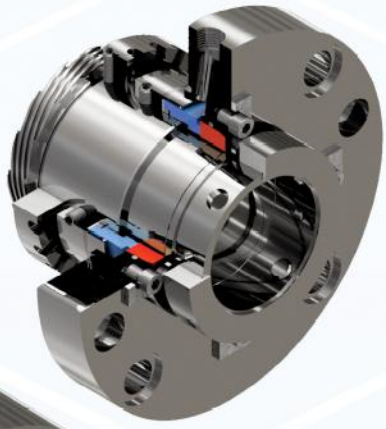
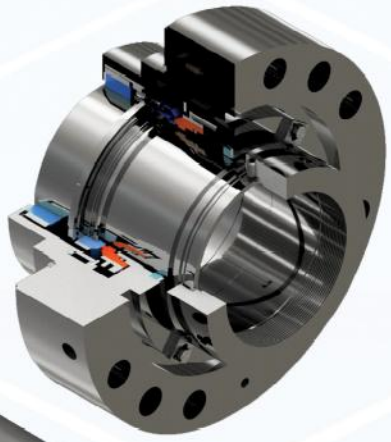
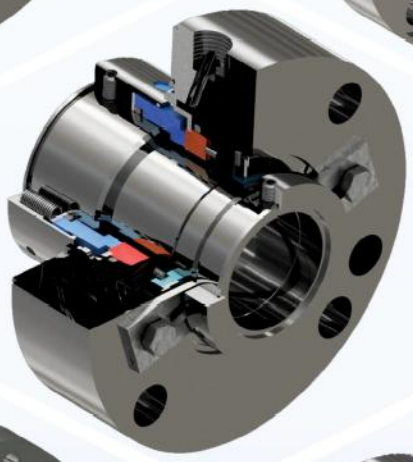
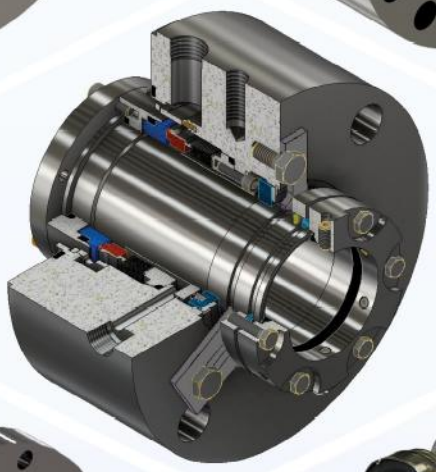
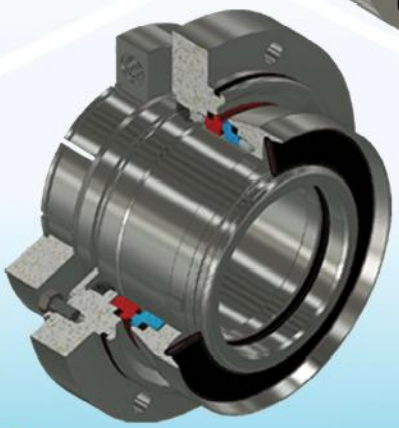
STEIN SEAL®

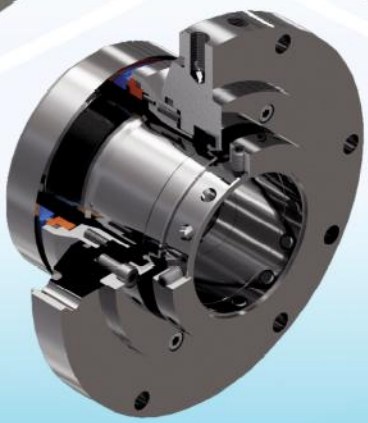




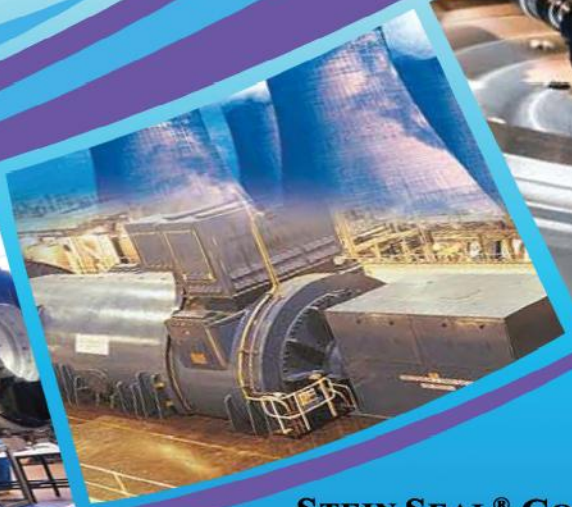








PRODUCT CATALOGUE



STEIN SEAL® COMPANY (INDIA) PRIVATE LIMITED

SY. NO.:11, LAKSHMANAPURA VILLAGE
(NEXT TO SOMPURA INDUSTRIAL AREA 2ND STAGE),
THYAMAGONDLU HOBLI, NELAMANGALA TALUK,
BANGALORE RURAL DISTRICT - 562 132
LANDLINE : +91 80 68785328

www.steinseal.in

E-mail : sales@steinseal.in

P/N : CB-23

CONTENTS

E-mail : sales@steinseal.in

ABOUT US

Since 1955, Stein Seal Company has been a leading provider of custom designed seals and precision components for use in a wide variety of aerospace, marine and industrial applications.

Stein Seal Started in a rented space with five employees and steadily grew into the recognized industry leader we are today. In 1987, moved into own modern manufacturing plant, and with building additions over the years, now have over 100,000 square feet in this highly specialized facility.

As a privately owned company, we have remained focused on our long-term growth strategy regardless of economic and market fluctuations. With over 500 employees and manufacturing facilities strategically located both inside and out of the Country. Stein Seal, along with its affiliated companies, is ideally positioned to provide design, development, sales and service worldwide.

Stein Seal Company (India) Private Limited established in the year 2008. It is now one of the India's leading manufacturer and service provider of Mechanical Seals. In 2022, we moved into our own modern manufacturing plant, now have over 36,000 square feet in this highly specialized facility.

We are providing a sealing system solution to our customers not just a seal to fill a space. We listen to the customer to learn the operating conditions, specifications and cost target to be met. Our company then develops a proposal to meet these requirements and review it with the customer where needed. Our proven ability to work side-by-side with our customers as a team is the foundation for our continued success and growth.

Stein Seal's expertise lies in the design, testing and manufacture of seals and precision components for the demanding and critical applications in military and commercial aircraft engines, power generation quipment, pumps, compressors, centrifuges, and both the military and commercial marine industry.

Surpassing our customers' expectations by setting the highest standards for design proficiency and originality, constantly investigating new materials and processes, and refining our ability to manufacture to rigorous tolerances have made us the premier supplier of seals and specialty machined components.

Stein Seal meet and surpass the most rigorous industry standards and our customers' expectations. Quality standards for dimensions, tolerances and finishes ensure that our seals operate at pressures, speeds, and elevated temperatures with minimal leakage and low rubbing wear. This is especially important in compressor and pipeline applications as well as high-performance aircraft engine applications.

Seal supply is a global business. We have customers located in many countries world-wide and many have divisions that located across multiple continents. To better serve these customers, we have subsidiaries located in Mexico, India, and the Czech Republic, along with a Sales Office in the UK. All of our subsidiaries are ISO 9001 and AS9100 certified and are familiar with the quality requirements needed by most of our customers.

FACILITY

SHOP FLOOR

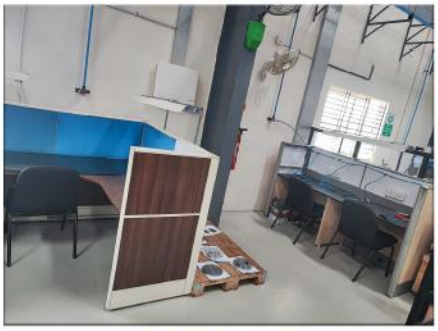
TURNING / MILLING

GRINDING

LAPPING

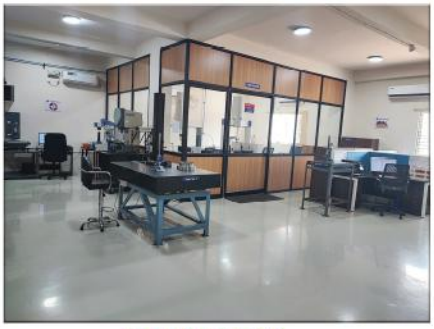
DISPATCH

STORAGE HOUSE



DEBURR

VIBRO-ETCH



QUALITY

In addition to general machining, including grinding, Stein Seal offers superior product finishing capability. We are qualified for critical cleaning operations that include particle counting after cleaning when required. We also maintain a clean room with positive air flow which we use to make critical assemblies for aero-space, nuclear and other critical products.

Stein Seal has invested heavily in mill-turning machines with dual chucks, which have proven to be highly efficient. More recently we have purchased Multi-Function machining centers with multiple pallets that can mill, turn, and perform 5-axis machining. These machines run untended 24 hours per day and parts to be machined can be loaded on pallets well before they are needed for machining. These machines are highly efficient and are helping to keep our costs competitive.

Stein Seal developed dynamic test rig capable of simulating extreme engine attitudes at any angle ranging from horizontal up to 90º vertical in order to verify seal performance. In addition to matching gas turbine engine bearing sump pressures and temperatures, the rig shaft rotates at speeds up to 20,000 rpm and can be maintained during the entire tilting process.

COMPANY HISTORY TIMELINE

YEAR	EVENTS
1955	Stein Seal Company founded by Dr. Stein Philadelphia, Pennsylvania
1982	Philip Stein Jr. becomes President of Bissinger & Stein Inc.
2008	India facility established in Bangalore as Stein Seal Company (India) Private Limited
2009	First Dry Gas Seal Panel supplied
2009	First batch of seals supplied to Dubai
2010	First API-682 Pusher seal supplied to Stein Seal Company USA
2010	Installation and commissioning of Dynamic Test Rig for Dry Gas Seal & Wet Seal
2011	First Batch of High Precision Components manufactured and supplied to Stein Seal Company USA
2011	First Seal Refurbishment Centre is established
2011	Certified to ISO 9001:2008
2012	First Supply of Stationary Metal Bellows Seals
2013	Repair, Reconditioning, Static and Dynamic testing of 7 numbers API-682 pusher seal carried out successfully
2014	Installation and commissioning of API-682 seals and flush plan contract is carried out at Mangalore
2014	Repair, Reconditioning, Static and Dyamic testing of 10 numbers Dry Gas Seal is carried out successfully
2014	Supplying of more than 50 numbers API-682 Pusher Seal
2015	Stein Seal Celebrates 60th Anniversary
2015	Supplied Different Types of Heavy Duty High Pressure Mechanical Seals to Slurry Applications
2016	Boiler Feed Water Pump Seal supplied for BHEL pump
2016	Furnace Seal supplied for 510 mm Tube Diameter
2017	Booster Pump Seal supplied for BHEL pump
2017	Mixer Seal supplied in India / Malaysia
2017	Supplied first batch of Mechanical Seals for Steel Plant
2017	Certified to AS9100D and ISO 9001:2015
2018	Supplied API PLAN 52 Piping & Instrumentation
2018	Aerospace Seal Parts manufactured & supplied
2018	Dual Pressurized Face to Face Pusher & Metal Bellows Mechanical Seal supplied to IOCL
2018	Dry Mixer Cartridge Mechanical Seal supplied to Agitator / Mixer OEM.
2018	Dual Pressurized Back to Back Pusher Mechanical Seal supplied to Agitator / Mixer OEM
2019	Dual Pressurized Back to Back Pusher Dry Mechanical Seal supplied to Agitator / Mixer OEM
2019	Supplied API PLAN 52 Piping & Instrumentation
2019	Supplied Dual Pressurized Stationary Metal Bellows Cartridge Mechanical Seal
2020	Supplied Boiler Feed Water & Booster Pumps Mechanical Seals to Thermal Power Plants
2021	Supplied API Multi Spring Balanced Mechanical Seal to Power Plant
2022	Established New Premises in Dabaspete on 1st April
2022	Supplied Dual Unpressurised Dry Cartridge Mechanical Seal to Autoclaves

ISO 9001:2015 CERTIFICATE

Certificate of Registration

This is to certify that the Quality Management System of:

STEIN SEAL COMPANY (INDIA) PRIVATE LIMITED

Sy. No 11, Lakshmanapura Village, Next to Sompura Industrial Area 2nd Stage, Thyamagondlu Hobli, Nelamangla Taluk, Bangalore Rural District, Karnataka, 562132, INDIA

applicable to:

Design, development, manufacture and service of mechanical seals, sealing systems and precision machined components for industrial applications

has been assessed and registered by NQA against the provisions of:

ISO 9001:2015

This registration is subject to the company maintaining a quality management system, to the above standard, which will be monitored by NQA

Managing Director

Certificate No.	74328
ISO Approval Date:	2 February 2018
Reissued:	11 October 2022
Valid Until:	1 February 2024
EAC Code:	21, 17

AS9100D CERTIFICATE

Certificate of Registration

nqa.

This is to certify that the Quality Management System of:

STEIN SEAL COMPANY (INDIA) PRIVATE LIMITED

Sy. No 11, Lakshmanapura Village, Next to Sompura Industrial Area 2nd Stage, Thyamagondlu Hobli, Nelamangla Taluk, Bangalore Rural District, Karnataka, 562132, INDIA

applicable to:

Manufacture of mechanical seals, seal parts and precision machined components for aerospace applications

has been assessed and registered by NQA against the provisions of:

AS9100D

in accordance with the requirements of EN 9104-001:2013. This registration is subject to the company maintaining a quality management system, to the above standard, which will be monitored by NQA.

Managing Director

Certificate No:	68273
ISO Approval Date:	2 February 2018
ASCS Approval Date:	2 February 2018
Issue Date:	5 March 2021
Reissue Date:	11 October 2022
Expiry Date:	1 February 2024
Prior Cycle Exp Date:	1 February 2021
EAC Code:	21, 17
Site Structure:	Single Site

UKAS MANAGEMENT SYSTEMS 0015

AEROSPACE SECTOR CERTIFICATION SCHEME

Page 1 of 1

MARKETS

AEROSPACE

Our seals will withstand the wide range of conditions that will occur during normal operations including temperature extremes, high speeds and strong vibration.

INDUSTRIAL

Whether it be in a centrifuge, compressor or pump, Stein's seals effectively prevent the leakage of hazardous gases and liquids under low differential pressure from escaping into the environment.

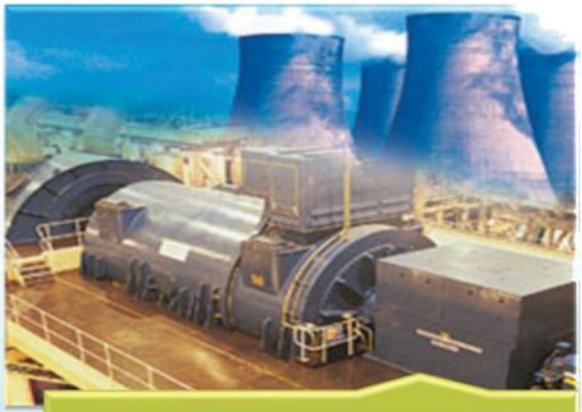
MARINE

We have a long history of proven reliability in marine applications, including steam and gas turbines, gearboxes and main propeller shafts.

NUCLEAR

Stein products are especially effective in meeting the critical requirements for reliability and safety needed in the nuclear industry.

POWER GENERATION



To meet the high demands of the power industry, Stein has designed seals that virtually eliminate leakage and shaft rub damage

PROCESS INDUSTRY

Maintaining the integrity of the seal while the equipment is constantly adjusted to allow for different flow speeds, is another specialty of Stein Seal

SERVICES

MACHINING

Stein's precision machining expertise coupled with quality controls built into every step of the process means that our products not only meet, but also exceed the most stringent industry standards.

AEROSPACE SEAL COMPONENT MACHINING

Stein's precision machining expertise coupled with manufacturing complicated aerospace components and committed to quality systems with confidence in innovating designing, tooling & implementing skills.

REPAIRS OF API 682 MECHANICAL SEALS & DRY GAS SEALS

BEFORE RECONDITIONING

For over 70 years the Stein Seal Company has manufactured, repaired, overhauled and redesigned seals and sealing systems for industrial, aero-space and other applications.

AFTER RECONDITIONING

TESTING

In Stein's test lab, we can accurately simulate the extreme limits of operating conditions, which allows us to accurately predict and verify performance under the most rigorous operating conditions.

PRODUCTS

CIRCUMFERENTIAL SEALS

Stein Seal's line of precision crafted circumferential sealing devices is perfect for low-pressure applications where minimal, controlled gas leakage, high temperatures, unlimited axial shaft movement and low wear are critical.

PUMP SEALS

The Stein Seal Company has developed API (American Petroleum Institute) 682 seals for the oil and gas industry market.

Stein Seal Company has developed various seals for other process industry market.

FACE SEALS

Stein Seal's extensive line of precision crafted face seals meets our customers' demanding criteria for innovation, performance, versatility and reliability.

BUSHINGS

Stein's bushing seals are the perfect choice for high-pressure gas and liquid applications. Each bushing seal is custom designed to fit the application and is often combined with our other seals to create sealing systems that meet the most stringent operating requirements.

BELLOWS

Stein's design and technical expertise in the manufacture of seals has resulted in a bellows seal with reliable, consistent performance unusual in the industry.

DIGITAL STATIC TESTER

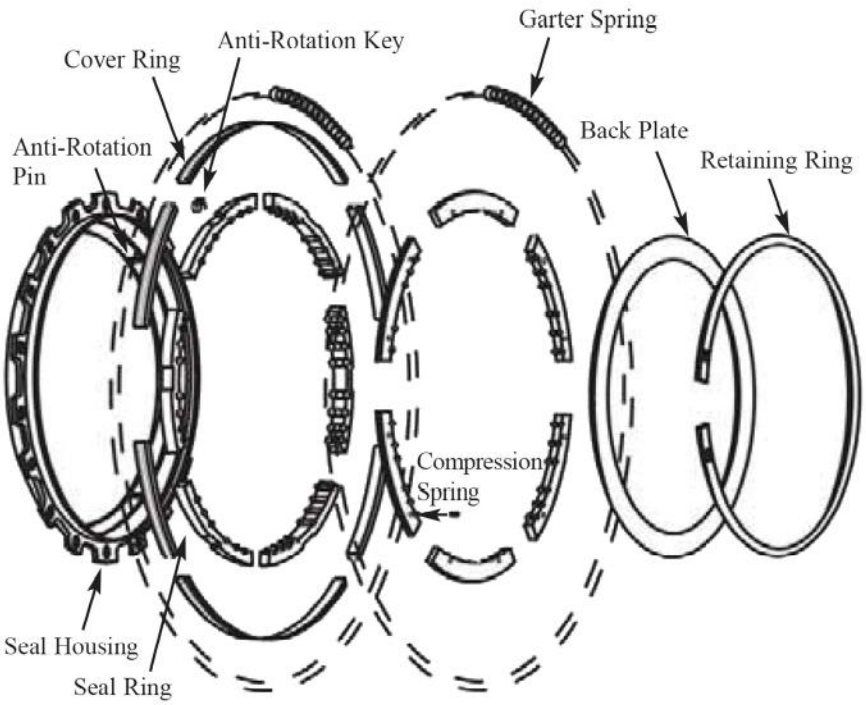
The Digital Static Tester (DST) measures the leakage rate of a seal (or other component) quickly and accurately, whether the seal is new or refurbished. It can be used to test the flow of any system's seal regardless of seal type or size.

CIRCUMFERENTIAL CARBON SEALS

Stein Seal's line of precision crafted circumferential carbon seals are perfect for low-pressure applications where minimal, controlled gas leakage, high temperatures, unlimited axial shaft movement and low wear are critical. They can be used independently or as part of a sealing system. The exceptionally lightweight carbon material and split housing capability make it easy to install, remove or repair seals in limited space areas.

A versatile choice for a wide range of applications, our circumferential seals offer exceptional performance in aircraft engine main shafts, accessory gearboxes, compressors, centrifuges, pumps and chemical processing equipment.

Key features in our circumferential seal design significantly extend operating life while maintaining top-notch performance. A unique scalloped design incorporated into the individual carbon segments increases flexibility to provide better sealing. A special gap design at the end of each segment permits the seal to handle dimensional changes in the shaft diameter. This gap design, consisting of a precision machined overlapping tongue and socket, creates a tight fit to further minimize leakage. Grooves on the face and bore of the segment reduce pressure loading to maximize seal life.



A combination of compression and garter springs ensures that the segments remain in contact with mating surfaces during low delta pressure and at shutdown conditions.

Types of Circumferential Seals

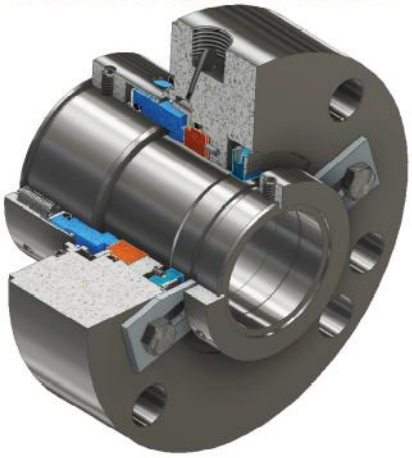
1. Clearance Seals 2. Liquid Seals 3. Film Riding 4. Hydrostatic 5. Gas Seals 6. Hydrodynamic

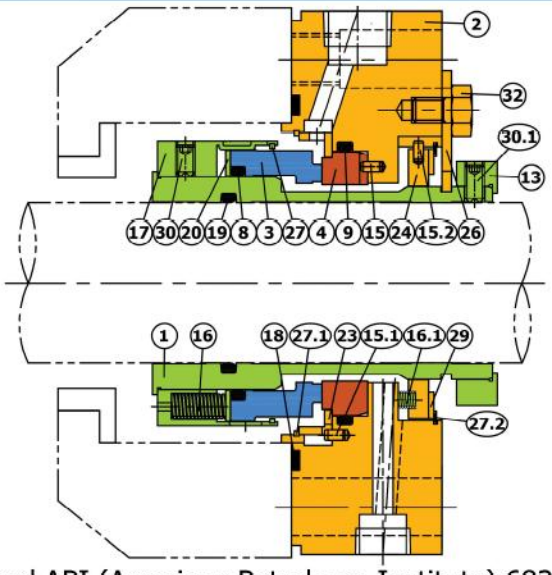
General Performance Characteristics

- Shaft rotation speeds up to 183 meters per second (600 feet per second)
- Temperature ranges up to 538° C (1000° F)
- Pressure ranges up to 586 KPa (85 psid)
- Diameter sizes ranging from 23.495 to 1054.100 millimeters (0.925 to 41.500 inches) with no practical upper limit restriction
- Leakage rates remain consistent over the life of the seal
- Seal life is rated at over 20,000 hours

HIGH PERFORMANCE TYPE-A CONTACTING WET API 682 SEALS

API 682 - SSMSB SEAL ASSEMBLY





PN		PART
1	----	SLEEVE
2	----	GLAND RING
3	----	ROTATING FACE
4	----	STATIONARY FACE
8	----	ROTATING FACE O-RING
9	----	STATIONARY FACE O-RING
13	----	DRIVE COLLAR
15	----	LOCK PIN
15.1	----	LOCK PIN
15.2	----	LOCK PIN
16	----	SPRING
16.1	----	SPRING
17	----	SPRING HOLDER
18	----	GLAND O-RING
19	----	SLEEVE O-RING
20	----	RETAINING RING
23	----	MULTIPORT RING
24	----	FLOATING THROTTLE BUSH
26	----	SETTING PLATE
27	----	SNAP RING
27.1	----	SNAP RING
27.2	----	SNAP RING
29	----	BACKUP PLATE
30	----	SET SCREW
30.1	----	SET SCREW
32	----	HEX. BOLT

The Stein Seal Company has developed API (American Petroleum Institute) 682 seals for the oil and gas industry market. Stein Seal has designed, manufactured and tested a Type A pusher seal, Arrangement 3, dual pressurized cartridge seal for this market. In an Arrangement 3 design the barrier fluid pressure is kept higher than the seal chamber pressure and is designed to handle and contain hazardous and light hydrocarbon fluids. The process-end face (inner) seal is specially balanced to handle reverse pressures while the atmospheric-end (outer) seal will contain the barrier fluids.

The Stein Seal Type A pusher seal is also available in Arrangement 1 and 2. An Arrangement 1 seal is a single contacting wet cartridge seal with a bushing. Arrangement 2 cartridge seal is the same configuration as the Arrangement 3 seal but is an un-pressurized dual seal where the barrier fluid pressure is kept lower than the seal chamber fluid pressure. The atmospheric-end (outer) seal will provide additional containment of hazardous fluids.

The Stein Seal Company seals designed for the oil and gas industry are built and qualification tested according to the rigorous API 682 standard's test protocols.

MATERIALS

Hardware : 316 SS, Alloy C-276
Rotating face : BRCG, Antimony Carbon, RBSiC, SSiC
Stationary face : RBSiC, SSiC
Elastomers : FKM, FFKM

OPERATING CONDITIONS

Media : Petroleum, Chemical Solvents, Weak Medium Acids, Water, Oil, Alkali etc..
Pressure : Upto 610 psig (42bar-g)
Temperature * : - 40°F ~ 480°F (-40°C ~ 250°C)
Speed : ≤ 82 ft/min (25 m/sec)

FEATURES

- Seal designs are fully compliant to API 682 design guidelines.
- Precise control of seal face tolerances provide superior performance such as low leakage, less heat generation and longer life.
- Modular cartridge design for quick installation and precise shaft alignment.
- Seals fit in most popular pump seal housings.
- Seals are pressure balanced to extend operating range including pressure reversals upto 40 psi (2.75 bar).
- High performance grades of carbon and carbide faces are used in all designs.
- Seals are available for shaft sizes ranging from 1inch (25mm) to 5inch (127mm) in .125inch (3mm) increments.

API 682 SEALS

* Depending on material selected

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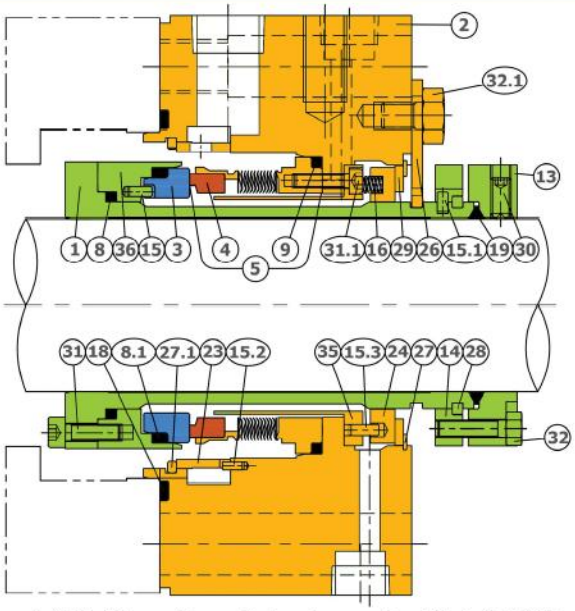
E-mail : sales@steinseal.in

HIGH PERFORMANCE TYPE-C CONTACTING WET API 682 SEALS

API 682 - SSSMB SEAL ASSEMBLY



PN	PART
1	SLEEVE
2	GLAND RING
3	ROTATING FACE
4	STATIONARY FACE
5	BELLOWS ASSEMBLY
8	ROTATING FACE GASKET
8.1	ROTATING FACE GASKET
9	STATIONARY FACE GASKET
13	DRIVE COLLAR
14	ADJUSTING COLLAR
15	LOCK PIN
15.1	LOCK PIN
15.2	LOCK PIN
15.3	LOCK PIN
16	SPRING
18	GLAND GASKET
19	SLEEVE GASKET
23	MULTIPORT RING
24	FLOATING THROTTLE BUSH
26	SETTING PLATE
27	SNAP RING
27.1	SNAP RING
28	SPLIT RING
29	BACKUP PLATE
30	SET SCREW
31	CAP SCREW
31.1	CAP SCREW
32	HEX. BOLT
32.1	HEX. BOLT
36	ROTATING FACE BODY

The Stein Seal Company has developed API (American Petroleum Institute) 682 seals for the oil and gas industry market. Stein Seal has designed, manufactured and tested a Type C bellows seal, Arrangement 3, dual pressurized cartridge seal for this market. In an Arrangement 3 design the barrier fluid pressure is kept higher than the seal chamber pressure and is designed to handle and contain hazardous and light hydrocarbon fluids. The process-end face (inner) seal is specially balanced to handle reverse pressures while the atmospheric-end (outer) seal will contain the barrier fluids.

The Stein Seal Type C bellows seal is also available in Arrangement 1 and 2. An Arrangement 1 seal is a single contacting wet cartridge seal with a bushing. Arrangement 2 cartridge seal is the same configuration as the Arrangement 3 seal but is an un-pressurized dual seal where the barrier fluid pressure is kept lower than the seal chamber fluid pressure. The atmospheric-end (outer) seal will provide additional containment of hazardous fluids.

The Stein Seal Company seals designed for the oil and gas industry are built and qualification tested according to the rigorous API 682 standard's test protocols.

MATERIALS

Bellows Hardware : Inconel 718, Hastelloy C-276
Other Hardware : 316 SS, Carpenter 42
Rotating Face : SiC
Stationary Face : Carbon, SiC
Secondary Seal : Grafoil

OPERATING CONDITIONS

Media : Hydro-Carbon, Heat Transfer Fluid
Pressure : ≤ 290 psi-g (20bar-g)
Temperature * : - 167°F ~ 797°F (-75°C ~ 425°C)
Speed : ≤ 151 ft/sec (46 m/s)

FEATURES

- Seal designs are fully compliant to API 682 design guidelines.
- Precise control of seal face tolerances provide superior performance such as low leakage, less heat generation and longer life.
- Modular cartridge design for quick installation and precise shaft alignment.
- Seals fit in most popular pump seal housings.
- Seals are pressure balanced to extend operating range including pressure reversals upto 40 psi (2.75 bar).
- High performance grades of carbon and carbide faces are used in all designs.
- Seals are available for shaft sizes ranging from 1inch (25mm) to 5inch (127mm) in .125inch (3mm) increments.

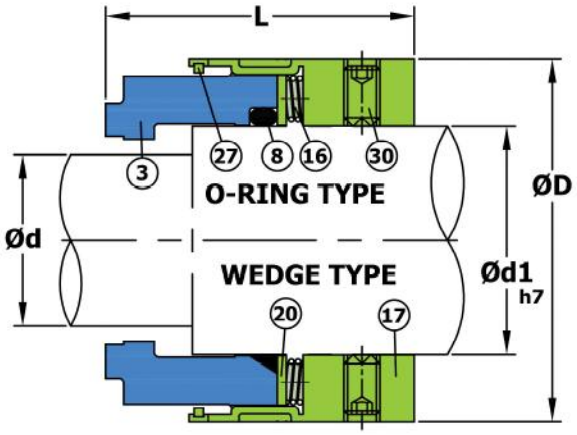
* Depending on material selected

API 682 SEALS

E-mail : sales@steinseal.in

MULTI-SPRING BALANCE

SSMSB



PN	PART
3	---- ROTATING FACE
8	---- ROTATING FACE O-RING / GASKET
16	---- SPRING
17	---- SPRING HOLDER
20	---- RETAINING RING
27	---- SNAP RING
30	---- SET SCREW

MATERIALS

Hardware : 316 SS

Rotating face : Carbon, SiC, SSiC, TC

Stationary face : SiC, SSiC, TC

Elastomers : EPDM, FKM, FFKM, PTFE

OPERATING CONDITIONS

Media : Petroleum, Chemical Solvents, Weak and Medium Acids, Water, Oil, Alkali etc..

Pressure : ≤ 40 Bar

Temperature * : - 20°C ~ 200°C

Speed : ≤ 20 m/s

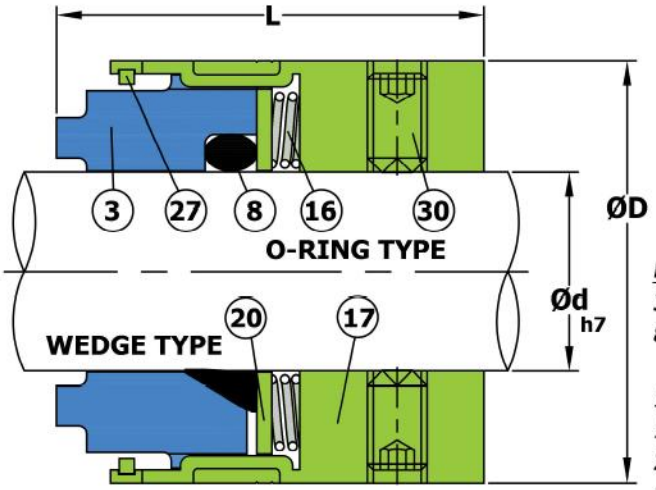
SIZE d (Inch)	d1 (Inch)	D (Inch)	L (Inch)
.625	.750	1.366	1.181
.750	.875	1.496	1.260
.875	1.000	1.614	1.299
1.000	1.125	1.732	1.378
1.125	1.250	1.929	1.378
1.125	1.375	2.047	1.457
1.250	1.500	2.189	1.457
1.375	1.625	2.401	1.772
1.500	1.750	2.531	1.772
1.625	1.875	2.563	1.772
1.750	2.000	2.783	1.772
1.875	2.125	3.031	2.047
2.000	2.250	3.153	2.047
2.125	2.375	3.272	2.047
2.250	2.500	3.409	2.047
2.375	2.625	3.527	2.047
2.500	2.750	3.653	2.047
2.625	2.875	3.776	2.047
2.750	3.000	3.846	2.047
2.875	3.125	3.964	2.047
3.000	3.250	4.153	2.047
3.125	3.375	4.279	2.047
3.250	3.500	4.409	2.047
3.375	3.625	4.563	2.047
3.500	3.750	4.653	2.047
3.625	3.875	4.775	2.047
3.750	4.000	4.905	2.047

SIZE d (mm)	d1 (mm)	D (mm)	L (mm)
16	20	34.2	30.5
18	22	36.5	31.5
20	24	37.8	31.5
24	28	42.5	34.2
25	30	44.5	34.2
28	33	47.5	37.5
30	35	49.5	38.0
33	38	55.0	38.0
35	40	57.0	38.0
38	43	60.0	39.5
40	45	62.0	39.5
43	48	65.0	39.5
45	50	66.3	39.5
48	53	68.7	39.5
50	55	70.8	44.0
53	58	78.5	44.0
55	60	79.8	44.0
58	63	82.8	49.0
60	65	85.5	49.0
63	68	87.8	49.0
65	70	90.5	49.0
70	75	95.2	55.5
75	80	103.8	55.5
80	85	109.1	55.5
85	90	113.8	60.0
90	95	118.5	60.0
95	100	123.5	60.0

* Depending on material selected

MULTI-SPRING UNBALANCE

SSMSU



PN	PART
3	ROTATING FACE
8	ROTATING FACE O-RING / GASKET
16	SPRING
17	SPRING HOLDER
20	RETAINING RING
27	SNAP RING
30	SET SCREW

MATERIALS

Hardware : 316 SS

Rotating face : CARBON, SiC, SSiC, TC

Stationary face : SiC, SSiC, TC

Elastomers : EPDM, FKM, FFKM, PTFE

OPERATING CONDITIONS

Media : Petroleum, Chemical Solvents, Weak and Medium Acids, Water, Oil, Alkali etc..

Pressure : ≤ 20 Bar

Temperature * : - 20°C ~ 200°C

Speed : ≤ 20 m/s

SIZE d (Inch)	D (Inch)	L (Inch)
.750	1.190	.937
.875	1.315	.937
1.000	1.440	1.000
1.125	1.565	1.000
1.250	1.690	1.000
1.375	1.940	1.125
1.500	1.940	1.156
1.625	2.250	1.375
1.750	2.315	1.375
1.875	2.500	1.375
2.000	2.625	1.375
2.125	2.815	1.375
2.250	2.845	1.375
2.375	3.000	1.687
2.500	3.125	1.687
2.625	3.250	1.687
2.750	3.375	1.687
2.875	3.500	1.687
3.000	3.625	1.687
3.125	3.750	1.687
3.250	3.875	1.687
3.375	4.000	1.687
3.500	4.125	1.687
3.625	4.250	1.687
3.750	4.375	1.687
3.875	4.500	1.687
4.000	4.625	1.687

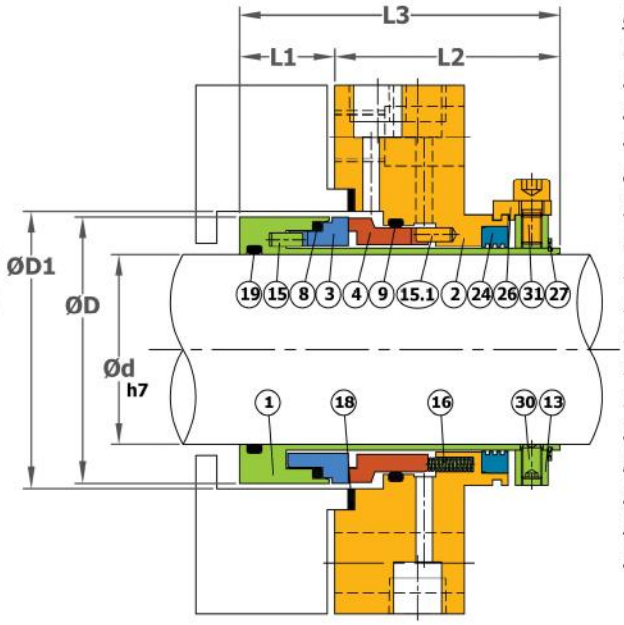
SIZE d (mm)	D (mm)	L (mm)
20	34.2	24.0
22	36.5	24.0
24	37.8	26.7
25	39.5	27.0
28	42.5	30.0
30	44.5	30.5
32	46.5	30.5
33	47.5	30.5
35	49.5	30.5
38	55.0	32.0
40	57.0	32.0
43	60.0	32.0
45	62.0	32.0
48	65.0	32.0
50	66.3	34.0
53	68.7	34.0
55	70.8	34.0
58	78.5	39.0
60	79.8	39.0
63	82.8	39.0
65	85.8	39.0
68	87.8	39.0
70	90.5	45.0
75	95.2	45.0
80	103.8	45.0
85	109.1	45.0
90	113.8	50.0
95	118.5	50.0
100	123.5	50.0

* Depending on material selected

STATIONARY MULTI SPRING BALANCE

NON-API SEALS

SSSMSB



PN	PART
1	SLEEVE
2	GLAND RING
3	ROTATING FACE
4	STATIONARY FACE
8	ROTATING FACE O-RING
9	STATIONARY FACE O-RING
13	DRIVE COLLAR
15	LOCK PIN
15.1	LOCK PIN
16	SPRING
18	GLAND GASKET
19	SLEEVE O-RING
24	FIXED THROTTLE BUSH
26	SETTING PLATE
27	SNAP RING
30	SET SCREW
31	CAP SCREW

MATERIALS

Hardware : 316 SS, Alloy C-276 & Alloy 20

Rotating face : Carbon & Filled PTFE

Stationary face : SiC, TC & Aluminium Oxide

Elastomers : Buna-N, EPDM, Neoprene, FKM, FFKM

OPERATING CONDITIONS

Shaft : 25mm to 200mm

Pressure : Full Vacuum to 6 Bar

Temperature * : - 40°C ~ 149°C

Speed : Upto 1.5 m/s

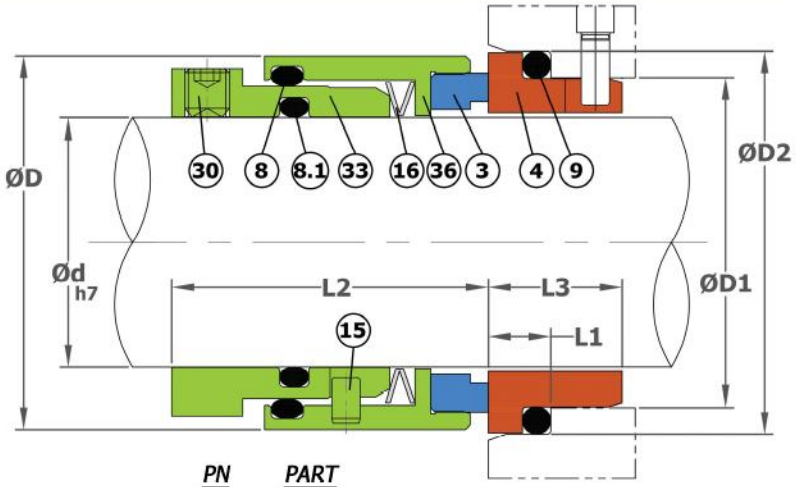
SIZE d (Inch)	D (Inch)	D1 MIN. (Inch)	D1 MAX. (Inch)	L1 (Inch)	L2 (Inch)	L3 (Inch)
1.000	1.693	1.750	2.008	3.130	2.102	1.028
1.125	1.811	1.850	2.047	3.130	2.102	1.028
1.250	1.969	2.008	2.244	3.130	2.102	1.028
1.375	2.087	2.126	2.421	3.130	2.102	1.028
1.500	2.205	2.244	2.589	3.130	2.102	1.028
1.625	2.344	2.375	2.700	3.130	2.102	1.028
1.750	2.461	2.520	2.874	3.130	2.102	1.028
1.875	2.583	2.638	2.953	3.130	2.102	1.028
2.000	2.677	2.717	3.071	3.130	2.102	1.028
2.125	2.835	2.875	3.425	3.130	2.102	1.028
2.250	2.961	3.000	3.560	3.130	2.102	1.028
2.375	3.071	3.110	3.583	3.130	2.102	1.028
2.500	3.213	3.250	3.800	3.130	2.102	1.028
2.625	3.339	3.338	3.937	3.130	2.102	1.028
2.750	3.661	3.740	4.252	3.130	2.102	1.028
2.875	3.937	4.000	4.646	3.130	2.102	1.028
3.000	3.937	4.000	4.646	3.858	2.516	1.343
3.125	4.189	4.252	4.882	3.858	2.516	1.343
3.250	4.189	4.252	4.882	3.858	2.516	1.343
3.375	4.311	4.374	5.039	3.858	2.516	1.343
3.500	4.437	4.500	5.157	3.858	2.516	1.343
3.625	4.563	4.626	5.315	3.858	2.516	1.343
3.750	4.689	4.752	5.433	3.858	2.516	1.343
4.000	4.937	5.000	5.669	3.858	2.516	1.343

SIZE d (mm)	D (mm)	D1 MIN. (mm)	D1 MAX. (mm)	L1 (mm)	L2 (mm)	L3 (mm)
25.0	43.0	44.0	51.5	79.5	53.4	26.1
28.0	46.0	47.0	52.0	79.5	53.4	26.1
30.0	48.0	49.0	56.0	79.5	53.4	26.1
32.0	49.8	51.0	57.0	79.5	53.4	26.1
33.0	49.8	51.0	57.0	79.5	53.4	26.1
35.0	53.0	54.0	61.5	79.5	53.4	26.1
38.0	56.0	57.0	66.0	79.5	53.4	26.1
40.0	58.0	59.0	68.0	79.5	53.4	26.1
42.0	60.5	61.5	69.5	79.5	53.4	26.1
43.0	60.5	61.5	70.5	79.5	53.4	26.1
45.0	62.5	64.0	73.0	79.5	53.4	26.1
48.0	65.6	67.0	75.0	79.5	53.4	26.1
50.0	68.0	69.0	78.0	79.5	53.4	26.1
53.0	72.0	73.0	87.0	79.5	53.4	26.1
55.0	73.0	74.0	83.0	79.5	53.4	26.1
60.0	78.0	79.0	91.0	79.5	53.4	26.1
65.0	84.8	85.7	98.5	79.5	53.4	26.1
70.0	93.0	95.0	108.0	79.5	53.4	26.1
75.0	100.0	101.6	118.0	98.0	63.9	34.1
80.0	106.4	108.0	124.0	98.0	63.9	34.1
85.0	109.5	111.1	128.0	98.0	63.9	34.1
90.0	115.9	117.5	135.0	98.0	63.9	34.1
95.0	119.1	120.7	138.0	98.0	63.9	34.1
100.0	125.4	127.0	144.0	98.0	63.9	34.1

* Depending on material selected

UNSTEPPED SHAFT
WAVE SPRING BALANCE

SS07



PN		PART
3	---	ROTATING FACE
4	---	STATIONARY FACE
8	---	ROTATING FACE O-RING
8.1	---	ROTATING FACE O-RING
9	---	STATIONARY FACE O-RING
15	---	LOCK PIN
16	---	WAVE SPRING
30	---	SET SCREW
33	---	SEAL DRIVE
36	---	ROTATING FACE BODY

MATERIALS

Hardware : 316 SS, 304 SS

Rotating face : CARBON, SiC, SSiC, TC

Stationary face : SiC, SSiC, TC

Elastomers : FKM, EPDM

OPERATING CONDITIONS

Media : Water, Oil, etc..

Pressure : ≤ 25 Bar

Temperature * : - 20°C ~ 200°C

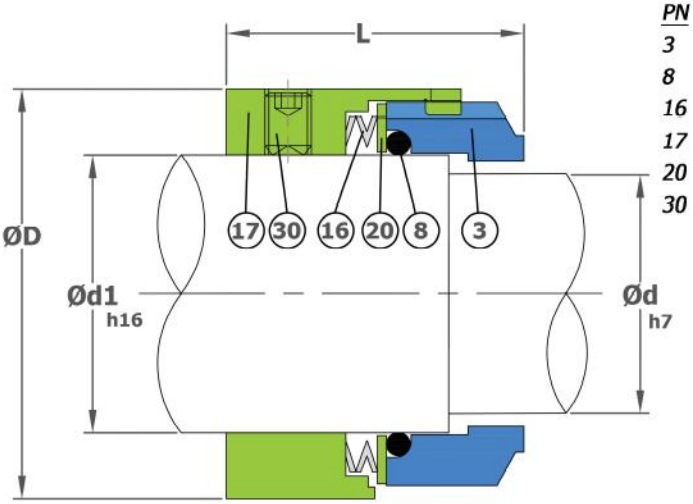
Speed : ≤ 20 m/s

SIZE d (mm)	D (mm)	D1 (mm)	D2 (mm)	L1 (mm)	L2 (mm)	L3 (mm)
18	32	27	33	7.0	30.5	15.0
20	34	29	35	7.0	30.5	15.0
22	36	31	37	7.0	30.5	15.0
24	38	33	39	7.0	33.0	15.0
25	39	34	40	7.0	33.0	15.0
28	42	37	43	7.0	35.5	15.0
30	44	39	45	7.0	35.5	15.0
32	47	42	48	7.0	35.5	15.0
33	47	42	48	7.0	35.5	15.0
35	49	44	50	7.0	35.5	15.0
38	54	49	56	8.0	37.0	16.0
40	56	51	58	8.0	37.0	16.0
43	59	54	61	8.0	37.0	16.0
45	61	56	63	8.0	37.0	16.0
48	64	59	66	8.0	37.0	16.0
50	66	62	70	9.5	38.0	17.0
53	69	65	73	9.5	38.0	17.0
55	71	67	75	9.5	38.0	17.0
58	78	70	78	10.5	42.0	18.0
60	80	72	80	10.5	42.0	18.0
63	83	75	83	10.5	42.0	18.0
65	85	77	85	10.5	42.0	18.0
68	88	81	90	11.0	42.0	18.0
70	90	83	92	11.5	48.5	19.0
75	99	88	97	11.5	48.5	19.0
80	104	95	105	11.5	48.5	19.0
85	109	100	110	11.5	48.5	19.0
90	114	105	115	13.0	52.0	20.5
95	119	110	120	13.0	52.0	20.5
100	124	115	125	13.0	52.0	20.5

* Depending on material selected

WAVE SPRING BALANCE

SSWSB



PN		PART
3	---	ROTATING FACE
8	---	ROTATING FACE O-RING
16	---	WAVE SPRING
17	---	SPRING HOLDER
20	---	RETAINING RING
30	---	SET SCREW

MATERIALS

Hardware : 316 SS, 304 SS

Rotating face : SiC, SSiC, TC

Stationary face : CARBON, SiC, SSiC, TC

Elastomers : EPDM, FKM

OPERATING CONDITIONS

Media : Petroleum, Chemical Solvents, Weak and Medium Acids, Water, Oil, Alkali etc..

Pressure : ≤ 25 Bar

Temperature * : - 20°C ~ 200°C

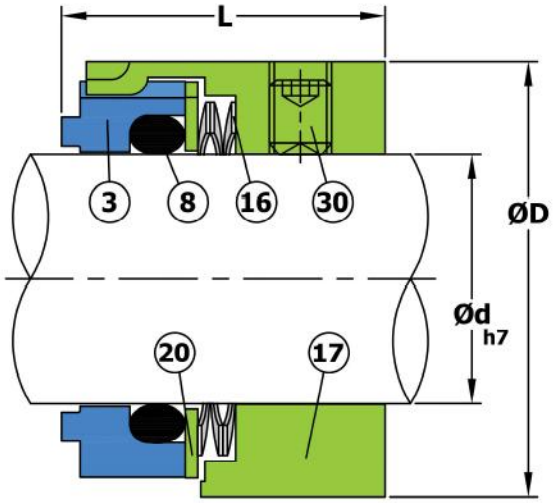
Speed : ≤ 20 m/s

SIZE d (mm)	d1 (mm)	D (mm)	L (mm)
14	18	33	32.5
16	20	35	32.5
18	22	37	33.5
20	24	39	33.5
22	26	41	33.5
24	28	43	36.0
25	30	45	36.0
28	33	48	38.5
30	35	50	38.5
32	38	55	38.5
33	38	55	38.5
35	40	57	38.5
38	43	60	38.5
40	45	62	38.5
43	48	65	38.5
45	50	67	38.5
48	53	70	38.5
50	55	72	42.5
53	58	79	42.5
55	60	81	42.5
58	63	84	47.5
60	65	86	47.5
63	68	89	47.5
65	70	91	47.5
70	75	99	52.0
75	80	104	52.0
80	85	109	52.0
85	90	114	56.8
90	95	119	56.8
95	100	124	57.8
100	105	129	57.8

* Depending on material selected

WAVE SPRING UNBALANCE

SSWSU



PN		PART
3	---	ROTATING FACE
8	---	ROTATING FACE O-RING
16	---	SPRING
17	---	SPRING HOLDER
20	---	RETAINING RING
30	---	SET SCREW

MATERIALS

Hardware : 316 SS, 304 SS

Rotating face : SiC, SSiC, TC

Stationary face : CARBON, SiC, SSiC, TC

Elastomers : EPDM, FKM

SIZE d (mm)	D (mm)	L (mm)
14	25	25.0
16	27	25.0
18	33	26.0
20	35	26.0
22	37	26.0
24	39	28.5
25	40	28.5
28	43	31.0
30	45	31.0
32	47	31.0
33	48	31.0
35	50	31.0
38	55	31.0
40	57	31.0
43	60	31.0
45	62	31.0
48	65	31.0
50	67	32.5
53	70	32.5
55	72	32.5
58	79	37.5
60	81	37.5
63	84	37.5
65	86	37.5
68	89	37.5
70	91	42.0
75	99	42.0
80	104	42.0
85	109	42.0
90	114	46.8
95	119	47.8
100	124	47.8

OPERATING CONDITIONS

Media : Petroleum, Chemical Solvents, Weak and Medium Acids, Water, Oil, Alkali etc..

Pressure : ≤ 20 Bar

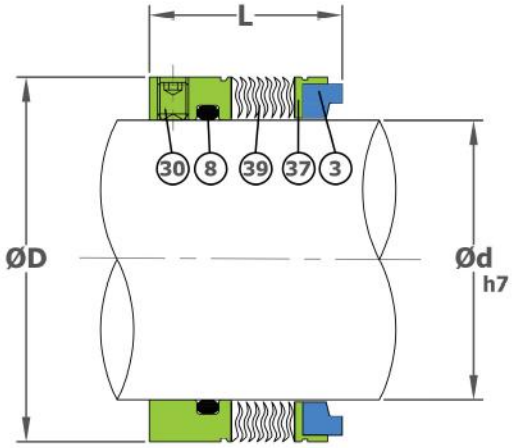
Temperature * : - 20°C ~ 200°C

Speed : ≤ 20 m/s

* Depending on material selected

ROTARY WELDED METAL BELLOWS (O-RING)

SSRMB



PN		PART
3	---	ROTATING FACE
8	---	ROTATING FACE O-RING
37	---	FACE END
38	---	BELLOWS END
39	---	BELLOWS CORE

MATERIALS

Bellows Hardware : 316L SS, AM350, Inconel 718, Hastelloy C-276, Alloy-20

Other Hardware : 316 SS, Hastelloy C-276

Rotating face : Carbon, SiC, SSiC, TC

Stationary face : SiC, SSiC, TC

Elastomers : FKM, FFKM

OPERATING CONDITIONS

Media : Viscous Fluids, Slurry, Hydrocarbons, Acids, Caustics, etc..

Pressure : ≤ 21 Bar

Temperature * : - 20°C ~ 200°C

Speed : ≤ 25 m/s

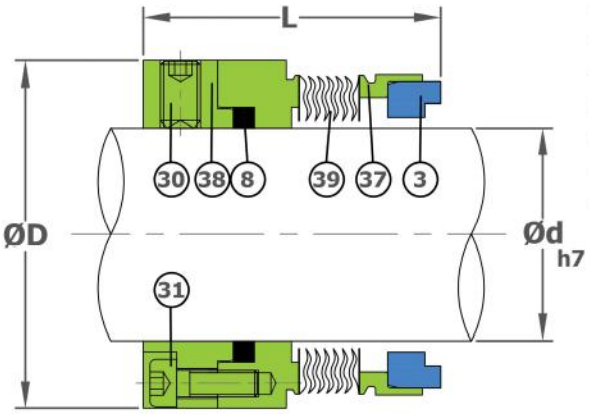
SIZE d (Inch)	D (Inch)	L (Inch)
.750	1.312	1.250
.875	1.437	1.250
.937	1.500	1.250
1.000	1.562	1.250
1.125	1.687	1.250
1.250	1.812	1.312
1.375	1.937	1.437
1.500	2.062	1.437
1.625	2.187	1.437
1.750	2.312	1.437
1.875	2.437	1.500
2.000	2.562	1.500
2.125	2.687	1.500
2.250	2.812	1.562
2.375	2.937	1.562
2.500	3.187	1.562
2.625	3.312	1.625
2.750	3.437	1.625
2.875	3.625	1.687
3.000	3.750	1.687
3.125	3.875	1.750
3.250	4.000	1.750
3.375	4.125	1.750
3.500	4.250	1.875
3.625	4.375	1.875
3.750	4.500	1.875
3.875	4.625	1.875
4.000	4.750	1.875
4.250	5.187	1.903
4.500	5.437	1.903
4.750	5.687	1.903
5.000	5.937	1.903
5.250	6.213	1.903
5.500	6.463	1.903
5.750	6.714	1.903
6.000	6.964	1.903

SIZE d (mm)	D (mm)	L (mm)
18	32.0	27.5
20	33.3	27.5
22	36.0	27.5
24	38.1	30.0
25	39.0	30.0
28	42.0	32.5
30	44.0	32.5
32	46.0	32.5
33	47.0	32.5
35	49.2	32.5
38	52.4	34.0
40	55.6	34.0
43	58.7	34.0
45	58.7	34.0
48	61.9	34.0
50	65.1	34.5
53	68.3	34.5
55	71.0	34.5
60	74.6	39.5
65	84.1	39.5
70	87.3	44.5
75	95.3	44.5
80	98.4	45.0
85	104.8	45.0
90	108.0	48.3
95	114.3	48.3
100	120.7	48.3
105	131.7	48.3
110	138.1	48.3
115	144.5	48.3
120	144.5	48.3
125	150.8	48.3
130	157.8	49.5
140	170.5	49.5
150	176.9	49.5

* Depending on material selected

ROTARY WELDED METAL BELLOWS (GASKET)

SSRMB



PN		PART
3	---	ROTATING FACE
8	---	ROTATING FACE GASKET
30	---	SET SCREW
31	---	CAP SCREW
37	---	FACE END
38	---	BELLOWS END
39	---	BELLOWS CORE

MATERIALS

Bellows Hardware : 316L SS, AM350, Inconel 718, Hastelloy C-276, Alloy-20

Other Hardware : 316 SS, Carpenter 42, Hastelloy C-276

Rotating face : Carbon, SiC, SSiC, TC

Stationary face : SiC, SSiC, TC

Elastomers : Grafoil

OPERATING CONDITIONS

Media : Viscous Fluids, Slurry, Hydrocarbons, Acids, Caustics, etc..

Pressure : ≤ 20 Bar

Temperature * : - 75°C ~ 425°C

Speed : ≤ 25 m/s

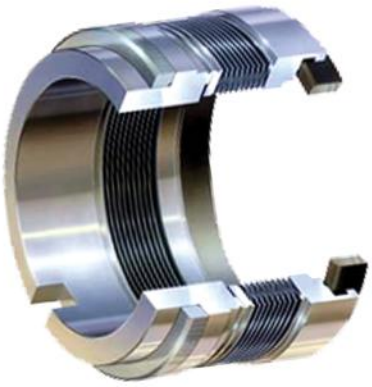
SIZE d (Inch)	D (Inch)	L (Inch)
.750	1.625	2.312
.875	1.750	2.343
1.000	1.875	2.343
1.125	2.000	2.375
1.250	2.125	2.375
1.375	2.250	2.468
1.500	2.375	2.500
1.625	2.500	2.500
1.750	2.625	2.531
1.875	2.750	2.531
2.000	2.875	2.562
2.125	3.000	2.562
2.250	3.250	2.750
2.375	3.375	2.781
2.500	3.500	2.781
2.625	3.687	2.875
2.750	3.812	3.000
2.875	4.000	3.000
3.000	4.125	3.000
3.125	4.250	3.000
3.250	4.375	3.000
3.375	4.500	3.000
3.500	4.625	3.000
3.625	4.750	3.000
3.750	4.875	3.000

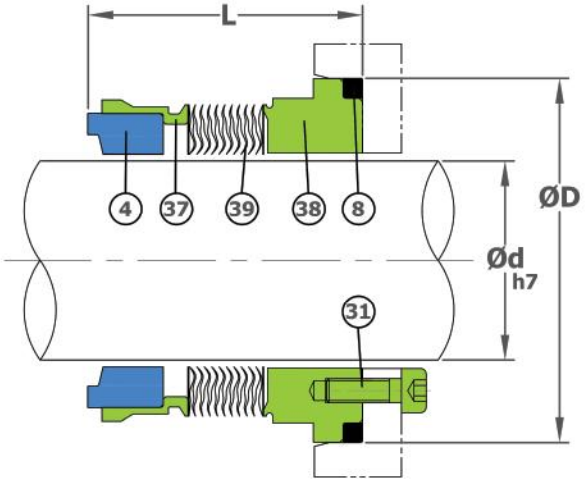
SIZE d (mm)	D (mm)	L (mm)
20	41.28	58.72
22	44.45	59.51
25	47.63	59.51
30	50.80	60.33
32	53.98	60.33
35	57.15	62.69
38	60.33	63.50
40	63.50	63.50
45	66.68	64.29
48	69.85	64.29
50	73.03	65.07
55	76.20	65.07
60	85.73	70.64
65	88.90	70.64
70	96.82	76.20
75	104.78	76.20
80	107.95	76.20
85	114.30	76.20
90	117.48	76.20
95	123.83	76.20
100	130.18	76.20

* Depending on material selected

STATIONARY WELDED METAL BELLOWS (GASKET)

SSSMB





PN		PART
3	---	ROTATING FACE
8	---	ROTATING FACE GASKET
31	---	CAP SCREW
37	---	FACE END
38	---	BELLOWS END
39	---	BELLOWS CORE

MATERIALS

Bellows Hardware : 316L SS, AM350, Inconel 718, Hastelloy C-276, Alloy-20

Other Hardware : 316 SS, Carpenter 42, Hastelloy C-276

Rotating face : Carbon, SiC, SSiC, TC

Stationary face : SiC, SSiC, TC

Elastomers : Grafoil

OPERATING CONDITIONS

Media : Viscous Fluids, Slurry, Hydrocarbons, Acids, Caustics, etc..

Pressure : ≤ 20 Bar

Temperature * : - 75°C ~ 425°C

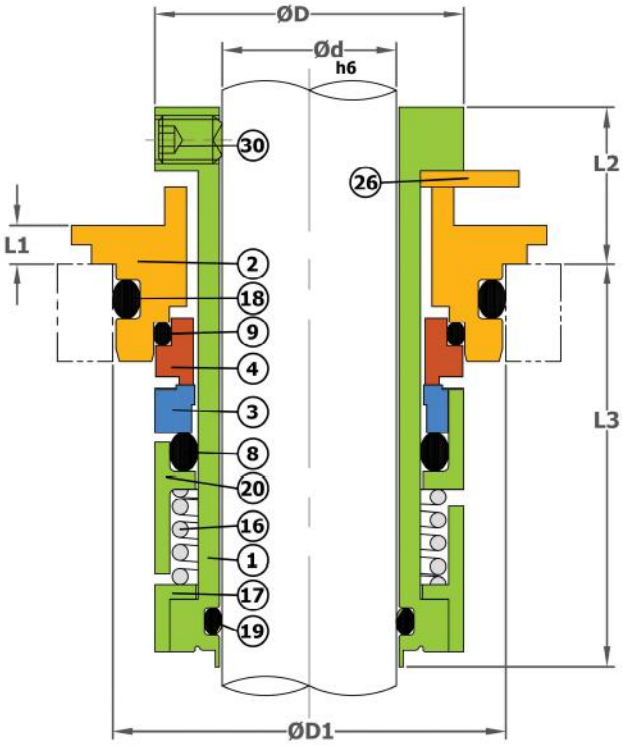
Speed : ≤ 25 m/s

SIZE d (Inch)	D (Inch)	L (Inch)
1.000	1.578	1.138
1.125	1.781	1.138
1.250	1.906	1.138
1.375	1.969	1.138
1.500	2.219	1.191
1.625	2.281	1.222
1.750	2.500	1.254
1.875	2.609	1.254
2.000	2.750	1.285
2.125	2.953	1.316
2.250	3.141	1.384
2.375	3.344	1.379
2.500	3.625	1.410
2.625	3.828	1.443
2.750	4.141	1.608
2.875	4.344	1.608
3.000	4.531	1.608
3.125	4.734	1.608
3.250	4.922	1.608
3.375	5.110	1.608
3.500	5.298	1.650
3.625	5.486	1.650
3.750	5.674	1.650
3.875	5.862	1.650

SIZE (mm)	D (mm)	L (mm)
25	40	28.91
30	45	28.91
32	48	28.91
35	50	28.91
38	56	30.25
40	58	31.04
45	63	31.85
48	66	31.85
50	70	32.64
55	75	33.43
60	80	35.03
65	85	35.81
70	92	40.84
75	97	40.84
80	105	40.84
85	110	40.84
90	115	41.91
95	120	41.91
100	125	41.91

* Depending on material selected

SSGPU



PN		PART
1	---	SLEEVE
2	---	GLAND RING
3	---	ROTATING FACE
4	---	STATIONARY FACE
8	---	ROTATING FACE O-RING
9	---	STATIONARY FACE O-RING
16	---	SPRING
17	---	SPRING HOLDER
18	---	GLAND O-RING
19	---	SLEEVE O-RING
20	---	RETAINING RING
26	---	SETTING PLATE
30	---	SET SCREW

MATERIALS

Other Hardware : 316 SS, 304 SS

Rotating face : SiC, TC

Stationary face : SiC, TC

Elastomers : Viton, Nitril

OPERATING CONDITIONS

Media : Water

Pressure : ≤ 10 Bar

Temperature * : - 30°C ~ 180°C

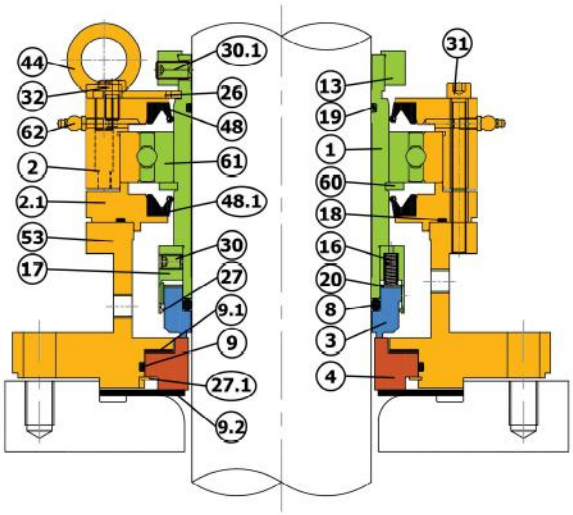
Speed : ≤ 10 m/s

Grundfos Pump Model	SIZE (mm)	d (mm)	D (mm)	D1 (mm)	L1 (mm)	L2 (mm)	L3 (mm)
CR, CEI, CRN 1s, 1, 3 and 5	12	12.0	24.9	29.0	4.3	12.5	44.5
CR, CEI, CRN 10, 15 and 20	16	16.0	30.5	34.0	4.8	13.2	46.3
CR, CEI, CRN 32, 45, 64 and 90	22	22.0	39.0	50.0	5.0	19.8	50.8

* Depending on material selected

WET RUNNING SINGLE AGITATOR BALANCE SEAL

SSMMSB



PN		PART
1	---	SLEEVE
2	---	OUTER GLAND RING
2.1	---	INNER GLAND RING
3	---	ROTATING FACE
4	---	STATIONARY FACE
8	---	ROTATING FACE O-RING
9	---	STATIONARY FACE O-RING
9.1	---	STATIONARY FACE GASKET
9.2	---	STATIONARY FACE GASKET
13	---	DRIVE COLLAR
16	---	SPRING
17	---	SPRING HOLDER
18	---	GLAND O-RING
19	---	SLEEVE O-RING
20	---	RETAINING RING
26	---	SETTING PLATE
27	---	SNAP RING
27.1	---	SNAP RING
30	---	SET SCREW
30.1	---	SET SCREW
31	---	CAP SCREW
32	---	HEX. BOLT
44	---	EYE BOLT
48	---	OIL SEAL
48.1	---	OIL SEAL
53	---	HOUSING
60	---	CIRCLIP
61	---	BEARING
62	---	GREASE NIPPLE

MATERIALS

Hardware : 316 SS, 304 SS

Rotating face : Carbon, SiC, TC

Stationary face : SiC, TC

Elastomers : FKM, PTFE, Nitrile

OPERATING CONDITIONS

Shaft : 25mm to 160mm

Pressure : upto 1.4 MPa

Temperature * : - 40°C ~ 220°C

Speed : Upto 3 m/s

FEATURES AND BENEFITS

- For Top & Side Entry Drives
- For Glass Lined Reactors
- Single Rotating multi-spring seal
- Flexible rotating face design
- Cartridge designs with or without bearing
- Cartridge design optional
- Modular designs allowing easy part replacement
- Cooling gland & heating gland option
- No barrier fluid or gas required
- Designed for steel and glass lined vessels
- Reverse pressure capability

RECOMMENDED APPLICATIONS / INDUSTRY

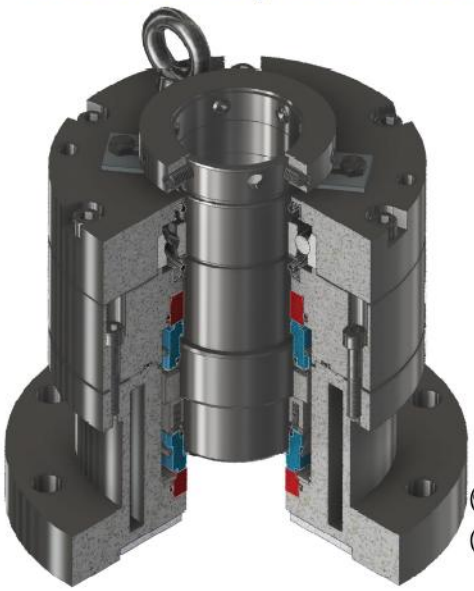
- Heavy Sludges
- Slurries
- Ash Removal
- Process
- Oil & gas
- Petrochemical
- Food & beverage
- Pharmaceutical

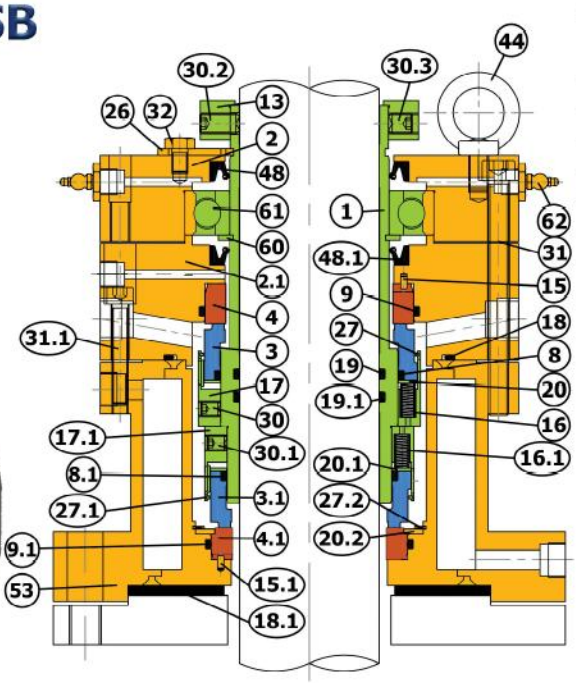
Agitator & Mixer in the industry conventionally use mechanical seals that work on the principle of faces lapping onto each other, thereby providing sealing. Our product design provide excellent performance in the application.

* Depending on material selected

WET RUNNING DUAL AGITATOR BALANCE SEAL

SSMMSB / SSMMSB





PN	PART
1	--- SLEEVE
2	---- OUTER GLAND RING
2.1	---- INNER GLAND RING
3	---- OUTER ROTATING FACE
3.1	---- INNER ROTATING FACE
4	---- OUTER STATIONARY FACE
4.1	---- INNER STATIONARY FACE
8	---- OUTER ROTATING FACE O-RING
8.1	---- INNER ROTATING FACE O-RING
9	---- OUTER STATIONARY FACE O-RING
9.1	---- INNER STATIONARY FACE GASKET
13	---- DRIVE COLLAR
15	---- OUTER LOCK PIN
15.1	---- INNER LOCK PIN
16	---- OUTER SPRING
16.1	---- INNER SPRING
17	---- OUTER SPRING HOLDER
17.1	---- INNER SPRING HOLDER
18	---- GLAND O-RING
18.1	---- GLAND GASKET
19	---- SLEEVE O-RING
19.1	---- SLEEVE O-RING
20	---- OUTER RETAINING RING
20.1	---- INNER RETAINING RING
26	---- SETTING PLATE
27	---- OUTER SNAP RING
27.1	---- INNER SNAP RING
27.2	---- SNAP RING
30	---- OUTER SET SCREW
30.1	---- INNER SET SCREW
30.2/30.3	- SET SCREW
31/31.1	--- CAP SCREW
32	---- HEX. BOLT
44	---- EYE BOLT
48/48.1	--- OIL SEAL
53	---- HOUSING
60	---- CIRCLIP
61	---- BEARING
62	---- GREASE NIPPLE

MATERIALS

Hardware : 316 SS, 304 SS

Rotating face : Carbon, SiC, TC

Stationary face : SiC, TC

Elastomers : FKM, PTFE, Nitrile

OPERATING CONDITIONS

Shaft : 25mm to 160mm

Pressure : upto 1.4 MPa

Temperature * : - 40°C ~ 220°C

Speed : Upto 3 m/s

FEATURES AND BENEFITS

- For Top & Side Entry Drives
- For Glass Lined Reactors
- Dual Rotating multi-spring seal
- Flexible rotating face design
- Cartridge designs with or without bearing
- Cartridge design optional
- Modular designs allowing easy part replacement
- Cooling gland & heating gland option
- No barrier fluid or gas required
- Designed for steel and glass lined vessels
- Reverse pressure capability

RECOMMENDED APPLICATIONS / INDUSTRY

- Heavy Sludges
- Slurries
- Ash Removal
- Process
- Oil & gas
- Petrochemical
- Food & beverage
- Pharmaceutical

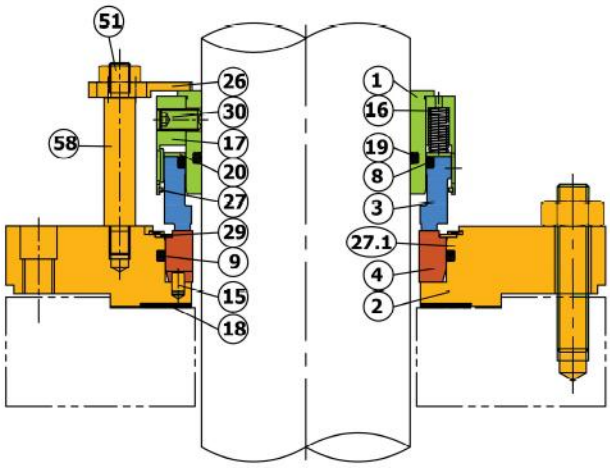
Agitator & Mixer in the industry conventionally use mechanical seals that work on the principle of faces lapping onto each other, thereby providing sealing. Our product design provide excellent performance in the application.

AGITATOR & MIXER SEALS

* Depending on material selected

DRY RUNNING MIXER SEAL

SSMXD



PN	PART
1	SLEEVE
2	GLAND RING
3	ROTATING FACE
4	STATIONARY FACE
8	ROTATING FACE O-RING
9	STATIONARY FACE O-RING
15	LOCK PIN
16	SPRING
17	SPRING HOLDER
18	GLAND GASKET
19	SLEEVE O-RING
20	RETAINING RING
26	SETTING PLATE
27	SNAP RING
27.1	SNAP RING
29	BACKUP PLATE
30	SET SCREW
58	STUD
51	LOCK NUT

MATERIALS

Hardware : 316 SS, Alloy C-276 & Alloy 20

Rotating face : Carbon & Filled PTFE

Stationary face : SiC, TC & Aluminium Oxide

Elastomers : Buna-N, EPDM, Neoprene, FKM, FFKM

FEATURES AND BENEFITS

- Dry running contacting seal
- Single outside mounted balanced design
- Rotating multi-spring seal
- Flexible rotating face design
- Seal operates at eccentric run-out levels upto 3.81mm FIM.
- Self-lubricating carbon or filled PTFE seal face runs dry without cooling
- Stationary face is double mounted o-ring prevents distortion
- Non metallic wetted metal parts option provides superior chemical resistance
- Cartridge designs with or without bearing
- Cartridge design optional
- Cooling gland & heating gland option
- No barrier fluid or gas required
- Designed for steel and glass lined vessels

OPERATING CONDITIONS

Shaft : 25mm to 200mm

Pressure : Full Vacuum to 6 Bar

Temperature * : - 40°C ~ 149°C

Speed : Upto 1.5 m/s

RECOMMENDED APPLICATIONS / INDUSTRY

- Pharmaceutical
- Bio technology
- Chemical
- Process
- Oil & gas
- Petrochemical
- Food & beverage
- Refinery

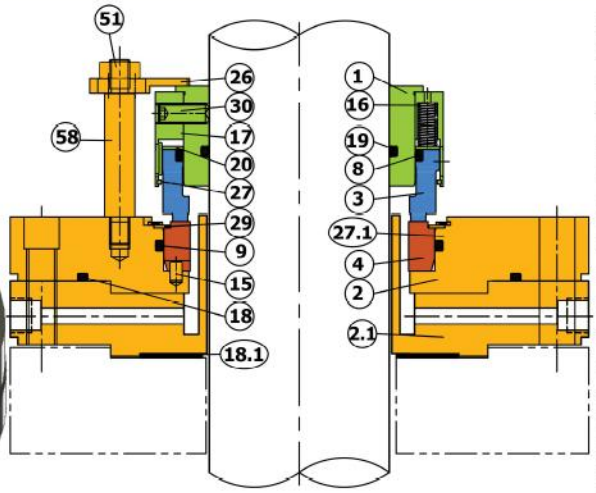
An single outside mounted dry running mixer seal designed specifically for use on Top-Entry Reactors, Mixers, Filters, Dryer and Agitator services.

* Depending on material selected

E-mail : sales@steinseal.in

DRY RUNNING PHARMACENTICAL MIXER SEAL

SSMXDS



PN		PART
1	---	SLEEVE
2	---	OUTER GLAND RING
2.1	---	INNER GLAND RING
3	---	ROTATING FACE
4	---	STATIONARY FACE
8	---	ROTATING FACE O-RING
9	---	STATIONARY FACE O-RING
15	---	LOCK PIN
16	---	SPRING
17	---	SPRING HOLDER
18	---	GLAND O-RING
18.1	---	GLAND GASKET
19	---	SLEEVE O-RING
20	---	RETAINING RING
27	---	SNAP RING
27.1	---	SNAP RING
29	---	BACKUP PLATE
30	---	SET SCREW
51	---	LOCK NUT
58	---	STUD

MATERIALS

Hardware : 316 SS, 316L SS, Alloy C-276 & Alloy 20

Rotating face : Carbon

Stationary face : SiC & Aluminium Oxide

Elastomers : Buna-N, EPDM, Neoprene, FKM, FFKM

OPERATING CONDITIONS

Shaft : 25mm to 200mm

Pressure : Full Vacuum to 6 Bar

Temperature * : - 40°C ~ 149°C

Speed : Upto 1.5 m/s

FEATURES AND BENEFITS

- Dry running contacting seal
- Single outside mounted balanced design
- Rotating multi-spring seal
- Flexible rotating face design
- Seal operates at eccentric run-out levels upto 3.81mm FIM.
- FDA grade materials
- Stationary face is double mounted o-ring prevents distortion
- Cartridge designs with or without bearing
- Cartridge design optional
- Sanitary gland for sterilization and steam cleaning debris
- No barrier fluid or gas required
- Designed for steel and glass lined vessels
- Clamping, shrink disc & set screw drive

RECOMMENDED APPLICATIONS / INDUSTRY

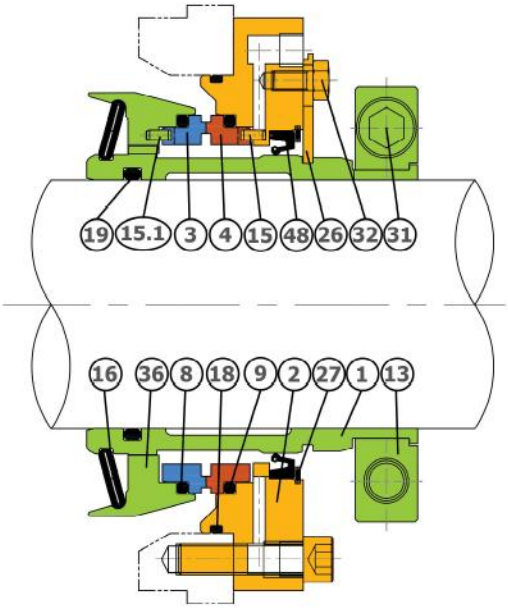
- Pharmaceutical
- Bio technology
- Fermentations
- Chemical
- Process
- Oil & gas
- Petrochemical
- Food & beverage
- Refinery

An single outside mounted dry running pharmaceutical mixer seal designed FDA grade materials specifically for use dead ended on Top-Entry Mixers in the pharmaceutical Industry.

* Depending on material selected

HEAVY DUTY SLURRY SEAL

SSLC



PN		PART
1	---	SLEEVE
2	---	GLAND RING
3	---	ROTATING FACE
4	---	STATIONARY FACE
8	---	ROTATING FACE O-RING
9	---	STATIONARY FACE O-RING
13	---	DRIVE COLLAR
15	---	LOCK PIN
15.1	---	LOCK PIN
16	---	DISC SPRING
18	---	GLAND O-RING
19	---	SLEEVE O-RING
26	---	SETTING PLATE
31	---	CAP SCREW
32	---	HEX. BOLT
36	---	ROTATING FACE BODY
48	---	OIL SEAL

MATERIALS

Hardware : High Chrome Iron, CD-4MCuN & Other Alloy
Rotating face : SiC, SSiC, TC
Stationary face : SiC, SSiC, TC
Elastomers : EPDM, Neoprene, FKM, FFKM, Aflas

OPERATING CONDITIONS

Shaft : 35mm to 220mm
Pressure : Upto 15 Bar
Temperature * : Upto 76°C without Quench
Upto 126°C with Water Quench
Speed : Upto 15 m/s
Duty : Abrasive services upto 60% Solids by Weight

FEATURES AND BENEFITS

- Encapsulated non-clogging cone spring
- Single cartridge designs
- Balanced
- Flexible stationary & rotating face design
- Split drive collar, set screw & shrink disc drive
- All static secondary o-rings
- Interchangeable seal faces
- Limited seal size
- Heavy duty construction

RECOMMENDED APPLICATIONS / INDUSTRY

- Minerals processing (Alumina, Copper phosphate, Coal, Bauxite & Iron ore)
- Water & Wastewater
- Pulp & Paper
- Steel Production
- Power generation
- Chemical

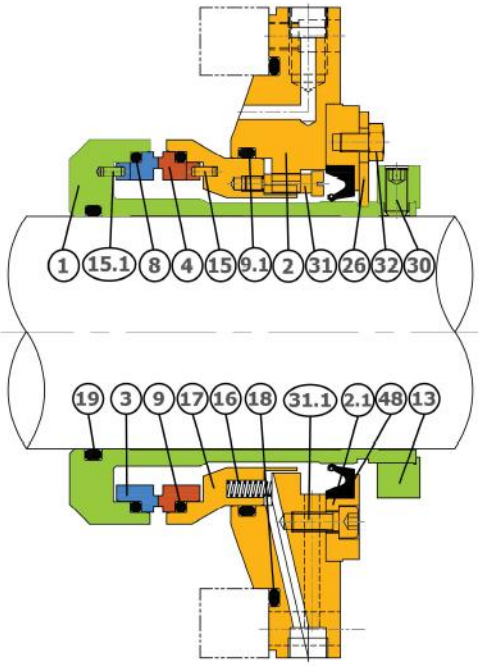
SSLC series seals are single cartridge designed for slurry pump services found in minerals mining and ore processing. it is build with a non-clogging cone spring that increases seal reliability and enables flush less operation for low operating costs.

SLURRY SEALS

* Depending on material selected

HIGH PRESSURE SLURRY SEAL

SSLP



PN		PART
1	---	SLEEVE
2	---	GLAND RING
2.1	---	AUXILIARY GLAND RING
3	---	ROTATING FACE
4	---	STATIONARY FACE
8	---	ROTATING FACE O-RING
9	---	STATIONARY FACE O-RING
9.1	---	STATIONARY FACE O-RING
13	---	DRIVE COLLAR
15	---	LOCK PIN
15.1	---	LOCK PIN
16	---	SPRING
17	---	SPRING HOLDER
18	---	GLAND O-RING
19	---	SLEEVE O-RING
26	---	SETTING PLATE
30	---	SET SCREW
31	---	SLOTTED HD. SHOULDER CAP SCREW
31.1	---	CAP SCREW
32	---	HEX. BOLT
48	---	OIL SEAL

MATERIALS

Hardware : High Chrome Iron, CD-4MCuN & Other Alloy

Rotating face : SiC, SSiC, TC

Stationary face : SiC, SSiC, TC

Elastomers : EPDM, Neoprene, FKM, FFKM, Aflas

OPERATING CONDITIONS

Shaft : 35mm to 220mm

Pressure : Upto 17.2 Bar

Temperature * : Upto 76°C without Quench

Upto 126°C with Water Quench

Speed : Upto 20 m/s

Duty : Abrasive services upto 35% Solids by Weight

FEATURES AND BENEFITS

- Static multi spring
- Single cartridge designs
- Balanced
- Flexible stationary & rotating face design
- Split drive collar, set screw & shrink disc drive
- All dynamic secondary o-rings
- Interchangeable seal faces
- Limited seal size
- Line on line hydraulically balanced

RECOMMENDED APPLICATIONS / INDUSTRY

- Minerals processing (Alumina, Copper phosphate, Coal, Bauxite & Iron ore)
- Water & Wastewater
- Pulp & Paper
- Steel Production
- Power generation
- Chemical

SSLP series seals are single cartridge designed for slurry pump services found in minerals mining and ore processing. It is build with a static multi spring pusher that increases seal reliability and enables flush less operation for low operating costs.

SLURRY SEALS

* Depending on material selected

BOILER FEED WATER PUMP SEAL

SSFWB

MATERIALS

Hardware : 316 SS, Alloy C-276 & Alloy 20

Rotating face : SiC

Stationary face : Antimony Carbon

Elastomers : FKM, FFKM

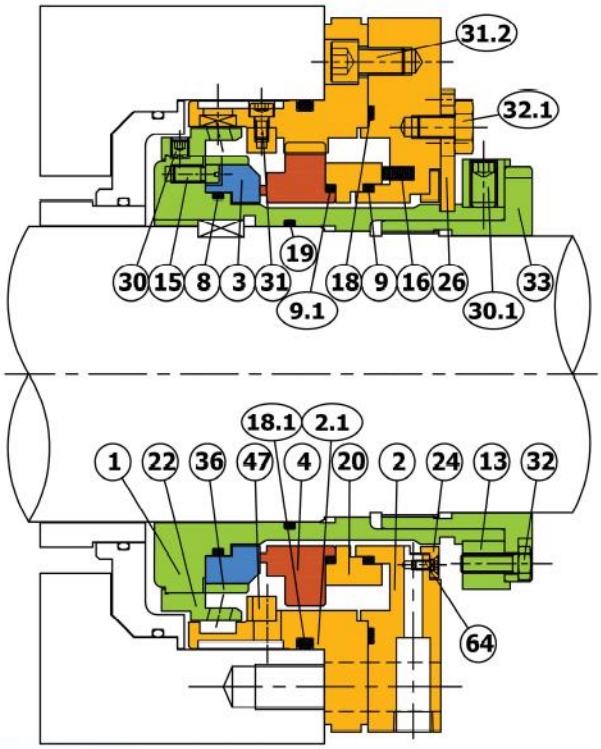
OPERATING CONDITIONS

Shaft : 120 - 200 mm

Pressure : 40 - 140 Bar Max.

Temperature * : -20 ~ 300 °C

Speed : Upto 6500 rpm



PN		PART
1	---	SLEEVE
2	---	OUTER GLAND RING
2.1	---	INNER GLAND RING
3	---	ROTATING FACE
4	---	STATIONARY FACE
8	---	ROTATING FACE O-RING
9	---	STATIONARY FACE O-RING
9.1	---	STATIONARY FACE O-RING
13	---	DRIVE COLLAR
15	---	LOCK PIN
16	---	SPRING
18	---	GLAND O-RING
18.1	---	GLAND O-RING
19	---	SLEEVE O-RING
20	---	COMPRESSION RING
22	---	PUMPING RING
24	---	THROTTLE BUSH
26	---	SETTING PLATE
30	---	SET SCREW
30.1	---	SET SCREW
31	---	CAP SCREW
31.1	---	CAP SCREW
31.2	---	CAP SCREW
32	---	HEX. BOLT
32.1	---	HEX. BOLT
33	---	SEAL DRIVE
36	---	ROTATING FACE BODY
47	---	CLAMPING PLATE
64	---	COUNTER SUNK SCREW

One such application involved the sealing of large boiler feed and steam generator pumps in power plants. Consequently, the mechanical seal faces are highly loaded in a fluid with far less than ideal lubricating qualities. It is evident, therefore, that these applications are technologically challenging for mechanical seal manufacturers not only from a tribological perspective, but also from a corrosion viewpoint when the feed water has a low electrical conductivity or is free of impurities.

For the sealing of feed pumps in power plants, mechanical seals have proven to be a reliable and cost effective sealing method compared to alternatives such as packing and throttle bushing seals with an injection of cold condensate. Mechanical seals achieve lifetimes of 40,000 hours or more in older power plants that historically use the All Volatile Water Treatment.

* Depending on material selected

SSBPSB

MATERIALS

Hardware : 316 SS, Alloy C-276 & Alloy 20

Rotating face : Carbon, Antimony Carbon

Stationary face : SiC

Elastomers : FKM, FFKM

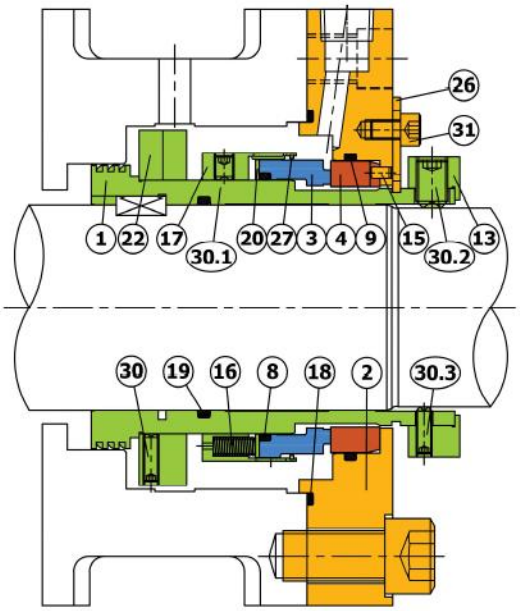
OPERATING CONDITIONS

Shaft : 120 - 200 mm

Pressure : 40 - 140 Bar Max.

Temperature * : -20 ~ 300 °C

Speed : Upto 6500 rpm



PN		PART
1	---	SLEEVE
2	---	GLAND RING
3	---	ROTATING FACE
4	---	STATIONARY FACE
8	---	ROTATING FACE O-RING
9	---	STATIONARY FACE O-RING
13	---	DRIVE COLLAR
15	---	LOCK PIN
16	---	SPRING
17	---	SPRING HOLDER
18	---	GLAND O-RING
19	---	SLEEVE O-RING
20	---	RETAINING RING
22	---	PUMPING RING
26	---	SETTING PLATE
30	---	SET SCREW
30.1	---	SET SCREW
30.2	---	SET SCREW
30.3	---	SET SCREW
31	---	CAP SCREW

Booster pumps are placed before the main pump. The booster pump use feed water pump to boost the inlet pressure of main pump to avoid cavitations due to low Net Positive Suction Head. Water pressure booster pumps are used to provide adequate water pressure to upper floors of high rise.

The booster pump is also known as a pressure pump. Booster pumps increase pressure and forcing water to flow through the pipes at a faster rate. As the pressure needed to move the water increases, the flow rate decreases. It is a type of centrifugal pump because it uses centrifugal force and one or more impellers to pump the fluid. Booster pumps work in conjunction with other pumps, meaning by themselves they cannot transport any fluid in a system. They are designed only to "boost" the performance of an existing pumping system.

For the sealing of feed pumps in power plants, mechanical seals have proven to be a reliable and cost effective sealing method compared to alternatives such as packing and throttle bushing seals with an injection of cold condensate. Mechanical seals achieve lifetimes of 40,000 hours or more in older power plants that historically use the All Volatile Water Treatment.

* Depending on material selected

CONDENSATE EXTRACTION PUMP SEAL

POWER PLANT SEALS

SSCESB

MATERIALS

Hardware : 316 SS, Alloy C-276 & Alloy 20

Rotating face : SiC

Stationary face : Carbon, Antimony Carbon

Elastomers : FKM, FFKM

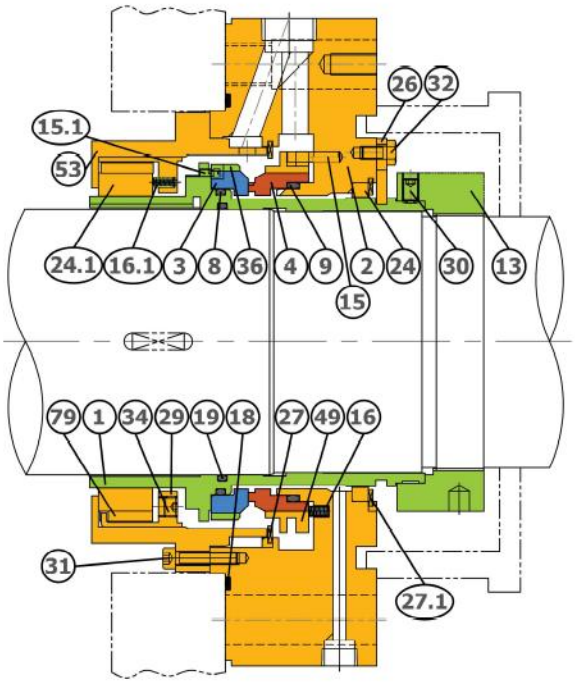
OPERATING CONDITIONS

Shaft : 120 - 200 mm

Pressure : 40 - 140 Bar Max.

Temperature * : -20 ~ 300 °C

Speed : Upto 6500 rpm



PN		PART
1	---	SLEEVE
2	---	GLAND RING
3	---	ROTATING FACE
4	---	STATIONARY FACE
8	---	ROTATING FACE O-RING
9	---	STATIONARY FACE O-RING
13	---	DRIVE COLLAR
15	---	LOCK PIN
15.1	---	LOCK PIN
16	---	SPRING
16.1	---	SPRING
18	---	GLAND O-RING
19	---	SLEEVE O-RING
24	---	FIXED THROTTLE BUSH
24.1	---	FLOATING THROTTLE BUSH
26	---	SETTING PLATE
27	---	SNAP RING
27.1	---	SNAP RING
29	---	BACKUP PLATE
30	---	SET SCREW
31	---	CAP SCREW
32	---	HEX. BOLT
34	---	PLUG
36	---	ROTATING FACE BODY
49	---	STATIONARY FACE BODY
53	---	HOUSING
79	---	THROTTLE BUSH BODY

Condensate extraction pumps (CEP) extract the condensate water from the condenser and pump it through the condensate polishing system and the LP heaters to the de-aerator feed water tank. In medium to large size gas-fired combined-cycle power plants, the CEP are vertical canned type to ensure enough Net Positive Suction Head Available (NPSHA). In small power plants, the CEP could also be horizontal end-suction type.

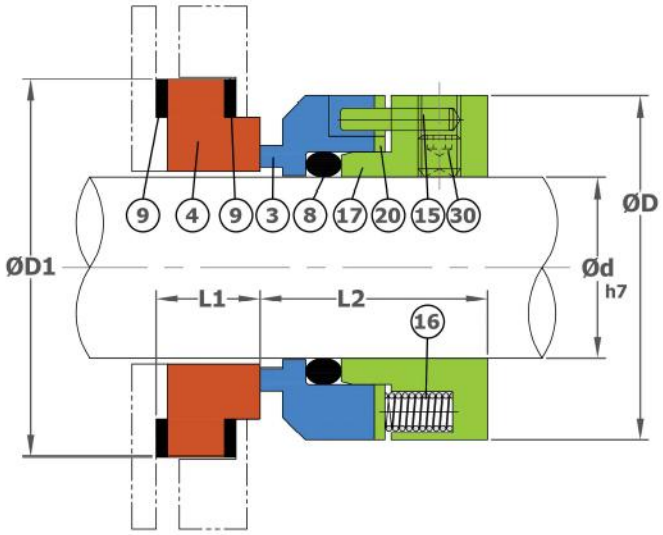
The condensate pumps are lower pressure pumps (~600 psig) designed to take suction from the low pressure condenser hotwell and deliver it to the main feedpumps. Several other pumps called Heater Drain pumps operate in parallel to assist in supplyiTng the main feedpumps by pumping condensate from the feedwater heaters' drain tanks forward also.

For the sealing of feed pumps in power plants, mechanical seals have proven to be a reliable and cost effective sealing method compared to alternatives such as packing and throttle bushing seals with an injection of cold condensate. Mechanical seals achieve lifetimes of 40,000 hours or more in older power plants that historically use the All Volatile Water Treatment.

* Depending on material selected

OUTSIDE MOUNTED MULTI-SPRING BALANCED

SSOMSB



PN		PART
3	---	ROTATING FACE
4	---	STATIONARY FACE
8	---	ROTATING FACE O-RING
9	---	STATIONARY FACE GASKET
15	---	LOCK PIN
16	---	SPRING
17	---	SPRING HOLDER
20	---	RETAINING RING
30	---	SET SCREW

MATERIALS

Hardware : 316 SS, Hastelloy C-276

Rotating face : Carbon, SiC, SSiC

Stationary face : Ceramic, SiC, TC

Elastomers : FKM, FFKM, EPDM

OPERATING CONDITIONS

Media : Oil, Acids, Alkali, etc..

Pressure : ≤ 15 Bar

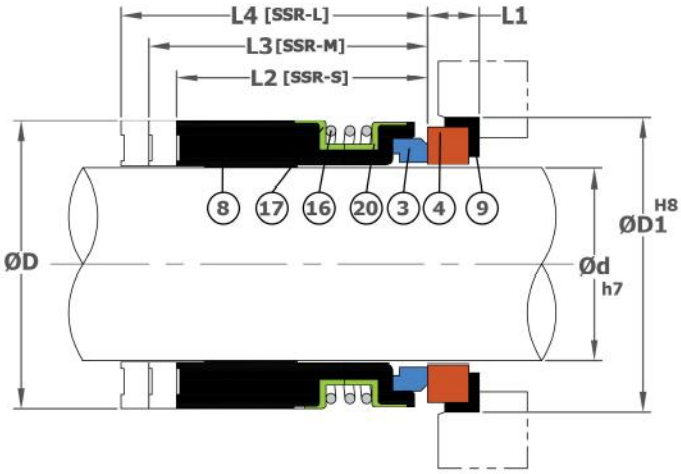
Temperature * : - 20°C ~ 200°C

Speed : ≤ 20 m/s

SIZE (Inch)	D (mm)	D1 (mm)	L1 (mm)	L2 (mm)
.625	38.9	41.1	17.9	31.95
.750	42.1	44.5	17.9	31.95
.875	45.3	47.5	17.9	31.95
1.000	48.4	53.2	17.9	31.95
1.125	52.0	56.4	17.9	31.95
1.250	55.2	59.5	17.9	31.95
1.375	58.0	61.1	17.9	31.95
1.500	61.2	69.1	17.9	31.95
1.625	64.3	72.2	17.9	31.95
1.750	67.6	78.6	17.9	31.95
1.875	70.7	81.8	17.9	31.95
2.000	73.9	88.1	17.9	31.95
2.125	77.1	94.5	17.9	31.95
2.250	80.2	97.6	17.9	31.95
2.375	83.4	98.4	17.9	31.95
2.500	86.5	104.0	17.9	31.95
2.625	89.7	107.2	17.9	31.95
2.750	92.9	113.5	27.0	31.95
2.875	96.1	116.7	27.0	31.95
3.000	99.2	121.4	27.0	31.95

* Depending on material selected

SSR



PN		PART
3	---	ROTATING FACE
4	---	STATIONARY FACE
8	---	ROTATING FACE GASKET
9	---	STATIONARY FACE GASKET
16	---	SPRING
17	---	SPRING HOLDER
20	---	RETAINING RING

MATERIALS

Hardware : 316 SS

Rotating face : CARBON, SiC, SSiC, TC

Stationary face : Ceramic, SiC, SSiC, TC

Elastomers : NBR, FKM, EPDM

OPERATING CONDITIONS

Media : Water, Oil, Less Corrosive Mediums etc..

Pressure : ≤ 10 Bar

Temperature * : - 20°C ~ 180°C

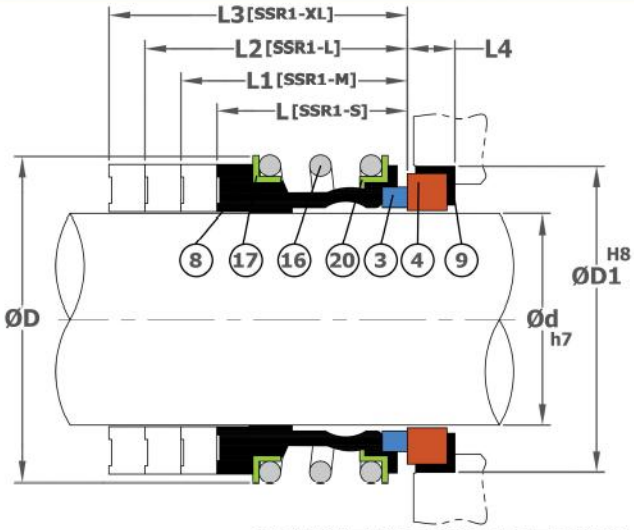
Speed : ≤ 12 m/s

SIZE d (mm)	D (mm)	D1 (mm)	L1 (mm)	L2 (mm)	L3 (mm)	L4 (mm)
10	20	21	5	15.2	26.7	34.2
12	22	23	6	15.2	26.7	34.2
14	24	25	6	15.2	29.2	34.2
15	25	26	6	15.2	29.2	34.2
16	26	27	6	15.2	29.2	34.2
18	32	33	6	20.2	31.7	39.2
20	34	35	6	20.2	31.7	39.2
22	36	37	6	20.2	31.7	39.2
24	38	39	6	20.2	34.2	43.2
25	39	40	6	20.2	34.2	44.2
28	42	43	6	26.2	34.7	44.2
30	44	45	7	26.2	35.7	44.2
32	46	48	7	26.2	35.7	47.2
33	47	48	7	26.2	35.7	47.2
35	49	50	8	26.2	36.7	47.2
38	54	56	8	30.2	37.2	48.2
40	56	58	8	30.2	37.2	48.2
43	59	61	8	30.2	37.2	50.2
45	61	63	8	30.2	37.2	50.2
48	64	66	10	30.2	37.2	52.2
50	66	70	10	30.2	37.7	52.2
53	69	73	10	30.2	37.7	58.2
55	71	75	10	30.2	37.7	58.2
58	78	78	10	33.2	40.7	60.2
60	80	80	12	33.2	40.7	60.2
63	83	83	12	33.2	40.7	60.2
65	85	85	12	33.2	40.7	68.2
68	88	90	12	33.2	40.7	68.2
70	90	92	12	33.2	47.7	68.2
75	99	97	12	40.2	47.7	68.2
80	104	105	14	40.2	48.2	77.7
85	109	110	14	40.2	48.2	77.7
90	114	115	14	40.2	52.7	77.7
95	119	120	14	40.2	52.7	77.7
100	124	125	14	40.2	52.7	77.7

SIZE d (Inch)	D (mm)	D1 (mm)	L1 (mm)	L2 (mm)
.375	20	22.225	7.9	15.2
.500	24	25.400	7.9	15.2
.625	26	31.750	10.3	15.2
.750	32	34.930	10.3	20.2
.875	36	38.100	10.3	20.2
1.000	39	41.280	11.1	20.2
1.125	42	44.450	11.1	26.2
1.250	46	47.630	11.1	26.2
1.375	49	50.800	11.1	26.2
1.500	54	53.980	11.1	30.2
1.625	56	60.330	12.7	30.2
1.750	61	63.500	12.7	30.2
1.875	64	66.680	12.7	30.2
2.000	66	69.850	12.7	30.2
2.125	69	76.200	14.3	30.2
2.250	77	79.380	14.3	33.2
2.375	80	82.550	14.3	33.2
2.500	83	85.730	14.3	33.2
2.625	83	85.730	15.9	33.2
2.750	89	88.900	15.9	33.2
2.875	96	95.250	15.9	33.2
3.000	99	98.425	15.9	40.2
3.125	103	101.600	19.8	40.2
3.250	104	104.775	19.8	40.2
3.375	108	104.950	19.8	40.2
3.500	112	111.125	19.8	40.2
3.625	114	114.300	19.8	40.2
3.750	118	117.475	19.8	40.2
3.875	122	120.650	19.8	40.2
4.000	124	123.830	19.8	40.2

* Depending on material selected

SSR1



PN		PART
3	---	ROTATING FACE
4	---	STATIONARY FACE
8	---	ROTATING FACE GASKET
9	---	STATIONARY FACE GASKET
16	---	SPRING
17	---	SPRING HOLDER
20	---	RETAINING RING

MATERIALS

Hardware : 316 SS, 304 SS

Rotating face : CARBON, SiC, SSiC, TC

Stationary face : SiC, SSiC, TC, Ceramic

Elastomers : NBR, FKM, EPDM

OPERATING CONDITIONS

Media : Water, Oil, Less Corrosive Mediums etc..

Pressure : ≤ 10 Bar

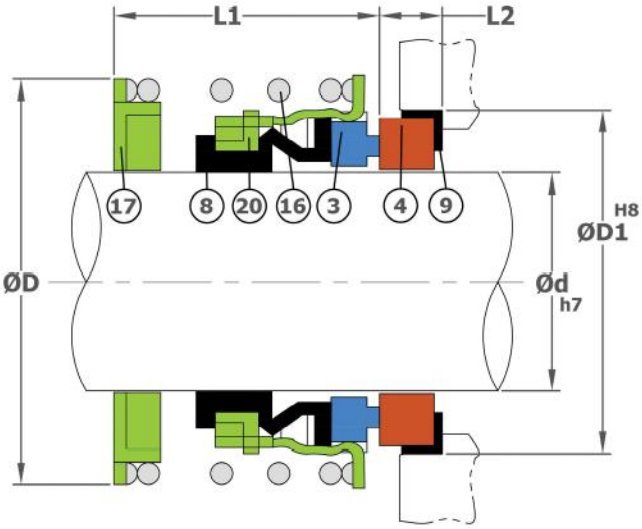
Temperature * : - 20°C ~ 180°C

Speed : ≤ 12 m/s

SIZE d (mm)	D (mm)	D1 (mm)	L (mm)	L1 (mm)	L2 (mm)	L3 (mm)	L4 (mm)
10	22.0	21	14.5	25	25.9	33.4	6.5
12	24.5	23	15.0	25	25.9	33.4	6.5
14	28.0	25	17.0	25	28.4	33.4	6.5
15	28.0	27	17.0	25	28.4	33.4	6.5
16	28.0	27	17.0	25	28.4	33.4	6.5
18	31.5	33	19.5	25	30.0	37.5	7.5
19	36.5	35	21.5	25	30.0	37.5	7.5
20	36.5	35	21.5	25	30.0	37.5	7.5
22	36.5	37	21.5	25	30.0	37.5	7.5
24	42.0	39	22.5	25	32.5	42.5	7.5
25	42.0	40	23.0	25	32.5	42.5	7.5
28	48.5	43	26.5	33	35.0	42.5	7.5
30	48.5	45	26.5	33	35.0	42.5	7.5
32	53.5	48	27.5	33	35.0	46.0	7.5
33	53.5	48	27.5	33	35.0	46.0	7.5
35	57.0	50	28.5	33	35.0	47.5	7.5
38	59.0	56	30.0	33	36.0	47.5	9.0
40	62.0	58	30.0	33	36.0	47.5	9.0
42	65.5	61	30.0	41	36.0	51.0	9.0
43	65.5	61	30.0	41	36.0	51.0	9.0
45	68.0	63	30.0	41	36.0	51.0	9.0
48	70.5	66	30.5	41	36.0	51.0	9.0
50	74.0	70	30.5	41	36.0	51.0	9.5
53	78.5	73	33.0	41	36.5	59.0	11.0
55	81.0	75	35.0	41	36.5	59.0	11.0
58	85.5	78	37.0	41	41.5	59.0	11.0
60	88.5	80	38.0	41	41.5	59.0	11.0
65	93.5	85	40.0	49	41.5	59.0	11.0
68	96.5	90	40.0	49	41.5	68.7	11.5
70	99.5	92	40.0	49	46.0	68.7	11.5
75	107.0	97	40.0	52	48.7	68.7	11.5
80	112.0	105	40.0	56	48.7	76.0	12.0
85	120.0	110	41.0	56	48.7	76.0	14.0
90	127.0	115	45.0	59	51.0	76.0	14.0
95	132.0	120	46.0	59	51.0	76.0	14.0
100	137.0	125	47.0	62	51.0	76.0	14.0

* Depending on material selected

SSR2



PN		PART
3	---	ROTATING FACE
4	---	STATIONARY FACE
8	---	ROTATING FACE GASKET
9	---	STATIONARY FACE GASKET
16	---	SPRING
17	---	SPRING HOLDER
20	---	RETAINING RING

MATERIALS

Hardware : 316 SS, 304 SS

Rotating face : CARBON, SiC, SSiC, TC

Stationary face : SiC, SSiC, TC, Ceramic

Elastomers : NBR, FKM, EPDM

OPERATING CONDITIONS

Media : Water, Oil, Less Corrosive Mediums etc..

Pressure : ≤ 10 Bar

Temperature * : - 20°C ~ 180°C

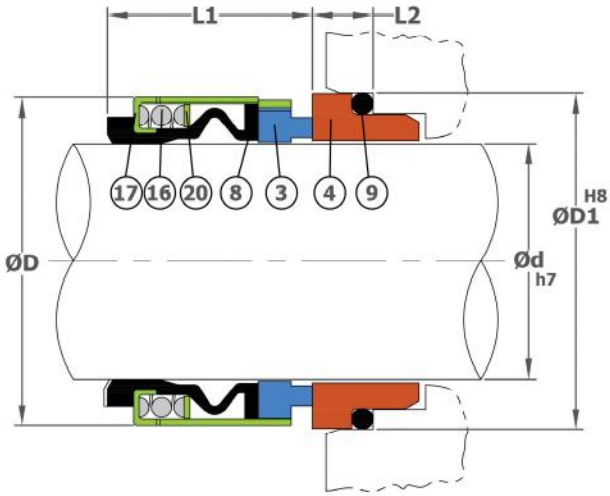
Speed : ≤ 12 m/s

SIZE d (Inch)	D (mm)	D1 (mm)	L1 (mm)	L2 (mm)
.625	34.0	30.95	25.2	10.3
.750	38.8	34.15	25.2	10.3
.875	41.5	37.30	25.2	10.3
1.000	44.8	40.50	25.2	10.3
1.125	48.5	47.65	33.2	11.9
1.250	57.0	50.80	33.2	11.9
1.375	57.0	54.00	33.2	11.9
1.500	67.0	57.15	33.2	11.9
1.625	67.0	60.35	33.2	11.9
1.750	73.0	63.50	41.2	11.9
1.875	73.0	66.70	41.2	11.9
2.000	79.0	69.85	41.2	13.5
2.125	84.0	73.05	41.2	13.5
2.250	84.0	76.20	41.2	13.5
2.375	90.0	79.40	41.2	13.5
2.500	94.0	82.55	41.2	13.5

SIZE d (mm)	D (mm)	D1 (mm)	L1 (mm)	L2 (mm)
16	34.0	30	25.2	8
18	36.8	32	25.2	8
20	36.8	34	25.2	8
22	41.5	36	25.2	8
25	44.8	39	26.2	8
28	48.5	43	26.2	8
30	52.0	48	26.2	8
35	57.0	53	30.2	10
40	67.0	58	34.2	10
45	73.0	63	36.2	10
50	79.0	68	41.2	10
55	84.0	73	41.2	12
60	90.0	79	41.2	12
65	98.5	86	49.2	12
70	103.5	91	52.2	12
75	110.5	96	52.2	12
80	120.0	105	56.2	14
85	125.0	110	56.2	14
90	132.0	115	56.2	14
95	137.0	120	56.2	14
100	144.0	125	62.2	14

* Depending on material selected

SSR5



PN		PART
3	---	ROTATING FACE
4	---	STATIONARY FACE
8	---	ROTATING FACE GASKET
9	---	STATIONARY FACE GASKET
16	---	SPRING
17	---	SPRING HOLDER
20	---	RETAINING RING

MATERIALS

Hardware : 316 SS

Rotating face : SiC, SSiC, TC

Stationary face : SiC, SSiC, TC, Ceramic

Elastomers : NBR, FKM, EPDM

SIZE d (mm)	D (mm)	D1 (mm)	L1 (mm)	L2 (mm)
14	24.0	25	23.0	12.0
16	26.0	27	23.0	12.0
18	32.0	33	24.0	13.5
20	34.0	35	24.0	13.5
22	36.0	37	24.0	13.5
24	38.0	39	27.0	13.5
25	39.0	40	27.0	13.0
28	42.0	43	30.0	12.5
30	44.2	45	30.5	12.0
32	45.8	48	30.5	12.0
33	46.9	48	30.5	12.0
35	48.8	50	30.5	12.0
38	54.2	56	32.0	13.0
40	56.1	58	32.0	13.0
43	58.8	61	32.0	13.0
45	60.9	63	32.0	13.0
48	64.1	66	32.0	13.0
50	66.2	70	34.5	13.5
53	69.1	73	34.5	13.5
55	71.1	75	34.5	13.5
58	78.2	78	39.5	13.5
60	79.9	80	39.5	13.5
63	82.8	83	39.5	13.5
65	85.1	85	39.5	13.5
68	88.0	90	39.5	13.5
70	90.0	92	45.5	14.5
75	97.0	97	45.5	14.5
80	104.0	105	45.5	15.0
85	108.0	110	45.5	15.0
90	114.0	115	50.0	15.0
95	118.0	120	50.0	15.0
100	124.0	125	50.0	15.0

OPERATING CONDITIONS

Media : Water, Oil, Less Corrosive Mediums etc..

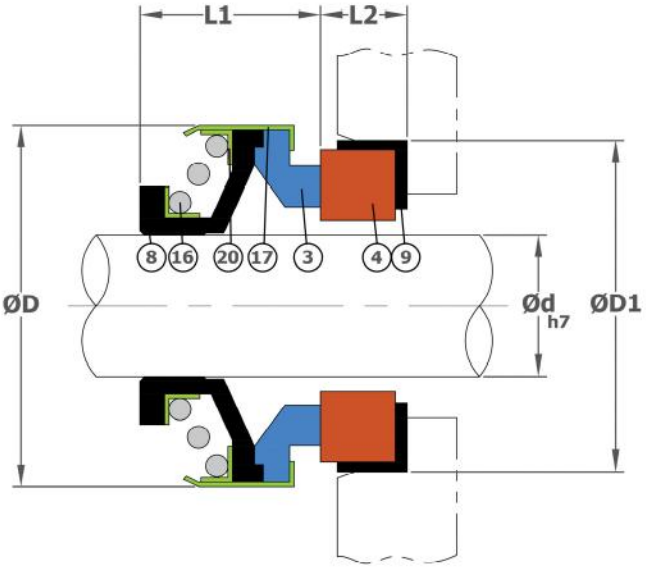
Pressure : ≤ 10 Bar

Temperature * : - 20°C ~ 180°C

Speed : ≤ 12 m/s

* Depending on material selected

SS301



PN		PART
3	---	ROTATING FACE
4	---	STATIONARY FACE
8	---	ROTATING FACE GASKET
9	---	STATIONARY FACE GASKET
16	---	SPRING
17	---	SPRING HOLDER
20	---	RETAINING RING

MATERIALS

Hardware : 316 SS, 304SS

Rotating face : Carbon, SiC

Stationary face : Ceramic, SiC, TC

Elastomers : NBR

OPERATING CONDITIONS

Media : Water, Oil etc..

Pressure : ≤ 4 Bar

Temperature * : - 20°C ~ 150°C

Speed : ≤ 10 m/s

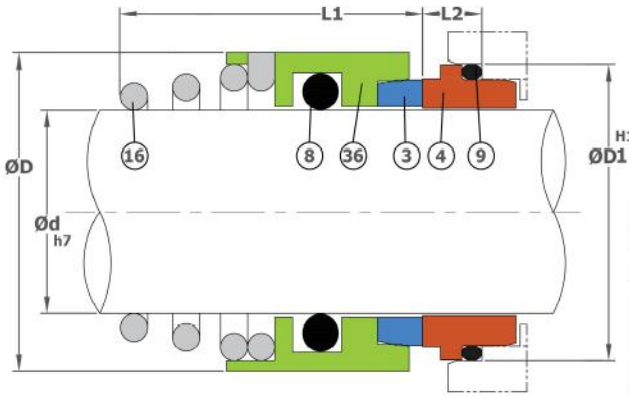
SIZE (mm)	d h6 (mm)	D Max. (mm)	D1 H8 (mm)	L1 ±0.5 (mm)	L2 (mm)
6	6	18	18	10	4
8S	8	18	22	11	4
8M	8	20	21	13	6
8L	8	24	26	11	8
10	10	24	26	11	8
11	11	24	26	13	8
12	12	24	26	13	8
13	13	24	26	13	5.5
13H	13	24	26	13	8
14S	14	26	28.0/28.5	13	8
14M	14	28	28.0/28.5	13	8
14L	14	32	29.5/38.0	13	8
15S	15	28	30	13	8
15M	15	32	29.5	13	8
15L	15	39	38	13	8
16S	16	28	30	13	8
16M	16	32	29.5	13	8
16L	16	39	42	13	8
17	17	39	42	13	8
18	18	39	42	13	8
19	18	39	42	13	8
20S	20	35	38	13	8
20M	20	39	42	13	8
20L	20	42	45	13	10

SIZE (mm)	d h6 (mm)	D Max. (mm)	D1 H8 (mm)	L1 ±0.5 (mm)	L2 (mm)
22S	22	39	42	13	8
22	22	42	45	13	10
23	23	47	50	13.5	10
24	24	47	50	13.5	10
25	25	47	50	13.5	10
25S	25	41.5	45/50	13.5	10
26	26	47	50	13.5	10
27	27	47	50	13.5	10
28	28	54	57	15	10
30	30	54	57	15	10
32	32	54	57	15	10
35	35	60	63	16	10
38	38	65	68	18	12
40	40	65	68	18	12
45	45	70	73	20	12
50	50	85	88	23	15
55	55	85	88	23	15
60	60	105	110	30	15
65	65	105	110	30	15
70	70	105	110	32	15

* Depending on material selected

SINGLE CONICAL SPRING

SSC01



PN		PART
3	---	ROTATING FACE
4	---	STATIONARY FACE
8	---	ROTATING FACE GASKET
9	---	STATIONARY FACE GASKET
16	---	SPRING
36	---	ROTATING FACE BODY

MATERIALS

Hardware : 316 SS, 304 SS

Rotating face : 316 SS, SiC, SSiC, TC

Stationary face : Carbon

Elastomers : NBR, FKM, EPDM

OPERATING CONDITIONS

Media : Water, Oil, etc..

Pressure : ≤ 12 Bar

Temperature * : - 20°C ~ 200°C

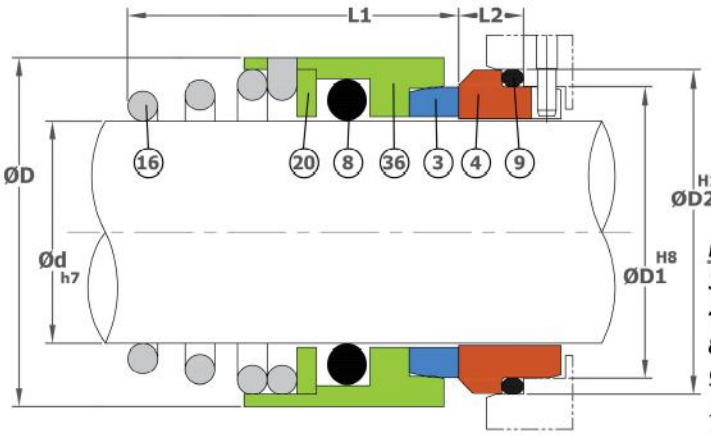
Speed : ≤ 10 m/s

SIZE d (mm)	D (mm)	D1 (mm)	L1 (mm)	L2 (mm)
8	16.0	17.1	15.2	5.5
10	17.5	18.1	15.2	5.5
12	20.0	20.6	18.2	5.5
14	23.0	23.1	22.2	6.0
15	24.0	26.9	22.2	7.0
16	26.0	26.9	23.2	7.0
17	27.0	26.9	23.2	7.0
18	29.0	30.9	24.2	8.0
19	30.0	30.9	25.2	8.0
20	30.0	30.9	25.2	8.0
22	34.0	35.4	25.2	8.0
24	35.0	35.4	27.2	8.0
25	37.0	38.2	27.2	8.5
26	38.0	38.2	27.2	8.5
28	42.0	43.3	29.2	9.0
30	43.0	43.3	30.2	9.0
32	45.0	43.3	30.2	9.0
33	48.0	53.5	39.2	11.5
35	50.0	53.5	39.2	11.5
38	54.0	60.5	39.2	11.5
40	56.0	60.5	39.2	11.5
42	59.0	60.5	39.2	11.5
43	60.0	60.5	39.2	11.5
45	64.0	65.5	41.2	11.5
48	68.0	65.5	41.2	11.5
50	69.0	72.5	45.2	11.5
55	74.0	72.5	47.2	11.5
60	80.0	79.3	49.2	11.5
65	87.0	84.5	51.2	11.5
70	92.0	89.5	51.2	11.5
75	97.0	94.5	57.2	11.5
80	102.0	99.5	59.2	11.5
85	110.0	105.5	59.2	13.5
90	117.0	111.5	62.2	13.5
95	122.0	116.5	62.2	13.5
100	127.0	119.5	75.2	13.5

* Depending on material selected

SINGLE CONICAL SPRING

SSC02



PN		PART
3	---	ROTATING FACE
4	---	STATIONARY FACE
8	---	ROTATING FACE GASKET
9	---	STATIONARY FACE GASKET
16	---	SPRING
20	---	RETAINING RING
36	---	ROTATING FACE BODY

MATERIALS

Hardware : 316 SS, 304 SS

Rotating face : 316 SS, SiC, SSiC, TC

Stationary face : Carbon, SiC, SSiC, TC

Elastomers : NBR, FKM, EPDM

OPERATING CONDITIONS

Media : Water, Oil, etc..

Pressure : ≤ 12 Bar

Temperature * : - 20°C ~ 200°C

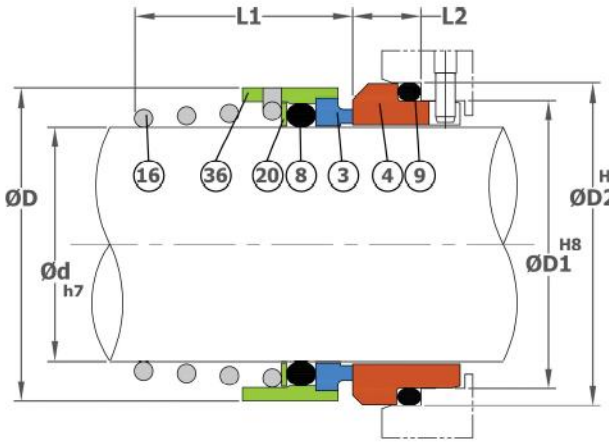
Speed : ≤ 10 m/s

SIZE d (mm)	D (mm)	D1 (mm)	D2 (mm)	L1 (mm)	L2 (mm)
16	26	23	27	16.5	10.0
18	31	27	33	18.0	11.5
20	34	29	35	19.0	11.5
22	36	31	37	20.5	11.5
24	38	33	39	22.0	11.5
25	39	34	40	23.5	11.5
28	42	37	43	24.5	11.5
30	44	39	45	24.5	11.5
32	46	42	48	28.0	11.5
35	49	44	50	28.0	11.5
38	54	49	56	31.0	14.0
40	56	51	58	34.0	14.0
45	61	56	63	36.5	14.0
48	64	59	66	42.0	14.0
50	66	62	70	43.0	15.0
55	71	67	75	47.0	15.0
58	78	70	78	50.0	15.0
60	79	72	80	51.0	15.0
65	85	77	85	52.0	15.0
68	88	81	90	52.7	18.0
70	90	83	92	54.0	18.0
75	98	88	97	54.0	18.0
80	103	95	105	58.0	18.2

* Depending on material selected

SINGLE CONICAL SPRING

SSC03



PN		PART
3	---	ROTATING FACE
4	---	STATIONARY FACE
8	---	ROTATING FACE GASKET
9	---	STATIONARY FACE GASKET
16	---	SPRING
20	---	RETAINING RING
36	---	ROTATING FACE BODY

MATERIALS

Hardware : 316 SS, 304 SS

Rotating face : 316 SS, SiC, SSiC, TC

Stationary face : Carbon, SiC, SSiC, TC

Elastomers : NBR, FKM, EPDM

OPERATING CONDITIONS

Media : Water, Oil, etc..

Pressure : ≤ 12 Bar

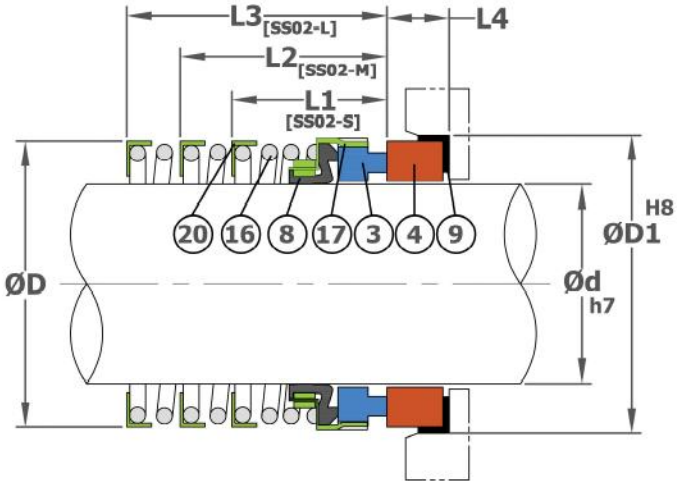
Temperature * : - 20°C ~ 200°C

Speed : ≤ 10 m/s

SIZE d (mm)	D (mm)	D1 (mm)	D2 (mm)	L1 (mm)	L2 (mm)
10	20.0	17.0	21.0	16.9	10.0
12	22.0	19.0	23.0	17.4	10.0
14	24.0	21.0	25.0	17.4	10.0
16	26.0	23.0	27.0	19.5	10.0
18	31.0	27.0	33.0	20.5	11.5
20	34.0	29.0	35.0	22.0	11.5
22	36.0	31.0	37.0	23.5	11.5
24	38.0	33.0	39.0	25.0	11.5
25	39.0	34.0	40.0	25.0	11.5
28	42.0	37.0	43.0	26.5	11.5
30	44.0	39.0	45.0	26.5	11.5
32	46.0	42.0	48.0	28.5	11.5
35	49.0	44.0	50.0	28.5	11.5
38	54.0	49.0	56.0	32.2	14.0
40	56.0	51.0	58.0	34.7	14.0
45	61.0	56.0	63.0	39.2	14.0
48	64.0	59.0	66.0	44.7	14.0
50	66.0	62.0	70.0	45.7	15.0
55	71.0	67.0	75.0	49.0	15.0
58	78.0	70.0	78.0	52.0	15.0
60	79.0	72.0	80.0	54.3	15.0
65	85.0	77.0	85.0	55.0	15.0
68	88.0	81.0	90.0	55.3	18.0
70	90.0	83.0	92.0	56.3	18.0
75	98.0	88.0	97.0	56.3	18.0
80	103.0	95.0	105.0	59.3	18.2

* Depending on material selected

SS02



PN		PART
3	---	ROTATING FACE
4	---	STATIONARY FACE
8	---	ROTATING FACE GASKET
9	---	STATIONARY FACE GASKET
16	---	SPRING
17	---	SPRING HOLDER
20	---	RETAINING RING

MATERIALS

Hardware : 316 SS

Rotating face : Carbon, SiC, SSiC

Stationary face : Ceramic, SiC, TC

Elastomers : NBR, FKM, EPDM

OPERATING CONDITIONS

Media : Water, Oil, Less Corrosive Mediums etc..

Pressure : ≤ 10 Bar

Temperature * : - 20°C ~ 180°C

Speed : ≤ 12 m/s

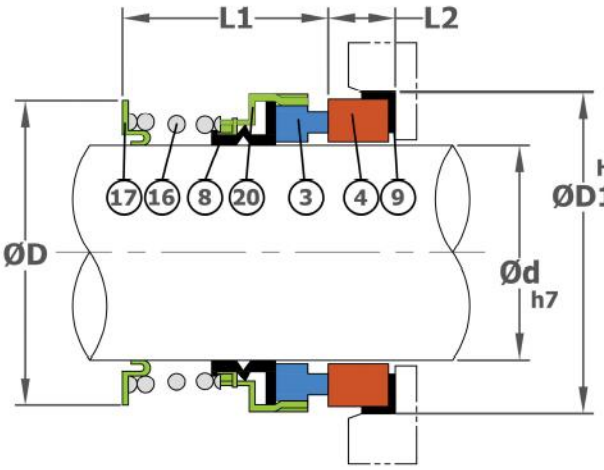
SIZE d (Inch)	D (mm)	D1 (mm)	L1 (mm)	L4 (mm)
.500	24.0	25.4	31.7	7.9
.625	26.7	31.7	34.9	10.3
.750	31.2	34.9	34.9	10.3
.875	33.5	38.1	36.5	10.3
1.000	43.2	41.2	41.2	11.1
1.125	46.5	44.4	42.8	11.1
1.250	49.5	47.6	42.8	11.1
1.375	52.7	50.8	42.8	11.1
1.500	56.0	53.9	42.8	11.1
1.625	62.2	60.3	50.8	12.7
1.750	66.0	63.5	50.8	12.7
1.875	66.0	66.6	53.9	12.7
2.000	73.0	69.8	53.9	12.7
2.125	73.5	76.2	60.3	14.2
2.250	79.6	79.3	60.3	14.2
2.375	82.0	82.5	63.5	14.2
2.500	85.0	85.7	63.5	14.2
2.625	88.5	85.7	69.8	15.9
2.750	92.7	88.9	69.8	15.9
2.875	95.0	95.2	73.0	15.9
3.000	102.0	98.0	73.0	15.9

SIZE d (mm)	D (mm)	D1 (mm)	L1 (mm)	L2 (mm)	L3 (mm)	L4 (mm)
10	20.0	21	23.9	25	44	8.6
12	21.7	23	23.9	25	44	8.6
14	24.0	25	26.4	25	44	8.6
16	26.7	27	26.4	25	44	8.6
18	30.5	33	27.5	25	44	10.0
20	33.5	35	27.5	25	44	10.0
22	33.5	37	27.5	25	44	10.0
24	38.0	39	30.0	25	44	10.0
25	39.5	40	30.0	25	60	10.0
28	42.0	43	32.5	33	60	10.0
30	44.0	45	32.5	33	60	10.0
32	46.0	48	32.5	33	60	10.0
33	46.0	48	32.5	33	60	10.0
35	49.0	50	32.5	33	60	10.0
38	53.0	56	34.0	33	60	11.0
40	56.0	58	34.0	33	60	11.0
43	58.0	61	34.0	40	70	11.0
45	64.0	66	34.0	40	70	11.0
48	66.0	70	34.5	40	70	13.0
50	70.7	73	34.5	41	70	13.0
53	71.7	75	34.5	41	70	13.0
55	79.6	78	37.2	41	71	13.0
58	78.5	80	39.5	41	71	13.0
60	81.5	83	39.5	41	71	13.0
63	84.5	85	39.5	41	71	13.0
65	89.7	90	39.5	49	71	15.3
70	89.7	92	44.7	49	71	15.3
75	97.0	97	44.7	52	73	15.3

* Depending on material selected

SINGLE SPRING

SS04



PN		PART
3	---	ROTATING FACE
4	---	STATIONARY FACE
8	---	ROTATING FACE GASKET
9	---	STATIONARY FACE GASKET
16	---	SPRING
17	---	SPRING HOLDER
20	---	RETAINING RING

MATERIALS

Hardware : 316 SS

Rotating face : Carbon, SiC, SSiC, TC

Stationary face : Ceramic, SiC, SSiC, TC

Elastomers : NBR, FKM, EPDM

OPERATING CONDITIONS

Media : Water, Oil, Less Corrosive Mediums etc..

Pressure : ≤ 10 Bar

Temperature * : - 20°C ~ 180°C

Speed : ≤ 12 m/s

SIZE d (Inch)	D (mm)	D1 (mm)	L1 (mm)	L2 (mm)
.625	27.76	31.75	33.52	10.29
.750	30.60	34.93	33.52	10.29
.875	35.00	38.10	35.13	10.29
1.000	39.00	41.28	39.87	11.10
1.125	42.00	44.45	41.48	11.10
1.250	45.00	47.63	41.48	11.10
1.375	49.00	50.80	43.05	11.10
1.500	51.00	53.98	43.05	11.10
1.625	58.00	60.33	51.00	12.70
1.750	61.00	63.50	51.00	12.70
1.875	63.80	66.68	54.17	12.70
2.000	68.00	69.85	54.17	12.70
2.125	71.42	76.20	60.53	14.27
2.250	74.60	79.38	60.53	14.27
2.375	77.77	82.55	63.70	14.27
2.500	80.95	85.73	63.70	14.27
2.625	85.73	85.73	70.05	15.90
2.750	88.90	88.90	70.05	15.90
2.875	92.08	95.25	73.20	15.90
3.000	95.25	98.43	73.20	15.90

* Depending on material selected

SS05

PN	PART
3	ROTATING FACE
4	STATIONARY FACE
8	ROTATING FACE O-RING / GASKET
9	STATIONARY FACE GASKET
16	SPRING
17	SPRING HOLDER
20	RETAINING RING

MATERIALS

Hardware : 316 SS

Rotating face : Carbon, SiC, TC

Stationary face : Ceramic, SiC, TC

Elastomers : FKM, EPDM, FFKM, PTFE, GFT, AFLAS

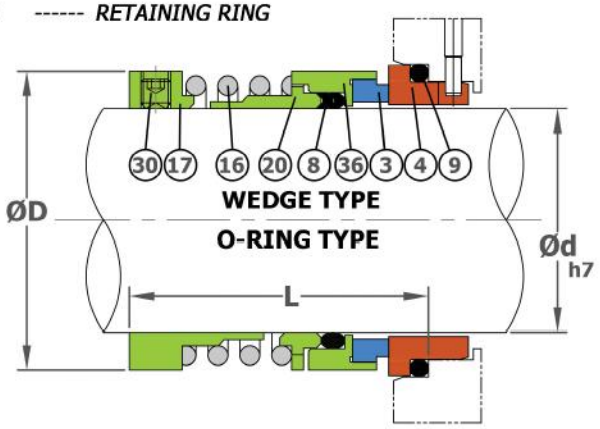
OPERATING CONDITIONS

Media : Water, Oil, etc..

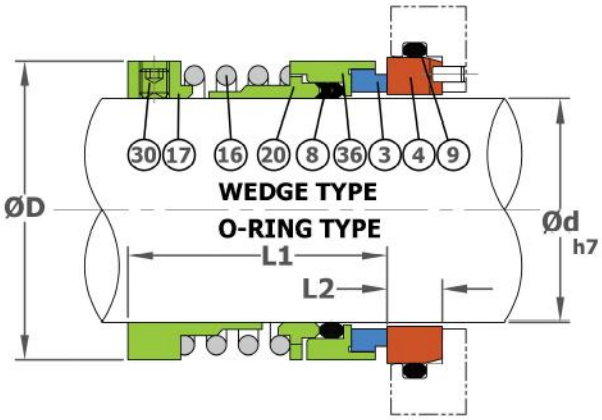
Pressure : ≤ 16 Bar

Temperature * : - 20°C ~ 280°C

Speed : ≤ 26 m/s



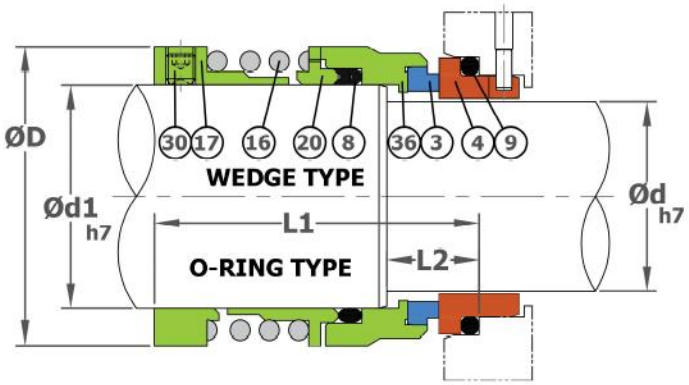
SIZE d (mm)	D (mm)	L (mm)
25	39.7	50
28	42.9	50
30	46.2	50
32	46.2	50
33	49.2	55
35	49.2	55
38	52.4	55
40	55.7	55
43	60.0	60
45	60.0	60
48	63.2	60
50	66.4	60
53	69.8	70
55	73.0	70
58	73.0	70
60	77.0	70
63	80.8	70
65	86.2	80
68	89.4	80
70	89.4	80
75	95.7	80
80	100.1	90



SIZE d (Inch)	D (mm)	L1 (mm)	L2 (mm)
.875	36.6	36.0	11.1
1.000	39.7	39.5	12.7
1.125	42.9	39.5	12.7
1.250	46.2	39.5	12.7
1.375	49.2	44.0	12.7
1.500	52.4	44.0	12.7
1.625	55.7	44.0	12.7
1.750	60.0	49.0	12.7
1.875	63.2	49.0	12.7
2.000	66.4	49.0	12.7
2.125	69.8	56.0	14.3
2.250	73.0	56.0	14.3
2.375	77.0	56.0	14.3
2.500	80.8	56.0	14.3
2.625	86.2	56.0	15.9
2.750	89.4	65.0	15.9
2.875	92.5	65.0	15.9
3.000	95.7	65.0	15.9
3.125	100.1	74.0	15.9
3.250	104.5	74.0	15.9

* Depending on material selected

SS05B



PN		PART
3	---	ROTATING FACE
4	---	STATIONARY FACE
8	---	ROTATING FACE O-RING / GASKET
9	---	STATIONARY FACE GASKET
16	---	SPRING
17	---	SPRING HOLDER
20	---	RETAINING RING
30	---	SET SCREW
36	---	ROTATING FACE BODY

MATERIALS

Hardware : 316 SS

Rotating face : Carbon, SiC, TC

Stationary face : Ceramic, SiC, TC

Elastomers : FKM, EPDM, FFKM, PTFE, GFT, AFLAS

OPERATING CONDITIONS

Media : Water, Oil, etc..

Pressure : ≤ 16 Bar

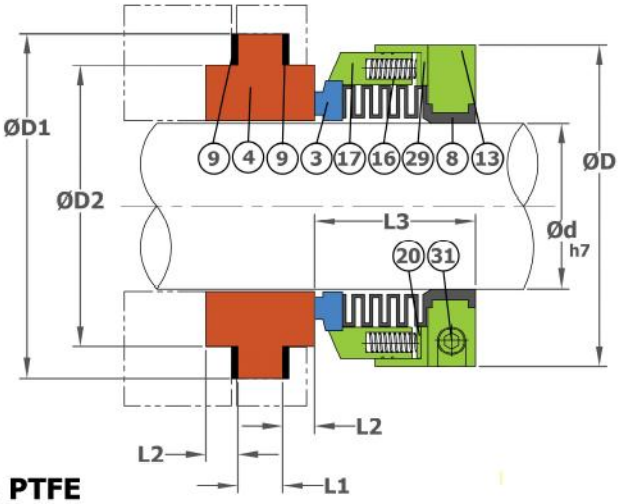
Temperature * : - 20°C ~ 280°C

Speed : ≤ 26 m/s

SIZE d (mm)	d1 (mm)	D (mm)	L1 (mm)	L2 (mm)
18	22	36	55	20
20	24	38	60	20
22	26	40	60	20
24	28	42	60	20
25	30	44	60	20
28	33	47	65	20
30	35	49	65	20
32	38	54	65	20
33	38	54	65	20
35	40	56	65	20
38	43	59	75	23
40	45	61	75	23
43	48	64	75	23
45	50	66	75	23
48	53	69	85	23
50	55	71	85	25
53	58	78	85	25
55	60	80	85	25
58	63	83	85	25
60	65	85	95	25
63	68	88	95	25
65	70	90	95	25
68	73	93	95	28
70	75	99	95	28
75	80	104	105	28
80	85	109	105	28
85	90	114	105	28
90	95	119	105	28
95	100	124	105	28
100	105	129	105	28

* Depending on material selected

SSTB



MATERIALS

Hardware : 316 SS

Rotating face : Carbon, SiC, SSiC, PTFE

Stationary face : Ceramic, SiC, SSiC

Elastomers : PTFE

OPERATING CONDITIONS

Media : Sulfuric Acid, Hydrochloric Acid, Phosporic Acid, Acetic Acid, Nitric Acid with Various Degrees, etc..

Pressure : ≤ 10 Bar

Temperature * : - 45°C ~ 120°C

Speed : ≤ 12 m/s

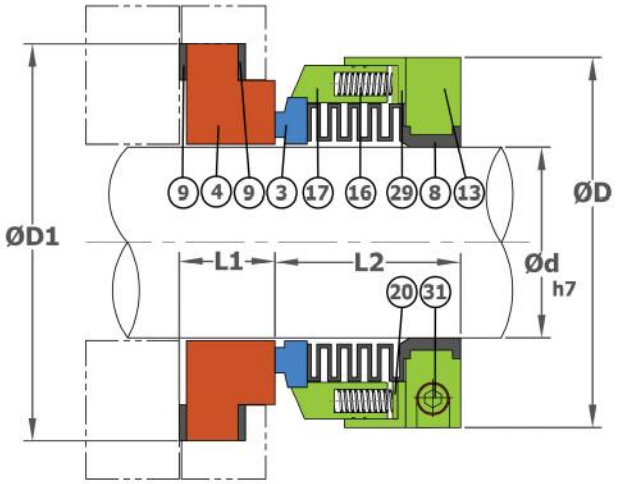
PN		PART
3	---	ROTATING FACE
4	---	STATIONARY FACE
8	---	ROTATING FACE GASKET
9	---	STATIONARY FACE GASKET
13	---	DRIVE COLLAR
16	---	SPRING
17	---	SPRING HOLDER
20	---	RETAINING RING
29	---	BACKUP PLATE
31	---	CAP SCREW

SIZE d (Inch)	D (mm)	D1 (mm)	D2 (mm)	L1 (mm)	L2 (mm)	L3 (mm)
1.000	61	54	42.86	19.05	4.8	33
1.125	67	65	50.80	22.25	8.0	36
1.250	70	68	53.98	22.25	8.0	37
1.375	73	71	57.15	22.25	8.0	38
1.500	76	78	63.50	22.25	8.0	38
1.625	80	81	66.68	22.25	8.0	40
1.750	83	84	69.85	22.25	8.0	40
1.875	86	87	73.03	22.25	8.0	43
2.000	89	97	79.38	28.58	9.5	43
2.125	103	100	82.55	28.58	9.5	53
2.250	107	103	85.73	28.58	9.5	53
2.375	110	106	88.90	28.58	9.5	53

SIZE d (mm)	D (mm)	D1 (mm)	D2 (mm)	L1 (mm)	L2 (mm)	L3 (mm)
25	61	54	42.86	19.05	4.8	33
30	70	68	53.98	22.25	8.0	37
32	70	68	53.98	22.25	8.0	37
35	73	71	57.15	22.25	8.0	38
40	80	81	66.68	22.25	8.0	40
45	83	84	69.85	22.25	8.0	40
50	89	97	79.38	28.58	9.5	43
55	107	103	85.73	28.58	9.5	53
60	110	106	88.90	28.58	9.5	53
65	116	113	95.25	28.58	9.5	53

* Depending on material selected

SSTB1



PN		PART
3	---	ROTATING FACE
4	---	STATIONARY FACE
8	---	ROTATING FACE GASKET
9	---	STATIONARY FACE GASKET
13	---	DRIVE COLLAR
16	---	SPRING
17	---	SPRING HOLDER
20	---	RETAINING RING
29	---	BACKUP PLATE
31	---	CAP SCREW

MATERIALS

Hardware : 316 SS

Rotating face : Carbon, SiC, SSiC, PTFE

Stationary face : Ceramic, SiC, SSiC

Elastomers : PTFE

OPERATING CONDITIONS

Media : Sulfuric Acid, Hydrochloric Acid, Phosporic Acid, Acetic Acid, Nitric Acid with Various Degrees, etc..

Pressure : ≤ 10 Bar

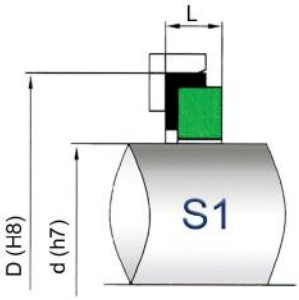
Temperature * : - 45°C ~ 120°C

Speed : ≤ 12 m/s

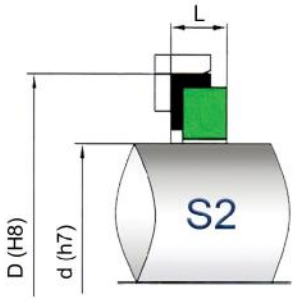
SIZE d (mm)	D (mm)	D1 (mm)	L1 (mm)	L2 (mm)
25	61	48	13	33
30	70	53	13	37
35	73	58	13	38
40	80	63	13	40
45	83	68	16	40
50	89	73	16	43
55	107	78	16	53
60	110	83	17	53
65	116	88	17	53

* Depending on material selected

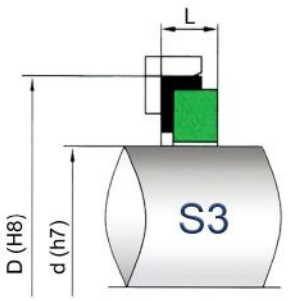
STATIONARY FACES



SIZE d (mm)	D (mm)	L (mm)
10	21	5.0
12	23	6.0
14	25	6.0
15	26	6.0
16	27	6.0
18	33	6.0
20	35	6.0
22	37	6.0
24	39	6.0
25	40	6.0
28	43	6.0
30	45	7.0
32	48	7.0
33	48	7.0
35	50	8.0
38	56	8.0
40	58	8.0
43	61	8.0
45	63	8.0
48	66	10.0
50	70	10.0
53	73	10.0
55	75	10.0
58	78	10.0
60	80	12.0
63	83	12.0
65	85	12.0
68	90	12.0
70	92	12.0
75	97	12.0
80	105	12.5
85	110	12.5
90	115	12.5
95	120	12.5
100	125	12.5

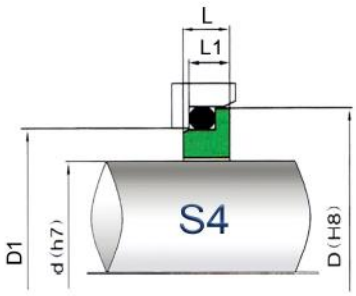


SIZE d (mm)	D (mm)	L (mm)
10	24.60	9.0
12	27.80	9.0
14	30.95	10.5
15	30.95	10.5
16	30.95	10.5
18	34.15	10.5
19	34.15	10.5
20	35.70	10.5
22	37.30	10.5
24	40.50	10.5
25	40.50	10.5
28	46.65	12.0
30	50.80	12.0
32	50.80	12.0
33	54.00	12.0
35	54.00	12.0
38	57.15	12.0
40	63.50	12.0
42	63.50	12.0
43	63.50	12.0
45	63.50	12.0
48	66.70	12.0
50	69.85	13.5
53	73.05	13.5
55	76.20	13.5
58	79.40	13.5
60	79.40	13.5
63	82.50	16.0
65	92.10	16.0
68	95.25	16.0
70	95.25	16.0
75	101.60	16.0
80	114.30	20.0
85	117.50	20.0
90	123.85	20.0
95	127.00	20.0
100	133.35	20.0

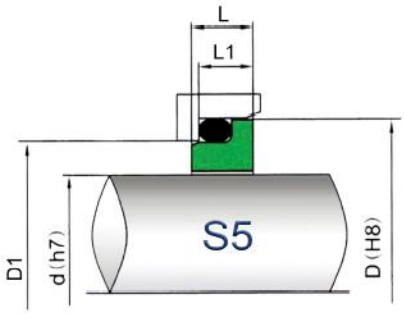


SIZE d (mm)	D (mm)	L (mm)
10	21	6.6
12	23	6.6
14	25	6.6
16	27	6.6
18	33	7.5
20	35	7.5
22	37	7.5
24	39	7.5
25	40	7.5
28	43	7.5
30	45	7.5
32	48	7.5
33	48	7.5
35	50	7.5
38	56	9.0
40	58	9.0
43	61	9.0
45	63	9.0
48	66	9.0
50	70	9.5
53	73	11.0
55	75	11.0
58	78	11.0
60	80	11.0
65	85	11.0
68	90	11.3
70	92	11.3
75	97	11.3
80	105	12.0
85	110	14.0
90	115	14.0
95	120	14.0
100	125	14.0

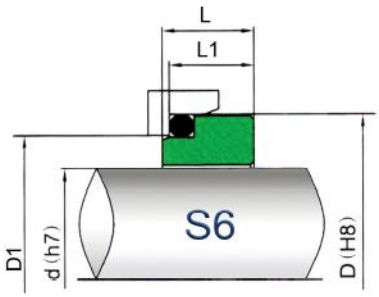
STATIONARY FACES



SIZE d (mm)	D (mm)	D1 (mm)	L (mm)	L1 (mm)
12	23	19	6.8	6.0
14	25	21	6.8	6.0
16	27	23	6.8	6.0
18	33	27	7.0	6.0
20	35	29	7.0	6.0
22	37	31	7.0	6.0
24	39	33	7.0	6.0
25	40	34	7.0	6.0
28	43	37	7.0	6.0
30	45	39	8.0	7.0
32	48	42	8.0	7.0
33	48	42	8.0	7.0
35	50	44	9.0	8.0
38	56	49	9.0	8.0
40	58	51	9.0	8.0
43	61	54	9.0	8.0
45	63	56	9.0	8.0
48	66	59	11.0	10.0
50	70	62	11.0	10.0
53	73	65	11.0	10.0
55	75	67	11.0	10.0
58	78	70	11.0	10.0
60	80	72	12.7	12.0
65	85	77	12.7	12.0
68	90	81	12.7	12.0
70	92	83	12.7	12.0
75	97	88	12.7	12.0
80	105	95	13.2	12.5
85	110	100	13.2	12.5
90	115	105	13.2	12.5
95	120	110	13.2	12.5
100	125	115	13.2	12.5

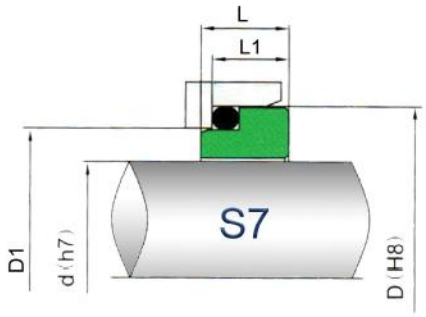


SIZE d (mm)	D (mm)	D1 (mm)	L (mm)	L1 (mm)
10	21	17	7.5	6.6
12	23	19	7.5	6.6
14	25	21	7.5	6.6
16	27	23	7.5	6.6
18	33	27	8.5	7.5
20	35	29	8.5	7.5
22	37	31	8.5	7.5
24	39	33	8.5	7.5
25	40	34	8.5	7.5
28	43	37	8.5	7.5
30	45	39	8.5	7.5
32	48	42	8.5	7.5
33	48	42	8.5	7.5
35	50	44	8.5	7.5
38	56	49	10.0	9.0
40	58	51	10.0	9.0
43	61	54	10.0	9.0
45	63	56	10.0	9.0
48	66	59	10.0	9.0
50	70	62	10.5	9.5
53	73	65	12.0	11.0
55	75	67	12.0	11.0
58	78	70	12.0	11.0
60	80	72	12.0	11.0
65	85	77	12.0	11.0
68	90	81	12.5	11.3
70	92	83	12.5	11.3
75	97	88	12.5	11.3
80	105	95	13.0	12.0
85	110	100	15.0	14.0
90	115	105	15.0	14.0
95	120	110	15.0	14.0
100	125	115	15.0	14.0

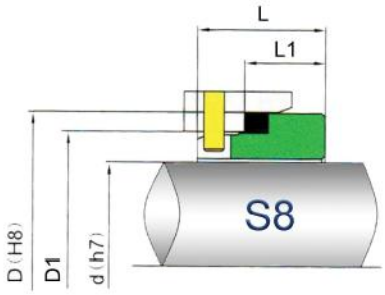


SIZE d (mm)	D (mm)	D1 (mm)	L (mm)	L1 (mm)
14	25	21	12.8	12.0
16	27	23	12.8	12.0
18	33	27	13.0	12.0
20	35	29	13.0	12.0
22	37	31	13.0	12.0
24	39	33	13.0	12.0
25	40	34	13.0	12.5
28	43	37	13.0	13.0
30	45	39	13.0	13.0
32	48	42	13.0	13.0
33	48	42	13.0	13.0
35	50	44	13.5	13.0
38	56	49	14.0	13.0
40	58	51	14.0	13.0
43	61	54	14.0	13.0
45	63	56	14.0	13.0
48	66	59	14.0	13.0
50	70	62	14.0	13.5
53	73	65	14.2	13.5
55	75	67	14.2	13.5
58	78	70	14.2	13.5
60	80	72	14.2	13.5
65	85	77	14.5	13.5
68	90	81	14.5	13.5
70	92	83	15.2	14.5
75	97	88	15.2	14.5
80	105	95	15.7	15.0
85	110	100	15.7	15.0
90	115	105	15.7	15.0
95	120	110	15.7	15.0
100	125	115	15.7	15.0

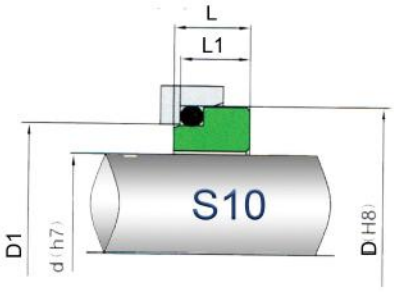
STATIONARY FACES



SIZE d (mm)	D (mm)	D1 (mm)	L (mm)	L1 (mm)
10	21	17	10.0	8.6
12	23	19	10.0	8.6
14	25	21	10.0	8.6
16	27	23	10.0	8.6
18	33	27	11.5	10.0
20	35	29	11.5	10.0
22	37	31	11.5	10.0
24	39	33	11.5	10.0
25	40	34	11.5	10.0
28	43	37	11.5	10.0
30	45	39	11.5	10.0
32	48	42	11.5	10.0
33	48	42	11.5	10.0
35	50	44	11.5	10.0
38	56	49	12.5	11.0
40	58	51	12.5	11.0
43	61	54	12.5	11.0
45	63	56	12.5	11.0
48	66	59	12.5	11.0
50	70	62	14.5	13.0
53	73	65	14.5	13.0
55	75	67	14.5	13.0
58	78	70	14.5	13.0
60	80	72	14.5	13.0
65	85	77	14.5	13.0
68	90	81	16.5	15.3
70	92	83	16.5	15.3
75	97	88	16.5	15.3
80	105	95	17.5	15.7
85	110	100	17.5	15.7
90	115	105	17.5	15.7
95	120	110	17.5	15.7
100	125	115	17.5	15.7

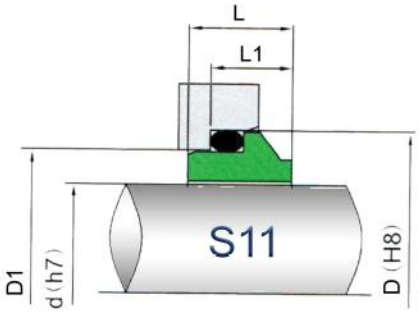


SIZE d (mm)	D (mm)	D1 (mm)	L (mm)	L1 (mm)
14	25	21	18.5	12.0
16	27	23	18.5	12.0
18	33	27	19.0	12.0
20	35	29	19.0	12.0
22	37	31	19.0	12.0
24	39	33	19.0	12.0
25	40	34	19.5	12.0
28	43	37	20.0	12.5
30	45	39	20.0	13.0
32	48	42	20.0	13.0
33	48	42	20.0	13.0
35	50	44	20.0	13.0
38	56	49	20.0	13.0
40	58	51	20.0	13.0
43	61	54	20.0	13.0
45	63	56	20.0	13.0
48	66	59	20.0	13.0
50	70	62	20.5	13.5
53	73	65	20.5	13.5
55	75	67	20.5	13.5
58	78	70	20.5	13.5
60	80	72	20.5	13.5
65	85	77	20.5	13.5
68	90	81	20.5	13.5
70	92	83	21.5	14.5
75	97	88	21.5	14.5
80	105	95	22.0	15.0
85	110	100	22.0	15.0
90	115	105	22.0	15.0
95	120	110	22.0	15.0
100	125	115	22.0	15.0

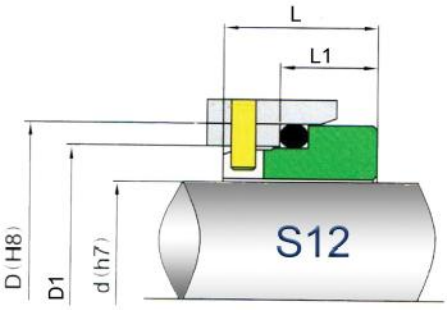


SIZE d (mm)	D (mm)	D1 (mm)	L (mm)	L1 (mm)
10	19.2	15.5	7.5	6.6
12	21.6	17.5	6.5	5.6
14	24.6	20.5	6.5	5.6
15	24.6	20.5	7.5	6.6
16	28.0	22.0	8.5	7.5
18	30.0	24.0	9.0	8.0
20	35.0	29.5	8.5	7.5
22	35.0	29.5	8.5	7.5
24	38.0	32.0	8.5	7.5
25	38.0	32.0	8.5	7.5
28	42.0	36.0	10.0	9.0
30	45.0	39.2	11.5	10.5
32	48.0	42.2	11.5	10.5
33	50.0	44.2	12.0	11.0
35	52.0	46.2	12.0	11.0
38	55.0	49.2	11.3	10.3
40	58.0	52.2	11.8	10.8
42	62.0	53.3	13.2	12.0
43	62.0	53.3	13.2	12.0
45	64.0	55.3	12.8	11.6
48	68.4	59.7	12.8	11.6
50	69.3	60.8	12.8	11.6
53	72.3	63.8	13.5	12.3
55	75.4	66.5	14.5	13.3
58	78.4	69.5	14.5	13.3
60	80.4	71.5	14.5	13.3
63	83.4	74.5	14.2	13.3
65	85.4	76.5	14.2	13.0
68	91.5	82.7	14.9	13.7
70	92.0	83.0	14.2	13.0
75	99.0	90.2	15.2	14.0
80	104.0	95.2	16.2	15.0
85	109.0	100.2	16.0	14.8
90	114.0	105.2	16.0	14.8
95	120.3	111.6	17.0	15.8
100	123.3	114.5	17.0	15.8

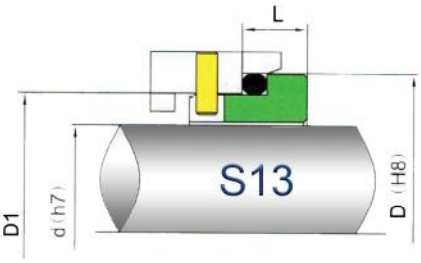
STATIONARY FACES



SIZE d (mm)	D (mm)	D1 (mm)	L (mm)	L1 (mm)
10	19.2	15.5	9	7.1
12	21.6	17.5	10	7.6
14	24.6	20.5	10	7.6
15	24.6	20.5	11	8.6
16	28.0	22.0	12	9.0
18	30.0	24.0	13	10.0
20	35.0	29.5	13	9.5
22	35.0	29.5	13	9.5
24	38.0	32.0	13	9.5
25	38.0	32.0	13	9.5
28	42.0	36.0	14	11.0
30	45.0	39.2	14	11.0
32	48.0	42.2	14	11.0
33	50.0	44.2	15	11.5
35	52.0	46.2	15	11.5
38	55.0	49.2	15	11.5
40	58.0	52.2	15	11.5
42	62.0	53.3	17	14.3
43	62.0	53.3	17	14.3
45	64.0	55.3	17	14.3
48	68.4	59.7	17	14.3
50	69.3	80.8	17	14.3
53	72.3	63.8	17	14.3
55	75.4	66.5	18	15.3
58	78.4	69.5	18	15.3
60	80.4	71.5	18	15.3
63	83.4	74.5	18	15.3
65	85.4	76.5	18	15.3
68	91.5	82.7	19	16.0
70	92.0	83.0	18	15.3
75	99.0	90.2	18	15.3
80	104.0	95.2	19	16.3
85	109.0	100.2	19	16.3
90	114.0	105.2	19	16.3
95	120.3	111.6	20	17.3
100	123.3	114.5	20	17.3

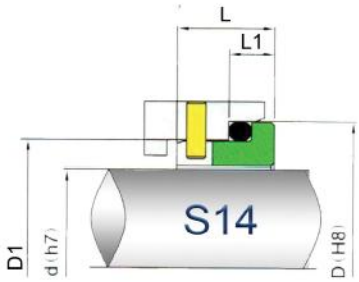


SIZE d (mm)	D (mm)	D1 (mm)	L (mm)	L1 (mm)
10	21	17	15.0	8.6
12	23	19	15.0	8.6
14	25	21	15 0	8.6
16	27	23	15.0	8.6
18	33	27	17.0	10.0
20	35	29	17.0	10.0
22	37	31	17.0	10.0
24	39	33	17.0	10.0
25	40	34	17.0	10.0
28	43	37	17.0	10.0
30	45	39	17.0	10.0
32	48	42	17.0	10.0
33	48	42	17.0	10.0
35	50	44	17.0	10.0
38	56	49	18.0	11.0
40	58	51	18.0	11.0
43	61	54	18.0	11.0
45	63	56	18.0	11.0
48	66	59	18.0	11.0
50	70	62	20.0	13.0
53	73	65	20.0	13.0
55	75	67	20.0	13.0
58	78	70	20.0	13.0
60	80	72	20.0	13.0
65	85	77	20.0	13.0
68	90	81	22.0	15.3
70	92	83	22.0	15.3
75	97	88	22.0	15.3
80	105	95	22.5	15.7
85	110	100	22.5	15.7
90	115	105	22.5	15.7
95	120	110	22 5	15.7
100	125	115	22.5	15.7

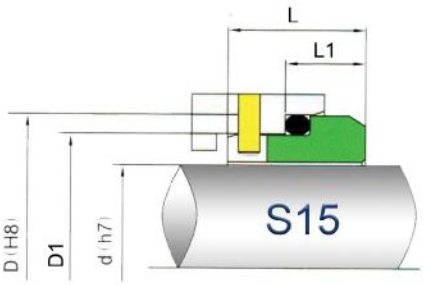


SIZE d (mm)	D (mm)	D1 (mm)	L (mm)
15	28.57	24.31	6.2
20	33.32	29.06	7.2
25	39.67	33.83	9.2
30	44.45	38.61	9.2
35	49.20	43.46	9.2
40	53.97	48.13	9.2
45	58.72	52.98	9.2
50	65.07	59.33	9.2
55	69.85	64.01	9.2
60	76.20	70.36	9.2
65	80.97	75.21	9.2
70	85.72	79.88	9.2
75	90.47	84.73	9.2
80	98.42	92.58	9.2
85	104.77	98.93	9.2
90	109.52	103.78	9.2
95	114.30	108.46	9.2
100	119.07	113.31	9.2

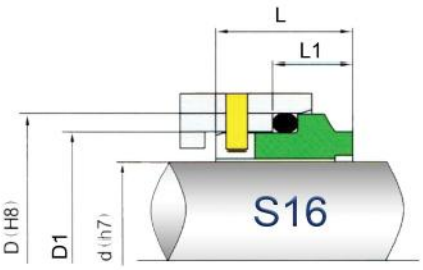
STATIONARY FACES



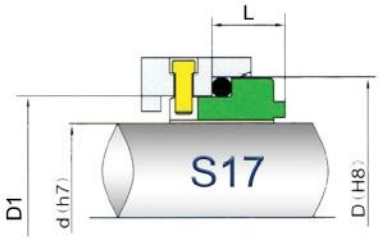
SIZE d (mm)	D (mm)	D1 (mm)	L (mm)	L1 (mm)
18	33	27	15.0	7.0
20	35	29	15.0	7.0
22	37	31	15.0	7.0
24	39	33	15.0	7.0
25	40	34	15.0	7.0
28	43	37	15.0	7.0
30	45	39	15.0	7.0
32	48	42	15.0	7.0
33	48	42	15.0	7.0
35	50	44	15.0	7.0
38	56	49	16.0	8.0
40	58	51	16.0	8.0
43	61	54	16.0	8.0
45	63	56	16.0	8.0
48	66	59	16.0	8.0
50	70	62	17.0	9.5
53	73	65	17.0	9.5
55	75	67	17.0	9.5
58	78	70	18.0	10.5
60	80	72	18.0	10.5
65	85	77	18.0	10.5
68	90	81	18.5	11.0
70	92	83	19.0	11.5
75	97	88	19.0	11.5
80	105	95	19.0	11.5
85	110	100	19.0	11.5
90	115	105	20.5	13.0
95	120	110	20.5	13.0
100	125	115	20.5	13.0



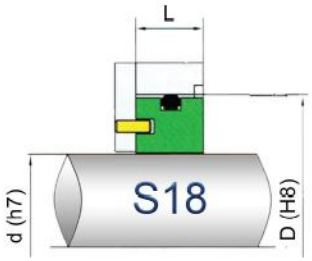
SIZE d (mm)	D (mm)	D1 (mm)	L (mm)	L1 (mm)
10	21	17	17.5	10.0
12	23	19	17.5	10.0
14	25	21	17.5	10.0
16	27	23	17.5	10.0
18	33	27	19.5	11.5
20	35	29	19.5	11.5
22	37	31	19.5	11.5
24	39	33	19.5	11.5
25	40	34	19.5	11.5
28	43	37	19.5	11.5
30	45	39	19.5	11.5
32	48	42	19.5	11.5
33	48	42	19.5	11.5
35	50	44	19.5	11.5
38	56	49	22.0	14.0
40	58	51	22.0	14.0
43	61	54	22.0	14.0
45	63	56	22.0	14.0
48	66	59	22.0	14.0
50	70	62	23.0	15.0
53	73	65	23.0	15.0
55	75	67	23.0	15.0
58	78	70	23.0	15.0
60	80	72	23.0	15.0
65	85	77	23.0	15.0
68	90	81	25.2	17.2
70	92	83	25.2	17.2
75	97	88	26.0	18.0
80	105	95	26.0	18.0
85	110	100	26.0	18.0
90	115	105	26.2	18.2
95	120	110	26.2	18.2
100	125	115	26.2	18.2



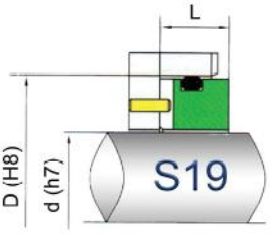
SIZE d (mm)	D (mm)	D1 (mm)	L (mm)	L1 (mm)
10	21.0	17.0	17.5	10.0
12	23.0	19.0	17.5	10.0
14	25.0	21.0	17.5	10.0
16	27.0	23.0	17.5	10.0
18	33.0	27.0	19.5	11.5
20	35.0	29.0	19.5	11.5
22	37.0	31.0	19.5	11.5
24	39.0	33.0	19.5	11.5
25	40.0	34.0	19.5	11.5
28	43.0	37.0	19.5	11.5
30	45.0	39.0	19.5	11.5
32	48.0	42.0	19.5	11.5
33	48.0	42.0	19.5	11.5
35	50.0	44.0	19.5	11.5
38	56.0	49.0	22.0	14.0
40	58.0	51.0	22.0	14.0
43	61.0	54.0	22.0	14.0
45	63.0	56.0	22.0	14.0
48	66.0	59.0	22.0	14.0
50	70.0	62.0	23.0	15.0
53	73.0	65.0	23.0	15.0
55	75.0	67.0	23.0	15.0
58	78.0	70.0	23.0	15.0
60	80.0	72.0	23.0	15.0
65	85.0	77.0	23.0	15.0
68	90.0	81.0	25.2	17.2
70	92.0	83.0	25.2	17.2
75	97.0	88.0	26.0	18.0
80	105.0	95.0	26.0	18.0
85	110.0	100.0	26.0	18.0
90	115.0	105.0	26.2	18.2
95	120.0	110.0	26.2	18.2
100	125.0	115.0	26.2	18.2



SIZE d (mm)	D (mm)	D1 (mm)	L (mm)
20	35.0	29.0	13.0
22	37.0	31.0	13.0
24	39.0	33.0	13.0
25	40.0	34.0	13.0
28	43.0	37.0	13.0
30	45.0	39.0	13.0
32	48.0	42.0	13.0
33	48.0	42.0	13.0
35	50.0	44.0	13.0
38	56.0	49.0	13.0
40	58.0	51.0	13.0
43	61.0	54.0	13.0
45	63.0	56.0	13.0
48	66.0	59.0	13.0
50	70.0	62.0	13.0
53	73.0	65.0	13.0
55	75.0	67.0	13.0
58	78.0	70.0	16.0
60	80.0	72.0	16.0
63	84.0	75.0	16.0
65	85.0	77.0	16.0
68	90.0	81.0	16.0
70	92.0	83.0	16.0
75	97.0	88.0	16.0
80	105.0	95.0	16.0
85	110.0	100.0	16.0
90	115.0	105.0	16.0
95	120.0	110.0	16.0
100	125.0	115.0	16.0



SIZE d (Inch)	D (mm)	L (mm)
.375	24.60	8.7
.500	27.80	8.7
.625	30.95	10.3
.750	34.15	10.3
.813	35.70	10.3
.875	37.30	10.3
1.000	40.50	10.3
1.125	47.65	11.9
1.250	50.80	11.9
1.375	54.00	11.9
1.500	57.15	11.9
1.625	60.35	11.9
1.750	63.50	11.9
1.875	66.70	11.9
2.000	69.85	13.5
2.125	73.05	13.5
2.250	76.20	13.5
2.375	79.40	13.5
2.500	82.55	13.5
2.625	92.10	15.9
2.750	95.25	15.9
2.875	98.43	15.9
3.000	101.60	15.9
3.125	111.15	19.9
3.250	114.30	19.9
3.375	117.48	19.9
3.500	120.65	19.9
3.625	123.85	19.9
3.750	127.00	19.9
3.875	130.20	19.9
4.000	133.35	19.9

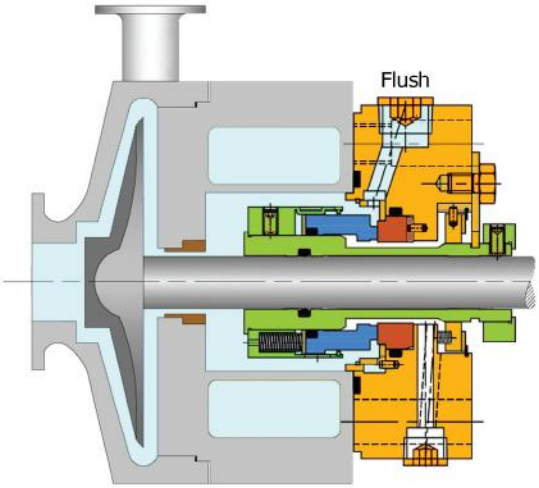


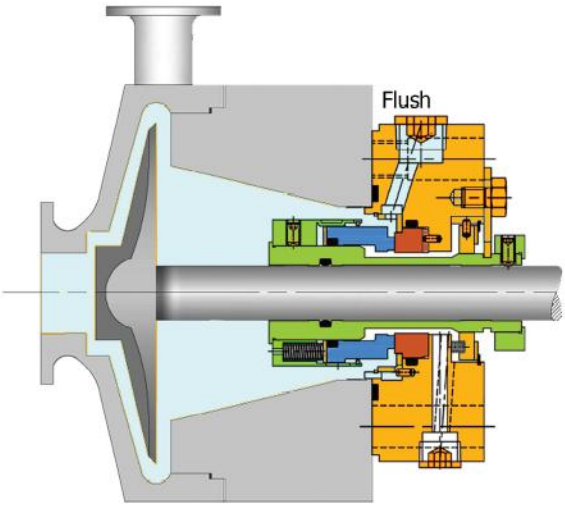
SIZE d (Inch)	D (Inch)	L (Inch)
.375	.875	.312
.500	1.000	.312
.625	1.250	.406
.750	1.375	.406
.875	1.500	.406
1.000	1.625	.437
1.125	1.750	.437
1.250	1.875	.437
1.375	2.000	.437
1.500	2.125	.437
1.625	2.375	.500
1.750	2.500	.500
1.875	2.625	.500
2.000	2.750	.500
2.125	3.000	.562
2.250	3.125	.562
2.375	3.250	.562
2.500	3.375	.562
2.625	3.375	.625
2.750	3.500	.625
2.875	3.750	.625
3.000	3.875	.625
3.125	4.000	.781
3.250	4.125	.781
3.375	4.250	.781
3.500	4.375	.781
3.625	4.500	.781
3.750	4.625	.781
3.875	4.750	.781
4.000	4.875	.781

SINGLE SEAL PIPING PLANS

PLAN 02

Dead Ended Seal Chamber with no flush fluid circulation. Used in cool clean fluids with high specific heat, low seal chamber pressure, in relatively low speed pumps.



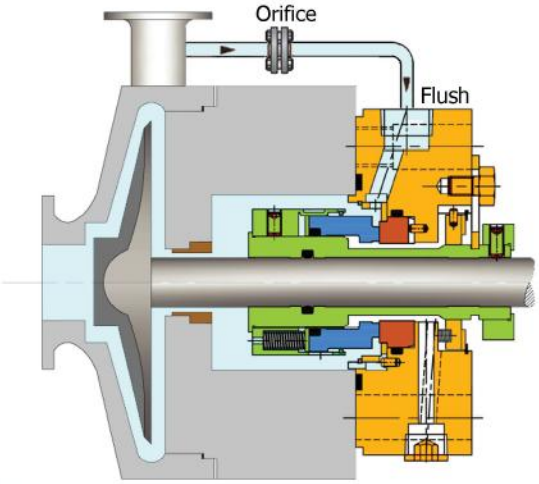


PLAN 03

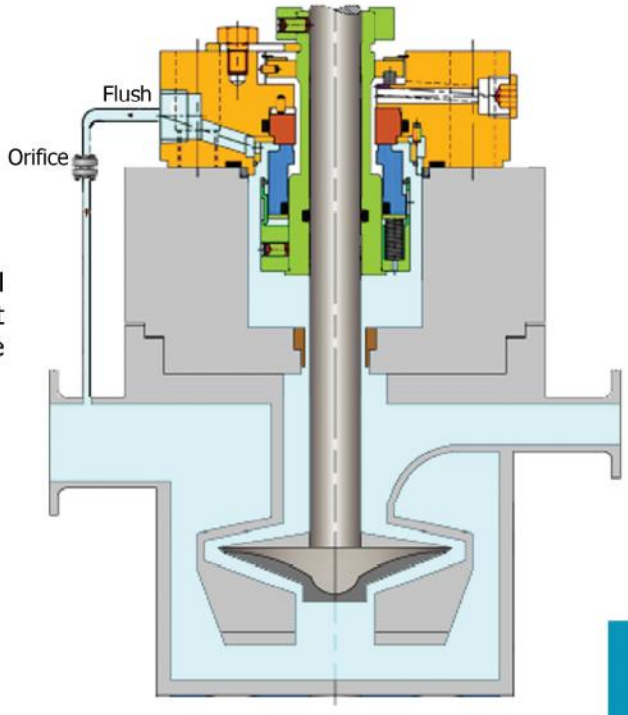
Circulation created by the design of the Seal Chamber. The seal chamber has a tapered bore and no throat bushing. Taper Bored Seal Chamber shape creates a velocity profile that expels solids & circulates cool fluid to the Seal.

PLAN 11

Recirculation from a high-pressure region of the pump (typically pump discharge piping) through a flow control orifice to the seal. This is the default seal flush plan for all Arrangement 1 and 2 seals.

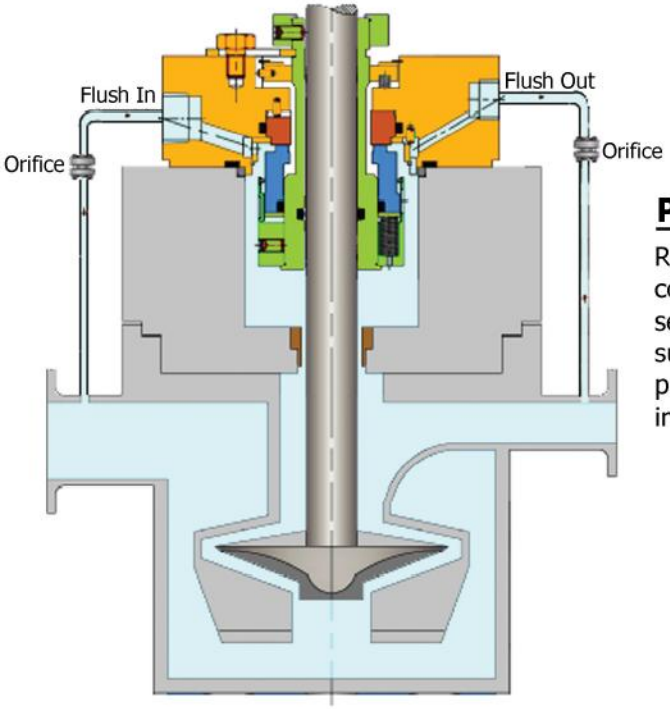


SINGLE SEAL PIPING PLANS



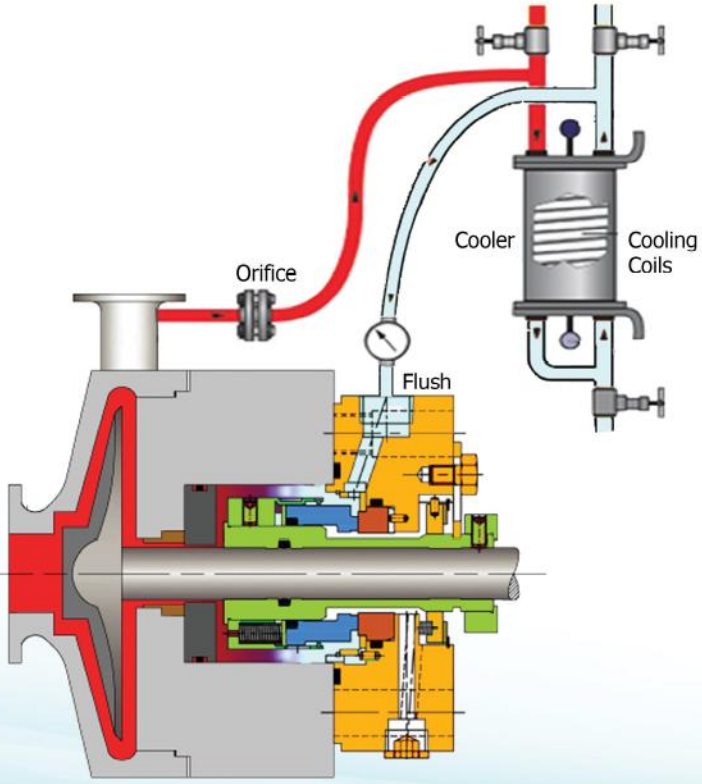
PLAN 13

Recirculation from the seal chamber through a flow control orifice and back to the pump suction or pump suction piping. It is the standard flush plan selection for vertical pumps that are not provided with a bleed bushing below the seal chamber.



PLAN 14

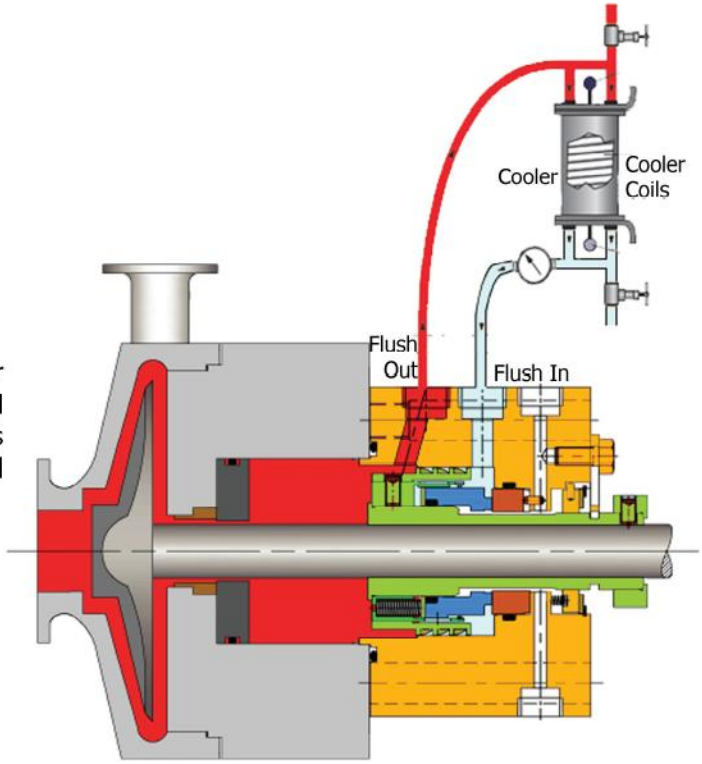
Recirculation from pump discharge through a flow control orifice to the seal and simultaneously from the seal chamber through a flow control orifice to pump suction. This allows fluid to enter the seal chamber and provide cooling while continuously venting the pressure in the seal chamber.



PLAN 21

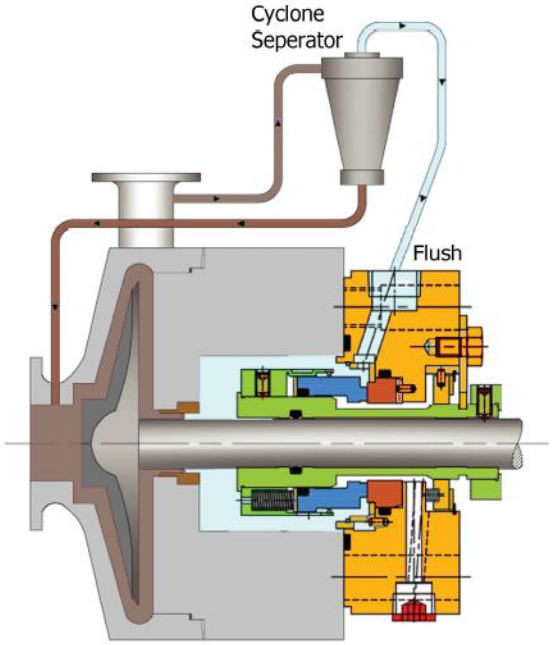
Recirculation from a high-pressure region of the pump (typically pump discharge piping) through a flow control orifice and cooler, then into the seal chamber. Provides a cool flush to the seal. This may be needed to improve the margin to vapor formation, to meet secondary sealing element temperature limits.

SINGLE SEAL PIPING PLANS



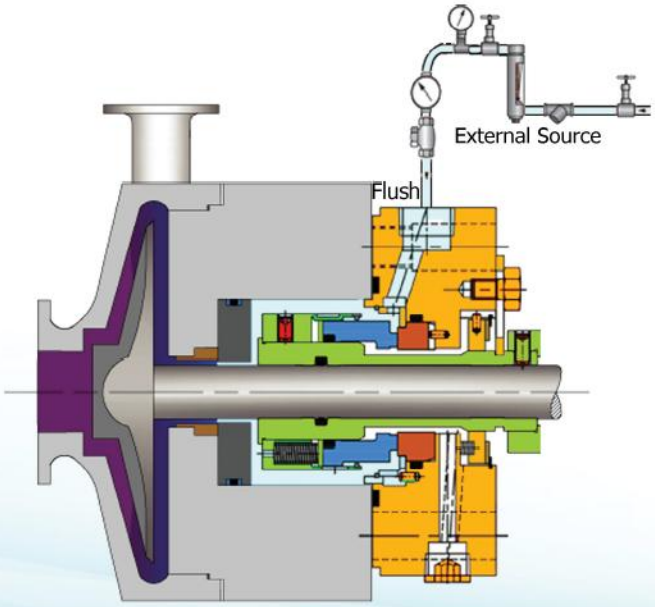
PLAN 23

Recirculation from a circulation device in the seal chamber through a cooler and back into the seal chamber. The seal is equipped with an internal circulating device that circulates seal chamber fluid through a cooler and back to the seal chamber.



PLAN 31

Recirculation from a high-pressure region of the pump (typically the pump discharge piping) through a cyclone separator delivering the clean fluid to the seal chamber. The solids are delivered to the pump suction line. This is used for water service to remove sand or pipe slag.



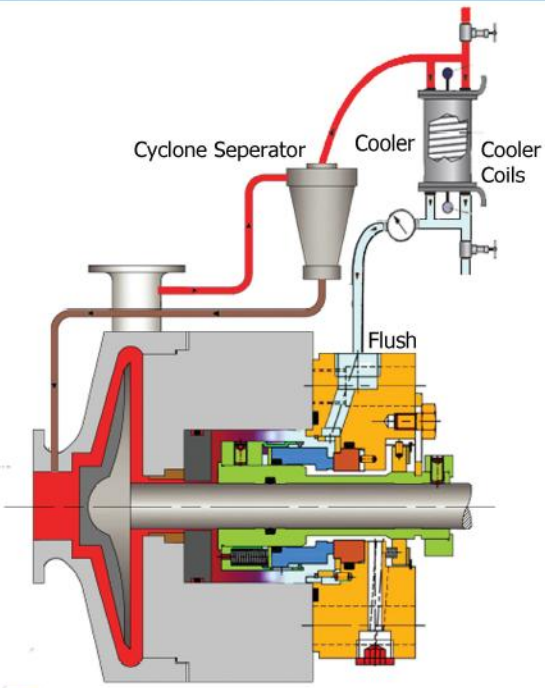
PLAN 32

Flushing product is brought from an external source to the seal. The external flush should be continuous and reliable even during nonstandard situations. Used in services containing solids or contaminants, in which a suitable cleaner or cooler external flush will improve the seal environment.

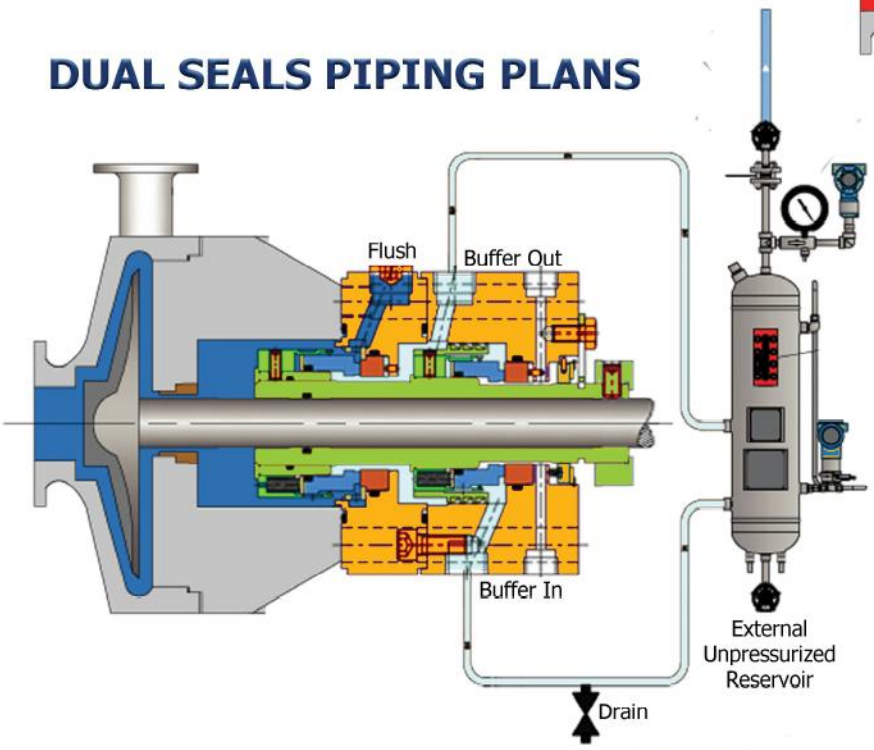
SINGLE SEAL PIPING PLANS

PLAN 41

Recirculation from a high-pressure region of the pump (typically the pump discharge piping) through a cyclone separator delivering the clean fluid to a cooler and then to the seal chamber. The solids are delivered to the pump suction line. combination of Piping Plan 21 and Piping Plan 31 and is specified only for hot services containing solids.



DUAL SEALS PIPING PLANS

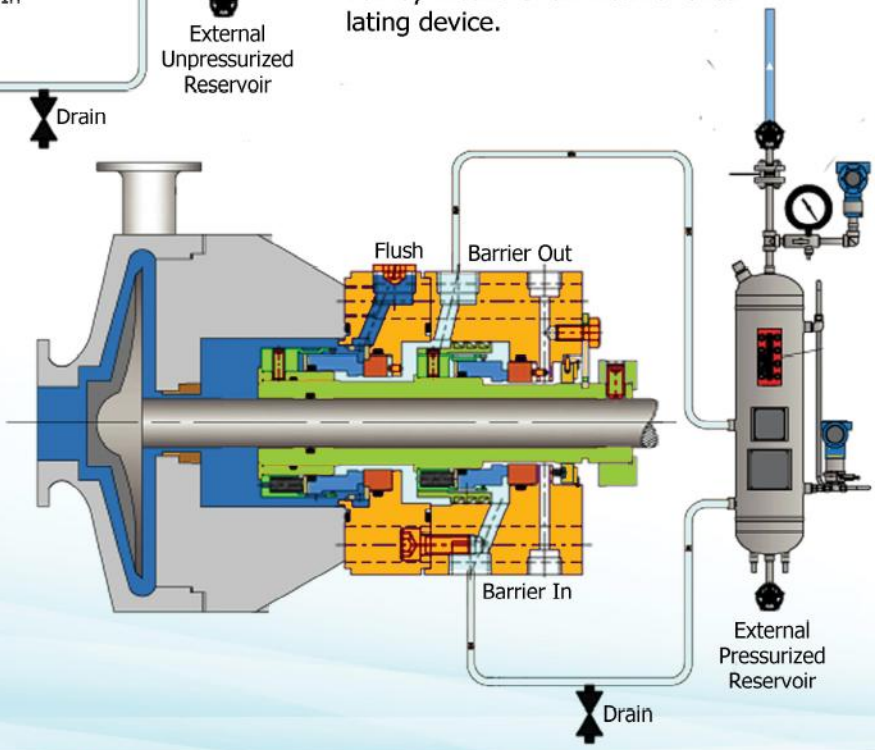


PLAN 52

External reservoir providing buffer liquid for the outer seal of an Arrangement 2 seal. The buffer liquid shall be maintained at a pressure less than seal chamber pressure and less than 0.28 MPa (2.8 bar) (40 psi). Buffer liquid is circulated to and from the reservoir by means of an internal circulating device.

PLAN 53A

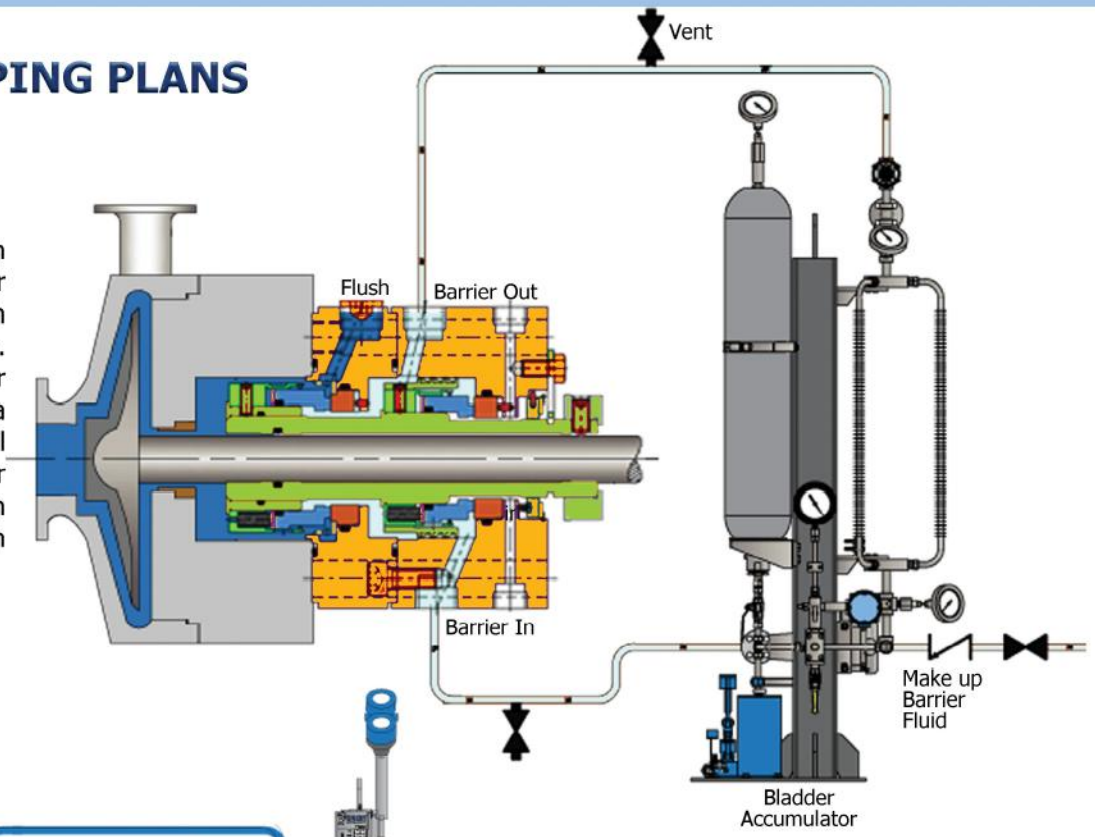
Pressurized external barrier fluid reservoir supplying clean fluid to the seal chamber. The reservoir pressure should always exceed the maximum seal chamber pressure by a minimum of 0.14 MPa (1.4 bar) (20 psi). Barrier liquid is circulated to and from the reservoir by means of an internal circulating device. Used with an Arrangement 3 seal and services where no leakage to atmosphere can be tolerated.



DUAL SEALS PIPING PLANS

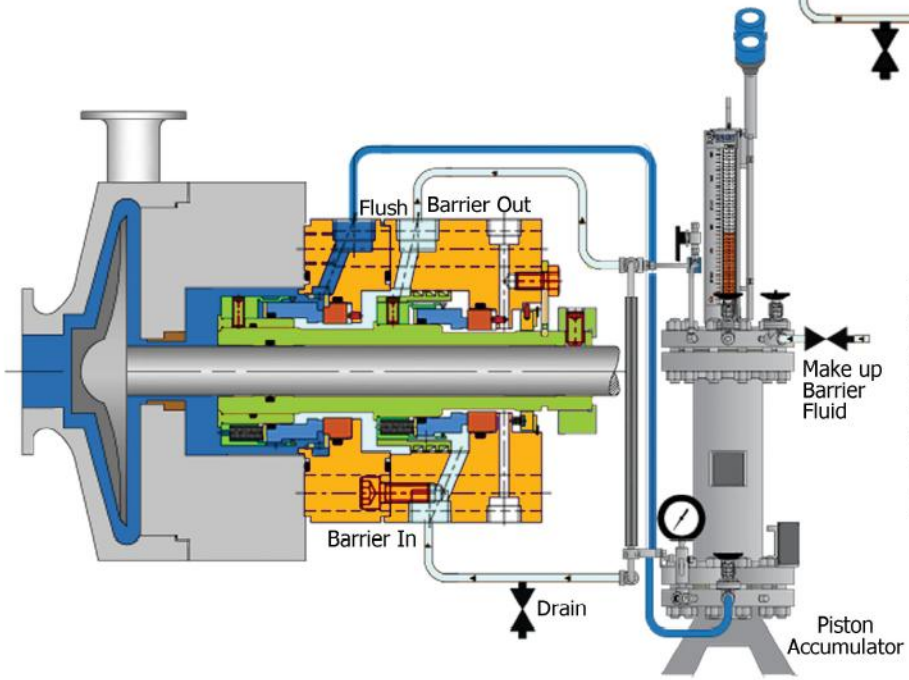
PLAN 53B

External barrier fluid system pressurized by a bladder accumulator supplying clean liquid to the seal chamber. The accumulator and barrier liquid are maintained at a pressure greater than seal chamber pressure. Barrier liquid is circulated through the system by means of an internal circulating device.



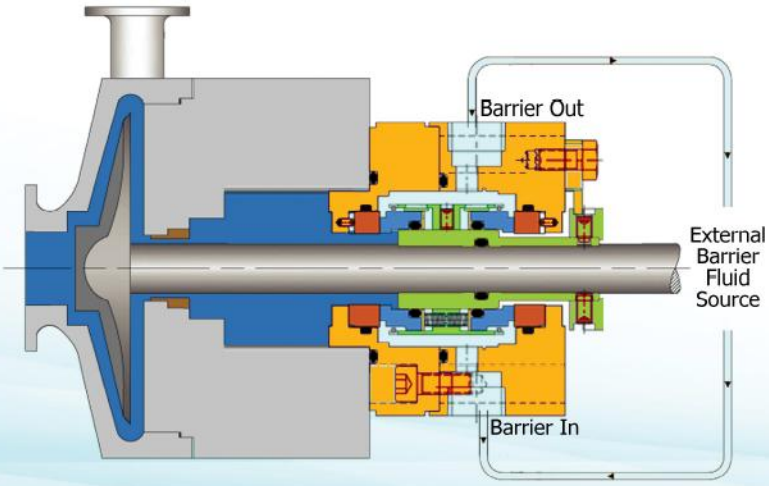
PLAN 53C

External barrier fluid system pressurized by a piston accumulator supplying clean liquid to the seal chamber. The barrier liquid is maintained at a pressure greater than seal chamber pressure. Barrier liquid is circulated through the system by means of an internal circulating device.



PLAN 54

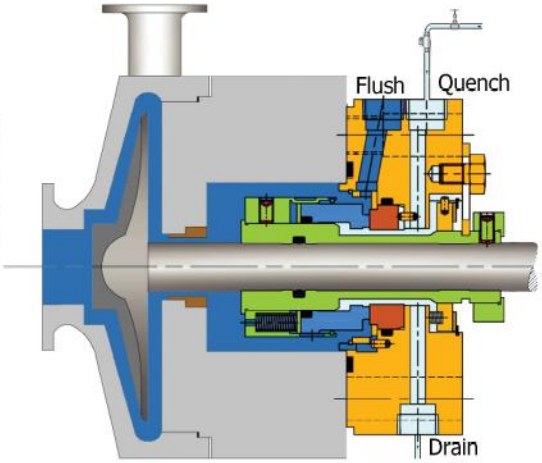
Pressurized external barrier fluid system supplying clean liquid to the barrier fluid seal chamber. Piping Plan 54 is used wilh Arrangement 3 liquid seals and the barrier liquid is maintained at a pressure greater than seal chamber pressure. Barrier liquid is circulated by an external pump or pressure system.

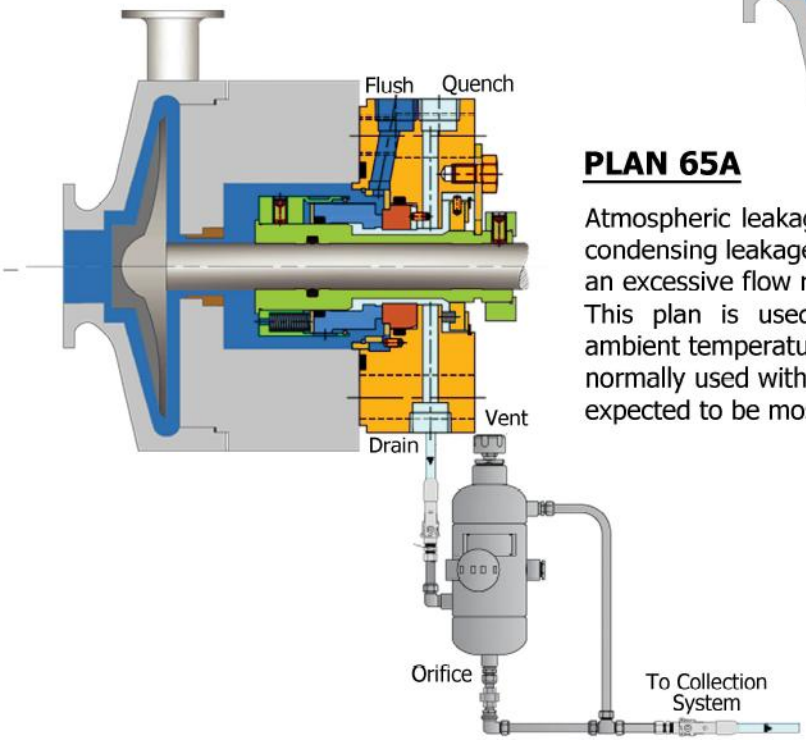


QUENCH SEAL PIPING PLANS

PLAN 62

Quench stream is brought from an external source to the atmospheric side of the seal faces. It is used in selected single seal applications to exclude the presence of oxygen to prevent coke formation (hot hydrocarbon services) and to flush away undesirable material buildup around the dynamic seal components (caustic and salt services).



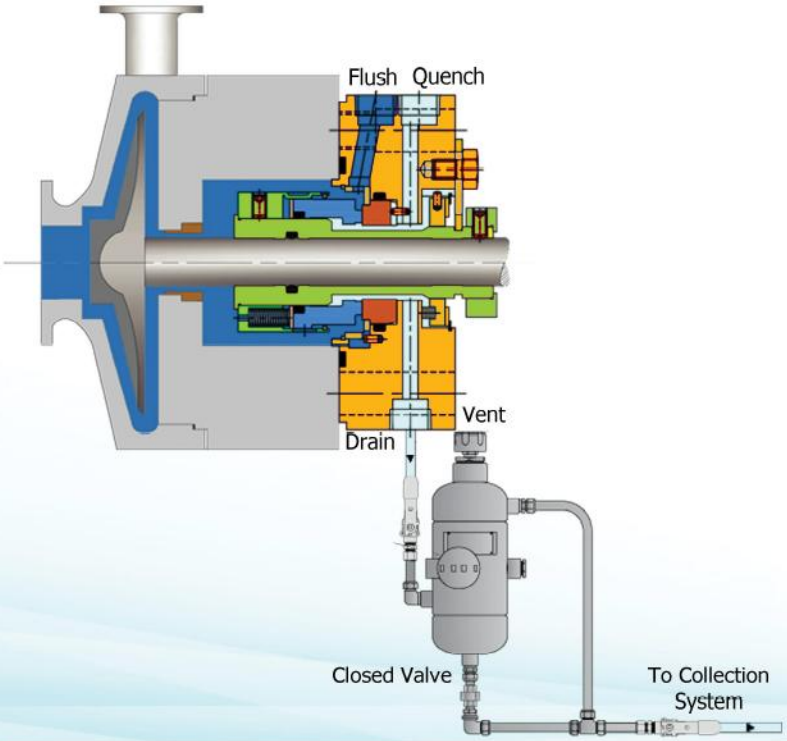


PLAN 65A

Atmospheric leakage collection and detection system for condensing leakage. Failure of the seal will be detected by an excessive flow rate into the leakage collection system. This plan is used when pumped fluid condenses at ambient temperatures. Seal leakage detection piping plan normally used with Arrangement 1 seals where leakage is expected to be mostly liquid (not gas).

PLAN 65B

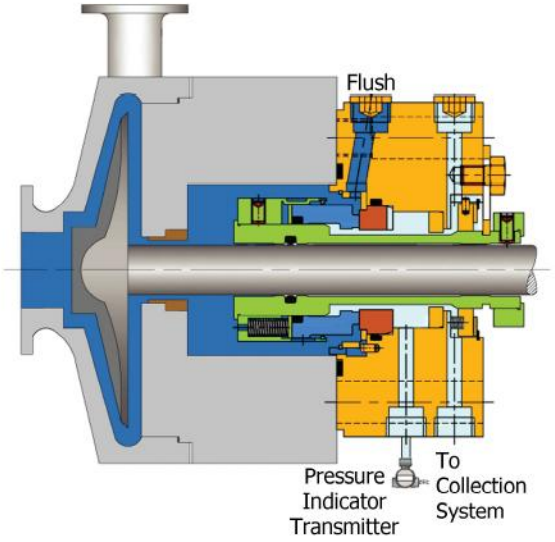
Atmospheric leakage collection and detection system for condensing leakage. Failure of the seal will be detected by a cumulative leakage into the system. This plan is used when pumped fluid condenses at ambient temperatures. Seal leakage detection piping plan normally used with Arrangement 1 seals where leakage is expected to be mostly liquid (not gas).

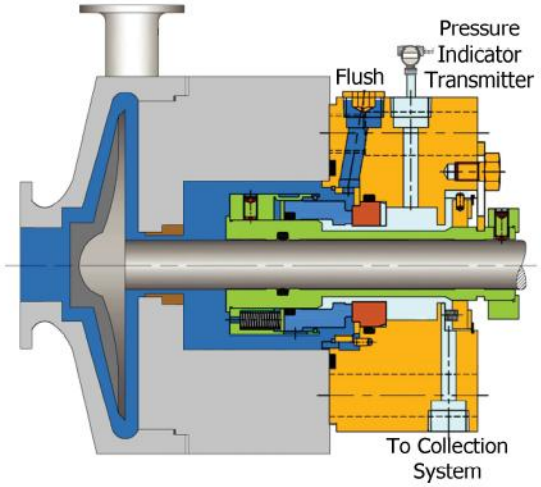


QUENCH SEAL PIPING PLANS

PLAN 66A

Throttle bushings in the seal gland minimize the seal leakage leaving the seal gland and allow for detection of a seal failure. Use in Arrangement 1 applications where it is required to limit leakage in case of a seal failure or it is required to monitor excessive leakage.



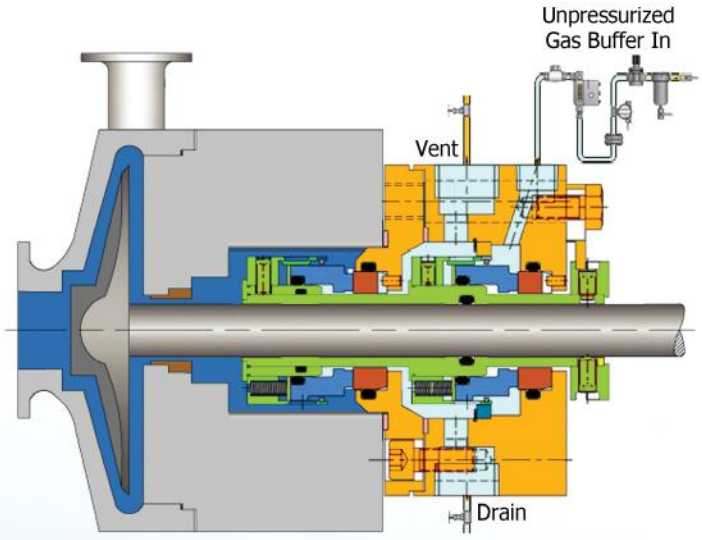


PLAN 66B

Orifice plug in the drain port minimizes the seal leakage leaving the seal gland and allows for detection of a seal failure. use in Arrangement 1 applications where it is required to limit leakage in case of a seal failure or it is required to monitor excessive leakage.

PLAN 72

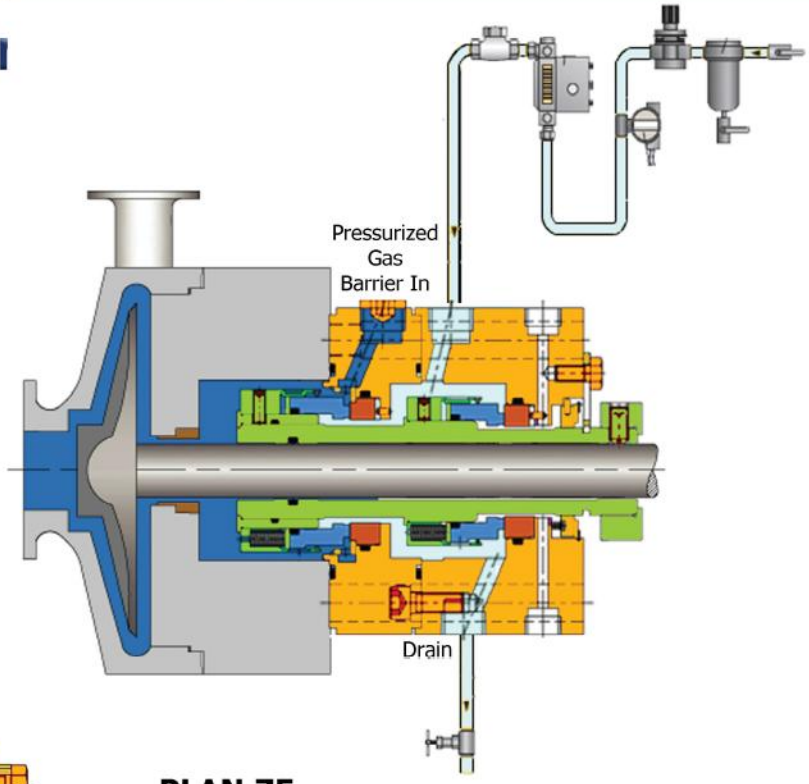
Externally supplied buffer gas for Arrangement 2 seals. Buffer gas is maintained at a pressure less than seal chamber pressure. In normal operation, the buffer gas pressure should not exceed 0.07 MPa (0.7 bar) (10 psi). used on Arrangement 2 unpressurized dual seals that use a dry-running containment seal.

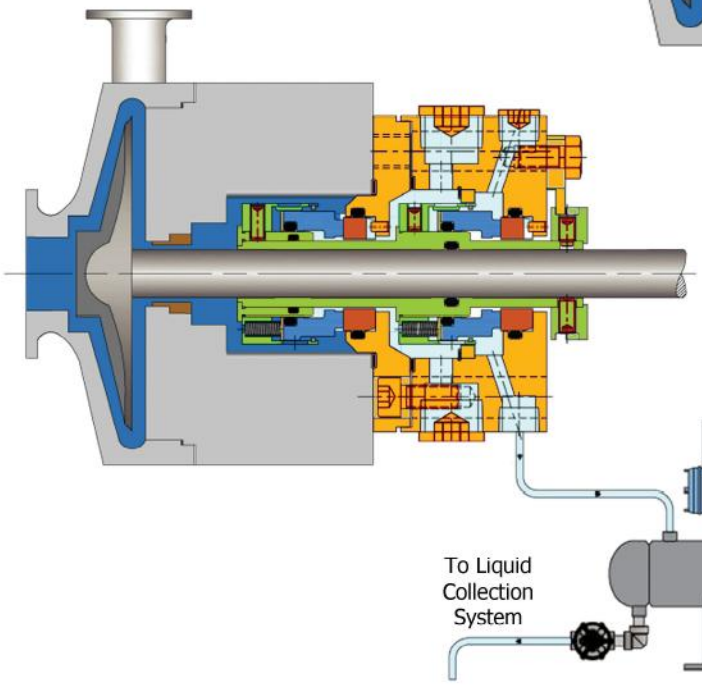


GAS SEALS PIPING PLAI

PLAN 74

Externally supplied barrier gas for Arrangement 3 seals. Barrier gas is maintained at a pressure greater than seal chamber pressure. used on Arrangement 3, dual pressurized seals, where the barrier medium is a gas. The most common barrier gas is plant nitrogen. The supply pressure to the seal is typically at least 0.17 MPa (1.7 bar) (25 psi) greater than the seal chamber pressure.



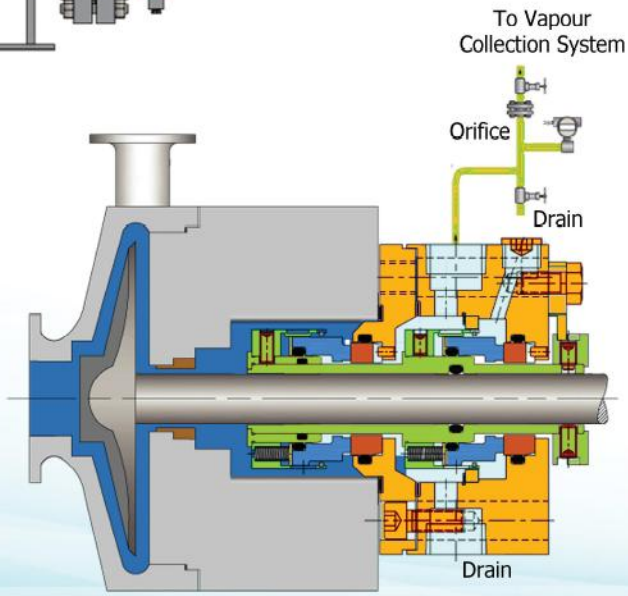


PLAN 75

Containment seal chamber leakage collection system for condensing or mixed phase leakage on Arrangement 2 seals. This plan is used when pumped fluid condenses at ambient temperatures.

PLAN 76

Containment seal chamber drain for noncondensing leakage on Arrangement 2 seals. This plan is used if the pumped fluid does not condense at ambient temperatures. This system is supplied by the vendor. Used on Arrangement 2, unpressurized dual seals, which also utilize a dry containment seal and where leakage from the inner seal will not condense.



ASSEMBLY MATERIAL CODE

Assembly material code consists of 6 digits Material code. The 1st digit starts with P or B. Here "P" denoted as a Pusher seal and "B" denoted as a Bellow seal. In case of dual seal arrangement the same 6 digits code will come twice for the both inboard seal and outboard seal.

For Pusher Seal :

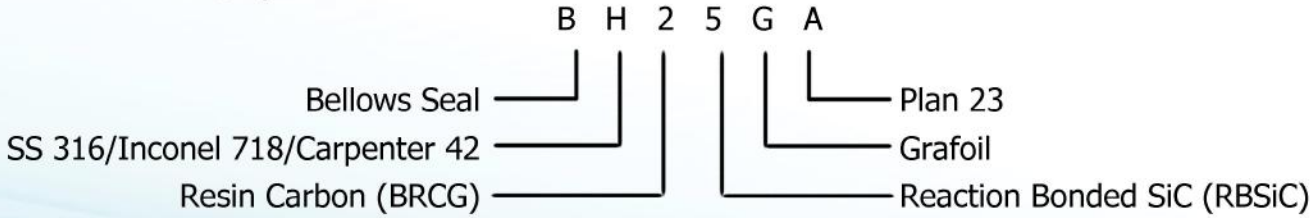
- P - Pusher Seal
- 2nd Digit - Hardware Material (Refer Table - 1)
- 3rd Digit - Rotating Face Material (Refer Table - 5)
- 4th Digit - Stationary Face Material (Refer Table - 5)
- 5th Digit - O-ring / Gasket Material (Refer Table - 2)
- 6th Digit - API Flush Plan (Refer Table - 3)

Example :

For Bellows Seal :

- B - Bellows Seal
- 2nd Digit - Bellows Material (Refer Table - 4)
- 3rd Digit - Rotating Face Material (Refer Table - 5)
- 4th Digit - Stationary Face Material (Refer Table - 5)
- 5th Digit - O-ring / Gasket Material (Refer Table - 2)
- 6th Digit - API Flush Plan (Refer Table - 3)

Example :



MATERIAL CODE SPECIFICATION

TABLE - 1	
SYM	HARDWARE MATERIAL
2	NICKEL
3	CARPENTER-20
4	ALUMINIUM
5	EN-19
6	INCONEL X-750
7	HYLAM
A	DUPLEX SS 2205
B	304L SS
C	304 SS
D	316L SS
E	316 SS
F	AM 350
G	17-4 PH SS
H	SUPER DUPLEX SS
J	HASTELLOY B
K	HASTELLOY C 276
L	INCONEL 718
M	20 SS (ALLOY 20)
Q	CARBON STEEL
R	BRONZE
V	18-8 SS
W	TITANIUM
X	Fe Ni ALLOY
Y	HIGH CHROME ALLOY
Z	CARPENTER-42
AA	ALLOY STEEL
AR	EN-42J
AS	PLASTIC
AU	410 SS
AV	420 SS
AX	BRASS
AY	CERAMIC
OT	OTHERS

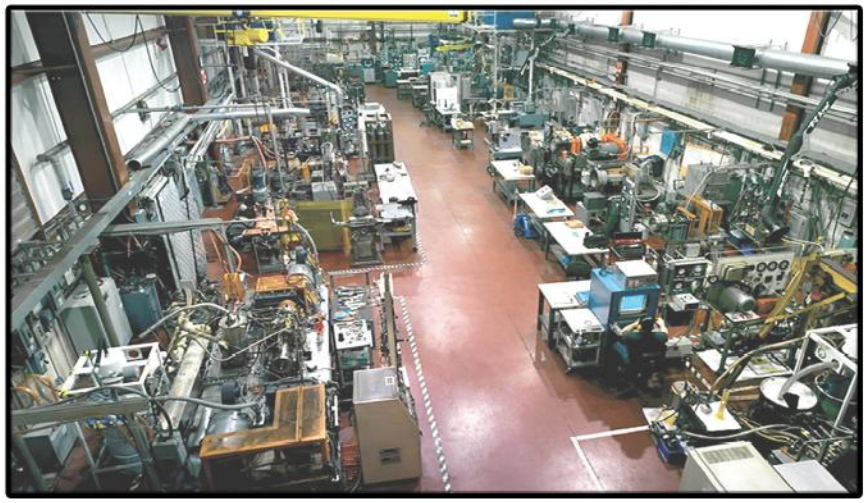
TABLE - 2	
SYM	O-RING/GASKET MATERIAL
2	CARBON FILLED PTFE
A	AFLAS
B	316SS/GRAFOIL SPRIAL WOUND
C	SPRING ENERGIZED TEFLON
D	CHEMRAZ 505 or FFKM or PER- FLUOROELASTOMER
E	ETHYLENE PROPLYENE (EPR,EPT,EPDM)
F	GLASS FILLED PTFE
G	GRAFOIL GRADE 'GTA' (CURED)
H	TEFLON ENCAPSULATED VITON
J	COMPRESSED NON-ASBESTOS FIBRE(CNAF)
K	FFKM (GRADE 6375)
M	NEOPRENE
N	NITRILE or BUNA-N
R	VITON EXTREME
S	SRPING ENERGIZED GRAFOIL
T	PTFE
V	VITON
Y	AS SPECIFIED

TABLE - 3	
SYM	API FLUSH PLAN
2	PLAN 01
3	PLAN 02
4	PLAN 11
5	PLAN 12
6	PLAN 13
7	PLAN 14
8	PLAN 21
9	PLAN 22
A	PLAN 23
B	PLAN 31
C	PLAN 32
D	PLAN 41
E	PLAN 51
F	PLAN 52
G	PLAN 53A
H	PLAN 53B
J	PLAN 53C
K	PLAN 54
L	PLAN 61
M	PLAN 62
N	PLAN 65
P	PLAN 71
Q	PLAN 72
R	PLAN 74
S	PLAN 75
T	PLAN 76

TABLE - 4	
SYM	BELLOWS MATERIAL
A	316 SS / INCONEL 718 / Fe Ni Alloy
C	316 SS / HAST-C / HAST-C
D	HAST-C / HAST-C / HAST-C
E	316 SS / AM-350 / 316 SS
G	CARPENTER 42 / INCONEL 718 / CARPENTER 42
H	316 SS / INCONEL 718 / CARPENTER 42
J	316 SS /316 SS / CARPENTER 42
K	316 SS /AM-350 / CARPENTER 42
L	DUPLEX / HAST-C / DUPLEX
M	316 SS / INCONEL 718 / 316 SS

TABLE - 5	
SYM	FACE MATERIAL
2	RESIN CARBON (BRCG)
3	ANTIMONY CARBON
5	REACTION BONDED SILICON CARBIDE (RBSiC)
6	SELF SINTERED SILICON CARBIDE (SSSiC)
7	GRAPHITE FILLED SILICON CARBIDE
8	TUNGSTEN CARBIDE (NICKEL BINDED)
9	TUNGSTEN CARBIDE (COBALT BINDED)
A	CERAMIC
C	316 SS –STELLITE COATING
D	BRONZE
E	BRONZE FILLED PTFE
F	GLASS FILLED PTFE
G	CARBON FILLED PTFE
H	CHROME STEEL

DYNAMIC TESTING FACILITY



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All specifications, instrumentation and capabilities subject to change without notice

P/N: CB-23

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