



# P838 Series

MECHANICAL SEALS

## DESCRIPTION

The P838 series is a heavy duty 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. P838 particularly exhibits high performance in the operation of critical process fluids of hydrocarbon, boiler feed water, sour gas, propane and butane, 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<sup>®</sup> and mechanical seal dynamic tester – AccuDYN<sup>®</sup> (Patent Pending).

The adoption of modularity concept has made P838 series even more versatile. Coupled with added interchangeable feature, P838 series seals are able to fit in various conditions, wider range of operating pressures, temperatures and process fluids. This concept ensures that the P838 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<sup>®</sup> is designed for this particular need. ARCAF<sup>®</sup> 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

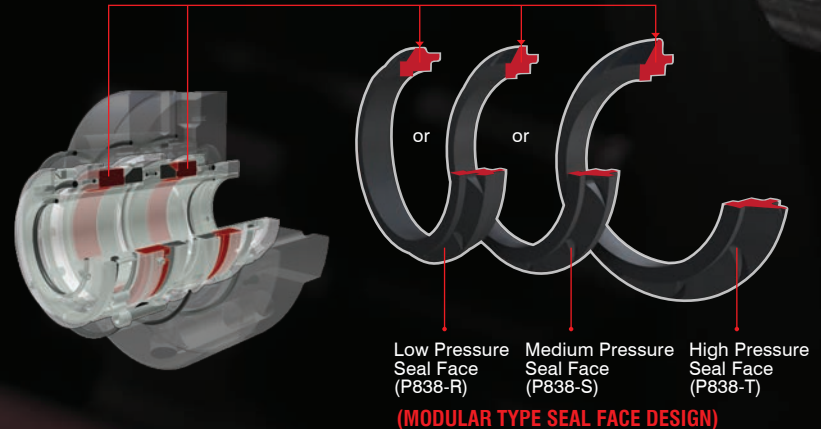
### DESIGN OVERVIEW

- 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

### RST DESIGN PHILOSOPHY

#### 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 310 °C / -40 °F to + 590°F

**Pressures** : Vacuum to 170 bar / 2540 psig

**Speeds** : 55 m/s / 11,000 fpm

SEAL PARTS

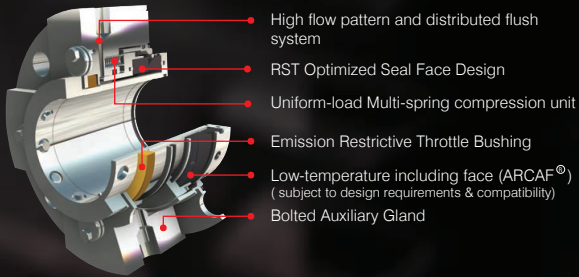


- 1** Spring Holder
- 2** Spring
- 3** Flange
- 4** Hexagon Screw
- 5** Setting Plate
- 6** Bushing Retainer
- 7** Shaft Sleeve
- 8** Set Screw
- 9** Drive Collar
- 10** Back-up Ring
- 11** O-Ring
- 12** Throttle Bushing
- 13** Seal Face
- 14** Seat

MATERIAL SPECIFICATION

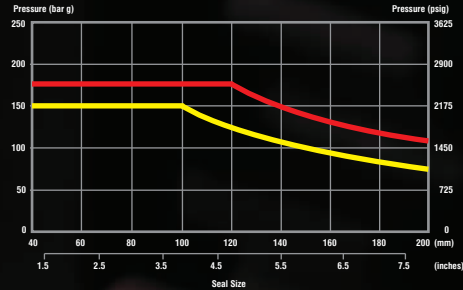
SEAL COMPONENTS		MATERIALS	
Description		Standard	Custom
Seal Face		Resin Impregnated Carbon	Tungsten Carbide (WC) Alpha Sintered Silicon Carbide ( $\alpha$ -SiC) Antimony Impregnated Carbon Reaction Bonded Silicon Carbide (RbSiC)
Seat		Reaction Bonded Silicon Carbide (RbSiC)	Alpha Sintered Silicon Carbide ( $\alpha$ -SiC)
Drive Collar Thrust Ring Set Screw Shaft Sleeve	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

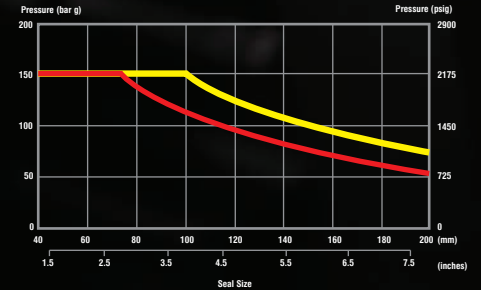


### PERFORMANCE CURVE

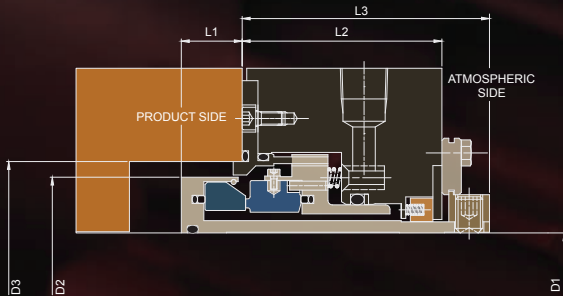
#### HYDROCARBON PRESSURE RATING



#### WATER / AQUEOUS SOLUTION PRESSURE RATING



### DESIGN DRAWING



The information and specification contained in this graph are believed to be accurate, they are supplied for informative purpose only.

— Dynamic Limit Silicon Carbide / Tungsten Carbide  
 — Dynamic Limit Silicon / Carbon

**DIMENSIONAL DATA**

Seal Size *	D1	D2	D3	L1	L2	L3
0400	40.0	69.0	71.0	32.3	45.0	63.1
0450	45.0	73.5	75.5	32.3	45.0	63.1
0500	50.0	81.5	83.5	40.3	45.0	63.1
0560	56.0	86.5	88.5	40.3	45.0	63.1
0600	60.0	93.5	95.5	40.3	45.0	63.1
0630	63.0	95.5	97.5	40.3	45.0	63.1
0670	67.0	100.0	102.0	40.3	45.0	63.1
0700	70.0	105.0	107.0	48.2	45.0	63.1
0750	75.0	109.5	111.5	48.2	45.0	63.1
0800	80.0	114.5	116.5	48.2	45.0	63.1
0850	85.0	121.5	123.5	48.2	45.0	63.1
0900	90.0	125.5	127.5	48.2	45.0	63.1
0950	95.0	131.5	133.5	48.2	45.0	63.1
1000	100.0	138.5	140.5	48.5	46.3	64.4
1050	105.0	142.5	144.5	48.5	46.3	64.4
1100	110.0	150.5	152.5	48.5	46.3	64.4
1150	115.0	157.0	159.0	48.5	46.3	64.4
1200	120.0	160.5	162.5	48.5	50.2	68.3
1250	125.0	171.0	173.0	48.5	50.2	68.3
1300	130.0	174.5	176.5	48.5	50.2	68.3
1350	135.0	178.5	180.5	48.5	50.2	68.3
1400	140.0	184.5	186.5	48.5	50.2	71.3
1450	145.0	191.0	193.0	48.5	50.2	71.3
1500	150.0	204.5	206.5	48.5	50.2	71.3
1600	160.0	214.5	216.5	48.5	50.2	71.3
1700	170.0	224.5	226.5	48.5	50.2	71.3
1800	180.0	238.5	240.5	48.5	50.2	71.3
1900	190.0	245.5	247.5	48.5	50.2	71.3
2000	200.0	259.5	261.5	48.5	50.2	71.3

\* All dimensions are in mm

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

Fluid Type	Criteria		Weightage
	Min (°C)	Max (°C)	
Hydrocarbons			
Fluid Temperature Range	60	80	0.90
	81	140	0.80
	141	270	0.70
	Above 271		0.55
Fluid Lubricity	Kerosene, Gasoline or Specific Gravity < 0.75		0.90 0.50
Motor Speed	Up to 4000 rpm Above 4000 rpm		0.90 4000/new speed
Aqueous Solution			
Fluid Temperature Range	60	80	0.90
	81	130	0.80
	131	180	0.70
	Above 181		0.65
Motor Speed	Up to 4000 rpm Above 4000 rpm		0.90 4000/new speed

For further information, please consult our Technical 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.

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.