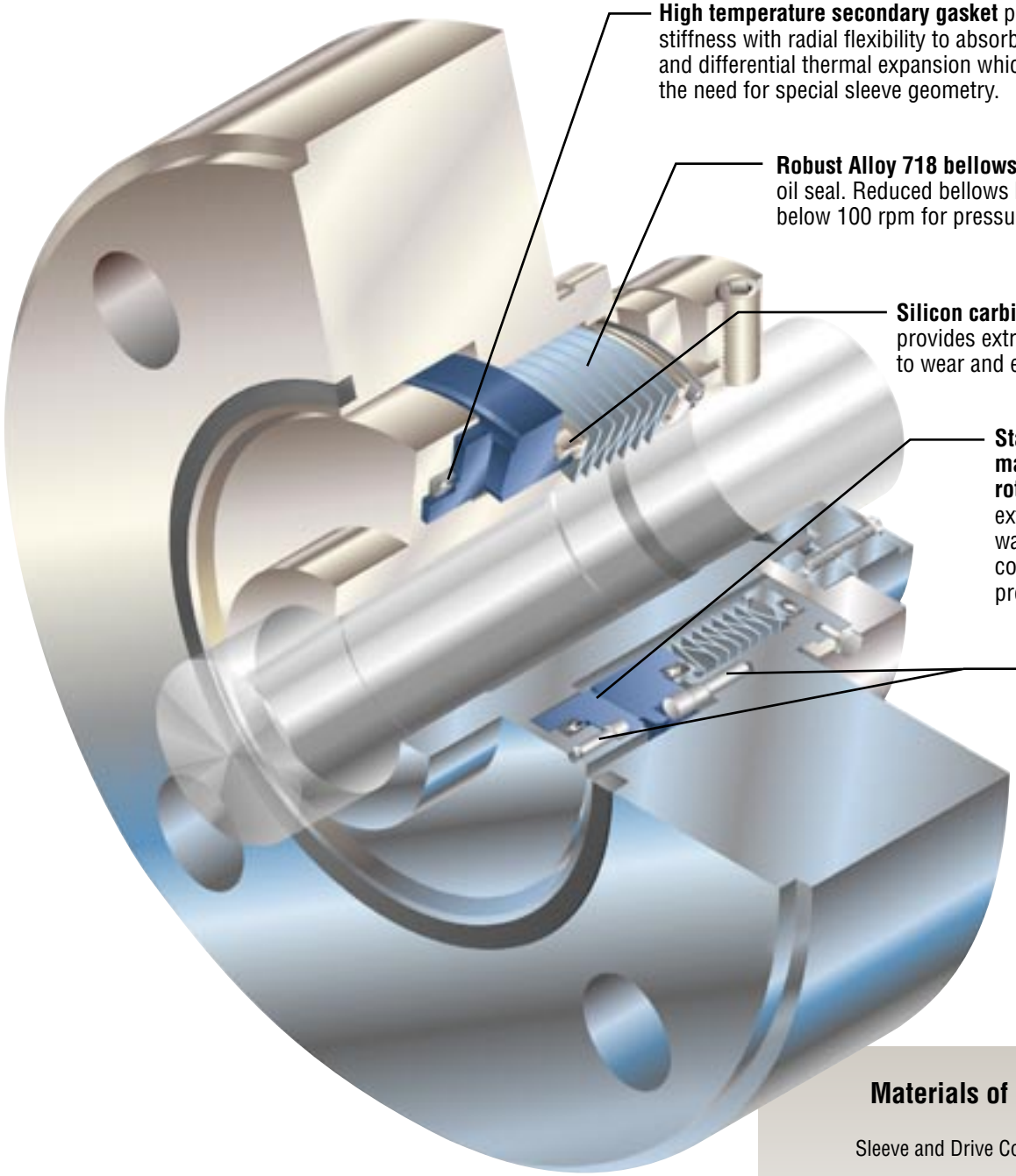
Bellows design helps eliminate secondary seal problems

GTS Inconel bellows helps eliminate dynamic secondary sealing element hang-up problems traditionally experienced in lightly loaded pusher seal designs.

Available as both internally and externally mounted designs

© 2002 Flowserve Corporation

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 50 psig or above.

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

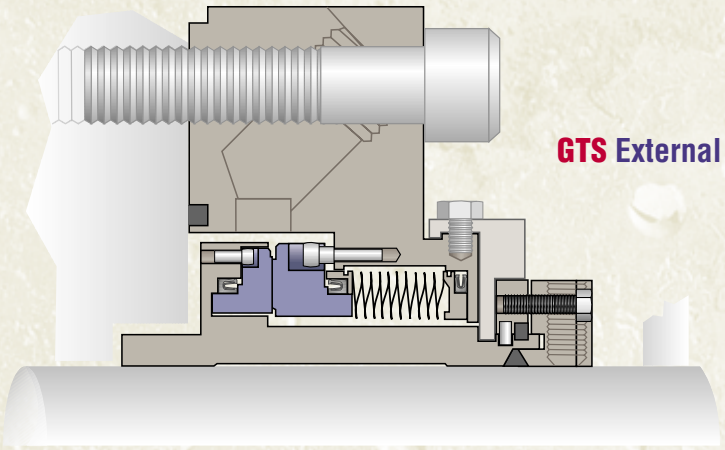
State of the art laser machined silicon carbide rotating face provides extremely tight tolerance wave geometry and consistent, repeatable and predictable performance.

Robust pin drives with rounded heads prevent chipping.

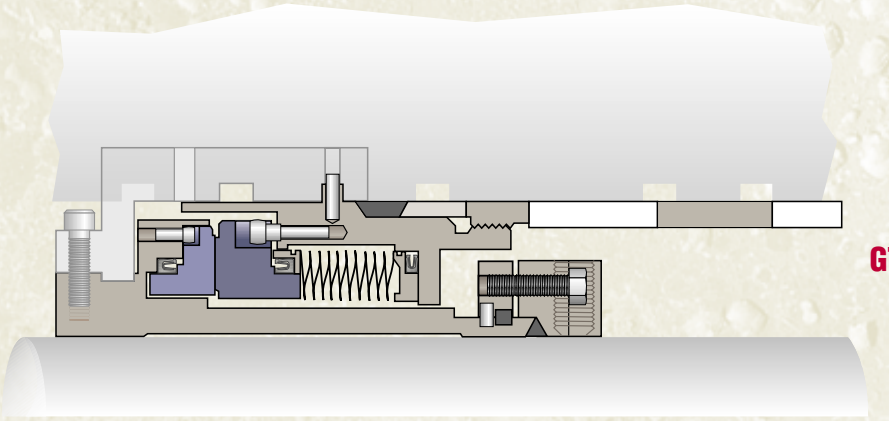
Materials of Construction

Sleeve and Drive Collar	416 Stainless Steel
Flange	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)

...stry, designed for real world applications.



GTS External Mount Arrangement



GTS Internal Mount Arrangement

Technical Information and Operating Parameters

Products	Steam (saturated and superheated) Hot Condensate
Maximum Speed	7000 rpm higher speeds with approval of Flowserve Technical Services
Minimum Slow Roll Speed	10 fps (3 m/s) less than 100 rpm at 50 psig or greater
Seal Chamber Pressure	0 - 300 psi (0 - 20 bar)
Seal Chamber Temperature	650°F (343°C)

Standard Sizes

Basic Seal	Max Shaft
2875	2.375" (60.3mm)
3250	2.750" (69.8mm)
4125	3.500" (88.9mm)
5000	4.375" (111.1mm)

The information and specifications presented in this product brochure are believed to be accurate, but are supplied for information purposes only and shoul sidered certified or as a guarantee of satisfactory results by reliance thereon. Nothing contained herein is to be construed as a warranty or guarantee, express or implied, with respect to the product. Although Flowserve Corporation can provide general application guidelines, it cannot provide specific information for all possible applications. The purchaser/user must therefore assume the ultimate responsibility for the proper selection, installation, operation and maintenance of Flowserve products. Because Flowserve Corporation is continually improving and upgrading its product design, the specifications, dimensions and information contained herein are subject to change without notice.

Primary Worldwide Flow Solutions Division Locations

Licensees, authorized agents, and affiliated companies located worldwide.

United States
Kalamazoo, MI
Phone 269-381-2650
Fax 269-382-8726

Canada
Edmonton, Alberta
Phone 780-463-7958
Fax 780-450-1241

Scarborough, Ontario
Phone 416-292-2877
Fax 416-292-5190

Netherlands
Roosendaal
Phone 31-165-581400
Fax 31-165-552622

Argentina
Villa Martelli
Phone 54-11-4709-6800
Fax 54-11-4709-7072

Australia
Marayong NSW
Phone 61-2-8822-7100
Fax 61-2-9679-7511

Singapore
Phone 65-6-8465100
Fax 65-6-747-1963

Mexico
Tlaxcala
Phone 52-2-461-6791
Fax 52-2-461-6847

Brazil
Sao Paulo
Phone 55-11-4066-8600
Fax 55-11-4066-7014

Japan
Osaka
Phone 81-720-85-5571
Fax 81-720-85-5575

Germany
Dortmund
Phone 49-231-6964-0
Fax 49-231-6964-248

www.flowserve.com

REV 9/02 USA
Printed in USA

ISO 9000
Certified

FSD107