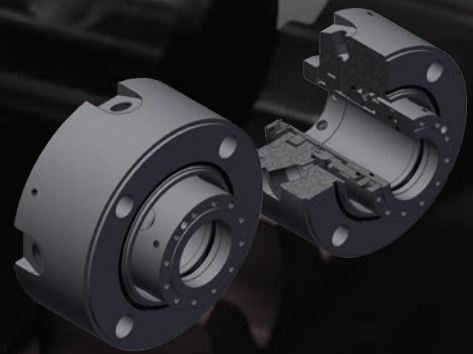
P868 Series

MECHANICAL SEALS

DESCRIPTION

The P868 series is a single cartridge seal intended to provide an excellent sealing performance for pumps. As one of the member of RST Mechanical Seals, it is designed to operate in a wide range of process fluids. P868 particularly exhibits high performance in the operation of critical process fluids of non-hydrocarbon, non-flashing hydrocarbon and flashing hydrocarbon. The improvements in design reliability and robustness are made possible by the utilisation of sophisticated Finite Element Analysis (FEA) Engineering Software. These features are further verified by the usage of ProEight's high-end testing equipment, the patented mechanical seal static tester – AccuTEST® and mechanical seal dynamic tester – AccuDYN® (Patent Pending).

The adoption of modularity concept has made P868 series even more versatile. Coupled with added interchangeable feature, P868 series seals are able to fit in various conditions, wider range of operating pressures, temperatures and process fluids. This concept ensures that the P868 series seal requires only minimum change-out on its seal face to suit these conditions, eliminating the need to redesign a completely different mechanical seal configuration. To cope with temperature sensitive environment, Low-temperature Inducing Face, ARCAF® is designed for this particular need. ARCAF® can be interchanged with other RST Standard Faces to suit other different operating conditions.



INDUSTRIAL APPLICATION

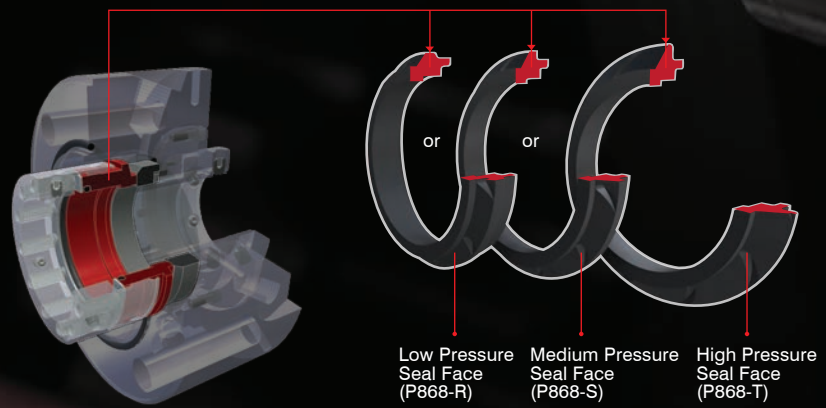
- Oil & Gas Production
- Petroleum Refining
- Pipeline
- Pulp & Paper
- Food & Beverage
- Mining & Minerals
- Power Generation
- Water Systems

SEAL APPLICATION

- Centrifugal Heavy Duty Pumps
- Centrifugal API Process Pumps
- Centrifugal General Purpose Pumps
- Positive Displacement Pumps

DESIGN OVERVIEW

- Meet API682 technical design configurations and requirements
- Materials Selection and Design is in accordance with API682 Standard
- RST Design Optimization for seal face design
- Flushing Flow pattern is optimised around seal faces, removing trapped vapour
- High efficiency buffer circulation system



(MODULAR TYPE SEAL FACE DESIGN)

RST DESIGN PHILOSOPY

Advanced FEA Program for Design Optimization

ProEight in-house FEA programs, SIGMA-FEA and CELC-FEA combined with ANSYS were used extensively to design the RST mechanical seals. Steady state and transient conditions coupled with various possible sealing environment gave a clear overview on the mechanical seal's performance. These software programs analyse combined seal distortion due to pressure, temperature, stress distortion and face loadings.

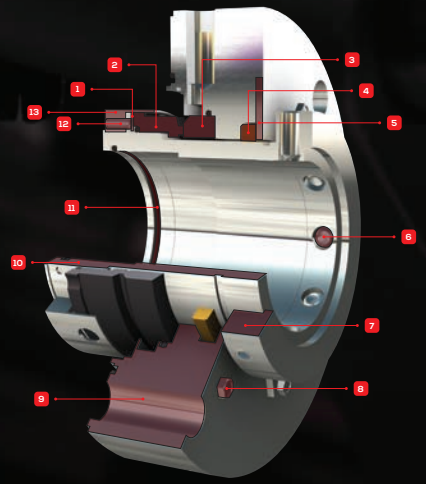
Internal Compression Unit

The main component of the seal is interchangeable to suit wide range of seal application.

PERFORMANCE CAPABILITIES

Temperature	:	-40°C to 210 °C / -40 °F to + 500°F
Pressures	:	Up tp 69 bar / 1000 psig
Speeds	:	Up tp 55 m/s / 5000 fpm

SEAL PARTS

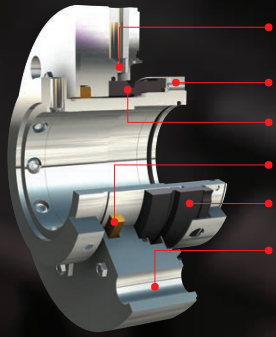


1. Thrust Ring
2. Seal Face
3. Seat
4. Throttle Bushing
5. Bushing Retainer
6. Set Screw
7. Drive Collar
8. Hexagon Screw
9. Flange
10. Shaft Sleeve
11. O-Ring
12. Spring
13. Spring Retainer

MATERIAL SPECIFICATION

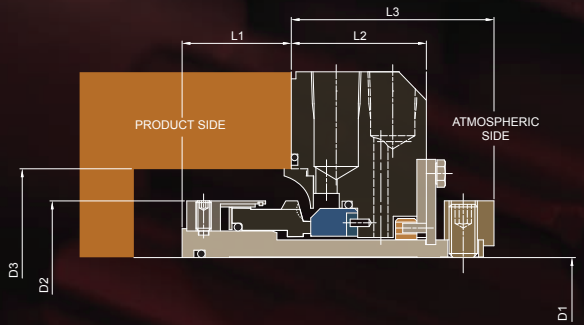
SEAL COMPONENTS	MATERIALS	
Description	Standard	Custom
Seal Face	Resin Impregnated Carbon	Tungsten Carbide (WC) Alpha Sintered Silicon Carbide (α-SiC) Antimony Impregnated Carbon Reaction Bonded Silicon Carbide (RbSiC)
Seat	Reaction Bonded Silicon Carbide (RbSiC)	Alpha Sintered Silicon Carbide (α- SiC)
Drive Collar Thrust Ring Set Screw Shaft Sleeve Drive Collar Throttle Bushing Flange Bushing Retainer	Stainless Steel 316L (UNS S31603) Stainless Steel 304L (UNS S30403)	Duplex (UNS S31803) Hastelloy© C-276 (UNS N10276) Bronze Titanium Alloy (UNS R56401)
Spring	Stainless Steel 316L (UNS S31603)	Hastelloy© C-276 (UNS N10276) Stainless Steel 304L (UNS S30403)
O-Ring	Fluoroelastomers - Viton© (FKM)	Amine-Resistant Perfluoroelastomer (FFKM) Low Temp Nitrile Butyl Rubber (NBR) Teflon Encapsulated Viton (VMQ) Ethylene Propylene Diene Monomer (EPDM)

DESIGN FEATURES



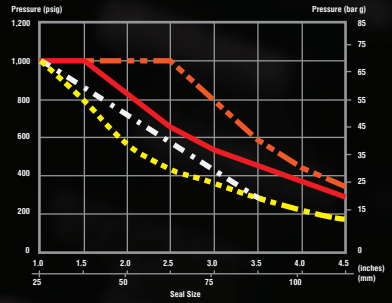
- High flow pattern and distributed flush system
- Uniform-load Multi-spring compression unit
- RST Optimized Seal Face Design
- Emission Restrictive Throttle Bushing
- Low-temperature including face (ARCAF ©)
  (subject to design requirements & compatibility)
- Bolted Auxiliary Gland

DESIGN DRAWING

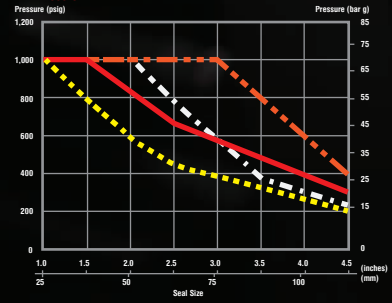


PERFORMANCE CURVE

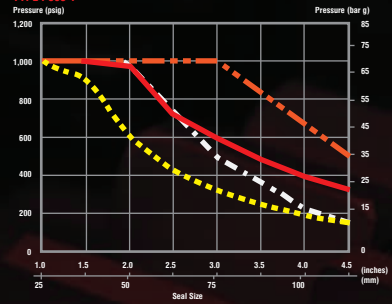
TYPE P868-R



TYPE P868-S



TYPE P868-T



- 1800 rpm Lubricating Fluid
- 3600 rpm Lubricating Fluid
- 1800 rpm Light Hydrocarbon
- 3600 rpm Light Hydrocarbon

DIMENSIONAL DATA

Seal Size *	D1	D2	D3	L1	L2	L3
34.90	22.6	50.8	60.3	32.3	45.0	63.0
38.10	25.7	54.0	63.5	32.3	45.0	63.0
41.20	28.9	60.3	69.8	40.3	45.0	63.0
44.40	32.1	63.5	73.0	40.3	45.0	63.0
47.60	35.3	66.7	76.2	40.3	45.0	63.0
50.80	38.5	69.9	79.4	40.3	45.0	63.0
53.90	41.6	76.2	85.7	48.2	45.0	63.0
57.10	44.8	79.4	88.9	48.2	45.0	63.0
60.30	48.0	82.6	92.1	48.2	45.0	63.0
63.50	51.2	85.7	95.3	48.2	45.0	63.0
66.60	54.3	88.9	98.4	48.2	45.0	63.0
69.80	57.5	92.1	101.6	48.2	45.0	63.0
73.00	60.7	95.3	104.8	48.5	46.3	64.5
76.20	63.8	96.8	106.3	48.5	46.3	64.5
79.30	67.0	100.0	109.5	48.5	46.3	64.5
82.50	70.2	104.8	114.3	48.5	46.3	64.5
85.70	73.4	108.0	117.5	48.5	50.2	68.2
88.90	76.6	111.1	120.7	48.5	50.2	68.2
92.00	79.7	114.3	123.8	48.5	50.2	68.2
95.20	82.9	117.5	127.0	48.5	50.2	68.2
98.40	86.1	120.7	130.2	48.5	50.2	71.2
101.60	89.3	123.8	133.4	48.5	50.2	71.2
104.70	92.4	130.2	139.7	48.5	50.2	71.2
107.90	95.6	133.4	142.9	48.5	50.2	71.2
111.10	98.8	136.5	146.1	48.5	50.2	71.2
114.30	102.0	139.7	149.2	48.5	50.2	71.2
117.40	105.1	142.9	152.4	48.5	50.2	71.2
120.60	108.3	146.1	155.6	48.5	50.2	71.2

* All dimensions are in mm

D1 assumes a standard ISO tolerance for shaft (ISO286-2)

Fluid Type	Temperature Range		Weightage
	Min (°C)	Max (°C)	
Lubricating Fluid Light Hydrocarbon	60	80	0.98
	81	100	0.93
	101	120	0.85
	121	160	0.83
	161	180	0.78
	181	200	0.73
	201	220	0.68
	221	260	0.63
Aqueous Solution	40	100	0.72

For further information, please consult our Tecnical Support Engineer.

NOTES:

1. The pressure weightages only confirm to seals with carbon primary rings. Hard face vs hard face combination seals are not applicable.
2. The listed temperatures are referred to single seal's product temperatures. For dual seals,the listed temperature are referred to the product fluids & buffer/barrier fluid's average temperature.

EXAMPLE FOR DETERMINING PRESSURE RATING LIMITS:

Seal : 88.9mm/3.5" diameter Type P868-R
Product : Lube Oil
Temperature : 82 C/180 F
Speed : 4000 rpm

Using P868-R performance curve, the pressure limit is 47 bar g/676.8psig. From the table above, apply the weightage value, in this case 0.93. For this service condition, the maximum operating pressure is: 47 bar g/666.98psig x 0.93 = 43.71 bar g/620.291 psig

All specifications are based on extensive tests and our many years of experience. The diversity of possible applications means, however, can only served as guide values. We must be notified of the exact conditions of application before we can provide any guarantee for a specific case. Subject prior to change.