



SINCE 1973

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5th
 Design Manual
 Edition
 2018

Unmatched Performance of Seals
 for more than 4 decades



SINCE 1973

Leak-Proof Engineering (I) Pvt. Ltd.

EFFECTIVELY PERFORMING IN THE INDUSTRIES OVER 4 DECADES



Leak-Proof has made significant contributions to the Indian Process industry. First in 1973 to manufacture mechanical seals.. first in 1983 to introduce flexible graphite, gaskets, packing and self sealing rings .. first to install facilities for manufacture of Silicon Carbide and High Alumina Ceramic seal faces, first to cartridge heavy duty feed pump seals .. and so on. The pioneering spirit pervades our business philosophy even today.

We believe in quality and class in engineering excellence rather than volumes. This is reflected in our predominant position in the higher end seals market in India. And, in the remarkable successes of our innovative application engineered seals, even in the most severe duty conditions. API 682 seal for refineries, LPG 901 for Dry Gas seals, LPH5149 for concrete volute pump, series LPKS 918 for ANFD seals series 800 HB2 in Boiler Feed Pumps; series 90B35 in turbulent slurry applications; series 900B in heavy duty pipe line pumping; these series have made significant impact in the Indian industry and abroad in Argentina, Australia, Brazil, Canada, Colombia, UAE, Egypt, France, Germany, Indonesia, Iran, Jordan, Kuwait, Malaysia, Norway, Oman, Puerto Rico, Russia, Saudi Arabia, Spain, U.K., U.S.A., Venezuela, etc.

We have a unique history. We have never considered competition seriously. We have always gone about confidently on our own, on the intrinsic strength of our engineering skills backed by state-of-art manufacturing, inspection and testing facilities, to make a name and earn a special position, in our field of endeavour.

Manufacturing unit at North Gujarat has greatly strengthened our capabilities to take on large requirements in quick delivery schedules.

With our complete range of mechanical seals of all types and sizes and the ever reliable Grafoil range of gaskets & packings we have an enviable reputation for reliable industrial sealing products, in India and abroad.



SINCE 1967

AN ISO 9001 : 2015 COMPANY
...together we achieve

EDR GROUP

AN ISO 9001 : 2015 COMPANY

EDR Group Established in the year 1967 was founded by Mr. E. D. Rajedia, Chairman of the Group. He initially started with Transport Business. EDR Group with 5 companies under its fold, today, has its presence in diverse areas of engineering field.



Leak-Proof Engineering (I) Pvt. Ltd.

Leak-Proof Cast (I) Pvt. Ltd.

Leak-Proof Enterprise (I) Pvt. Ltd.

Leak-Proof Steel Plant Project Pvt. Ltd.

Leak-Proof Auto parts Pvt Ltd.

All the **EDR Group** companies are located in Gujarat state of India about 600 km north of Mumbai. We have group marketing network with 33 branch offices spread all over India serving major industrial hubs with head office located in Mumbai, commercial capital of India. Experienced sales and product support staff man branch officers.



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MATERIAL CODIFICATION SYSTEM

CODE	SECONDARY SEAL	SEAL RING	HARDWARE	MATING RING	SPRING
A			TITANIUM - 1		
A1			TITANIUM - 2		
B	BUTYL	BRONZE	BRONZE	BRONZE	
B1			BRASS		
C		CERAMIC - 99.5%	COPPER	CERAMIC - 99.5%	
C1		CERAMIC / SS 316		CERAMIC / SS 316	
C2		CERAMIC / SS 304		CERAMIC / SS 304	
C4		CERAMIC / HAST - C		CERAMIC / HAST - C	
C6		CERAMIC / Ti		CERAMIC / Ti	
D		S-SiC	SS 410	S-SiC	SPRING STEEL
D1			SPRING STEEL		SPRING STEEL / PTFE
E	EPR / EPDM	SS 304	SS 304	SS 304	SS 304
E1			CF8		SS 304 / PTFE
F	GFT	GFT	SS 302	GFT	SS 302
F1	RULON				SS 304 / PTFE
G	GRAFOIL		HAST - B	HAST - B	HAST - B
H	HYPALON		HAST - C	HAST - C	HAST - C
I		SS 316	SS 316	SS 316	SS 316
I1			CF8M		
I2			SS 316L		
J		CARBON - M SOLID	SS-17-4 PH	CARBON - M SOLID	
J1		CARBON - M / SS 316		CARBON - M / SS 316	
J2		CARBON - M / SS 304		CARBON - M / SS 304	
J3		CARBON - M / C - 42		CARBON - M / C - 42	
J4		CARBON - M / HAST - C		CARBON - M / HAST - C	
J5		CARBON - M / A - 20		CARBON - M / A - 20	
J6		CARBON - M / Ti		CARBON - M / Ti	
K	KALREZ	TC (Co) SOLID	A 20 (20CB - 3)	TC (Co) SOLID	A - 20 (20CB-3)
K1		TC (Co) / SS 316		TC (Co) / SS 316	
K2		TC (Co) / SS 304		TC (Co) / SS 304	
K3		TC (Co) / C - 42		TC (Co) / C - 42	
K4		TC (Co) / HAST - C		TC (Co) / HAST - C	
K5		TC (Co) / A - 20		TC (Co) / A - 20	
K6		TC (Co) / Ti		TC (Co) / Ti	
L	PTFE	CR. OXIDE / SS 316		CR. OXIDE / SS 316	
L1	VITON / PTFE	CERAMIC / SS 316		CERAMIC / SS 316	
L2		CR. OXIDE / HAST - C		CR. OXIDE / HAST - C	
M		LECROLOY	MONEL	LECROLOY	MONEL
M1				SS 410 H.T.	
				SS 420 H.T.	

CODE	SECONDARY SEAL	SEAL RING	HARDWARE	MATING RING	SPRING
N	NEOPRENE	LECROLOY	NICKEL	LECROLOY	
O	NITRILE (BUNA-N)				
O1	NITRILE (FOOD GRADE)				
P	PFE	CARBON - R SOLID		CARBON - R SOLID	
P1		CARBON - R / SS 316		CARBON - R / SS 316	
P2		CARBON - R / SS 304		CARBON - R / SS 304	
P3		CARBON - R / C - 42		CARBON - R / C - 42	
P4		CARBON - R / HAST - C		CARBON - R / HAST - C	
P5		CARBON - R / A - 20		CARBON - R / A - 20	
P6		CARBON - R / Ti		CARBON - R / Ti	
Q	FLUOROSILICONE				
R		CAST IRON	CAST IRON	CAST IRON	
R1		EN - 36	EN - 36	EN - 36	
S	SILICONE	STELLITED / SS 316	STEEL	STELLITED / SS 316	STEEL
S1		STELLITED / SS 304	HTS	STELLITED / SS 304	
T	CFT	CFT	CARBON STEEL	CFT	
T1		CFT / SS 316	C - 42	CFT / SS 316	
T2			AM 350		
U	AFLAS	SiC SOLID		SiC SOLID	
U1		SiC / SS 316		SiC / SS 316	
U2		SiC / SS 304		SiC / SS 304	
U3		SiC / C - 42		SiC / C - 42	
U4		SiC / HAST - C		SiC / HAST - C	
U5		SiC / A - 20		SiC / A - 20	
U6		SiC / Ti		SiC / Ti	
V	VITON	CERAMIC - 95%		CERAMIC - 95%	
V1	FEP	CERAMIC / SS 316		CERAMIC / SS 316	
V2	VITON - A	CERAMIC / SS 304		CERAMIC / SS 304	
V2	VITON - B	CERAMIC / HAST - C		CERAMIC / HAST - C	
X			DIN 1.4112 (AISI 440B)	■	
X3			BACKELITE / HYLEM		
Z		TC (Ni) SOLID	ALLUMINIUM	TC (Ni) SOLID	
Z1		TC (Ni) / SS 316		TC (Ni) / SS 316	
Z2		TC (Ni) / SS 304		TC (Ni) / SS 304	
Z3		TC (Ni) / C - 42		TC (Ni) / C - 42	
Z4		TC (Ni) / HAST - C		TC (Ni) / HAST - C	
Z5		TC (Ni) / A - 20		TC (Ni) / A - 20	
Z6		TC (Ni) / Ti		TC (Ni) / Ti	

NOTE : ■ WITH TITANIUM NITRITE COATING

CODE SUFIX FOR SEAL RING & MATING RING

1	SS 316	4	HASTELLOY - C	7	MONEL	10	TITANIUM - 2	13	HASTELLOY - B
2	SS 304	5	ALLOY - 20	8	SS 329	11	NICKEL	14	17 - 4 PH
3	CARPENTER - 42	6	TITANIUM	9	LECROLOY	12	TC COATING / SS 316	15	SS 316L

THE MATERIALS OF CONSTRUCTION

Ceramic: This is a super fine-grain High Alumina Ceramic Material (99.5% Al₂O₃) that exhibits excellent low wear characteristics. It is the best seal face material for highly corrosive chemical services.

Metal impregnated Carbon: This is an antimony impregnated hard Carbon that is specially suited for extreme heavy duty application involving non-corrosive media. Boiler feed water and hydrocarbon service seals with this hard Carbon as a sealing face have a much longer service life. Hard Carbon exhibits better abrasive resistance and emergency dry running characteristics.

Resin impregnated Carbon: This is the normal rotary seal face material and grade of Carbon offered is obtained from the best internal sources. Recommended in most general purpose applications involving corrosive fluids, this Carbon exhibits good resistance to thermal shock and good dimensional stability over a wide temperature range. In addition, resin impregnated Carbon has low permeability and good thermal conductivity.

Tungsten Carbide: This universally accepted hard seal face is available in two forms-nickel bonded and cobalt bonded. Solid seal rings of Tungsten Carbide are offered as a standard as against shrunk-fit faces with their inherent limitations.

Silicon Carbide: Technologically the best seal face material till date. It is highly resistant to thermal stress and corrosion in high temperature oxidising atmospheres has low wear properties and is an ideal seal face material for the petrochemical, fertilizer, chemical, refinery and off-shore duties. It is harder than Tungsten Carbide, Silicon Carbide also exhibits better dry run capabilities thus making it an ideal choice for an emergency dry running characteristics.

Lecrolloy: This is a specially developed high-chrome cast steel exhibiting excellent wear characteristics and is offered as a replacement to stellite faces. The major advantage of Lecrolloy faces lies in the fact that the faces are solid single piece and not deposit or coating that are liable to peel off/chip off.

Glass Filled PTFE: Offered as a standard seal face material on outside mounted PTFE bellows type seals. Is recommended for extremely corrosive light duties only.

Other face Materials: Alternate face materials are available for custom seals and other special applications. Seal faces of stainless steel with stellite and Ni-resist are available. Cast Iron faces are also available for certain non-critical duties. Seal faces with coating such as chrome oxide and TC coating can be offered on request.

Material	Compressive Strength N/mm ²	Density g/cm ³	Modulus of elasticity kN/mm ²	Coeff. of Thermal Expansion x 10 ⁻⁶ /°C	Thermal Conductivity W/m°C	Hardness
Carbon, resin impregnated	207-250	1.75-1.83	18.5-24	2.4-4.9	8-13	83-95*
Carbon, antimony impregnated	276-350	2.15-2.5	26-33	4-4.7	12.0	80.0*
Tungsten Carbide	3200-6200	14.3-14.9	550-620	4.6-7.0	80-115	1230-1600**
Reaction Bonded Silicon Carbide	2200	3.0	400	4.5	110	2400
Sintered Silicon Carbide	3900	3.15	410	4.3	130	2600
Ceramic	3000-3500	3.8-3.9	350-380	6.6-8.5	29-50	2000-2300**
Lecrolloy	-	2.65	140	3.0	125	-

* Scler. Hardness

** Vickers Hardness



Material	Leak-Proof Code	DIN 24960 Code	Max. Temp. Limit °C
CARBONS			
Carbon-R	P	B	+285
Carbon-M	J	A	+400
PLASTICS			
GFT	F	Y1	+175
CFT	T	Y2	+175
METALS			
Bronze	B	N	+175
Stellite	S	L	+175
Cast Iron	T	D	+150
Lecrolloy	M	S	+175
Hastelloy B	G	M1	+250
Hastelloy C	H	M	+250
SS 316	I	G	
Monel	M	M4	
METAL CARBIDES			
TC (Co)-solid	K	U1	+400
TC (Co)-shrink fitted	K1	U11	+110
TC (Ni)-solid	Z	U2	+400
TC (Ni)-shrink fitted	Z1	U22	+110
SiC-solid	U	Q2	+425
SiC - shrink fitted	U1	Q22	+110
METAL OXIDES			
Ceramic	C	V	+95

Material	Leak-Proof Code	DIN 24960 Code	Max. Range °C	Comments
Nitrile (Buna-N)	O	P	-40+120	
Neoprene	N	N	-20+90	
Butyl	B	B	-55+110	
Silicone	S	S	-50+210	
Fluorosilicone	Q		-70+205	With basic fuel and oils has good high & low temperature properties, particularly dry heat resistance.
EPR (EPDM)	E	E	-40+150	Not resistant to mineral fats and oils.
Viton®	V	V	-18+200	With hot water to a maximum of 120°C only.
AFLAS	U		-40+230	
FFKM	K	K	-20+270	
PTFE	L	T	-75+230	
Glass Filled PTFE	F	Y1	-212+250	
FEP	V1	-	-40+180	
Flexible Grafoil®	G	G	-270+480	very good resistance to high & low temperatures.

Notes

The temperature limits listed are for guidance only. The value may vary depending upon the nature of surrounding liquids.

API 682
Mechanical Seal
Low Emission, Single and Dual Pressurised

Mechanical Seal **Series LPA90**

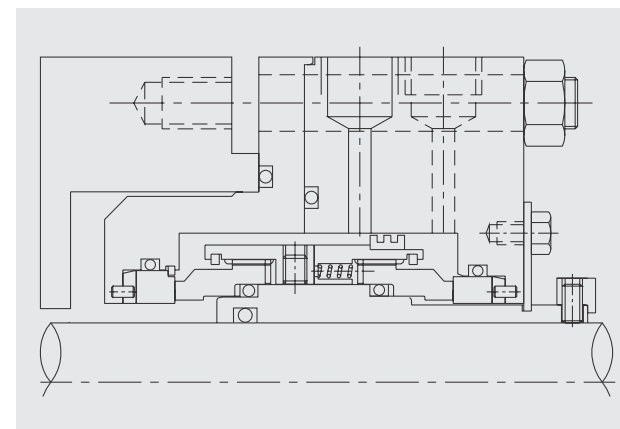


Advantages

These special engineered seals provide the following advantages:

- To extend Life Beyond 25000 Hours of operation
- To Reduce emission levels
- To ensure Plant and personnel safety in hazardous environments
- To standardize the Seals and Sealing Systems

Series LPA90 multi-spring pusher seals are designed and qualification tested according to the stringent testing norms specified by API 682 standard. These dependable, engineered mechanical seals are developed to attain extremely low emissions, typically to less than 150 ppm. These seals are offered in single, dual unpressurised and dual pressurised arrangements for a wide range of petroleum and light hydrocarbon services in refinery and petrochemical industries

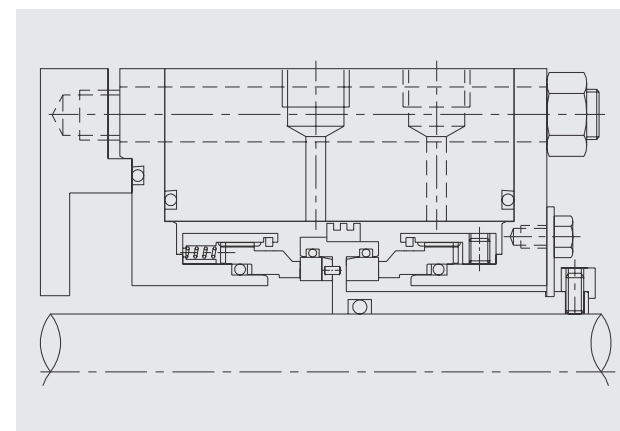


Series LPA90B Type A

Arrangement 3 – Dual Pressurised
 Back to Back Cartridge Seal

Operating Limits

Shaft diameter d1 : 20...110mm
 Pressure p : Vacuum to 42 bar
 Temperature t : -40°C to 176°C
 Configuration v : 3CW-BB

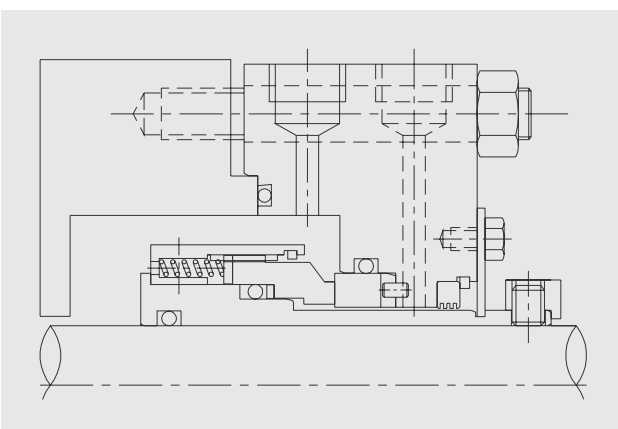


Series LPA90F Type A

Arrangement 3 – Dual Pressurised
 Face to Face Cartridge Seal.

Operating Limits

Shaft diameter d1 : 20...110mm
 Pressure p : Vacuum to 42 bar
 Temperature t : -40°C to 176°C
 Configuration v : 3CW-FF

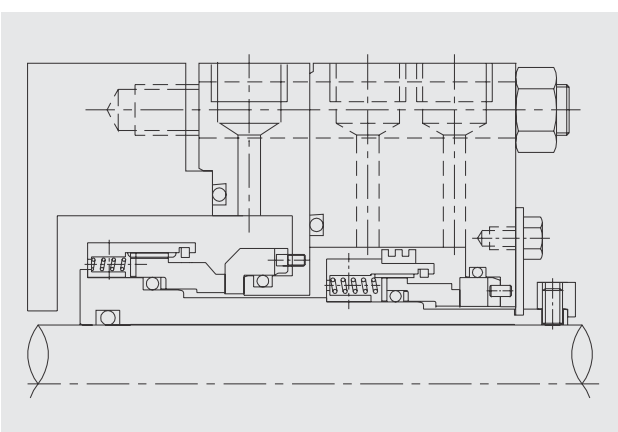


Series LPA 90 S Type A

Arrangement 1 – Single Cartridge Seal.

Operating Limits

Shaft diameter d1 : 20 110 mm
 Pressure p : Vacuum to 42 bar
 Temperature t : -40°C to 176°C
 Configuration v : 1CW-FX



Series LPA 90 T Type A

Arrangement 2 – Dual Unpressurised Face
 to Back Cartridge Seal.

Operating Limits

Shaft diameter d1 : 20 110mm
 Pressure p : Vacuum to 42 bar
 Temperature t : -40°C to 176°C
 Configuration v : 2CW-CS

Seal Components	Materials	
Description	Standard	Options
Seal Ring	Resin Impregnated Carbon	Antimony Impregnated Carbon Reaction Bonded Silicon Carbide Alfa Sintered Silicon Carbide Nickel Bonded Tungsten Carbide
Mating Ring	Reaction Bonded Silicon Carbide	Alfa Sintered Silicon Carbide Nickel Bonded Tungsten Carbide
Retainer Snap Ring Thrust Ring Grub Screws Sleeve Gland Drive collar Auxilliary Gland Location Plate	Stainlell Steel 316	-----
Spring	Hastelloy C-276	Stainless Steel 316 (Single Coil Spring Only)
Secondary Sealing Elements	Fluoroelastomer	Perfluoroelastomer Low Temperature Buna - N

API 682
Metal Bellows Seal
Low Emissions, Single and Dual Pressurised

Mechanical Seal **Series LPA45 & LPA47**

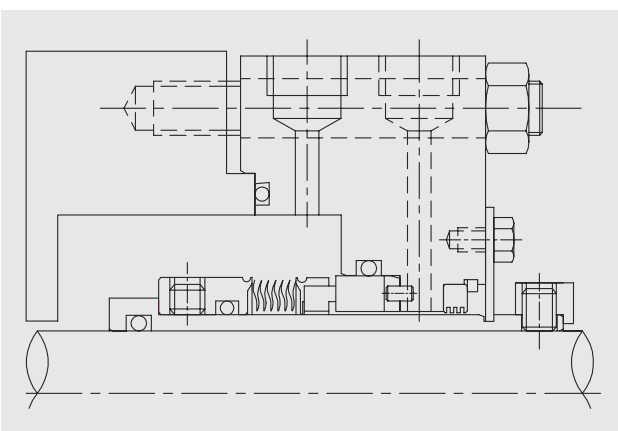


Advantages

These special engineered seals provide the following advantages:

- To extend Life Beyond 25000 Hours of operation
- To Reduce emission levels
- To ensure Plant and personnel safety in hazardous environments
- To standardize the Seals and Sealing Systems

Series LPA45, IPA47 non-pusher metal bellows seals are designed and qualification tested according to the stringent testing norms specified by API 682 standard. These dependable, engineered mechanical seals are developed to attain extremely low emissions. These seals are offered in single, dual unpressurised and dual pressurised arrangements for a wide range of petroleum and light hydrocarbon services in refinery and petrochemical industries.

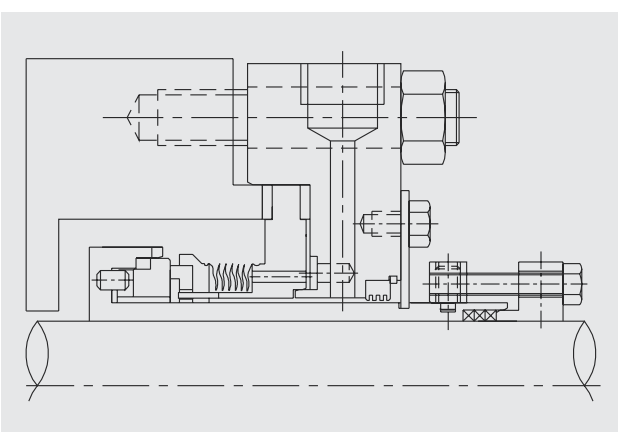


Series LPA 45 S Type B

Arrangement 1 – Single Cartridge Seal.

Operating Limits

Shaft diameter d1 : 20 110 mm
 Pressure p : Vacuum to 20 bar
 Temperature t : -40° C to 176° C
 Configuration v : 1CW-FX

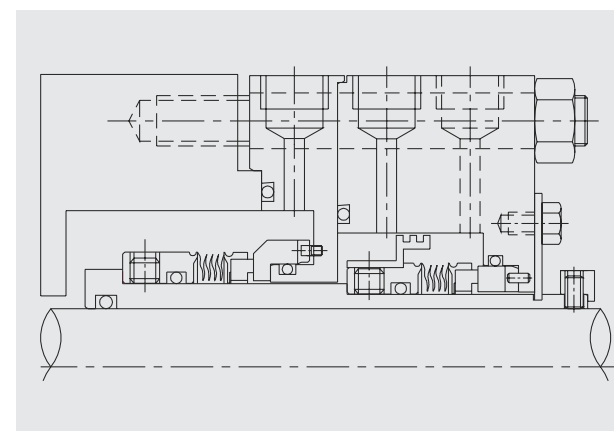


Series LPA 47 S Type C

Arrangement 1 – Single Cartridge Seal.

Operating Limits

Shaft diameter d1 : 20 110mm
 Pressure p : Vacuum to 20 bar
 Temperature t : - 40°C to 400°C
 Configuration v : 1CW-FX

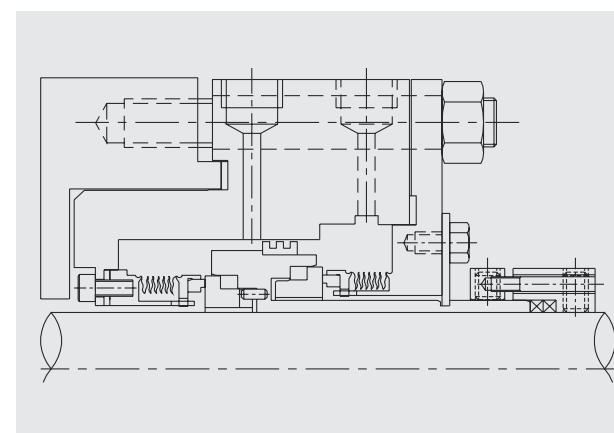


Series LPA 45 T Type B

Arrangement 2 – Dual Unpressurised Face to Back Cartridge Seal.

Operating Limits

Shaft diameter d1 : 20...110mm
 Pressure p : Vacuum to 20 bar
 Temperature t : - 40° C to 176° C
 Configuration v : 2CW-CW



Series LPA 47 F Type C

Arrangement 3 – Dual Pressurised Face to Face Cartridge Seal.

Operating Limits

Shaft diameter d1 : 20...110mm
 Pressure p : Vacuum to 20 bar
 Temperature t : - 40° C to 400° C
 Configuration v : 3CW-FF

Seal Components	Materials	
	Description	Options
Seal Ring	Resin Impregnated Carbon	Antimony Impregnated Carbon Reaction Bonded Silicon Carbide Alfa Sintered Silicon Carbide Nickel Bonded Tungsten Carbide
Mating Ring	Reaction Bonded Silicon Carbide	Alfa Sintered Silicon Carbide Nickel Bonded Tungsten Carbide
Sleeve Gland Drive Collar Grub Screws Rear Collar Auxilliary Gland Location Plate	Stainless Steel 316	
Seal Ring Housing	Stainless Steel 316 Carpenter 42	
Secondary Sealing Elements	Fluoroelastomer (up to 176° C) Flexible Graphite (up to 400° C)	Perfluoroelastomer Low Temperature Buna-N
Metal Bellows	Hastelloy C- 276 (up to 176° C) Inconel Alloy 718 (up to 400° C)	-----



SERIES LPA45 & LPA47



Concrete Volute Pump Seal

Series LPH 5149



Series LPH 5149 seals are developed for large shaft size **Concrete volute pumps**.

The split faces are replaceable without disassembling the pump during maintenance shutdowns.

Operating Limits

Shaft Diameter	d1 : 50 ... 500 mm
Pressure	p : Vacuum ... 20 bar (max)
Temperature	t : Amb. ... 50°C (max)
Velocity	v : 20 m/sec

Dry Gas Seal

Series LPG 901



Dry Gas seals are part of our manufacturing range which are used on high speed compressors in Gas and Oil Industries. We refurbish dry gas seals of any brand.

Operating Limits

Shaft Diameter	d1 : 30 mm to 350 mm
Pressure	p : upto 450 Bar
Temperature	t : upto 300°C.
Velocity	v : upto 200 m/sec

High Pressure Double Seal

Series F900B/900B/CK



Cartridge version

Series F900B/900B/CK is top of the line Balanced Double high pressure seal developed **first time in India** for **120 bar** pressure at 350° C saturated water service.

This seal is developed on the lines of already proven series 9008/CG seals working for 126.5 bar pressure for over 20 years.

Operating Limits

Shaft Diameter	d1 : 20 ... 150 mm.
Pressure	p : 50 ... 180 bar.
Temperature	t : amb ... 350°C
Velocity	v : 25m/sec.

ANFD Seal

Series LPKS 918



Series LPKS 918 seals are designed for **Agitated nutsche filters (ANF)**. These seals are used for ANF filters & dryers, Rotary vacuum paddle dryers and Horizontal reactors with expanding shafts.

Operating Limits

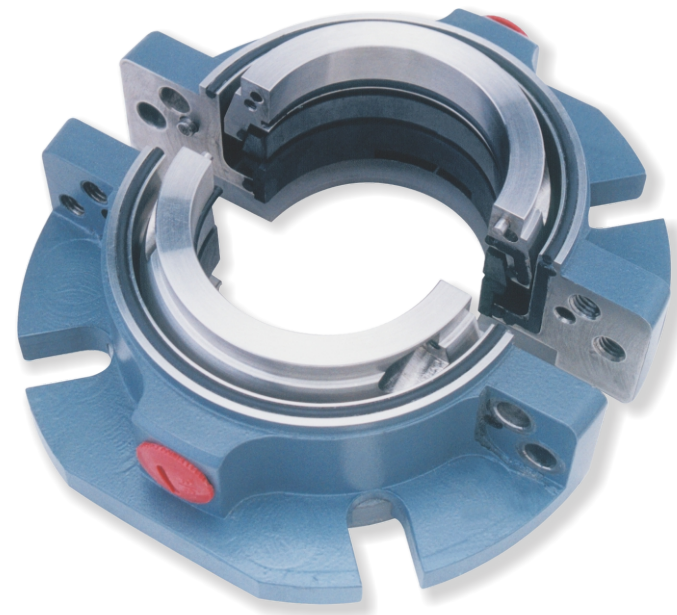
Shaft Diameter	d1 : 50 ... 150 mm
Pressure	p : full vacuum to 7 bar
Temperature	t : - 80 ... +200°C
Velocity	v : 1 m/sec

Split Seal

For Top Entry Agitators, Vessels and Mixers

Split Seal

Series LPH 5050



Standard Style

Face Materials

Carbon / Silicon Carbide

Metal Parts

SS 316, SS 304
Monel, Titanium

Secondary Seal

Elastomers

Applications

- Utility Pumps
- Transfer Pumps
- Agitator (As Dry Running Seal)

Seal Characteristics

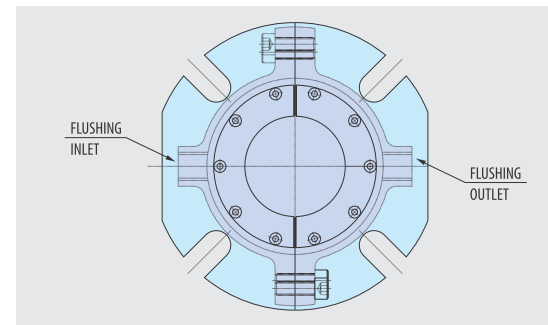
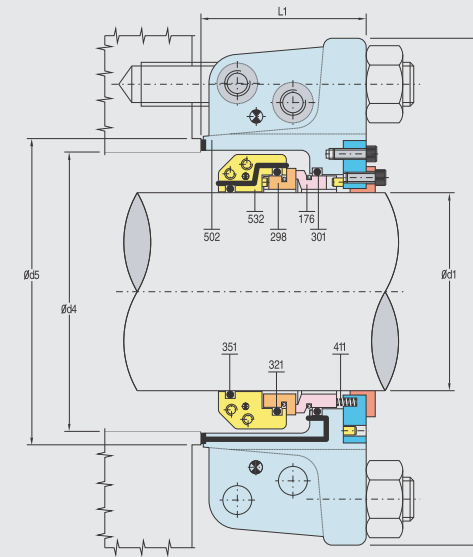
- Fully Split Components
- Ease of Installation
- Balanced Seal Faces

Operating Limits

Shaft diameter	: 2.0" 8.0"
Pressure	: 15 bar (max)
Temperature	: Amb.... 140°C
Shaft speed	: 3600 rpm upto 2.5"
	1800 rpm from 2.5"
	to 5.25"
	900 rpm > 5.25"

Series LPH 5050 is a unique design with minimum components for assembling the seal and allow user to install the seal in minimum time. The multi spring design keep the faces uniformly in contact. The split seal face is balanced covered with split O-Ring as a sealing member. Slots provided in the housing facilitates fitting the seal on various equipments with different PCDs.

Series LPH 5050



Part No.	Description
176	Seal Ring
298	Mating Ring
301	O - Ring
321	O - Ring
351	O - Ring
411	Spring
502	Gland
532	Mating Ring Housing



SERIES LPH 5050

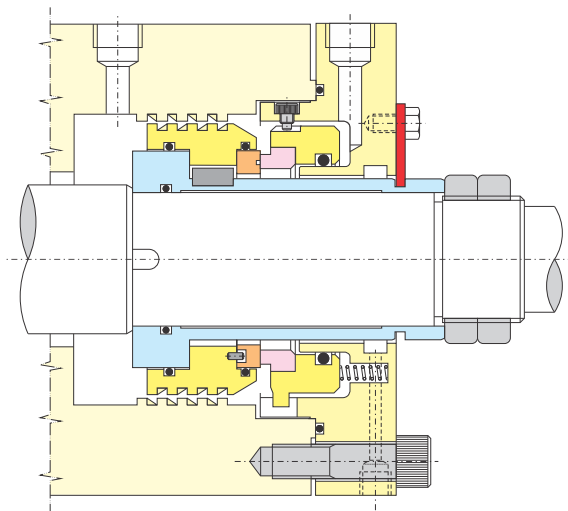
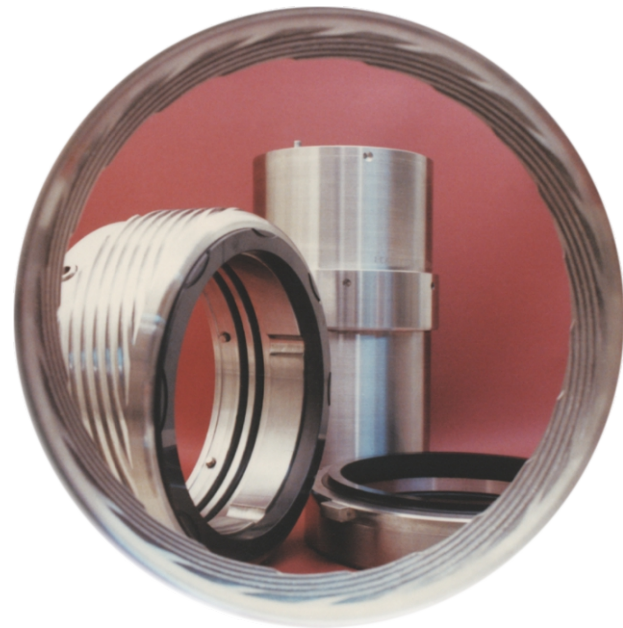
d1	d4 Min.	d4 Max.	d5 Min.	d10 ^{+1.0}	L1
2.000"	69.8	76.2	82.5	137.7	50.8
2.125"	73.1	79.5	85.8	152.4	50.8
2.250"	76.2	82.5	88.9	158.7	50.8
2.375"	79.5	85.8	92.2	165.1	50.8
2.437"	82.5	88.0	101.6	165.1	50.8
2.5000"	82.5	88.0	101.6	165.1	50.8
2.750"	95.2	101.0	120.6	196.8	63.5
3.000"	101.6	106.0	127.0	203.2	63.5
3.250"	107.9	113.0	133.3	209.5	63.5
3.500"	114.3	120.0	139.7	215.9	63.5
3.750"	120.6	126.0	146.0	222.2	63.5
4.000"	127.0	133.0	152.4	228.6	63.5
4.250"	133.3	139.0	158.7	235.0	63.5
4.500"	139.7	145.0	165.1	241.3	63.5
4.750"	146.0	152.0	171.4	247.6	63.5
5.000"	158.7	164.0	190.5	279.4	76.2
5.500"	171.4	175.0	203.2	292.1	76.2
6.000"	184.1	190.0	216.0	304.8	76.2
6.500"	196.8	202.0	228.6	317.5	76.2
7.000"	209.5	216.0	241.3	330.2	76.2
7.250"	216.0	222.0	247.6	336.5	76.2
7.500"	222.2	228.0	254.0	343.0	76.2
7.750"	228.6	234.0	260.3	349.2	76.2
8.000"	235.0	241.0	266.7	355.6	76.2

Boiler Feed Water Seal

Single Acting, Dependent of Direction of Rotation

Mechanical Seal

Series 800HB2/CG



Standard Style

Face Materials

Carbon / Silicon Carbide

Metal Parts

SS 316, SS 304

Secondary Seal

Elastomers

Applications

- Boiler feed water Pumps
- HSD Pumps
- Booster Pumps
- Drip Pumps
- Condensate Pumps
- Fuel Oil Pumps

Seal Characteristics

- Single acting
- Balanced
- Inside mounted
- Dependent of direction of rotation

Operating Limits

Shaft diameter d1 : 65 150 mm
 Pressure p : 50 ... 140 bar (max)
 Temperature t : -20 ... +250°C (API plan 23)
 Velocity v : ≤65 m/sec

This is a unique seal developed to meet stringent technical requirements of Boiler feed water pumps. Rotating mating ring design makes it suitable for high speed application & avoids critical requirements of stuffing box face squareness. Both the faces are having strong positive drive & locking arrangement which make seal very strong and sturdy.

Thermodynamic circulation grooves inscribed on the rotating faces boost the cooling of the sliding faces by reducing the coefficient of friction and protecting the seal against thermal over loading. Increased coolant flow affected by the pumping screws & the fluid guiding channel combine to force the cold water into the gap between seal ring and mating ring, blowing out gas bubbles and dirt particles and picking up frictional heat.

In view of risk of dynamic distortion because of high sliding velocity of over 25m/sec the springs are located in the stationary part. For this seal 20,000 hours of continuous running may be viewed as normal. Attainment of over 79000 hours is possible.

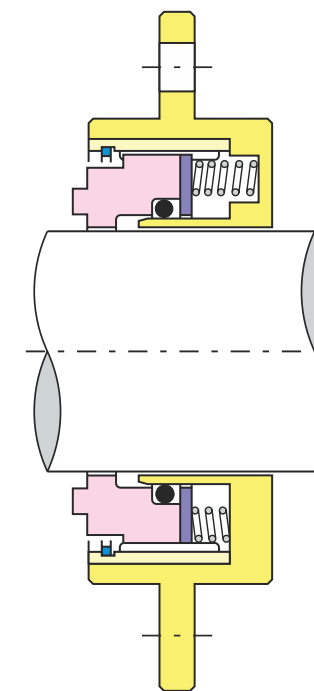
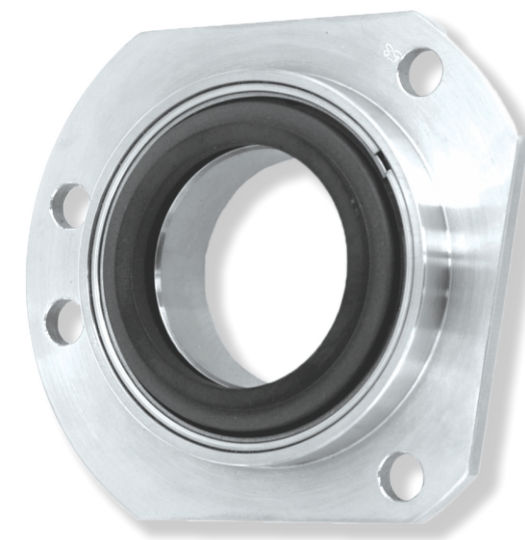
Sundyne Seal

Single Acting, Independent of Direction of Rotation

Mechanical Seal

Series 850B & 855B

for Sundyne Pump Models
LMV311/322/313/331/333



Standard Style

Face Material

Carbon / TC
Carbon / Sic

Metal Parts

SS 316, SS 304, Duplex Stainless Steel

Secondary Seal

850B : Elastomers
855B : PTFE, GFT

Applications

- Sundyne Pump
- Sunflow Pump
- Refineries

Seal Characteristics

- Single acting
- Inside mounted
- Independent of direction of rotation
- Balanced
- High Speed

Operating Limits

Shaft Diameter d1 : 1.25", 1.375", 1.5"
 Pressure p : 20 bar (max)
 Temperature t : -45 ... +180° C
 Speed v : 25,000 RPM

Series 850B & 855B are specially developed for sundyne and sunflow pumps. Single seals are used in most applications for non abrasive or non Hazardous liquids. Double seals are recommended when pumped liquid contains abrasive and leakage could be hazardous or when pump is likely to run dry. Tandem seal arrangement also can be offered which will protect the leakage if main seal fails



Rotary Furnace Seal

Series LPM 850 / LPM 850



Series LPM 850/LPM 850 seals are designed for installation on large size shafts. The seal is configured with double back to back arrangement for operational safety and reliability. Largest size seal (512mm) is in operation on a **Rotary Furnace**.

Operating Limits

Shaft Diameter d1 : 150 ... 600 mm.
Pressure p : up to 10 bar.
Temperature t : - 20 to 200°C
Velocity v : 5 m/sec.

Turbine seal

Series 1000 VKT



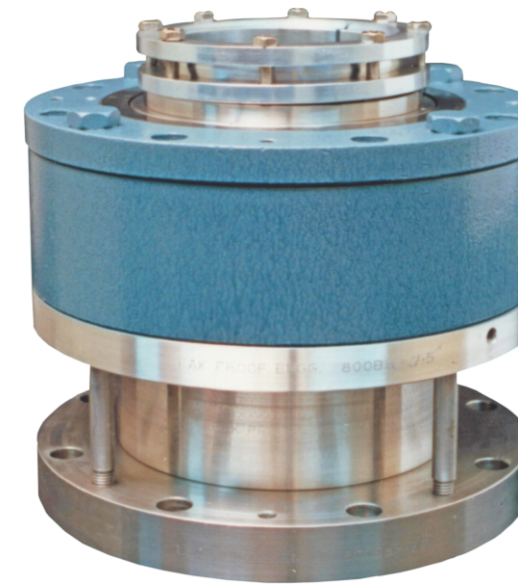
Series LPH 9010 Turbine Pump Seals are series of segmented carbon rings arranged in one assembly to contain leakage of pumping medium. These seals are used for different types of turbine pumps.

Operating Limits

Shaft Diameter d1 : 50 ... 500 mm
Pressure p : up to 10 bar
Temperature t : amb ... 60°C
Velocity v : 25 m/sec

Bottom Entry Slurry Seal

Series 800BB/CK



Series 800BB/CK seal is an engineered seal developed for bottom entry shaft vessels. The seal configured with reverse balance feature which will not allow seal faces to open up when barrier medium pressure drops. Successfully installed on Chemineer Reactor for handling polypropylene slurry service.

Operating Limits

Shaft Diameter d1 : 50 ... 200 mm.
Pressure p : 35 bar (max).
Temperature t : - 20 ... 200°C.
Velocity v : 10 m/sec.

Ekato Reactor Seal

Series 90B3/800BB/CK



Series 90B3/800BB/CK seal is specially engineered for installation on bottom entry shaft vessels. The seal is configured with three balanced seals to handle highly abrasive slurry services and safety. Successfully installed on **Ekato Reactor** for handling PVC slurry service.

Operating Limits

Shaft Diameter d1 : 50 ... 200 mm.
Pressure p : 25 bar (max).
Temperature t : - 20 ... 180°C.
Velocity v : 10 m/sec.



High Pressure Seal for Votator

Series LPS 900



Cartridge version

Series LPS 900 seals are developed for **high pressure** applications in food processing industries for **Votator, Crystalliser** etc. Seal faces are TC/TC, Elastomers in Silicone/ Viton.

Operating Limits

Shaft Diameter	d1	:	25 ... 150mm
Pressure	p	:	Vacuum ... 120 bar (max)
Temperature	t	:	Amb 200°C (max)
Velocity	v	:	20 m/sec



Balanced Seal for Boiler Feed Water

Series LPM 906



Series LPM 906 is a cartridge construction multiple spring inside mounted balanced seal specially developed for Boiler Feed Water. Compact design seal fits in most of pumps. No external cooling required this eliminates cooling water, Heat Exchanger etc. Multiple flush option distributes API PLAN 11 flow around the seal faces.

Operating Limits

Shaft Diameter	d1	:	50 ... 500 mm
Pressure	p	:	up to 10 bar
Temperature	t	:	amb ... 60°C
Velocity	v	:	25 m/sec

Balanced Seal for higher axial float

Series LPM 902



Cartridge version

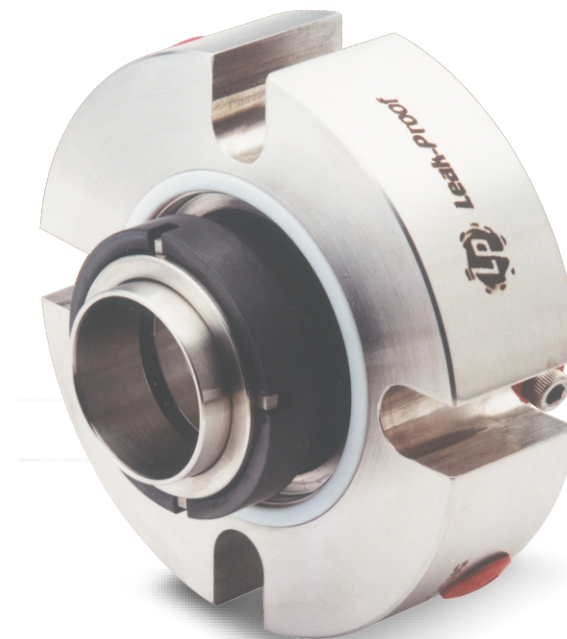
Series LPM 902 is multiple spring seal specially designed for higher axial float of the shaft. High axial float is inherent in some between bearings pump designs and other equipment. This seal has advantage over standard seals and can work successfully where axial float of shaft is up to ± 3.0 mm.

Operating Limits

Shaft diameter	d1	:	25 ... 150mm
Pressure	p	:	Vacuum ... 25 bar (max)
Temperature	t	:	Amb. 200° C (max)
Velocity	v	:	20 m/sec

Double Seal for Slurry Application

Series LPM 944/CG



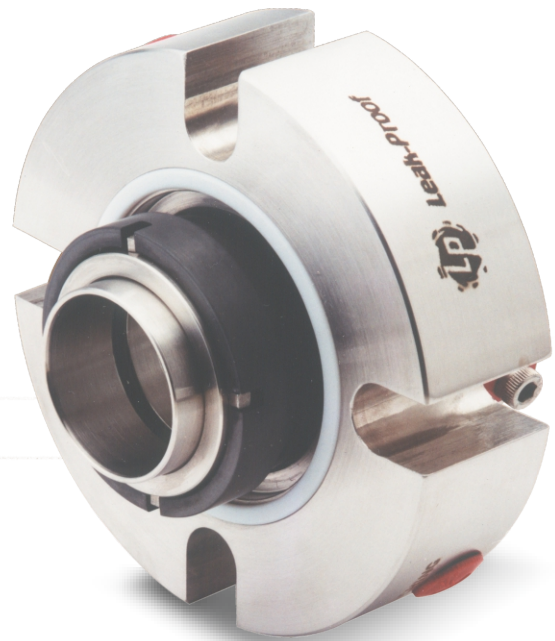
Series LPM 944/CG is a cartridge construction double seal 90B35/ 90B35 specially developed for equipment handling clean media as well as slurries and other fluids that polymerize or solidify with the change in temperature. The springs are isolated from the process fluid being sealed by dynamic O-ring which enhances seal life.

Operating Limits

Shaft diameter	d1	:	25 mm --- 75 mm.
Pressure	p	:	25 bar (max).
Temperature	t	:	- 20 --- +180°C.
Velocity	v	:	20 m/sec

Double Seal for Slurry Application

Series LPM 942/CG



Series LPM 942/CG is a cartridge construction double seal 90B35/ 88B2 specially developed for equipment handling clean media as well as slurries and other fluids that polymerize or solidify with the change in temperature. The springs are isolated from the process fluid being sealed by dynamic O-ring which enhances seal life.

Operating Limits

Shaft diameter d1 : 25 mm --- 75 mm.
Pressure p : 25 bar (max).
Temperature t : - 20 --- +180°C.
Velocity v : 20 m/sec

Carbon Bush Bearings & Segmented Carbon Rings



Bush bearings in different grades of carbon (resin or antimony impregnated) with or without housing in different sizes are offered depending on the requirement. Segmented carbon rings with SS garter spring for any size are available with different joint configurations.

Features

Bush bearings with straight or helical grooves for circulation of lubricating medium.
Segmented carbon ring size : From 50 ... 1000mm.
Temperature : - 40 ... 250°C

Labyrinth Seal



Labyrinth seal comprises of segmented carbon rings assembled together in one split housing assembly to prevent leakage of lubricating oil circulated to bearings using forced circulation system. These seals are used on large equipment like electric motors where the rotor is supported at either ends by antifriction bearings.

Operating Limits

Shaft Diameter d1 : up to 600 mm.
Pressure p : up to 5 bar.
Temperature t : 100°C.
Velocity v : 15 m/sec

Bearing Isolator

Series LPBI 101



Series LPBI 101 Bearing Isolators enhance bearing life on pumps and other rotating equipment by reducing bearing lubrication contamination and loss.

Bearing failure is a leading cause of downtime in pumps. Proper bearing protection is critical to improve rotating equipment reliability and preventing downtime and production loss.

Operating Limits

Shaft diameter : 16100 mm



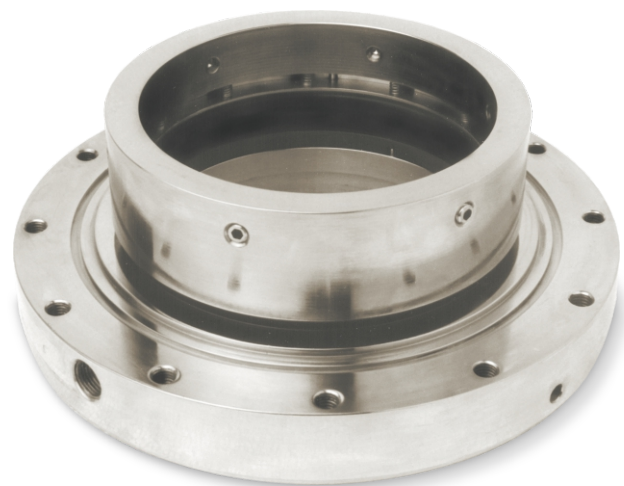
SERIES LPM 942/CG, SERIES LPBI 101

Dry Running Seal

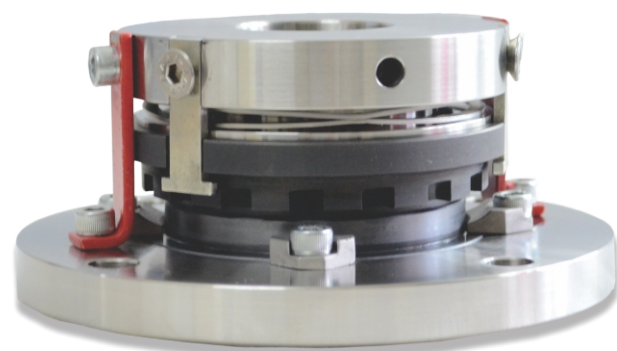
For Top Entry Agitators, Vessels and Mixers
Single Acting, Independent of Direction of Rotation

Mechanical Seal

Series 88B2A/CG, Series LPW 881/CG



Series 88B2A/CG



Series LPW 881/CG

Standard Style

Face Materials

Carbon / Silicon Carbide

Metal Parts

SS 316, SS 304, Hastelloy - C,
Hastelloy - B, Monel, Alloy - 20

Secondary Seal

88B2A/CG : Elastomers, FEP - Multi Springs Seal
LPW 881/CG : Elastomers, FEP - Wave Spring Seal

Applications

- Food Products
- Pharmaceutical Products

Seal Characteristics

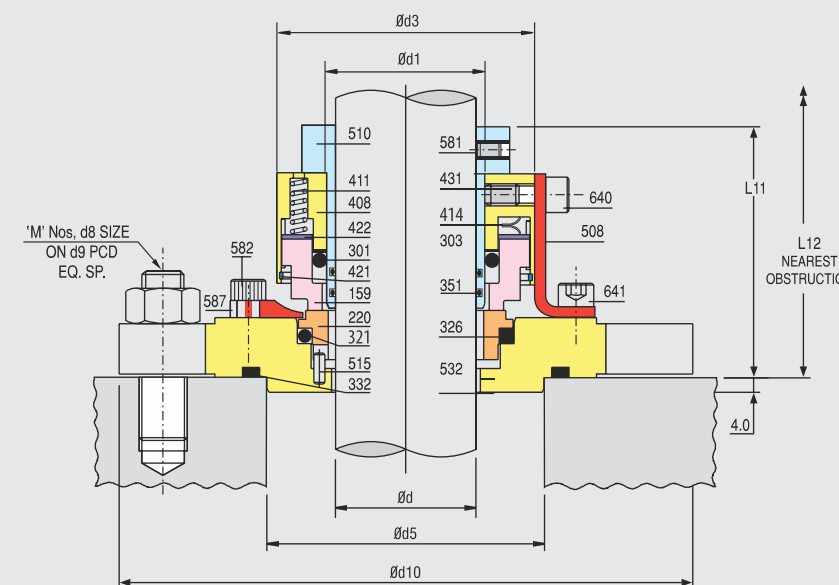
- Single acting
- Reverse Balanced
- Outside Mounted
- Independent of Direction of Rotation
- Dry Running

Operating Limits

Shaft diameter d : 15 150mm*
Pressure p : Vacuum 10 bar (max)
Temperature t : Amb. 120°C (max)
Speed n : 320 rpm

Series 88B2A/CG

Series LPW 881/CG



Shaft d ^{g6}	SEAL SIZE +0.00 d1 ^{-0.05}		d3	d5 ^{H12}	M,d8	d9	d10	L11	L12
	inch	mm							
15.0	1.000	25.40	47.5	40.0	4,M8	90.0	105.0	60.0	95.0
20.0	1.125	28.58	50.7	45.0	4,M8	95.0	110.0	60.0	95.0
25.0	1.375	34.92	58.4	50.0	4,M8	105.0	120.0	65.0	100.0
28.0	1.375	34.92	58.4	60.0	4,M10	115.0	135.0	65.0	100.0
30.0	1.500	38.10	61.6	60.0	4,M10	115.0	135.0	65.0	100.0
35.0	1.750	44.45	71.2	60.0	4,M10	120.0	140.0	80.0	115.0
40.0	2.000	50.80	77.5	70.0	4,M10	130.0	150.0	80.0	115.0
45.0	2.125	53.98	81.2	75.0	4,M10	130.0	150.0	80.0	115.0
50.0	2.375	60.32	87.6	80.0	4,M10	140.0	160.0	80.0	115.0
55.0	2.500	63.50	90.8	85.0	4,M10	145.0	165.0	80.0	115.0
60.0	2.750	69.85	97.1	90.0	4,M10	150.0	170.0	80.0	115.0
65.0	3.000	76.20	103.5	100.0	6,M10	160.0	180.0	80.0	115.0
70.0	3.125	79.38	106.6	105.0	6,M10	165.0	185.0	80.0	115.0
75.0	3.375	85.72	113.0	110.0	6,M10	170.0	190.0	80.0	115.0
80.0	3.500	88.90	116.2	120.0	6,M12	175.0	200.0	80.0	115.0
85.0	3.750	95.25	122.5	130.0	6,M12	185.0	210.0	80.0	115.0
90.0	4.000	101.60	128.9	140.0	8,M12	185.0	210.0	80.0	115.0
95.0	4.125	104.78	132.0	145.0	8,M12	195.0	220.0	85.0	120.0
100.0	4.375	111.12	141.1	145.0	8,M12	200.0	225.0	85.0	120.0
105.0	4.500	114.30	144.2	150.0	8,M12	210.0	235.0	85.0	120.0
110.0	4.750	120.65	152.0	160.0	8,M12	220.0	245.0	85.0	120.0
115.0	5.000	127.00	160.0	165.0	8,M12	225.0	250.0	85.0	120.0
120.0	5.125	130.18	162.0	170.0	8,M12	230.0	255.0	85.0	120.0
125.0	5.375	136.52	169.5	170.0	8,M12	235.0	260.0	85.0	120.0
130.0	5.500	139.70	170.0	175.0	8,M12	240.0	265.0	85.0	120.0
135.0	5.750	146.05	176.0	180.0	8,M12	245.0	270.0	90.0	125.0
140.0	6.000	152.40	183.0	185.0	8,M12	255.0	280.0	90.0	125.0
145.0	6.125	155.58	186.0	190.0	8,M12	260.0	285.0	90.0	125.0
150.0	6.375	161.92	192.0	195.0	8,M12	265.0	290.0	90.0	125.0

*For seal sizes above 150.0 mm consult **Leak-Proof**

Part No.	Description
159	Seal Ring
220	Mating Ring
301	O-Ring
303	Back-up Ring
321	O-Ring
326	Packing
332	Gasket
351	O-Ring
408	Retainer
411	Spring
414	Wave Spring
421	Snap Ring
422	Thrust Ring
431	Grub Screw
508	Location Plate
510	Sleeve
515	Pin
532	M. R. Housing
581	Grub Screw
582	Allen Screw
587	M. R. Clamp
640	Allen Screw
641	Allen Screw



SERIES 88B2A/CG, Series LPW 881/CG

Series 88B2A/CG - multiple springs seal and series LPW 881/CG - Wave spring seal are factory assembled & dynamically tested seal for steel, glass lined and SS mixers, agitator & vessels. This is a multiple spring externally mounted, reverse balanced seal with O-ring as secondary sealing member. Various elastomers can be offered for wide service application. These seals are basically used on top entry agitators as dry running seals. When food products or pharmaceutical products are agitated in agitator, mixing of any other liquid will contaminate the product & affect its quality, hence these dry running seals are used. These seals don't require any external media for lubricating the faces, that is why they are known as dry running seals.

Wet Running Seal

For Top / Side Entry Agitators, Vessels and Mixers
Single Acting, Independent of Direction of Rotation

Mechanical Seal

Series LPKS 924



Standard Style

Face Materials

Carbon / Ceramic
Carbon / Silicon Carbide
Carbon / Tungsten Carbide

Metal Parts

SS 316, SS 304, Hastelloy-C,
Hastelloy-B, Monel, Alloy - 20

Secondary Seal

Elastomers, FEP

Applications

- Corrosive Chemicals
- Hydrocarbons
- General & Light Chemicals

Seal Characteristics

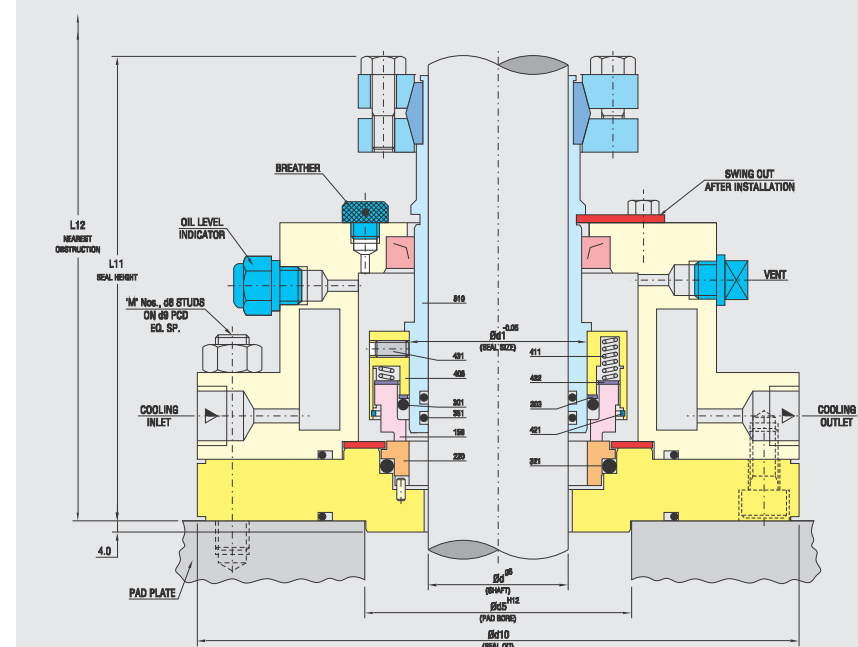
- Single acting
- Reverse Balanced
- Outside mounted
- Independent of Direction of Rotation
- Without Bearing

Operating Limits

Shaft Diameter d : 25 150 mm
Pressure p : Vacuum 10 bar (max)
Temperature t : Amb. 180°C (max)
Speed n : 320 rpm

Series LPKS 924 are factory assembled & dynamically tested cartridge units for steel, glass lined, ss mixers, agitators & vessels. These are used with non pressurised barrier fluid preferably clean soft water because of its good heat transfer qualities. Fluids like oil, hydrocarbon, solvents etc. can also be used as buffer fluid by considering the corrosion resistance of wetted parts & compatibility with main media to be sealed. These seals are supplied with cooling water jacket, which ensure cool running of seals.

Series LPKS 924



Part No.	Description
159	Seal Ring
220	Mating Ring
301	O-Ring
303	Back-up Ring
321	O-Ring
351	O-Ring
408	Retainer
411	Spring
421	Snap Ring
422	Thrust Ring
431	Grub Screw
510	Sleeve

Shaft d^{g6}	SEAL SIZE $d1^{+0.00/-0.05}$		$d5^{H12}$	M,d8	d9	d10	L11	L12
	inch	mm						
25.0	1.375	34.92	45.0	6,M10	130.0	150.0	120.0	170.0
30.0	1.625	41.28	50.0	6,M10	135.0	155.0	120.0	170.0
35.0	1.750	44.45	55.0	6,M10	140.0	160.0	130.0	180.0
40.0	2.000	50.80	60.0	6,M10	145.0	165.0	130.0	180.0
45.0	2.125	53.98	65.0	6,M10	150.0	170.0	130.0	180.0
50.0	2.375	60.32	70.0	6,M10	155.0	175.0	150.0	200.0
55.0	2.625	66.68	80.0	6,M10	165.0	185.0	150.0	200.0
60.0	2.750	69.85	90.0	8,M12	175.0	200.0	150.0	200.0
65.0	3.000	76.20	95.0	8,M12	180.0	205.0	150.0	200.0
70.0	3.250	82.55	100.0	8,M12	185.0	210.0	150.0	200.0
75.0	3.375	85.72	105.0	8,M12	190.0	215.0	160.0	210.0
80.0	3.625	92.08	110.0	8,M12	195.0	220.0	160.0	210.0
85.0	3.750	95.25	115.0	8,M12	200.0	225.0	160.0	210.0
90.0	4.000	101.60	125.0	8,M12	205.0	230.0	160.0	210.0
95.0	4.125	104.78	130.0	8,M12	210.0	235.0	160.0	210.0
100.0	4.375	111.12	140.0	8,M12	220.0	245.0	160.0	210.0
105.0	4.500	114.30	150.0	8,M12	225.0	250.0	170.0	220.0
110.0	4.750	120.65	160.0	8,M12	230.0	255.0	170.0	220.0
115.0	5.000	127.00	165.0	8,M12	235.0	260.0	170.0	220.0
120.0	5.125	130.18	170.0	8,M12	240.0	265.0	170.0	220.0
125.0	5.375	136.52	175.0	8,M12	245.0	270.0	170.0	220.0
130.0	5.500	139.70	180.0	8,M12	250.0	275.0	170.0	220.0
135.0	5.750	146.05	185.0	8,M12	260.0	285.0	170.0	220.0
140.0	6.000	152.40	190.0	8,M12	265.0	290.0	180.0	230.0
145.0	6.125	155.58	195.0	8,M12	270.0	295.0	180.0	230.0
150.0	6.375	161.92	200.0	8,M12	275.0	300.0	180.0	230.0

*For seal sizes above 150.0 mm consult **Leak-Proof**

Wet Running Seal with Bearing

For Top / Side Entry Agitators, Vessels and Mixers
Single Acting, Independent of Direction of Rotation

Mechanical Seal

Series LPKS 921



Standard Style

Face Materials

Carbon, Ceramic,
Silicon Carbide, Tungsten Carbide, Lecrolloy

Metal Parts

SS 316, SS 304, Hastelloy-C,
Hastelloy-B, Monel, Alloy - 20

Secondary Seal

Elastomers, FEP

Applications

- Corrosive Chemicals
- General Light Chemicals
- Food Products
- Pharmaceutical Products

Seal Characteristics

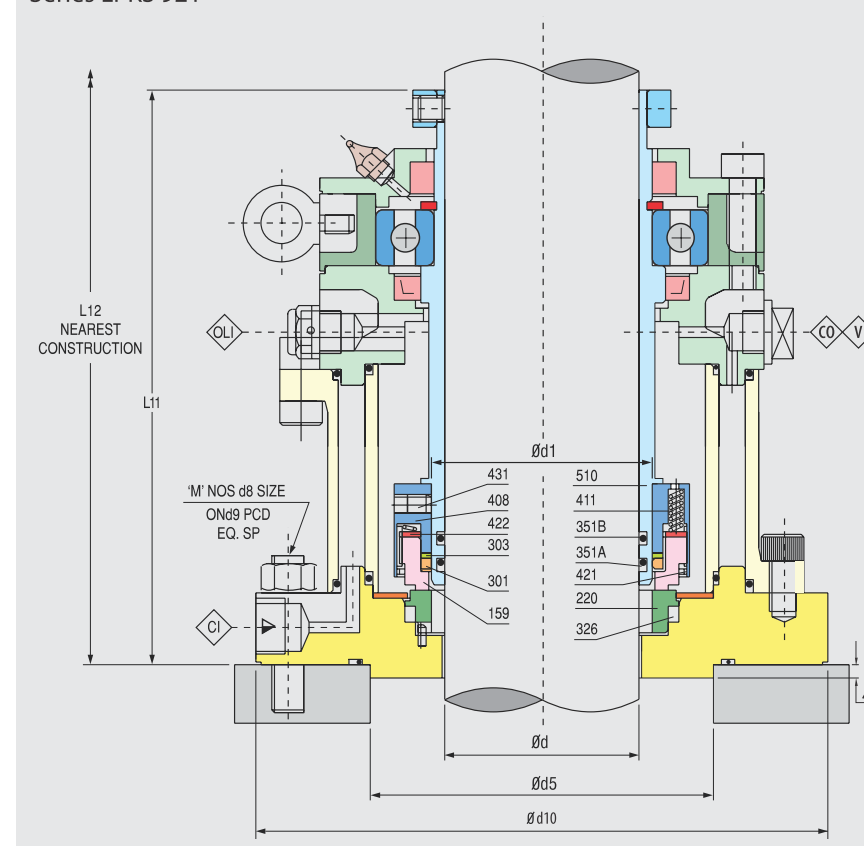
- Single acting
- Reverse Balanced
- Outside Mounted
- Independent of Direction of rotation
- With Bearing

Operating Limits

Shaft Diameter d : 25 150mm*
Pressure p : Vacuum ... 10 bar (max)
Temperature t : Amb. 180°C (max)
Speed n : 320 rpm

Series LPKS 921 is factory assembled and dynamically tested cartridge units for Steel, glass-lined and SS mixers, agitators and vessels. These are used with non pressurised barrier fluid preferably clean soft water because of its good heat transfer qualities. Fluids like oil, hydrocarbon, solvents etc. can also be used as buffer fluid by considering the corrosion resistance of the wetted parts and compatibility with main media to be sealed. These seals are supplied with cooling water jacket, which ensure cool running of the seals & with integral bearings which are close to seal ensure optimum running and sealing conditions.

Series LPKS 921



Part No.	Description
159	Seal Ring
220	Mating Ring
301	O-Ring
303	Back-up Ring
321	O-Ring
351	O-Ring
408	Retainer
411	Spring
421	Snap Ring
422	Thrust Ring
431	Grub Screw
510	Sleeve

Shaft d ^{g6}	SEAL SIZE +0.00 d1 -0.05		d5 ^{H12}	M,d8	d9	d10	L11	L12
	inch	mm						
25.0	1.375	34.92	75.0	4, M10	130.0	150.0	200.0	240.0
30.0	1.625	41.28	80.0	4, M10	135.0	155.0	200.0	240.0
35.0	1.750	44.45	85.0	4, M10	140.0	160.0	210.0	250.0
40.0	2.000	50.80	90.0	4, M10	145.0	165.0	210.0	250.0
45.0	2.125	53.98	95.0	4, M10	155.0	175.0	215.0	255.0
50.0	2.375	60.32	100.0	4, M10	155.0	175.0	215.0	255.0
55.0	2.625	66.68	105.0	6, M12	175.0	200.0	220.0	260.0
60.0	2.750	69.85	110.0	6, M12	180.0	205.0	220.0	260.0
65.0	3.000	76.20	115.0	6, M12	185.0	210.0	220.0	260.0
70.0	3.250	82.55	120.0	6, M12	190.0	215.0	220.0	260.0
75.0	3.375	85.72	125.0	6, M12	195.0	220.0	225.0	265.0
80.0	3.625	92.07	130.0	6, M12	200.0	225.0	225.0	265.0
85.0	3.750	95.25	135.0	8, M16	220.0	250.0	230.0	270.0
90.0	4.000	101.60	140.0	8, M16	225.0	255.0	240.0	280.0
95.0	4.125	104.78	145.0	8, M16	245.0	275.0	250.0	290.0
100.0	4.375	111.12	160.0	8, M16	250.0	280.0	250.0	290.0
105.0	4.500	114.30	165.0	8, M16	255.0	285.0	255.0	295.0
110.0	4.750	120.65	170.0	8, M16	260.0	290.0	255.0	295.0
115.0	5.000	127.00	175.0	8, M16	265.0	300.0	255.0	295.0
120.0	5.125	130.17	180.0	8, M16	270.0	300.0	255.0	295.0
125.0	5.375	136.52	195.0	8, M16	275.0	320.0	255.0	295.0
130.0	5.500	139.70	200.0	8, M16	280.0	320.0	255.0	295.0
140.0	6.000	152.40	210.0	8, M16	295.0	345.0	265.0	305.0
150.0	6.375	161.92	220.0	8, M16	300.0	365.0	265.0	305.0

*For seal sizes above 150.0 mm consult **Leak-Proof**

Double Mechanical Seal

For Top / Side Entry Agitators, Vessels and Mixers
Double Acting, Independent of Direction of Rotation

Mechanical Seal

Series LPKS 901 & LPKS 913



Standard Style

Face Materials

Carbon / Ceramic,
Silicon Carbide, Tungsten Carbide, Lecrolloy

Metal Parts

SS 316, SS 304, Carbon Steel, Hastelloy-B,
Hastelloy-C, Monel, Alloy - 20

Secondary Seals

LPKS 901 : PTFE, GFT
LPKS 913 : Inboard - PTFE, GFT
 : Outboard - Elastomers

Applications

- Petrochemicals and its vapours
- General Chemicals and its vapours
- Light hydrocarbons and its vapours

Seal Characteristics

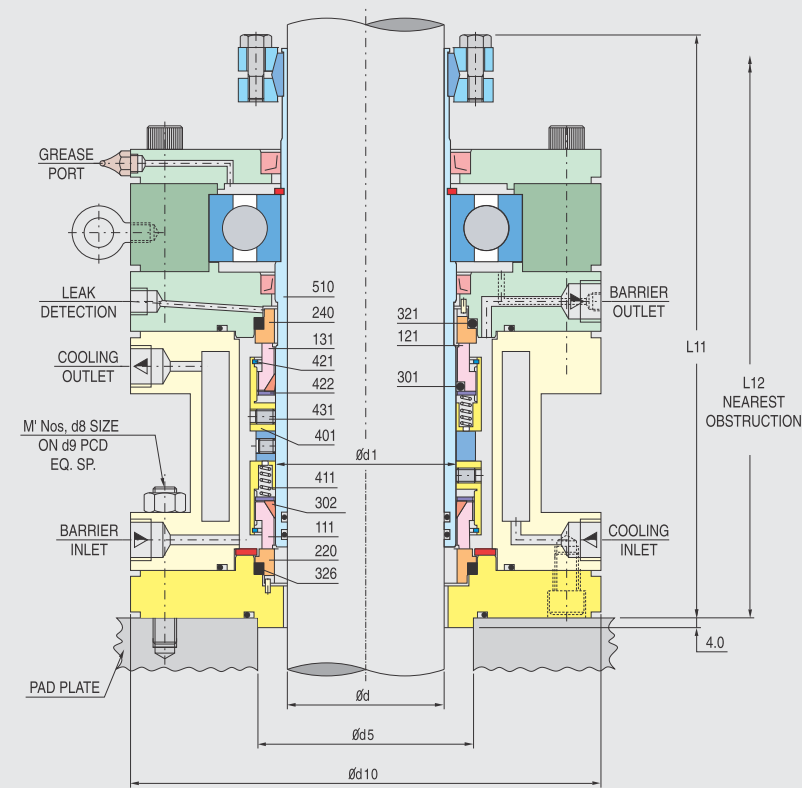
- Double Acting Back to Back Seals
- Unbalanced
- Cartridge Unit
- Independent of Direction of Rotation
- Operated with Pressurised Barrier Fluid

Operating Limits

Shaft Diameter d : 25 150mm*
Pressure p : Vacuum 10 bar (max)
Temperature t : Amb. ... 200°C (max)
Shaft speed n : 600 rpm. (max)
Barrier fluid pressure : Vessel pressure + 1.5 bar

Series LPKS 901

Series LPKS 913



Part No.	Description
111	Seal Ring
121	Seal Ring
131	Seal Ring
220	Mating Ring
240	Mating Ring
301	O-Ring
302	Wedge
321	O-Ring
326	M. R. Packing
401	Retainer
411	Spring
421	Snap Ring
422	Thrust Ring
431	Grub Screw
510	Sleeve

Shaft d ^{g6} mm	SEAL SIZE		d5 ^{H12}	M,d8	d9	d10	d11	d12
	d1 ^{+0.00/-0.05} inch	d1 ^{+0.00/-0.05} mm						
25.0	1.375	75.0	4, M10	130.0	150.0	240.0	280.0	
30.0	1.625	80.0	4, M10	135.0	155.0	240.0	280.0	
35.0	1.750	85.0	4, M10	140.0	160.0	240.0	280.0	
40.0	2.000	90.0	4, M10	145.0	165.0	246.0	290.0	
45.0	2.125	95.0	4, M10	155.0	175.0	246.0	290.0	
50.0	2.375	100.0	4, M10	155.0	175.0	246.0	290.0	
55.0	2.625	105.0	8, M12	175.0	200.0	280.0	320.0	
60.0	3.750	110.0	8, M12	180.0	205.0	280.0	320.0	
65.0	3.000	115.0	8, M12	185.0	210.0	280.0	320.0	
70.0	3.250	120.0	8, M12	190.0	215.0	285.0	325.0	
75.0	3.375	125.0	8, M12	195.0	220.0	285.0	325.0	
80.0	3.625	130.0	8, M12	200.0	225.0	285.0	325.0	

Shaft d ^{g6} mm	SEAL SIZE		d5 ^{H12}	M,d8	d9	d10	d11	d12
	d1 ^{+0.00/-0.05} inch	d1 ^{+0.00/-0.05} mm						
85.0	3.750	135.0	8, M16	220.0	250.0	290.0	330.0	
90.0	4.000	140.0	8, M16	225.0	255.0	305.0	345.0	
95.0	4.125	145.0	8, M16	245.0	275.0	350.0	390.0	
100.0	4.375	160.0	8, M16	250.0	280.0	350.0	390.0	
105.0	4.500	165.0	8, M16	255.0	285.0	350.0	390.0	
110.0	4.750	170.0	8, M16	260.0	290.0	355.0	395.0	
115.0	5.000	175.0	8, M16	265.0	300.0	355.0	395.0	
120.0	5.125	180.0	8, M16	270.0	300.0	355.0	395.0	
125.0	5.375	195.0	8, M16	275.0	320.0	355.0	395.0	
130.0	5.500	200.0	8, M16	280.0	320.0	380.0	420.0	
140.0	6.000	210.0	8, M16	295.0	345.0	385.0	425.0	
150.0	6.375	220.0	8, M16	300.0	365.0	385.0	425.0	

*For seal sizes above 150.0 mm consult **Leak-Proof**

Series LPKS 901 & LPKS 913 are factory assembled cartridge units used on mixtures, agitators and reaction vessels. The seals are designed for handling severe services including products emitting toxic vapours during reaction process. The design incorporates bearing located very close to the seal. This standard feature effectively arrests the shaft whip for smooth and trouble free operation enabling enhanced seal life. The cooling jacket, also a standard feature, helps to maintain cool environment around the seal. Large clearance between rotating shaft/sleeve and mating ring permits higher deflection of the shaft, invariably associated with top entry agitators.

Double Mechanical Seal

For Top / Side Entry Agitators, Vessels and Mixers
Double Acting, Independent of Direction of Rotation

Mechanical Seal

Series LPKS 903 & LPKS 925



Standard Style

Face Materials

Carbon / Ceramic,
Silicon Carbide, Tungsten Carbide, Lecrolloy

Metal Parts

SS 316, SS 304, Carbon Steel, Hastelloy-B,
Hastelloy-C, Monel, Alloy - 20

Secondary Seals

LPKS 903 : PTFE, GFT
LPKS 925 : Inboard - PTFE, GFT
 : Outboard - Elastomers

Applications

- Petrochemicals and its vapours
- General Chemicals and its vapours
- Light hydrocarbons and its vapours

Seal Characteristics

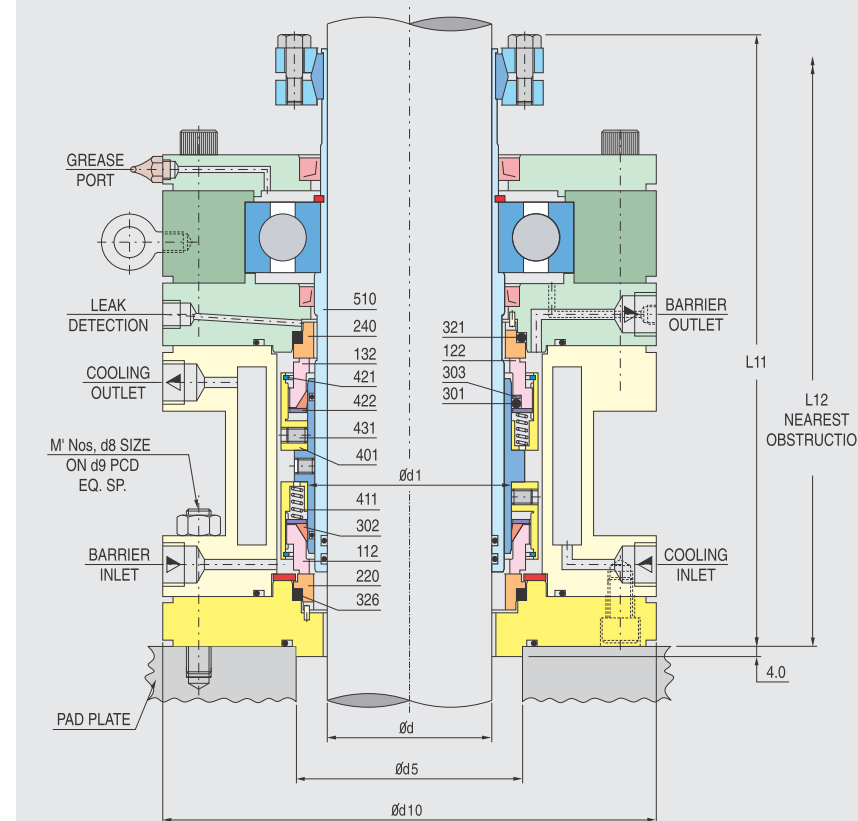
- Double acting Back to Back Seals
- Balanced
- Cartridge Unit
- Independent of Direction of Rotation
- Operated with Pressurised Barrier Fluid

Operating Limits

Shaft Diameter d : 25 150mm*
Pressure p : Vacuum 35 bar (max)
Temperature t : Amb. ... 200°C (max)
Shaft speed n : 600 rpm. (max)
Barrier fluid pressure : Vessel pressure + 1.5 bar

Series LPKS 903

Series LPKS 925



Part No.	Description
112	Seal Ring
122	Seal Ring
132	Seal Ring
220	Mating Ring
240	Mating Ring
301	O-Ring
302	Wedge
303	Back-up Ring
321	O-Ring
326	M. R. Packing
401	Retainer
411	Spring
421	Snap Ring
422	Thrust Ring
431	Grub Screw
510	Sleeve

Shaft d ^{g6} mm	SEAL SIZE +0.00 d1 ^{-0.05}		d5 ^{H12}	M,d8	d9	d10	d11	d12
	inch							
25.0	1.625	75.0	4, M10	130.0	150.0	240.0	280.0	
30.0	1.875	80.0	4, M10	135.0	155.0	240.0	280.0	
35.0	2.000	85.0	4, M10	140.0	160.0	240.0	280.0	
40.0	2.250	90.0	4, M10	145.0	165.0	246.0	290.0	
45.0	2.500	95.0	4, M10	155.0	175.0	246.0	290.0	
50.0	2.625	100.0	4, M10	155.0	175.0	246.0	290.0	
55.0	2.875	105.0	8, M12	175.0	200.0	280.0	320.0	
60.0	3.125	110.0	8, M12	180.0	205.0	280.0	320.0	
65.0	3.375	115.0	8, M12	185.0	210.0	280.0	320.0	
70.0	3.500	120.0	8, M12	190.0	215.0	285.0	325.0	
75.0	3.750	125.0	8, M12	195.0	220.0	285.0	325.0	
80.0	3.875	130.0	8, M12	200.0	225.0	285.0	325.0	

Shaft d ^{g6} mm	SEAL SIZE +0.00 d1 ^{-0.05}		d5 ^{H12}	M,d8	d9	d10	d11	d12
	inch							
85.0	4.250	135.0	8, M16	220.0	250.0	290.0	330.0	
90.0	4.500	140.0	8, M16	225.0	255.0	305.0	345.0	
95.0	4.875	145.0	8, M16	245.0	275.0	350.0	390.0	
100.0	5.000	160.0	8, M16	250.0	280.0	350.0	390.0	
105.0	5.250	165.0	8, M16	255.0	285.0	350.0	390.0	
110.0	5.375	170.0	8, M16	260.0	290.0	355.0	395.0	
115.0	5.625	175.0	8, M16	265.0	300.0	355.0	395.0	
120.0	5.750	180.0	8, M16	270.0	300.0	355.0	395.0	
125.0	6.000	195.0	8, M16	275.0	320.0	355.0	395.0	
130.0	6.250	200.0	8, M16	280.0	320.0	380.0	420.0	
140.0	6.625	210.0	8, M16	295.0	345.0	385.0	425.0	
150.0	7.000	220.0	8, M16	300.0	365.0	385.0	425.0	

*For seal sizes above 150.0 mm consult **Leak-Proof**

Series LPKS 903 & LPKS 925 are factory assembled cartridge units used on mixtures, agitators and reaction vessels. The seals are designed for handling severe services including products emitting toxic vapours during reaction process. The design incorporates bearing located very close to the seal. This standard feature effectively arrests the shaft whip for smooth and trouble free operation enabling enhanced seal life. The cooling jacket, also a standard feature, helps to maintain cool environment around the seal. Large clearance between rotating shaft/sleeve and mating ring permits higher deflection of the shaft, invariably associated with top entry agitators.

Double Mechanical Seal

For Top Entry Glass Lined Agitators, Vessels and Mixers
Double Acting, Independent of Direction of Rotation

Mechanical Seal

Series LPKG 901



Standard Style

Face Materials:
carbon, Silicon Carbide

Metals Parts:
Contact Parts** : SS 316, SS 304
Non Contact Parts : carbon Steel
* * NOTE : Higher Alloys on Request

Secondary Seals:
PTFE, GFT

Applications

- Pharmaceutical
- General Chemicals and its vapours

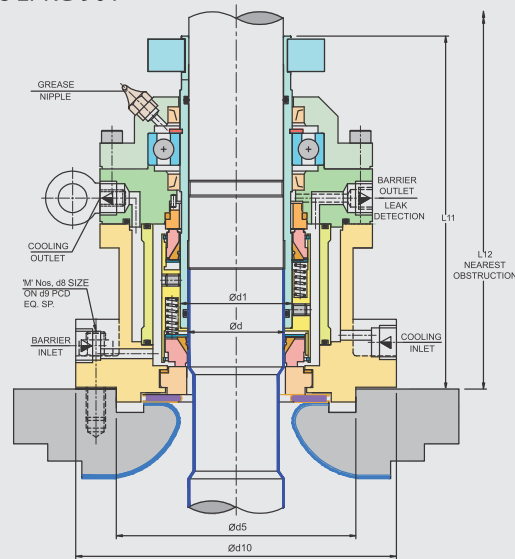
Seal Characteristics

- Double Acting Back to Back seals
- Unbalanced
- Cartridge Unit
- Independent of Direction of Rotation
- Operated with Pressurised Barrier Fluids

Operating Limits

Shaft Diameter d : 50 160mm*
Pressure p : vacuum 10 bar (max)
Temperature t : Amb 200°C (max)
Shaft speed n : 600 rpm. (max)
Barrier fluid pressure : Vessel pressure + 1.5 bar

Series LPKG 901



Shaft d ^{g6}	SEAL SIZE		d5 ^{H12}	M,d8	d9	d10	L11	L12
	0 -0.002 d1 inch	0 -0.05 d1 mm						
40.0	2.000	50.80	114.0	4,M16	145.0	175.0	200.0	245.0
50.0	2.375	60.32	126.0	8, M16	155.0	180.0	200.0	245.0
60.0	2.750	69.85	137.0	8,M16	170.0	200.0	210.0	270.0
65.0	3.000	76.20	137.0	8,M16	170.0	200.0	210.0	270.0
80.0	3.625	92.08	167.0	8,M16	200.0	230.0	230.0	290.0
95.0	4.375	111.12	203.0	8,M16	270.0	300.0	240.0	290.0
100.0	4.375	111.12	203.0	8, M16	270.0	300.0	240.0	290.0

All dimensions are in mm unless otherwise specified

Shaft d ^{g6}	SEAL SIZE		d5 ^{H12}	M,d8	d9	d10	L11	L12
	0 -0.002 d1 inch	0 -0.05 d1 mm						
110.0	4.750	120.65	220.0	8, M20	295.0	330.0	275.0	325.0
120.0	5.125	130.17	220.0	8,M20	295.0	330.0	275.0	325.0
125.0	5.500	139.70	220.0	8,M20	295.0	330.0	275.0	325.0
130.0	5.500	139.70	220.0	8,M20	295.0	330.0	275.0	325.0
140.0	6.000	152.40	313.0	12,M20	350.0	385.0	280.0	330.0
150.0	6.375	161.92	313.0	12,M20	350.0	385.0	280.0	330.0
160.0	6.750	171.45	313.0	12,M20	350.0	385.0	280.0	330.0

* Other sizes available on request

Wet Running Seal with Bearing

For Top Entry Glass Lined Agitators, Vessels and Mixers
Single Acting, Independent of Direction of Rotation

Mechanical Seal

Series LPKG 908



Standard Style

Face Materials
Carbon, Silicon Carbide

Metals Parts :
Contact Parts** : SS 316, SS 304
Non Contact Parts : Carbon Steel
* * NOTE : Higher Alloys on Request

Secondary Seals
FEP, KALREZ

Applications

- Pharmaceutical
- General Chemicals and its vapours

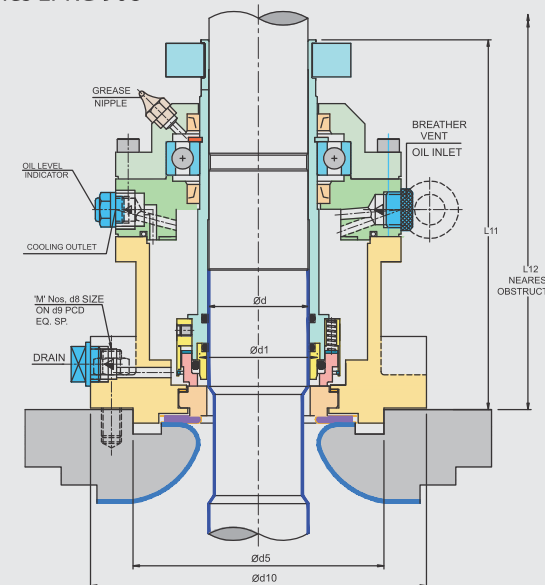
Seal Characteristics

- Single Acting
- Reverse Balanced
- Outside Mounted
- Independent of Direction of Rotation
- With Bearing

Operating Limits

Shaft Diameter d : 50 160mm*
Pressure p : vacuum 10 bar (max)
Temperature t : Amb 180°C (max)
Shaft speed n : 320 rpm. (max)

Series LPKG 908



Shaft d ^{g6}	SEAL SIZE		d5 ^{H12}	M,d8	d9	d10	L11	L12
	0 -0.002 d1 inch	0 -0.05 d1 mm						
40.0	1.875	47.62	114.0	4,M16	145.0	175.0	200.0	245.0
50.0	2.250	51.15	126.0	8,M16	155.0	180.0	200.0	245.0
60.0	2.750	69.85	137.0	8,M16	170.0	200.0	210.0	270.0
65.0	2.875	73.02	137.0	8,M16	170.0	200.0	210.0	270.0
80.0	3.500	88.90	167.0	8,M16	200.0	230.0	230.0	290.0
95.0	4.375	111.12	203.0	8,M16	270.0	300.0	215.0	285.0
100.0	4.375	111.12	203.0	8,M16	270.0	300.0	215.0	285.0

All dimensions are in mm. unless otherwise specified

Shaft d ^{g6}	SEAL SIZE		d5 ^{H12}	M,d8	d9	d10	L11	L12
	0 -0.002 d1 inch	0 -0.05 d1 mm						
110.0	4.750	120.65	220.0	8, M20	295.0	330.0	230.0	290.0
120.0	5.125	130.17	220.0	8, M20	295.0	330.0	230.0	290.0
125.0	5.375	136.52	220.0	8, M20	295.0	330.0	230.0	290.0
130.0	5.500	139.70	220.0	8, M20	295.0	330.0	230.0	290.0
140.0	6.000	152.40	313.0	12, M20	350.0	385.0	235.0	290.0
150.0	6.375	161.92	313.0	12, M20	350.0	385.0	235.0	290.0
160.0	6.750	171.45	313.0	12, M20	350.0	385.0	235.0	290.0

* Other sizes available on request



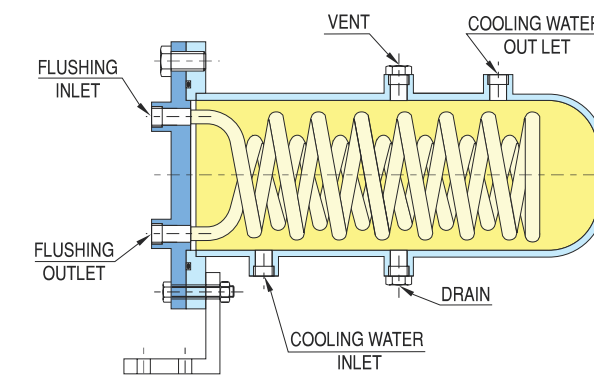
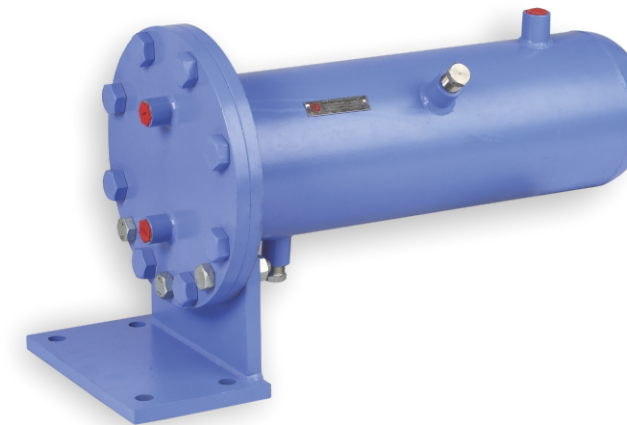
Advantages of Air Finned Coolers

- No Water Needed.
- No forced Air Draft.
- No topping the Systems.
- No De-scaling Required.
- Could be used for API Plan 21, 22 & 23
- Minimal Maintenance.
- No Spill- No Contamination on the production or factory Floor.
- Environment Friendly.
- No consumption of Energy.
- Ever Lasting.

Operating Parameters

Temperature from : 40°C to 425°C (800°F)
 Pressur : 80 bar (1200 psi)

High efficiency Air Finned Coolers are used to remove heat generated by mechanical seals. Different models are available to meet required differential temperature (Δ as high as 200°C).



Series HE-4 & HE-8 are used for bringing down the temperature of flushing fluid before it enters in the seal chamber. When the mechanical seals are used with API plan 21, 23 & 41, Heat Exchangers are used. Special feature of this heat exchanger is that its cooling coil can be removed for cleaning purpose.

Standard Style

Metal Parts

Heat Exchanger shell : Carbon Steel / SS 304 / SS 316
 Cooling coil : SS 304 / SS 316
 Empty weight : HE-4 - 25 kg (Approx)
 : HE-8 - 35 kg (Approx)

Secondary Seal

Elastomers

Operating Limits

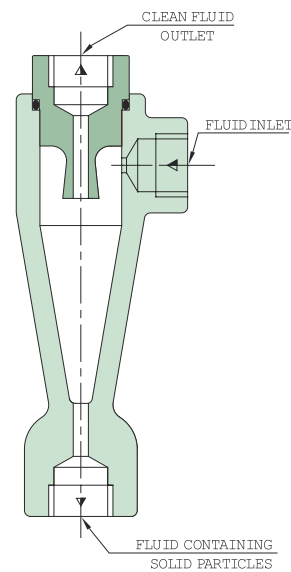
	HE-4	HE-8
Capacity	7.5 ltr	10 ltr
Heat Transfer area of cooling coil	0.4 m ²	0.8 m ²
Design Pressure of cooling coil	45 bar	80 bar
Working Pressure of cooling coil	40 bar	70 bar
Design Pressure of Shell	30 bar	30 bar
Working Pressure of Shell	15 bar	20 bar

Connection Specifications

Cooling water inlet	3/4" NPT	3/4" NPT
Cooling water outlet	3/4" NPT	3/4" NPT
Flush liquid inlet	1/2" NPT	1/2" NPT
Flush liquid outlet	1/2" NPT	1/2" NPT
Vent & Drain	1/4" NPT	1/4" NPT

Cyclone Separator

Series LPCS03



Standard Style

Metal Parts: Carbon Steel / SS 304 / SS 316
Empty weight : 1 kg (Approx)

Secondary Seal
PTFE

Operating Limits

Solid Contents : 10% by weight (max)
Liquid Viscosity : 20 Centistokes (max)
Differential Pressure : 2 to 8.5 bar (max)

Technical Specifications

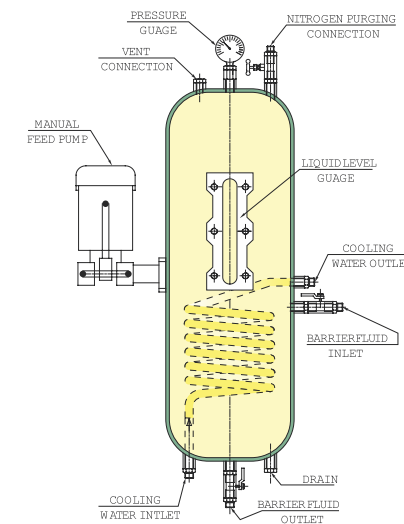
Size : 1/2" NPT (F) or 1/2" BSP (F)
Design Pressure : 40 bar
Working Pressure : 25 bar
Design Temperature : 180°C
Working Temperature : 150°C

Series LPCS03 is designed to supply clear flushing fluid for lubrication to mechanical seal in seal chamber. This is fitted in between pump discharge and seal flush port line, to remove abrasive particles which can cause damage to mechanical seal and reduce its recommended operational life.

Due to centrifugal action of the fluid, cyclone is generated in the cyclone separator and 80% of abrasive particles are separated and sent back to pump suction.

Thermosyphon Vessel (Unpressurised)

Series LPTS 07



Standard Style

Metal Parts
Thermosyphon shell : Carbon steel / SS 304 / SS 316
Cooling coil : SS 304 / SS 316
Empty weight : 10 kg (Approx)

Secondary Seal
Elastomers

Operating Limits

Capacity : 7.0 ltrs
Design Pressure : 35 bar
Hydraulic Test pressure : 53 bar
Working temperature (max) : 150°C
Heat Transfer area of cooling coil : 0.2 m²
Cooling water flow rate recommended : 5 ltrs/min

Connection specifications

Cooling Water Inlet : 3/8" NPT (F)
Cooling Water Outlet : 3/8" NPT (F)
Barrier Fluid Inlet : 3/8" NPT (F)
Barrier Fluid outlet : 3/8" NPT (F)
Pressure Gauge Connection : 3/8" NPT (F)
Filling Connection : 3/8" NPT (F)
Nitrogen Purging Connection : 3/8" NPT (F)
Feed Pump Connection : 3/8" NPT (F)
Drain : 3/8" NPT (F)

Accessories

Pressure Gauge : 0-40 bar
Level Gauge : To indicate barrier fluid
Manual Feed Pump : (optional)

Series LPTS07 is basically used as a storage & pressurising unit. This is used for double mechanical seals in back to back or tandem seal arrangement to provide necessary lubrication and cooling to the seal faces to achieve recommended seal life. This is equipped with cooling coil inside the shell to bring down the temperature of barrier fluid coming from seal to Thermosyphon Vessel. Higher capacity upto 20 ltr. can also be offered.

API Plan 53A

Thermosyphon Vessel (Pressurised)



Series LPATS 20

Series LPATS 20 is used as a storage & pressurising unit. Used for double mechanical seals in back-to-back arrangement. Instrumentation on storage unit and capacity as per API 682 Standard can be adapted to suit application and customer requirement

Operating Limits

Capacity	: 20.0 ltrs
Design Pressure	: 35 bar
Hydraulic Test pressure	: 53 bar
Working temperature (max)	: 150° C
Heat Transfer area of cooling coil	: 0.4 m2
Cooling water flow rate recommended	: 10 ltrs/min

API Plan 53C

Constant Pressure Barrier Fluid Sealing System



The constant pressure barrier fluid system comprises of a vessel and formed bellow assembly. This maintains constant differential pressure across seal faces regardless of fluctuations in suction or discharge pressure of the pump. It requires no external supply of nitrogen or power source to pressurize the system. The advantage with this system is there is no piston drag compared to piston type constant pressure system.

Operating Parameters

Capacity	: 10 & 80 ltr.
Pressure	: up to 200 bar
Flow rate	: 3 ... 30 lpm*

*depends on the seal circulation device

API Plan 53B

Accumulator with Bladder



A close loop Plan 53B (with Bladder Accumulator) allows stand- alone operation of a double liquid seal. It contains Air Fin Cooler, Pressure Transmitter, Pressure Gauge, Hand Pump, Valves, and Fittings etc.

Plan 53B System provides lubrication to seals, dissipate heat & maintain the required pressure gradient across the seal faces for back to back & tandem double seals.

A range of Standard designs with accumulator sizes from 20 to 50 LTRS & with various types of coolers can be offered.

API Plan 54

Forced Circulation Systems



Features

- Independent Pressurized fluid supply system.
- Compact and easy to operate.
- Automatic pressure hold.
- Available for various pressures & reservoir capacity i.e 40-120 Ltrs capacity & pressure 40 to 120 bar.



API Plan 53A, 53B, 53C & 54

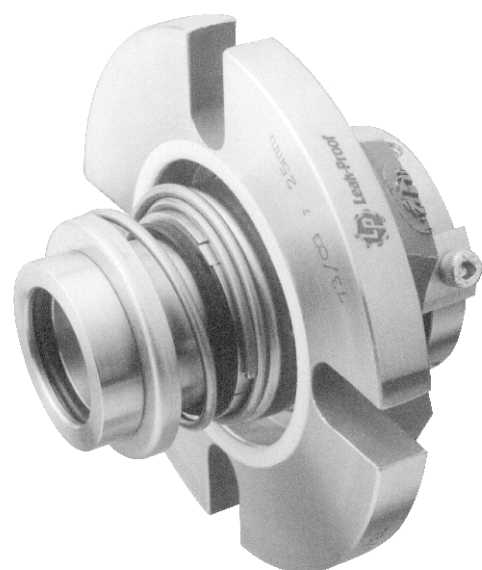
DIN 24960

Unbalanced Seal

Single Acting, Independent of Direction of Rotation

Mechanical Seal

Series N73



Seal with cartridge construction

Standard Style

Face Materials

- Carbon / Lecrolloy
- Carbon / Ceramic
- Carbon / Silicon Carbide
- Silicon Carbide / Silicon Carbide

Metal Parts

SS 316, SS 304

Secondary Seal

Nitrile, Viton

Applications

- Water Pumps
- Submersible Pumps

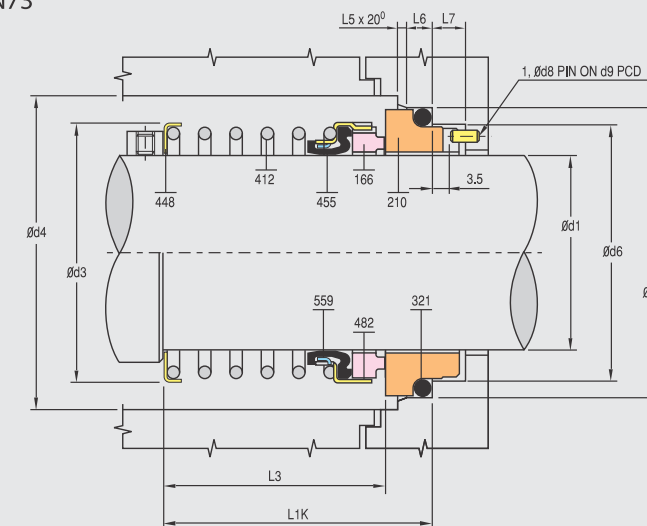
Seal Characteristics

- Single acting
- Unbalanced
- Single helical coil Spring
- Independent of Direction of Rotation
- Torque Transmission by Elastomer bellow
- To DIN 24960

Operating Limits

Shaft Diameter $d1$: 10 100 mm
 Pressure p : 12 bar (max)
 Temperature t : -20 ... +180°C
 Velocity v : 10 m/sec

Series N73



Part No.	Description
166	Seal Ring
210	Mating Ring
321	O - Ring
412	Spring
448	Spring Holder
455	Bellow
482	Retainer
559	Drive Ring

SEAL SIZE $d1$ +0.00 -0.05	$d3$	$d4$	$d6$ ^{H11}	$d7$ ^{H8}	$d8$	$d9$	$L3$	$L5$	$L6$	$L7$	$L1K$ ^{±0.5}
mm											
10.0	20.0	22.0	17.0	21.0	3.0	14.0	23.5	1.5	4.0	8.5	32.5
12.0	22.0	24.0	19.0	23.0	3.0	16.0	23.5	1.5	4.0	8.5	32.5
14.0	24.0	26.0	21.0	25.0	3.0	18.0	26.0	1.5	4.0	8.5	35.0
16.0	26.0	28.0	23.0	27.0	3.0	20.0	26.0	1.5	4.0	8.5	35.0
18.0	29.5	34.0	27.0	33.0	3.0	23.0	27.0	2.0	5.0	9.0	37.5
20.0	31.5	36.0	29.0	35.0	3.0	25.0	27.0	2.0	5.0	9.0	37.5
22.0	32.5	38.0	31.0	37.0	3.0	27.0	27.0	2.0	5.0	9.0	37.5
24.0	36.0	40.0	33.0	39.0	3.0	29.0	29.5	2.0	5.0	9.0	40.0
25.0	38.0	41.0	34.0	40.0	3.0	30.0	29.5	2.0	5.0	9.0	40.0
28.0	40.0	44.0	37.0	43.0	3.0	33.0	32.0	2.0	5.0	9.0	42.5
30.0	43.0	46.0	39.0	45.0	3.0	35.0	32.0	2.0	5.0	9.0	42.5
32.0	45.0	48.0	42.0	48.0	3.0	38.0	32.0	2.0	5.0	9.0	42.5
33.0	46.5	49.0	42.0	48.0	3.0	38.0	32.0	2.0	5.0	9.0	42.5
35.0	48.5	51.0	44.0	50.0	3.0	40.0	32.0	2.0	5.0	9.0	42.5
38.0	52.5	58.0	49.0	56.0	4.0	44.0	33.5	2.0	6.0	9.0	45.0
40.0	56.0	60.0	51.0	58.0	4.0	46.0	33.5	2.0	6.0	9.0	45.0
43.0	59.0	63.0	54.0	61.0	4.0	49.0	33.5	2.0	6.0	9.0	45.0
45.0	61.0	65.0	56.0	63.0	4.0	51.0	33.5	2.0	6.0	9.0	45.0
48.0	64.0	68.0	59.0	66.0	4.0	54.0	33.5	2.0	6.0	9.0	45.0
50.0	66.0	70.0	62.0	70.0	4.0	57.0	34.0	2.5	6.0	9.0	47.5
53.0	69.0	73.0	65.0	73.0	4.0	60.0	34.0	2.5	6.0	9.0	47.5
55.0	71.0	75.0	67.0	75.0	4.0	62.0	34.0	2.5	6.0	9.0	47.5
58.0	78.0	83.0	70.0	78.0	4.0	65.0	39.0	2.5	6.0	9.0	52.5
60.0	80.0	85.0	72.0	80.0	4.0	67.0	39.0	2.5	6.0	9.0	52.5
63.0	83.0	88.0	75.0	83.0	4.0	70.0	39.0	2.5	6.0	9.0	52.5
65.0	85.0	90.0	77.0	85.0	4.0	72.0	39.0	2.5	6.0	9.0	52.5
68.0	88.0	93.0	81.0	90.0	4.0	75.0	37.0	2.5	7.0	9.0	52.5
70.0	90.0	95.0	83.0	92.0	4.0	77.0	44.5	2.5	7.0	9.0	60.0
75.0	96.0	104.0	88.0	97.0	4.0	82.0	44.5	3.0	7.0	9.0	60.0
80.0	102.0	109.0	95.0	105.0	4.0	88.0	44.0	3.0	7.0	9.0	60.0
85.0	107.0	114.0	100.0	110.0	4.0	93.0	44.0	3.0	7.0	9.0	60.0
90.0	112.0	119.0	105.0	115.0	4.0	98.0	49.0	3.0	7.0	9.0	65.0
95.0	117.0	124.0	110.0	120.0	4.0	104.0	49.0	3.0	7.0	9.0	65.0
100.0	124.0	129.0	115.0	125.0	4.0	108.0	49.0	3.0	7.0	9.0	65.0

Series N73 is single coil spring with elastomeric bellow, designed for water, oil and light duties. This seal has self aligning feature which compensates abnormal shaft end play and run out, which leads to improved service life. Elastomeric bellow protect shaft and sleeve from fretting. Drive to the seal faces is given through notches - provided on retainer. Seal can be repaired in field with minimum spares minimising the down time cost.



DIN 24960

Unbalanced Seal
Single Acting, Independent of Direction of Rotation

Mechanical Seal

Series N70U & N75U



Seal with cartridge construction

Standard Style

Face Materials

Carbon, Ceramic,
Silicon Carbide, Tungsten Carbide, Lecrolloy

Metal Parts

SS 316, SS 304

Secondary Seal

N70U : Elastomers
N75U : PTFE, GFT

Applications

- Petrochemicals
- Petroleum refinery
- General chemicals
- Light hydrocarbons

Seal Characteristics

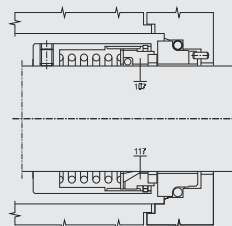
- Single acting
- Unbalanced
- Inside mounted
- Independent of direction of rotation
- To DIN 24960

Operating Limits

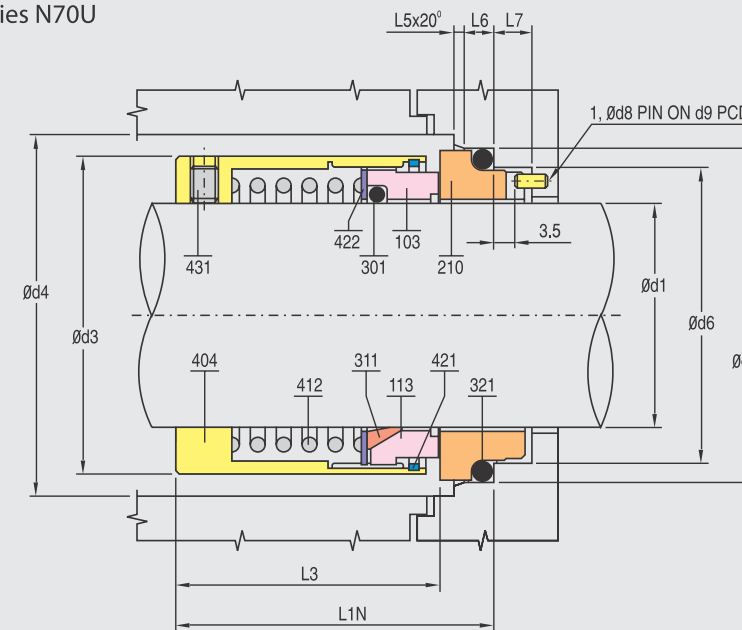
Shaft Diameter d1 : 14 100 mm
Pressure p : 10 bar (max)
Temperature t : -60 ... +220°C
Velocity v : 20 m/sec

Shrink Fit Arrangement

Temperature Limits:
SS 304 110°C
SS 316 110°C
Hastelloy-C 175°C
Carpenter - 42 350°C



Series N70U



Series N75U

Part No.	Description
103	Seal Ring
113	Seal Ring
210	Mating Ring
301	O - Ring
311	Wedge
321	O - Ring
404	Retainer
412	Spring
421	Snap Ring
422	Thrust Ring
431	Grub Screw

SEAL SIZE d1 ^{+0.00} -0.05	d3	d4	d6 ^{H11}	d7 ^{H8}	d8	d9	L3	L5	L6	L7	L1N ^{±0.5}
mm											
14.0	24.0	26.0	21.0	25.0	3.0	18.0	31.0	1.5	4.0	8.5	40.0
16.0	26.0	28.0	23.0	27.0	3.0	20.0	31.0	1.5	4.0	8.5	40.0
18.0	32.0	34.0	27.0	33.0	3.0	23.0	34.5	2.0	5.0	9.0	45.0
20.0	34.0	36.0	29.0	35.0	3.0	25.0	34.5	2.0	5.0	9.0	45.0
22.0	36.0	38.0	31.0	37.0	3.0	27.0	34.5	2.0	5.0	9.0	45.0
24.0	38.0	40.0	33.0	39.0	3.0	29.0	39.5	2.0	5.0	9.0	50.0
25.0	39.0	41.0	34.0	40.0	3.0	30.0	39.5	2.0	5.0	9.0	50.0
28.0	42.0	44.0	37.0	43.0	3.0	33.0	39.5	2.0	5.0	9.0	50.0
30.0	44.0	46.0	39.0	45.0	3.0	35.0	39.5	2.0	5.0	9.0	50.0
32.0	46.0	48.0	42.0	48.0	3.0	38.0	44.5	2.0	5.0	9.0	55.0
33.0	47.0	49.0	42.0	48.0	3.0	38.0	44.5	2.0	5.0	9.0	55.0
35.0	49.0	51.0	44.0	50.0	3.0	40.0	44.5	2.0	5.0	9.0	55.0
38.0	54.0	58.0	49.0	56.0	4.0	44.0	43.5	2.0	6.0	9.0	55.0
40.0	56.0	60.0	51.0	58.0	4.0	46.0	43.5	2.0	6.0	9.0	55.0
43.0	59.0	63.0	54.0	61.0	4.0	49.0	48.5	2.0	6.0	9.0	60.0
45.0	61.0	65.0	56.0	63.0	4.0	51.0	48.5	2.0	6.0	9.0	60.0
48.0	64.0	68.0	59.0	66.0	4.0	54.0	48.5	2.0	6.0	9.0	60.0
50.0	66.0	70.0	62.0	70.0	4.0	57.0	46.5	2.5	6.0	9.0	60.0
53.0	69.0	73.0	65.0	73.0	4.0	60.0	56.5	2.5	6.0	9.0	70.0
55.0	71.0	75.0	67.0	75.0	4.0	62.0	56.5	2.5	6.0	9.0	70.0
58.0	78.0	83.0	70.0	78.0	4.0	65.0	56.5	2.5	6.0	9.0	70.0
60.0	80.0	85.0	72.0	80.0	4.0	67.0	56.5	2.5	6.0	9.0	70.0
63.0	83.0	88.0	75.0	83.0	4.0	70.0	56.5	2.5	6.0	9.0	70.0
65.0	85.0	90.0	77.0	85.0	4.0	72.0	66.5	2.5	6.0	9.0	80.0
68.0	88.0	93.0	81.0	90.0	4.0	75.0	64.5	2.5	7.0	9.0	80.0
70.0	90.0	95.0	83.0	92.0	4.0	77.0	64.5	2.5	7.0	9.0	80.0
75.0	99.0	104.0	88.0	97.0	4.0	82.0	64.5	2.5	7.0	9.0	80.0
80.0	104.0	109.0	95.0	105.0	4.0	88.0	74.0	3.0	7.0	9.0	90.0
85.0	109.0	114.0	100.0	110.0	4.0	93.0	74.0	3.0	7.0	9.0	90.0
90.0	114.0	119.0	105.0	115.0	4.0	98.0	74.0	3.0	7.0	9.0	90.0
95.0	119.0	124.0	110.0	120.0	4.0	104.0	74.0	3.0	7.0	9.0	90.0
100.0	124.0	129.0	115.0	125.0	4.0	108.0	74.0	3.0	7.0	9.0	90.0

Series N70U & N75U are single helical coil spring seals developed for dirty media and clogging type applications. Torque transmission from retainer shell to seal ring is done through drive lugs. All components are held together by a snap ring which helps in easier installation and removal. As all parts are interchangeable, one can convert series N70U & N75U by changing only the seal ring and the secondary seal. This concept is ideal for stock rationalisation.



SERIES N70U / N75U

DIN 24960
Balanced Seal
Single Acting, Independent of Direction of Rotation

Mechanical Seal **Series N70B & N75B**



Seal with cartridge construction

Standard Style

Face Materials

Carbon, Ceramic,
 Silicon Carbide, Tungsten Carbide, Lecrolloy

Metal Parts

SS 316, SS 304

Secondary Seal

N70B : Elastomers
 N75B : PTFE, GFT

Applications

- Petrochemicals
- Petroleum refinery
- General chemicals
- Light hydrocarbons

Seal Characteristics

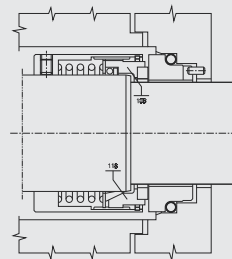
- Single acting
- Balanced
- Inside mounted
- Independent of direction of rotation
- To DIN 24960

Operating Limits

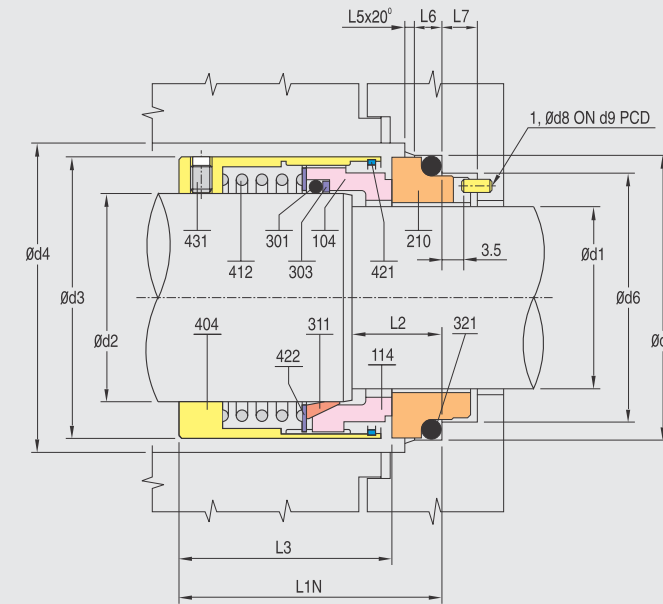
Shaft Diameter d1 : 14 100 mm
 Pressure p : 35 bar (max)
 Temperature t : -60 ... +200°C
 Velocity v : 20 m/sec

Shrink Fit Arrangement

Temperature Limits:
 SS 304 110°C
 SS 316 110°C
 Hastelloy-C 175°C
 Carpenter - 42 350°C



Series N70B



Series N75B

Part No.	Description
104	Seal Ring
114	Seal Ring
210	Mating Ring
301	O-Ring
303	Back-up Ring
311	Wedge
321	O-Ring
404	Retainer
412	Spring
421	Snap Ring
422	Thrust Ring
431	Grub Screw

SEAL SIZE d1 ^{+0.00} _{-0.05}	d2 ^{h6}	d3	d4	d6 ^{H11}	d7 ^{H8}	d8	d9	L2	L3	L5	L6	L7	L1N ^{±0.5}
mm													
14.0	18.0	32.0	34.0	21.0	25.0	3.0	18.0	18.0	46.0	1.5	4.0	8.5	55.0
16.0	20.0	34.0	36.0	23.0	27.0	3.0	20.0	18.0	46.0	1.5	4.0	8.5	55.0
18.0	22.0	36.0	38.0	27.0	33.0	3.0	23.0	20.0	44.5	2.0	5.0	9.0	55.0
20.0	24.0	38.0	40.0	29.0	35.0	3.0	25.0	20.0	49.5	2.0	5.0	9.0	60.0
22.0	26.0	40.0	42.0	31.0	37.0	3.0	27.0	20.0	49.5	2.0	5.0	9.0	60.0
24.0	28.0	42.0	44.0	33.0	39.0	3.0	29.0	20.0	49.5	2.0	5.0	9.0	60.0
25.0	30.0	44.0	46.0	34.0	40.0	3.0	30.0	20.0	49.5	2.0	5.0	9.0	60.0
28.0	33.0	47.0	49.0	37.0	43.0	3.0	33.0	20.0	54.5	2.0	5.0	9.0	65.0
30.0	35.0	49.0	51.0	39.0	45.0	3.0	35.0	20.0	54.5	2.0	5.0	9.0	65.0
32.0	38.0	54.0	58.0	42.0	48.0	3.0	38.0	20.0	54.5	2.0	5.0	9.0	65.0
33.0	38.0	54.0	58.0	42.0	48.0	3.0	38.0	20.0	54.5	2.0	5.0	9.0	65.0
35.0	40.0	56.0	60.0	44.0	50.0	3.0	40.0	20.0	54.5	2.0	5.0	9.0	65.0
38.0	43.0	59.0	63.0	49.0	56.0	4.0	44.0	23.0	63.5	2.0	6.0	9.0	75.0
40.0	45.0	61.0	65.0	51.0	58.0	4.0	46.0	23.0	63.5	2.0	6.0	9.0	75.0
43.0	48.0	64.0	68.0	54.0	61.0	4.0	49.0	23.0	63.5	2.0	6.0	9.0	75.0
45.0	50.0	66.0	70.0	56.0	63.0	4.0	51.0	23.0	63.5	2.0	6.0	9.0	75.0
48.0	53.0	69.0	73.0	59.0	66.0	4.0	54.0	23.0	73.5	2.0	6.0	9.0	85.0
50.0	55.0	71.0	75.0	62.0	70.0	4.0	57.0	25.0	71.5	2.5	6.0	9.0	85.0
53.0	58.0	78.0	83.0	65.0	73.0	4.0	60.0	25.0	71.5	2.5	6.0	9.0	85.0
55.0	60.0	80.0	85.0	67.0	75.0	4.0	62.0	25.0	71.5	2.5	6.0	9.0	85.0
58.0	63.0	83.0	88.0	70.0	78.0	4.0	65.0	25.0	71.5	2.5	6.0	9.0	85.0
60.0	65.0	85.0	90.0	72.0	80.0	4.0	67.0	25.0	81.5	2.5	6.0	9.0	95.0
63.0	68.0	88.0	93.0	75.0	83.0	4.0	70.0	25.0	81.5	2.5	6.0	9.0	95.0
65.0	70.0	90.0	95.0	77.0	85.0	4.0	72.0	25.0	81.5	2.5	6.0	9.0	95.0
70.0	75.0	99.0	104.0	83.0	92.0	4.0	77.0	28.0	79.5	2.5	7.0	9.0	95.0
75.0	80.0	104.0	109.0	88.0	97.0	4.0	82.0	28.0	89.0	2.5	7.0	9.0	105.0
80.0	85.0	109.0	114.0	95.0	105.0	4.0	88.0	28.0	89.0	3.0	7.0	9.0	105.0
85.0	90.0	114.0	119.0	100.0	110.0	4.0	93.0	28.0	89.0	3.0	7.0	9.0	105.0
90.0	95.0	119.0	124.0	105.0	115.0	4.0	98.0	28.0	89.0	3.0	7.0	9.0	105.0
95.0	100.0	124.0	129.0	110.0	120.0	4.0	104.0	28.0	89.0	3.0	7.0	9.0	105.0
100.0	105.0	129.0	134.0	115.0	125.0	4.0	108.0	28.0	89.0	3.0	7.0	9.0	105.0

Series N70B & N75B are single helical coil spring seals developed for dirty media and clogging type applications. Torque transmission from retainer shell to seal ring is done through drive lugs. All components are held together by a snap ring which helps in easier installation and removal. As all parts are interchangeable, one can convert series N70B to N75B by changing only the seal ring and the secondary seal. This concept is ideal for stock rationalisation.



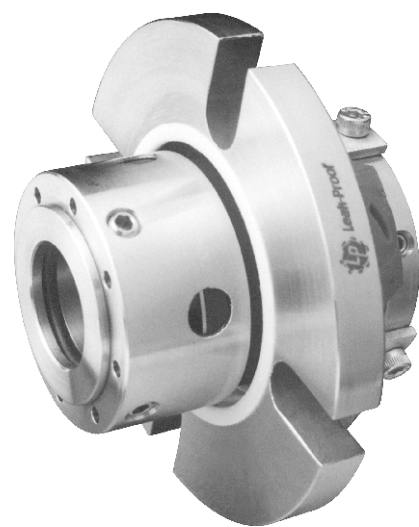
SERIES N70B / N75B

DIN 24960

Unbalanced Seal
Single Acting, Independent of Direction of Rotation

Mechanical Seal

Series N80U & N85U



Seal with cartridge construction

Standard Style

Face Materials

Carbon, Ceramic,
Silicon Carbide, Tungsten Carbide, Lecrolloy

Metal Parts

SS 316, SS 304,
Hastelloy-C, Monel, Alloy - 20

Secondary Seal

N80U : Elastomers
N85U : PTFE, GFT

Applications

- Petrochemicals
- Petroleum refinery
- General chemicals
- Light hydrocarbons

Seal Characteristics

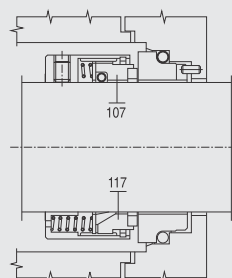
- Single acting
- Unbalanced
- Inside mounted
- Independent of direction of rotation
- To DIN 24960

Operating Limits

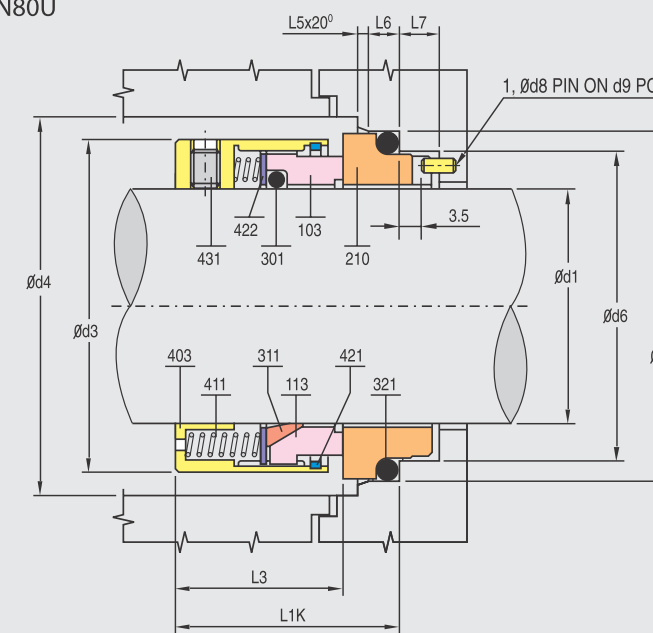
Shaft Diameter d1 : 14 100 mm
Pressure p : 10 bar (max)
Temperature t : -60 ... +200°C
Velocity v : 20 m/sec

Shrink Fit Arrangement

Temperature Limits:
SS 304 110°C
SS 316 110°C
Hastelloy-C 175°C
Carpenter - 42 350°C



Series N80U



Series N85U

Part No. Description

103	Seal Ring
113	Seal Ring
210	Mating Ring
301	O-Ring
311	Wedge
321	O-Ring
403	Retainer
411	Spring
421	Snap Ring
422	Thrust Ring
431	Grub Screw

SEAL SIZE d1 ^{+0.00} _{-0.05}	d3	d4	d6 ^{H11}	d7 ^{H8}	d8	d9	L3	L5	L6	L7	L1K ^{±0.5}
mm											
14.0	24.0	26.0	21.0	25.0	3.0	18.0	26.0	1.5	4.0	8.5	35.0
16.0	26.0	28.0	23.0	27.0	3.0	20.0	26.0	1.5	4.0	8.5	35.0
18.0	32.0	34.0	27.0	33.0	3.0	23.0	27.0	2.0	5.0	9.0	37.5
20.0	34.0	36.0	29.0	35.0	3.0	25.0	27.0	2.0	5.0	9.0	37.5
22.0	36.0	38.0	31.0	37.0	3.0	27.0	27.0	2.0	5.0	9.0	37.5
24.0	38.0	40.0	33.0	39.0	3.0	29.0	29.5	2.0	5.0	9.0	40.0
25.0	39.0	41.0	34.0	40.0	3.0	30.0	29.5	2.0	5.0	9.0	40.0
28.0	42.0	44.0	37.0	43.0	3.0	33.0	32.0	2.0	5.0	9.0	42.5
30.0	44.0	46.0	39.0	45.0	3.0	35.0	32.0	2.0	5.0	9.0	42.5
32.0	46.0	48.0	42.0	48.0	3.0	38.0	32.0	2.0	5.0	9.0	42.5
33.0	47.0	49.0	42.0	48.0	3.0	38.0	32.0	2.0	5.0	9.0	42.5
35.0	49.0	51.0	44.0	50.0	3.0	40.0	32.0	2.0	5.0	9.0	42.5
38.0	54.0	58.0	49.0	56.0	4.0	44.0	33.5	2.0	6.0	9.0	45.0
40.0	56.0	60.0	51.0	58.0	4.0	46.0	33.5	2.0	6.0	9.0	45.0
43.0	59.0	63.0	54.0	61.0	4.0	49.0	33.5	2.0	6.0	9.0	45.0
45.0	61.0	65.0	56.0	63.0	4.0	51.0	33.5	2.0	6.0	9.0	45.0
48.0	64.0	68.0	59.0	66.0	4.0	54.0	33.5	2.0	6.0	9.0	45.0
50.0	66.0	70.0	62.0	70.0	4.0	57.0	34.0	2.5	6.0	9.0	47.5
53.0	69.0	73.0	65.0	73.0	4.0	60.0	34.0	2.5	6.0	9.0	47.5
55.0	71.0	75.0	67.0	75.0	4.0	62.0	34.0	2.5	6.0	9.0	47.5
58.0	78.0	83.0	70.0	78.0	4.0	65.0	39.0	2.5	6.0	9.0	52.5
60.0	80.0	85.0	72.0	80.0	4.0	67.0	39.0	2.5	6.0	9.0	52.5
63.0	83.0	88.0	75.0	83.0	4.0	70.0	39.0	2.5	6.0	9.0	52.5
65.0	85.0	90.0	77.0	85.0	4.0	72.0	39.0	2.5	6.0	9.0	52.5
68.0	88.0	93.0	81.0	90.0	4.0	75.0	37.0	2.5	7.0	9.0	52.5
70.0	90.0	95.0	83.0	92.0	4.0	77.0	44.5	2.5	7.0	9.0	60.0
75.0	99.0	104.0	88.0	97.0	4.0	82.0	44.5	2.5	7.0	9.0	60.0
80.0	104.0	109.0	95.0	105.0	4.0	88.0	44.0	3.0	7.0	9.0	60.0
85.0	109.0	114.0	100.0	110.0	4.0	93.0	44.0	3.0	7.0	9.0	60.0
90.0	114.0	119.0	105.0	115.0	4.0	98.0	49.0	3.0	7.0	9.0	65.0
95.0	119.0	124.0	110.0	120.0	4.0	104.0	49.0	3.0	7.0	9.0	65.0
100.0	124.0	129.0	115.0	125.0	4.0	108.0	49.0	3.0	7.0	9.0	65.0

Series N80U & N85U are multiple spring units developed for universal application. Their compact design permits their use in all types of centrifugal pumps. Torque transmission from retainer shell to seal ring is done through drive lugs. All components are held together by a snap ring which helps in easier installation and removal. As all parts are interchangeable, one can convert series N80U to N85U by changing only the seal ring and the secondary seal. This concept is ideal for stock rationalisation.



SERIES N80U / N85U

DIN 24960

Balanced Seal

Single Acting, Independent of Direction of Rotation

Mechanical Seal

Series N80B & N85B



Seal with cartridge construction

Standard Style

Face Materials

Carbon, Ceramic,
Silicon Carbide, Tungsten Carbide, Lecrolloy.

Metal Parts

SS 316, SS304,
Hastelloy-C, Monel, Alloy - 20

Secondary Seal

N80B : Elastomers
N85B : PTFE, GFT

Applications

- Petrochemicals
- Petroleum refinery
- General chemicals
- Light hydrocarbons

Seal Characteristics

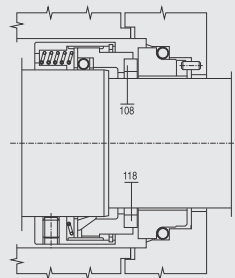
- Single acting
- Balanced
- Inside mounted
- Independent of direction of rotation
- To DIN 24960

Operating Limits

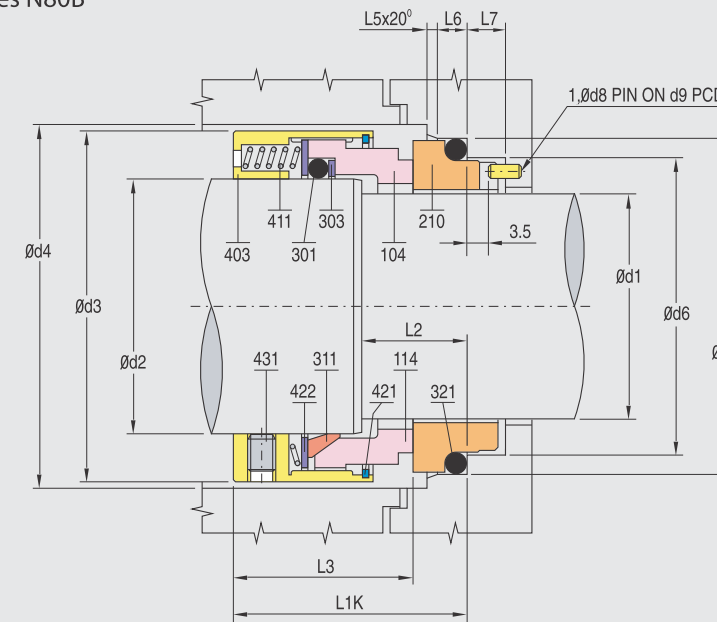
Shaft Diameter d_1 : 14 100 mm
Pressure p : 35 bar (max)
Temperature t : -60 ... +200°C
Velocity v : 20 m/sec

Shrink Fit Arrangement

Temperature Limits:
SS 304 110°C
SS 316 110°C
Hastelloy-C 175°C
Carpenter - 42 350°C



Series N80B



Series N85B

Part No.	Description
104	Seal Ring
114	Seal Ring
210	Mating Ring
301	O-Ring
303	Back-up Ring
311	Wedge
321	O-Ring
403	Retainer
411	Spring
421	Snap Ring
422	Thrust Ring
431	Grub Screw

SEAL SIZE $d_1^{+0.00/-0.05}$	$d_2^{h_6}$	d_3	d_4	$d_6^{H_{11}}$	$d_7^{H_8}$	d_8	d_9	L2	L3	L5	L6	L7	L1K $^{±0.5}$
mm													
14.0	18.0	32.0	34.0	21.0	25.0	3.0	18.0	18.0	33.5	1.5	4.0	8.5	42.5
16.0	20.0	34.0	36.0	23.0	27.0	3.0	20.0	18.0	33.5	1.5	4.0	8.5	42.5
18.0	22.0	36.0	38.0	27.0	33.0	3.0	23.0	20.0	34.5	2.0	5.0	9.0	45.0
20.0	24.0	38.0	40.0	29.0	35.0	3.0	25.0	20.0	34.5	2.0	5.0	9.0	45.0
22.0	26.0	40.0	42.0	31.0	37.0	3.0	27.0	20.0	34.5	2.0	5.0	9.0	45.0
24.0	28.0	42.0	44.0	33.0	39.0	3.0	29.0	20.0	37.0	2.0	5.0	9.0	47.5
25.0	30.0	44.0	46.0	34.0	40.0	3.0	30.0	20.0	37.0	2.0	5.0	9.0	47.5
28.0	33.0	47.0	49.0	37.0	43.0	3.0	33.0	20.0	39.5	2.0	5.0	9.0	50.0
30.0	35.0	49.0	51.0	39.0	45.0	3.0	35.0	20.0	39.5	2.0	5.0	9.0	50.0
32.0	38.0	54.0	58.0	42.0	48.0	3.0	38.0	20.0	39.5	2.0	5.0	9.0	50.0
33.0	38.0	54.0	58.0	42.0	48.0	3.0	38.0	20.0	39.5	2.0	5.0	9.0	50.0
35.0	40.0	56.0	60.0	44.0	50.0	3.0	40.0	20.0	39.5	2.0	5.0	9.0	50.0
38.0	43.0	59.0	63.0	49.0	56.0	4.0	44.0	23.0	41.0	2.0	6.0	9.0	52.5
40.0	45.0	61.0	65.0	51.0	58.0	4.0	46.0	23.0	41.0	2.0	6.0	9.0	52.5
43.0	48.0	64.0	68.0	54.0	61.0	4.0	49.0	23.0	41.0	2.0	6.0	9.0	52.5
45.0	50.0	66.0	70.0	56.0	63.0	4.0	51.0	23.0	41.0	2.0	6.0	9.0	52.5
48.0	53.0	69.0	73.0	59.0	66.0	4.0	54.0	23.0	41.0	2.0	6.0	9.0	52.5
50.0	55.0	71.0	75.0	62.0	70.0	4.0	57.0	25.0	44.0	2.5	6.0	9.0	57.5
53.0	58.0	78.0	83.0	65.0	73.0	4.0	60.0	25.0	44.0	2.5	6.0	9.0	57.5
55.0	60.0	80.0	85.0	67.0	75.0	4.0	62.0	25.0	44.0	2.5	6.0	9.0	57.5
58.0	63.0	83.0	88.0	70.0	78.0	4.0	65.0	25.0	49.0	2.5	6.0	9.0	62.5
60.0	65.0	85.0	90.0	72.0	80.0	4.0	67.0	25.0	49.0	2.5	6.0	9.0	62.5
63.0	68.0	88.0	93.0	75.0	83.0	4.0	70.0	25.0	49.0	2.5	6.0	9.0	62.5
65.0	70.0	90.0	95.0	77.0	85.0	4.0	72.0	25.0	49.0	2.5	6.0	9.0	62.5
70.0	75.0	99.0	104.0	83.0	92.0	4.0	77.0	28.0	54.5	2.5	7.0	9.0	70.0
75.0	80.0	104.0	109.0	88.0	97.0	4.0	82.0	28.0	54.5	2.5	7.0	9.0	70.0
80.0	85.0	109.0	114.0	95.0	105.0	4.0	88.0	28.0	54.0	3.0	7.0	9.0	70.0
85.0	90.0	114.0	119.0	100.0	110.0	4.0	93.0	28.0	59.0	3.0	7.0	9.0	75.0
90.0	95.0	119.0	124.0	105.0	115.0	4.0	98.0	28.0	59.0	3.0	7.0	9.0	75.0
95.0	100.0	124.0	129.0	110.0	120.0	4.0	104.0	28.0	59.0	3.0	7.0	9.0	75.0
100.0	105.0	129.0	134.0	115.0	125.0	4.0	108.0	28.0	59.0	3.0	7.0	9.0	75.0

Series N80B & N85B are multiple spring units developed for universal high pressure applications. Their compact design permits their use in all types of centrifugal pumps. Torque transmission from retainer shell to seal ring is done through drive lugs. All components are held together by a snap ring which helps in easier installation and removal. As all parts are interchangeable, one can convert series N80B to N85B by changing only the seal ring and the secondary seal. This concept is ideal for stock rationalisation.

DIN 24960

Unbalanced Seal

Single Acting, Independent of Direction of Rotation

Mechanical Seal

Series N110U & N115U



Seal with cartridge construction

Standard Style

Face Materials

Carbon, Ceramic, Stellite,
Silicon Carbide, Tungsten Carbide, Lecrolloy

Metal Parts

SS 316, SS 304

Secondary Seal

N110U : Elastomers
N115U : PTFE, GFT

Applications

- Light Abrasive handling pumps
- Light Sewage handling pumps
- High viscosity handling pumps
- General & light chemicals
- Hydrocarbons

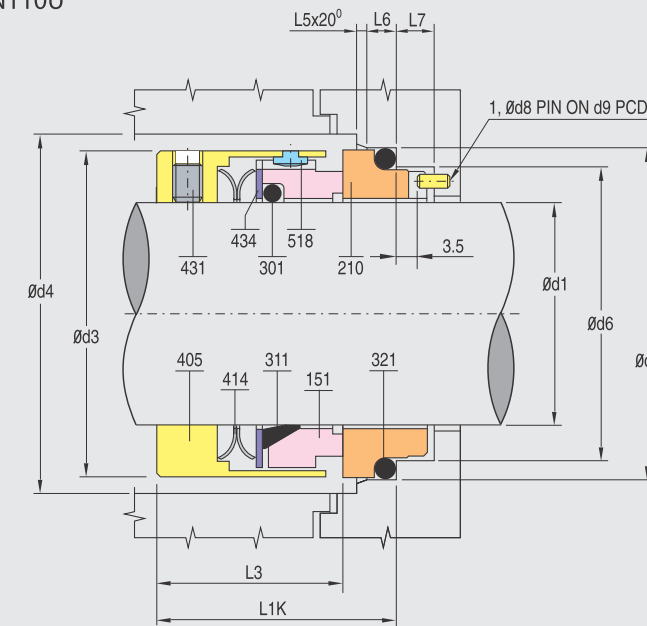
Seal Characteristics

- Single acting
- Unbalanced
- Inside mounted
- Independent of direction of rotation
- Wave Spring loaded
- To DIN 24960

Operating Limits

Shaft Diameter d1 : 14 100 mm
Pressure p : 10 bar (max)
Temperature t : -45 ... +200°C
Velocity v : 20 m/sec

Series N110U



Series N115U

Part No.	Description
151	Seal Ring
210	Mating Ring
301	O-Ring
311	Wedge
321	O-Ring
405	Retainer
414	Wave Spring
431	Grub Screw
434	Thrust Ring
518	Drive Pin

SEAL SIZE d1 <small>+0.00 -0.05</small>	d3	d4	d6 ^{H11}	d7 ^{H8}	d8	d9	L3	L5	L6	L7	L1K ^{±0.5}
14.0	24.0	26.0	21.0	25.0	3.0	18.0	26.0	1.5	4.0	8.5	35.0
16.0	26.0	28.0	23.0	27.0	3.0	20.0	26.0	1.5	4.0	8.5	35.0
18.0	32.0	34.0	27.0	33.0	3.0	23.0	27.0	2.0	5.0	9.0	37.5
20.0	34.0	36.0	29.0	35.0	3.0	25.0	27.0	2.0	5.0	9.0	37.5
22.0	36.0	38.0	31.0	37.0	3.0	27.0	27.0	2.0	5.0	9.0	37.5
24.0	38.0	40.0	33.0	39.0	3.0	29.0	29.5	2.0	5.0	9.0	40.0
25.0	39.0	41.0	34.0	40.0	3.0	30.0	29.5	2.0	5.0	9.0	40.0
28.0	42.0	44.0	37.0	43.0	3.0	33.0	32.0	2.0	5.0	9.0	42.5
30.0	44.0	46.0	39.0	45.0	3.0	35.0	32.0	2.0	5.0	9.0	42.5
32.0	46.0	48.0	42.0	48.0	3.0	38.0	32.0	2.0	5.0	9.0	42.5
33.0	47.0	49.0	42.0	48.0	3.0	38.0	32.0	2.0	5.0	9.0	42.5
35.0	49.0	51.0	44.0	50.0	3.0	40.0	32.0	2.0	5.0	9.0	42.5
38.0	54.0	58.0	49.0	56.0	4.0	44.0	33.5	2.0	6.0	9.0	45.0
40.0	56.0	60.0	51.0	58.0	4.0	46.0	33.5	2.0	6.0	9.0	45.0
43.0	59.0	63.0	54.0	61.0	4.0	49.0	33.5	2.0	6.0	9.0	45.0
45.0	61.0	65.0	56.0	63.0	4.0	51.0	33.5	2.0	6.0	9.0	45.0
48.0	64.0	68.0	59.0	66.0	4.0	54.0	33.5	2.0	6.0	9.0	45.0
50.0	66.0	70.0	62.0	70.0	4.0	57.0	34.0	2.5	6.0	9.0	47.5
53.0	69.0	73.0	65.0	73.0	4.0	60.0	34.0	2.5	6.0	9.0	47.5
55.0	71.0	75.0	67.0	75.0	4.0	62.0	34.0	2.5	6.0	9.0	47.5
58.0	78.0	83.0	70.0	78.0	4.0	65.0	39.0	2.5	6.0	9.0	52.5
60.0	80.0	85.0	72.0	80.0	4.0	67.0	39.0	2.5	6.0	9.0	52.5
63.0	83.0	88.0	75.0	83.0	4.0	70.0	39.0	2.5	6.0	9.0	52.5
65.0	85.0	90.0	77.0	85.0	4.0	72.0	39.0	2.5	6.0	9.0	52.5
68.0	88.0	93.0	81.0	90.0	4.0	75.0	37.0	2.5	7.0	9.0	52.5
70.0	90.0	95.0	83.0	92.0	4.0	77.0	44.5	2.5	7.0	9.0	60.0
75.0	99.0	104.0	88.0	97.0	4.0	82.0	44.5	2.5	7.0	9.0	60.0
80.0	104.0	109.0	95.0	105.0	4.0	88.0	44.0	3.0	7.0	9.0	60.0
85.0	109.0	114.0	100.0	110.0	4.0	93.0	44.0	3.0	7.0	9.0	60.0
90.0	114.0	119.0	105.0	115.0	4.0	98.0	49.0	3.0	7.0	9.0	65.0
95.0	119.0	124.0	110.0	120.0	4.0	104.0	49.0	3.0	7.0	9.0	65.0
100.0	124.0	129.0	115.0	125.0	4.0	108.0	49.0	3.0	7.0	9.0	65.0

Series N110U & N115U are single wave spring seals suitable for most general application. Major advantage of these seals is due to use of single wave spring it is of compact design with reduced axial length. These seals can also be used in dirty application as spring clogging does not occur. Torque transmission from retainer shell to seal ring is through drive pin.



DIN 24960

Metal Bellows Seal, Single Acting, Independent of Direction of Rotation

Mechanical Seal

Series N40 & N45



Seal with cartridge construction

Standard Style

Face Materials

Carbon, Silicon Carbide, Tungsten Carbide

Metal Parts

Series N40 : SS 316, SS 304, Carpenter 42
Series N45 : Hastelloy-C

Welded Bellows

Series N40 : AM 350
Series N45 : Hastelloy-C

Secondary Seal

Elastomers, PTFE, GFT

Applications

- Chemicals
- Petrochemicals
- Refinery
- Corrosive chemicals

Seal Characteristics

- Single acting
- Inherently balanced
- Inside mounted
- Independent of direction of rotation
- Welded Metal Bellows
- To DIN 24960

Operating Limits

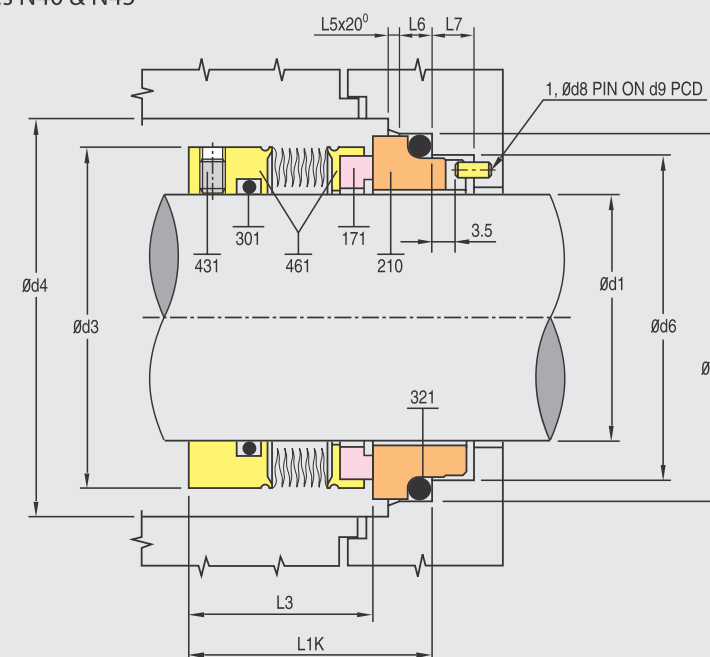
Shaft Diameter d1 : 20 100 mm
Pressure p : 20 bar (max)
Temperature t : -20 ... +200°C
Velocity v : 20 m/sec

Shrink Fit Arrangement*

Temperature Limits:
SS 304 110°C
SS 316 110°C
Hastelloy-C 175°C
Carpenter - 42 350°C

Series N40 & N45 are welded metal bellow seals used in chemical, petrochemical and refinery process pumps for moderate temperature/pressure application and for process services requiring corrosion resistance. These bellow seals are constructed by welding a series of diaphragms together at the edges to form a bellows unit. The bellows unit eliminates the need for springs, dynamic secondary seal and provides flexibility to the seal face in addition to compensating for seal face wear.

Series N40 & N45



Part No.	Description
171 + 461	Seal face shrink-fitted with Metal bellows
210	Mating Ring
301	O-Ring
321	O-Ring
431	Grub Screw

SEAL SIZE d1 ^{+0.00} -0.05	d3	d4	d6 ^{H11}	d7 ^{H8}	d8	d9	L3	L5	L6	L7	L1K ^{±0.5}
mm											
20.0	33.5*	36.0	29.0	35.0	3.0	25.0	27.0	2.0	5.0	9.0	37.5
22.0	38.0*	42.0*	31.0	37.0	3.0	27.0	27.0	2.0	5.0	9.0	37.5
24.0	38.0*	40.0	33.0	39.0	3.0	29.0	29.5	2.0	5.0	9.0	40.0
25.0	39.7*	42.0*	34.0	40.0	3.0	30.0	29.5	2.0	5.0	9.0	40.0
28.0	42.9*	46.0*	37.0	43.0	3.0	33.0	32.0	2.0	5.0	9.0	42.5
30.0	46.0*	48.0*	39.0	45.0	3.0	35.0	32.0	2.0	5.0	9.0	42.5
32.0	46.0*	48.0	42.0	48.0	3.0	38.0	32.0	2.0	5.0	9.0	42.5
33.0	49.4*	51.0*	42.0	48.0	3.0	38.0	32.0	2.0	5.0	9.0	42.5
35.0	49.4*	51.0	44.0	50.0	3.0	40.0	32.0	2.0	5.0	9.0	42.5
38.0	52.5	58.0	49.0	56.0	4.0	44.0	33.5	2.0	6.0	9.0	45.0
40.0	55.5	60.0	51.0	58.0	4.0	46.0	33.5	2.0	6.0	9.0	45.0
43.0	59.0	63.0	54.0	61.0	4.0	49.0	33.5	2.0	6.0	9.0	45.0
45.0	59.0	65.0	56.0	63.0	4.0	51.0	33.5	2.0	6.0	9.0	45.0
48.0	62.0	68.0	59.0	66.0	4.0	54.0	33.5	2.0	6.0	9.0	45.0
50.0	65.0	70.0	62.0	70.0	4.0	57.0	34.0	2.5	6.0	9.0	47.5
53.0	68.5	73.0	65.0	73.0	4.0	60.0	34.0	2.5	6.0	9.0	47.5
55.0	71.5	75.0	67.0	75.0	4.0	62.0	34.0	2.5	6.0	9.0	47.5
58.0	75.0	83.0	70.0	78.0	4.0	65.0	39.0	2.5	6.0	9.0	52.5
60.0	75.0	85.0	72.0	80.0	4.0	67.0	39.0	2.5	6.0	9.0	52.5
63.0	81.0	88.0	75.0	83.0	4.0	70.0	39.0	2.5	6.0	9.0	52.5
65.0	84.0	90.0	77.0	85.0	4.0	72.0	39.0	2.5	6.0	9.0	52.5
68.0	87.5	93.0	81.0	90.0	4.0	75.0	37.0	2.5	7.0	9.0	52.5
70.0	87.5	95.0	83.0	92.0	4.0	77.0	44.5	2.5	7.0	9.0	60.0
75.0	95.5	104.0	88.0	97.0	4.0	82.0	44.5	2.5	7.0	9.0	60.0
80.0	102.0	109.0	95.0	105.0	4.0	88.0	44.0	3.0	7.0	9.0	60.0
85.0	105.0	114.0	100.0	110.0	4.0	93.0	44.0	3.0	7.0	9.0	60.0
90.0	108.0	119.0	105.0	115.0	4.0	98.0	49.0	3.0	7.0	9.0	65.0
95.0	114.5	124.0	110.0	120.0	4.0	104.0	49.0	3.0	7.0	9.0	65.0
100.0	121.0	129.0	115.0	125.0	4.0	108.0	49.0	3.0	7.0	9.0	65.0

*Seal OD d3 is not as per DIN 24960.

Balanced Seal

High Pressure, Heavy Duty Seal, Single Acting,
Independent of Direction of Rotation

Mechanical Seal

Series 900B/CG



Standard Style

Face Materials

Carbon / Silicon Carbide
Carbon / Tungsten Carbide
Silicon Carbide / Silicon Carbide

Metal Parts

SS 316, SS 304, Hastelloy-C,
Titanium, Alloy-20, Monel

Secondary Seal

Elastomers

Applications

- Oil Pipeline Pumps
- Boiler Feed Water Pumps

Seal Characteristics

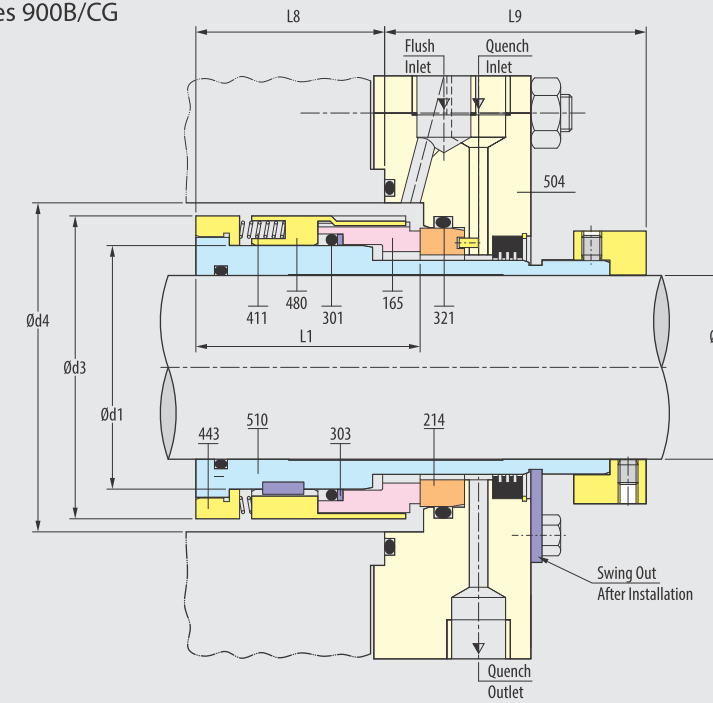
- Single acting
- Balanced
- Inside mounted
- Independent of direction of rotation
- Multiple springs design
- Sturdy drive mechanism

Operating Limits

Shaft diameter d1 : 25.4 114.3 mm
Pressure p : 25.....150 bar
Temperature t : -40.....180°C
Velocity v : 20 m/sec

Series 900B/CG is specially designed cartridge seal for pumps handling oil, water and other fluids which are being pumped at very high pressure. These seals are widely used on pipe & Boiler feed water pumps. Very sturdy design and drive arrangement makes the seal suitable for very high pressure. This being multiple spring seal, it provides uniform face loading.

Series 900B/CG



Part No.	Description
165	Seal Ring
214	Mating Ring
301	O - Ring
303	Back-up Ring
321	O - Ring
411	Spring
443	Spring holder
480	Retainer
504	Gland
510	Sleeve

Shaft d	SEAL SIZE d1		d3	d4	L1	L8	L9
	inch	mm					
25.40	1.437	36.50	54.0	58.0	59.5	48.0	75.0
28.58	1.625	41.28	57.5	61.5	59.5	48.0	75.0
31.75	1.750	44.45	60.5	64.5	59.5	48.0	75.0
34.92	1.875	47.62	63.5	67.5	59.5	48.0	75.0
38.10	2.000	50.80	67.0	71.0	59.5	48.0	75.0
41.28	2.125	53.98	70.0	74.0	59.5	48.0	75.0
44.45	2.250	57.15	73.0	77.0	59.5	48.0	75.0
47.62	2.375	60.32	76.5	80.5	59.5	50.0	75.0
50.80	2.500	63.50	79.5	83.5	59.5	50.0	75.0
53.98	2.625	66.68	86.0	90.0	64.5	53.0	79.0
57.15	2.750	69.85	89.0	93.0	64.5	53.0	79.0
60.32	2.875	73.02	92.5	96.5	64.5	53.0	79.0
63.50	3.000	76.20	95.5	99.5	64.5	53.0	79.0
66.68	3.125	79.38	98.5	102.5	64.5	53.0	79.0
69.85	3.250	82.55	102.0	106.0	64.5	53.0	79.0
73.02	3.375	85.72	105.0	109.0	64.5	56.0	79.0
76.20	3.500	88.90	108.0	112.0	64.5	56.0	90.0
79.37	3.875	98.42	116.0	120.0	69.5	56.0	90.0
82.55	4.000	101.60	119.0	123.0	69.5	56.0	90.0
85.72	4.125	104.78	122.5	126.5	69.5	56.0	90.0
88.90	4.250	107.95	125.5	130.5	69.5	56.0	90.0
92.07	4.375	111.13	129.0	134.0	69.5	56.0	90.0
95.25	4.500	114.30	132.0	137.0	69.5	56.0	90.0
98.42	4.625	117.48	135.0	140.0	69.5	56.0	90.0
101.60	4.750	120.65	138.5	143.5	69.5	56.0	90.0
104.77	4.875	123.83	146.5	151.5	74.0	60.5	90.0
107.95	5.000	127.00	149.5	154.5	74.0	60.5	90.0
111.12	5.125	130.18	152.5	157.5	74.0	60.5	90.0
114.30	5.250	133.35	156.0	161.0	74.0	60.5	90.0



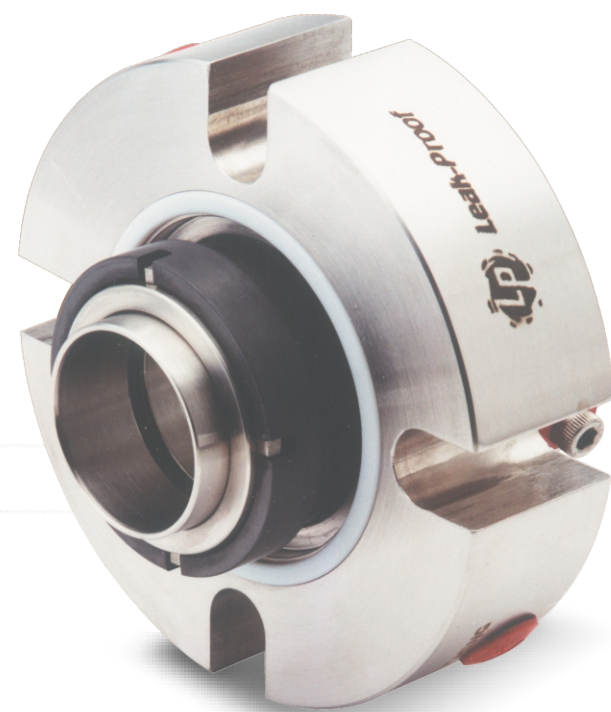
SERIES 900B/CG

Cartridge Heavy Duty Balanced Seal

Single Acting, Independent of Direction of Rotation

Mechanical Seal

Series LPM 900/CG



Standard Style

Face Materials

Silicon Carbide / Silicon Carbide
Tungsten Carbide / Silicon Carbide

Metal Parts

SS 316, SS 304, Hastelloy-C,
Monel, Alloy - 20

Secondary Seal

Elastomers, FEP

Applications

- Ash slurry Pumps
- Clinker Grinders
- Pulp Pumps
- Sludge Pumps
- Syrup Pumps
- Slurry Pumps

Seal Characteristics

- Single acting
- Balanced
- Inside mounted
- Independent of direction of rotation
- Cartridge unit

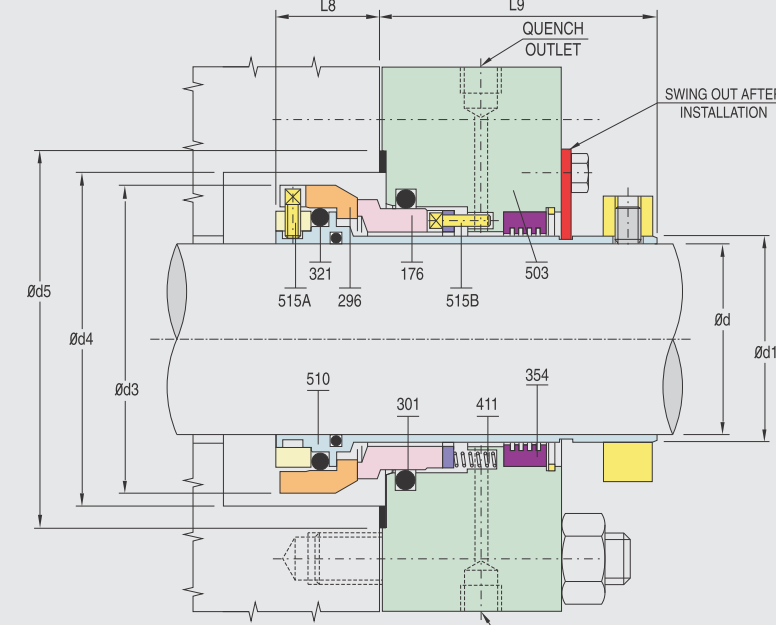
Operating Limits

Shaft diameter d1 : 17 100 mm
Pressure p : 25 bar (max)
Temperature t : -20 ... +180°C
Velocity v : 20 m/sec

Series LPM 900/CG is a cartridge construction multiple spring heavy duty balanced seal specially developed for equipments handling slurries, sludges, syrups and other fluids that polymerizes or solidify with the changes in temperature. The springs are isolated from the fluid being sealed by dynamic O-ring, which enhances the seal life.

Seal requires tightening of studs, nuts and detaching of location plates before starting the equipment. No dimensional measurement to be done at site. Even non - skilled person can install the seal.

Series LPM 900/CG



Part No.	Description
176	Seal Ring
296	Mating Ring
301	O-Ring
321	O-Ring
354	Throttle Bush
411	Spring
503	Gland
510	Sleeve
515A	Drive Pin
515B	Lock Pin

Shaft +0.00 d -0.05	SEAL SIZE +0.00 d1 -0.05		d3	d4	d5	L8	L9
	inch	mm					
17-18	0.875	22.22	43.0	49.0	60.0	38.5	58.0
18-20	1.000	25.40	46.0	52.0	60.0	38.5	58.0
20-23	1.125	28.58	49.0	55.0	65.0	38.5	58.0
23-26	1.250	31.75	52.0	58.0	70.0	38.5	58.0
26-30	1.375	34.92	56.0	62.0	70.0	38.5	58.0
30-33	1.500	38.10	60.0	66.0	75.0	38.5	58.0
33-35	1.625	41.28	63.0	69.0	80.0	38.5	58.0
35-38	1.750	44.45	66.0	72.0	80.0	38.5	58.0
38-43	1.875	47.62	73.0	79.0	90.0	38.5	58.0
43-46	2.000	50.80	76.0	82.0	90.0	38.5	58.0
46-49	2.125	53.98	79.0	85.0	95.0	38.5	63.0
49-51	2.250	57.15	82.0	88.0	100.0	38.5	63.0
51-54	2.375	60.32	86.0	92.0	100.0	40.5	63.0
54-56	2.500	63.50	89.0	95.0	105.0	40.5	63.0
56-59	2.625	66.68	92.0	98.0	110.0	40.5	63.0
59-62	2.625	66.68	95.0	101.0	110.0	40.5	63.0
62-65	2.750	69.85	98.0	104.0	115.0	40.5	63.0
65-68	2.875	73.02	102.0	108.0	120.0	40.5	65.0
68-71	3.000	76.20	105.0	111.0	120.0	40.5	65.0
71-75	3.125	79.38	109.0	115.0	125.0	40.5	65.0
75-78	3.250	82.55	112.0	118.0	130.0	40.5	65.0
78-81	3.375	85.72	115.0	121.0	130.0	40.5	65.0
81-84	3.500	88.90	118.0	124.0	135.0	40.5	65.0
84-87	3.625	92.08	121.0	127.0	135.0	40.5	65.0
87-90	3.750	95.25	124.0	130.0	140.0	40.5	65.0
90-93	3.875	98.42	127.0	133.0	140.0	40.5	65.0
93-97	4.000	101.60	131.0	137.0	145.0	40.5	65.0
97-100	4.125	104.78	134.0	140.0	150.0	40.5	65.0



SERIES LPM 900/CG

Compact Cartridge Balanced Seal

Single Acting, Independent of Direction of Rotation

Mechanical Seal

Series 90B35/CG



Standard Style

Face Materials

Carbon / Silicon Carbide
Silicon Carbide / Silicon Carbide
Tungsten Carbide / Silicon Carbide

Metal Parts

SS 316, SS 304, Hastelloy-C,
Monel, Alloy - 20

Secondary Seal

Elastomers, FEP

Applications

- Pulp Pumps
- Sludge Pumps
- Syrup Pumps
- Slurry Pumps

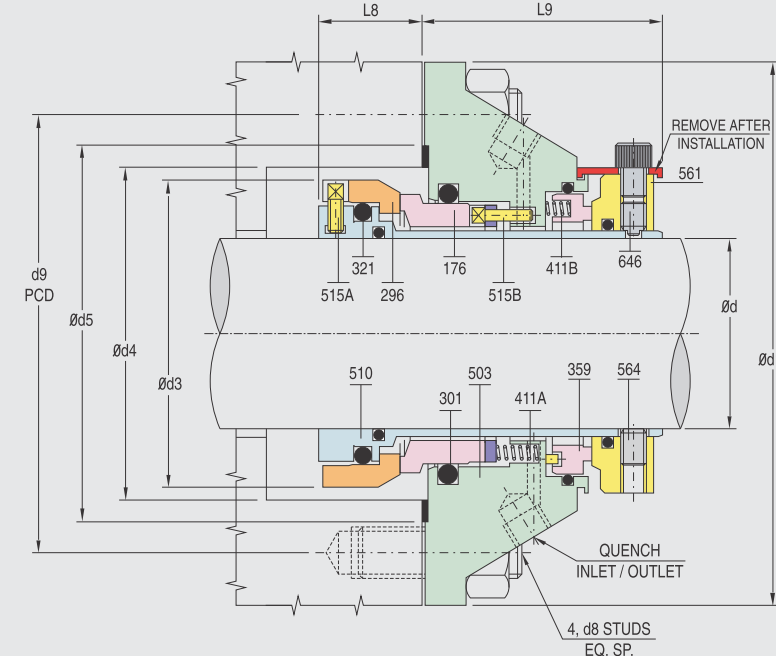
Seal Characteristics

- Single acting
- Balanced
- Inside mounted
- Independent of direction of rotation
- Compact cartridge unit

Operating Limits

Shaft diameter d1 : 0.75" 3.0"
Pressure p : 18 bar (max)
Temperature t : -20 ... +180°C
Velocity v : 20 m/sec

Series 90B35/CG



Part No.	Description
176	Seal Ring
296	Mating Ring
301	O-Ring
321	O-Ring
359	Floating Throttle Bush
411A	Spring
411B	Spring
503	Gland
510	Sleeve
515A	Drive Pin
515B	Lock Pin
561	Drive Collar
564	Grub Screw
646	Dog Screw

SEAL SIZE		d3 ^{-0.2}	d4	d5	d8 ^{+0.3}	d9	d10 ^{+1.0}	L8 ^{±0.5}	L9 ^{±0.5}
inch	d1 ^{+0.00/-0.05} mm								
0.750	19.05	40.5	44.0	55.0	M10	73.0	95.0	20.5	47.5
0.875	22.23	43.5	47.0	55.0	M10	73.0	95.0	20.5	47.5
1.000	25.40	47.5	51.0	60.0	M10	73.0	100.0	20.5	47.5
1.125	28.58	48.5	52.0	65.0	M10	80.0	100.0	20.5	47.5
1.250	31.75	52.0	56.0	65.0	M10	80.0	100.0	20.5	47.5
1.375	34.92	57.0	61.0	70.0	M10	95.0	117.0	21.5	49.5
1.500	38.10	60.0	64.0	75.0	M12	95.0	120.0	21.5	49.5
1.625	41.28	63.0	67.0	75.0	M12	95.0	120.0	21.5	49.5
1.750	44.45	66.0	70.0	80.0	M12	100.0	125.0	21.5	49.5
1.875	47.62	70.0	74.0	85.0	M14	110.0	135.0	21.5	49.5
2.000	50.80	73.0	77.0	85.0	M14	110.0	135.0	21.5	49.5
2.125	53.98	78.5	82.5	90.0	M14	115.0	140.0	21.5	51.0
2.250	57.15	81.5	85.5	95.0	M14	115.0	140.0	22.5	51.0
2.375	60.32	85.0	89.0	100.0	M14	120.0	150.0	22.5	51.0
2.500	63.50	88.0	92.0	100.0	M14	120.0	155.0	22.5	51.0
2.625	66.68	91.5	96.0	105.0	M14	127.0	155.0	22.5	51.0
2.750	69.85	95.0	99.0	110.0	M14	130.0	160.0	22.5	52.5
2.875	73.02	98.5	103.0	115.0	M14	135.0	160.0	22.5	52.5
3.000	76.20	101.0	105.0	115.0	M14	135.0	160.0	22.5	52.5

For seal sizes above 3.0" consult **Leak-Proof**

Series 90B35/CG is a cartridge construction multiple spring balanced seal specially developed for equipments handling slurries, sludges, syrups and other fluids that polymerizes or solidify with the changes in temperature. The springs are isolated from the fluid being sealed by dynamic O-ring, which enhances the seal life.

Seal requires tightening of studs, nuts and detaching of location plates before starting the equipment. No dimensional measurement to be done at site. Even non - skilled person can install the seal.



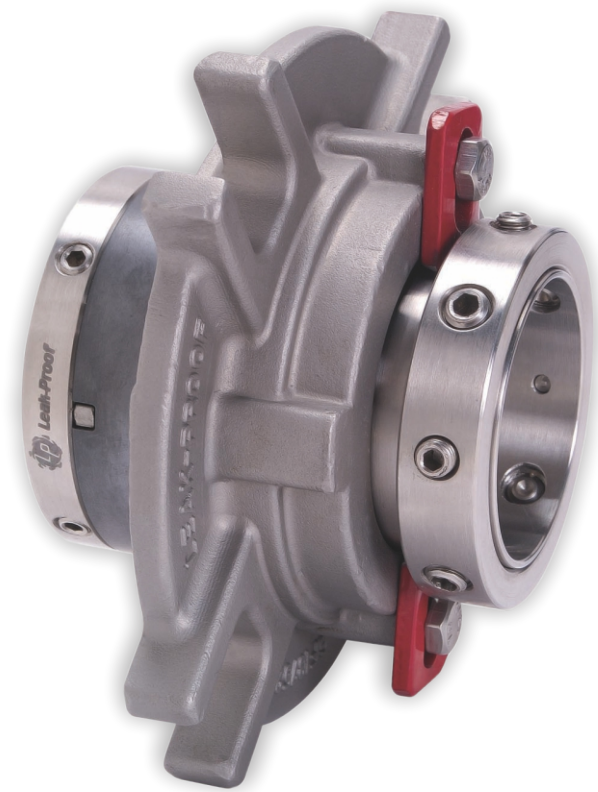
SERIES 90B35/CG

Compact Cartridge Balanced Seal

Single Acting, Independent of Direction of Rotation

Mechanical Seal

Series LPM 935/CG



Standard Style

Face Materials

Carbon / Silicon Carbide
 Silicon Carbide / Silicon Carbide
 Tungsten Carbide / Silicon Carbide

Metal Parts

SS 316, SS 304, Hastelloy-C,
 Monel, Alloy - 20

Secondary Seal

Elastomers, FEP

Applications

- Food
- Chemical
- Mining
- Water Treatment
- Media Containing Slurry

Seal Characteristics

- Single acting
- Balanced
- Inside mounted
- Independent of direction of rotation
- Compact cartridge unit

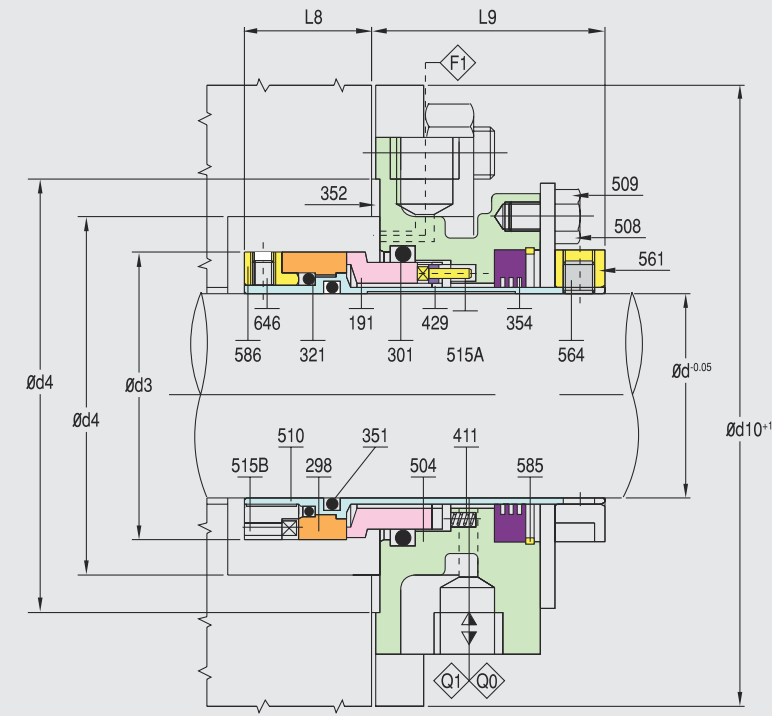
Operating Limits

Shaft diameter d1 : 0.875" 3.0"
 Pressure p : 18 bar (max)
 Temperature t : -20 ... +180°C
 Velocity v : 20 m/sec

Series LPM 935/CG is a cartridge construction multiple spring balanced seal specially developed for equipment handling clean media as well as slurries, sludges, syrups and other fluids that polymerise or solidify with the change in temperature. The springs are isolated from the fluid being sealed by dynamic O-ring, which enhances the seal life. This seal assembly can be accommodated in almost all stuffing boxes of different pumps.

Seal requires tightening of studs, nuts and detaching of location plates before starting the equipment. No dimensional measurement to be done at site. Even unskilled person can install the seal.

Series LPM 935/CG



Part No.	Description
191	Seal Ring
298	Mating Ring
301	O-Ring
321	O-Ring
351	O-Ring
352	Plain Gasket
354	Fixed Throttle Bush
411	Spring
429	Thrust Ring
504	Gland
508	Location Plate
509	Hex Screw
510	Sleeve
515A	Lock Pin
515B	Lock Pin
561	Drive Collar
564	Grub Screw
585	Snap Ring
586	Spacer
646	Dog Screw

SEAL SIZE +0.00 d1 -0.05		d3 ^{+0.2}	d4	d5	d8	d9	d10 ^{+1.0}	L8 ±0.5	L9 ±0.5
inch	mm								
0.875	22.23	38.6	41.6	55.0	12.0	61.0	95.0	20.5	47.5
1.00	25.40	41.9	44.9	60.0	12.0	61.0	100.0	20.5	47.5
1.125	28.58	44.9	47.9	65.0	12.0	68.0	100.0	20.5	47.5
1.250	31.75	48.0	51.0	65.0	12.0	68.0	100.0	20.5	47.5
1.375	34.92	51.5	54.5	70.0	12.0	83.0	117.0	21.5	49.5
1.500	38.10	54.2	57.2	75.0	14.0	81.0	120.0	21.5	49.5
1.625	41.28	57.7	60.7	75.0	14.0	81.0	120.0	21.5	49.5
1.750	44.45	61.2	64.2	80.0	14.0	86.0	125.0	21.5	49.5
1.875	47.62	64.6	67.6	85.0	16.0	94.0	135.0	21.5	49.5
2.000	50.80	68.0	71.0	85.0	16.0	94.0	135.0	21.5	49.5
2.125	53.98	74.5	77.5	90.0	16.0	99.0	140.0	21.5	51.0
2.250	57.15	77.7	81.7	95.0	16.0	99.0	140.0	22.5	51.0
2.375	60.32	81.0	84.0	100.0	16.0	104.0	150.0	22.5	51.0
2.500	63.50	84.0	87.0	100.0	16.0	104.0	155.0	22.5	51.0
2.625	66.68	87.3	90.3	105.0	16.0	111.0	155.0	22.5	51.0
2.875	73.02	93.6	96.6	115.0	16.0	119.0	160.0	22.5	52.5
3.000	76.20	96.8	99.8	115.0	16.0	119.0	160.0	22.5	52.5

For seal sizes above 3.0" consult **Leak-Proof**



SINCE 1973
SERIES LPM 935/CG

Metal Bellow Seal

Single Acting, Independent of Direction of Rotation

Mechanical Seal

Series 60L, 65L



Series 60L



Series 65L

Cartridge version

Standard Style

Face Materials

Carbon, Silicon Carbide, Tungsten Carbide

Metal Parts

SS 316, Carpenter - 42

Welded Bellows

AM 350

Secondary Seal

Grafoil

Applications

- Petrochemicals
- Petroleum refinery
- Refinery

Seal Characteristics

- Single acting
- Inherently Balanced
- Inside Mounted
- Independent of direction of rotation
- Welded Metal Bellows

Operating Limits

Shaft diameter d1 : 0.75" 0.4"
 Pressure p : 20 bar (max)
 Temperature t : -20...+350°C
 Velocity v : 20 m/sec

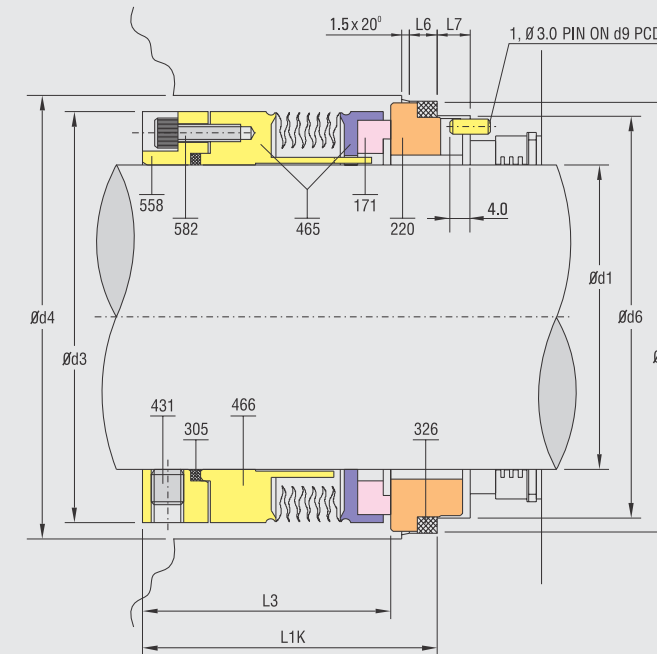
Shrink Fit Arrangement*

Temperature Limits:
 SS 304 110°C
 SS 316 110°C
 Hastelloy-C 175°C
 Carpenter - 42 350°C

Series 60L is welded metal bellow seal used in process pumps for high temperature and moderate pressure applications in chemical, petrochemical plants and refineries. The bellow is constructed by welding a series of diaphragms together at the edges. The bellows unit eliminates the need for springs, dynamic secondary seals and provides flexibility to the seal face wear. Drive to the seal ring is given by strong drive lugs, which also protects bellows from damage.

Series 65L is welded stationary bellow seal used for high temperature, viscous fluids and moderate pressure applications in Petrochemical plants, Petroleum refineries, Edible oil refineries etc.

Series 60L



Part No. Description

171 + 465	Seal face shrink fitted with Metal bellows
220	Mating Ring
305	Packing
326	M. Ring Packing
431	Grub Screw
466	Rear Collar
558	Pusher
582	Allen Screw

SEAL SIZE		d3	d4	d6 ^{+0.1 -0.0}	d7 ^{±0.05}	d9	L3 ^{±0.5}	L6	L7	L1K
d1 ^{+0.00 -0.05}	mm									
0.750	19.05	34.9	38.0	29.07	34.57	25.4	37.5	4.6	5.6	44.5
0.875	22.22	38.1	42.0	32.25	37.75	28.6	37.5	4.6	5.6	44.5
1.000	25.40	41.3	44.5	35.35	40.85	31.6	37.5	4.6	5.6	44.5
1.125	28.58	44.0	47.0	38.52	44.02	34.6	37.5	4.6	5.6	44.5
1.250	31.75	49.5	52.5	41.70	47.20	38.0	41.3	4.6	5.6	48.3
1.375	34.92	54.0	57.0	44.84	50.37	41.2	46.0	4.6	5.6	53.0
1.500	38.10	57.0	60.0	48.05	53.55	44.4	46.0	4.6	5.6	53.0
1.625	41.28	60.0	64.0	54.40	59.90	50.6	46.0	5.0	5.8	54.4
1.750	44.45	62.5	66.5	60.75	66.25	57.0	46.0	5.0	5.8	54.4
1.875	47.62	67.0	71.0	63.92	69.42	61.0	46.0	5.0	5.8	54.4
2.000	50.80	69.5	73.5	63.92	69.42	61.0	47.6	5.0	5.8	56.0
2.125	53.98	72.5	76.5	73.45	78.95	70.2	47.6	5.5	6.6	56.8
2.250	57.15	76.0	80.0	76.62	82.12	72.8	49.2	5.5	6.6	58.4
2.375	60.32	81.5	85.5	76.62	82.12	72.8	49.2	5.5	6.6	58.4
2.500	63.50	85.5	89.5	79.80	85.30	76.0	49.2	5.5	6.6	58.4
2.625	66.68	89.0	93.0	79.80	85.30	76.0	51.0	5.5	7.4	61.0
2.750	69.85	92.0	96.0	82.97	88.47	79.2	51.0	5.5	7.4	61.0
2.875	73.02	95.5	99.5	86.22	91.72	81.5	51.0	5.5	7.4	61.0
3.000	76.20	99.0	103.0	89.04	97.60	85.4	51.0	7.5	5.5	62.8
3.125	79.38	101.5	105.5	95.39	103.95	91.8	51.0	7.5	5.5	62.8
3.250	82.55	105.0	109.0	95.39	103.95	91.8	51.0	7.5	5.5	62.8
3.375	85.72	108.0	112.0	98.57	107.13	95.0	51.0	7.5	5.5	62.8
3.500	88.90	111.0	115.0	102.10	110.66	98.5	51.0	7.5	5.5	62.8
3.625	92.08	114.5	119.5	104.92	113.48	100.50	51.0	7.5	6.0	63.9
3.750	95.25	117.5	122.5	108.09	116.65	104.60	51.0	7.5	6.0	63.9
3.875	98.42	120.5	125.5	111.62	120.18	107.00	51.0	7.5	6.0	63.9
4.000	101.60	124.0	129.0	114.44	123.00	110.80	51.0	7.5	6.0	63.9



SERIES 60L, 65L

Metal Bellow Seal

Single Acting, Independent of Direction of Rotation

Mechanical Seal

Series 40 & 45



Seals are also available as per DIN 24960 standard



Seal with cartridge construction

Standard Style

Face Materials:

- Carbon / Silicon Carbide
- Carbon / Tungsten Carbide
- Silicon Carbide / Tungsten Carbide

Metal Parts

- Series 40 : SS 316, SS 304
- Series 45 : Hastelloy-C

Welded Bellows

- Series 40 : AM 350
- Series 45 : Hastelloy-C

Secondary Seal

- Elastomers, PTFE, GFT

Applications

- Chemicals
- Petrochemicals
- Refinery
- Corrosive chemicals

Seal Characteristics

- Single acting
- Inherently Balanced
- Inside Mounted
- Independent of direction of rotation
- Welded Metal Bellows

Operating Limits

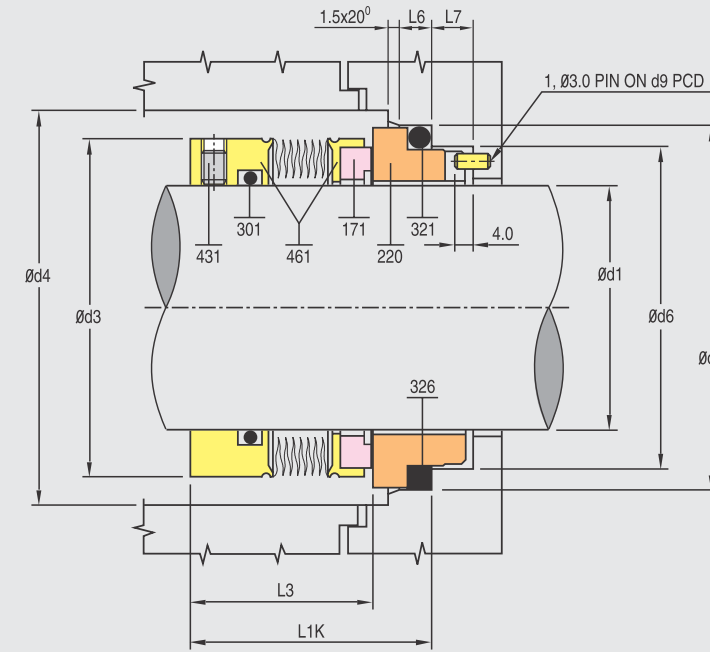
- Shaft Diameter d1 : 0.75" 4.0"
- Pressure p : 18 bar (max)
- Temperature t : -20 ... + 175°C
- Velocity v : 20 m/sec

Shrink Fit Arrangement*

- Temperature Limits:
- SS 304 110°C
- SS 316 110°C
- Hastelloy-C 175°C
- Carpenter - 42 350°C

Series 40 & 45 are welded metal bellow seals used in chemical, petrochemical and refinery process pumps for moderate temperature/pressure application and for process services requiring corrosion resistance. These bellow seals are constructed by welding a series of diaphragms together at the edges to form a bellows unit. The bellows unit eliminates the need for springs, dynamic secondary seal and provides flexibility to the seal face in addition to compensating for seal face wear.

Series 40



Series 45

Part No.	Description
171 + 461	Seal face shrink fitted with Metal bellows
220	Mating Ring
301	O-Ring
321	O-Ring
326	Mating Ring Packing
431	Grub Screw

SEAL SIZE		d3	d4	d6 ^{+0.1} ₀	d7 ^{±0.05}	d9	L3 ^{±0.5}	L6	L7	L1K
inch	mm									
0.750	19.05	33.5	36.5	29.07	34.57	25.4	27.5	4.6	5.6	34.5
0.875	22.22	38.0	41.0	32.25	37.75	28.6	27.5	4.6	5.6	34.5
1.000	25.40	39.7	43.0	35.35	40.85	31.6	30.0	4.6	5.6	37.0
1.125	28.58	42.9	46.0	38.52	44.02	34.6	32.5	4.6	5.6	39.5
1.250	31.75	46.0	49.0	41.70	47.20	38.0	32.5	4.6	5.6	39.5
1.375	34.92	49.4	52.5	44.84	50.37	41.2	32.5	4.6	5.6	39.5
1.500	38.10	52.5	55.5	48.05	53.55	44.4	34.0	4.6	5.6	41.0
1.625	41.28	55.5	58.5	54.40	59.90	50.6	34.0	5.0	5.8	42.4
1.750	44.45	59.0	62.0	60.75	66.25	57.0	34.0	5.0	5.8	42.4
1.875	47.62	62.0	65.0	63.92	69.42	61.0	34.0	5.0	5.8	42.4
2.000	50.80	65.0	68.0	63.92	69.42	61.0	34.5	5.0	5.8	42.9
2.125	53.98	68.5	71.5	73.45	78.95	70.2	34.5	5.5	6.6	43.7
2.250	57.15	75.0	78.0	76.62	82.12	72.8	39.5	5.5	6.6	48.7
2.375	60.32	75.0	78.0	76.62	82.12	72.8	39.5	5.5	6.6	48.7
2.500	63.50	81.0	84.0	79.80	85.30	76.0	39.5	5.5	6.6	48.7
2.625	66.68	84.0	87.0	79.80	85.30	76.0	39.5	5.5	7.4	49.5
2.750	69.85	87.5	90.5	82.97	88.47	79.2	45.0	5.5	7.4	55.0
2.875	73.02	92.0	95.0	86.22	91.72	81.5	45.0	5.5	7.4	55.0
3.000	76.20	95.5	98.5	89.04	97.60	85.4	45.0	7.5	5.5	56.3
3.125	79.38	102.0	105.0	95.39	103.95	91.8	44.5	7.5	5.5	56.3
3.250	82.55	102.0	105.0	95.39	103.95	91.8	44.5	7.5	5.5	56.3
3.375	85.72	105.0	108.0	98.57	107.13	95.0	44.5	7.5	5.5	56.3
3.500	88.90	108.0	111.0	102.10	110.66	100.50	49.5	7.5	5.5	61.3
3.625	92.08	110.0	113.0	104.92	113.48	100.50	49.5	7.5	6.0	62.4
3.750	95.25	114.5	117.5	108.09	116.65	104.60	49.5	7.5	6.0	62.4
3.875	98.42	118.0	121.0	111.62	120.18	107.00	48.5	7.5	6.0	61.4
4.000	101.60	121.0	124.0	114.44	123.00	110.80	48.5	7.5	6.0	61.4



SERIES 40 / 45

PTFE Bellow Seals

Single Acting, Independent of Direction of Rotation

Mechanical Seal

Series 20M & LPT20R



Standard Style

Face Materials

20M : GFT / Ceramic
 LPT 20R : GFT / Ceramic
 Silicon Carbide / Ceramic
 Carbon / Ceramic
 Silicon Carbide / Silicon Carbide

Metal Parts

SS 316, SS 304, Hastelloy-C

Springs

Hastelloy-C

Secondary Seal

PTFE Bellows

Applications

- Extremely corrosive services

Seal Characteristics

- Single acting
- Outside mounted
- Independent of direction of rotation

Operating Limits

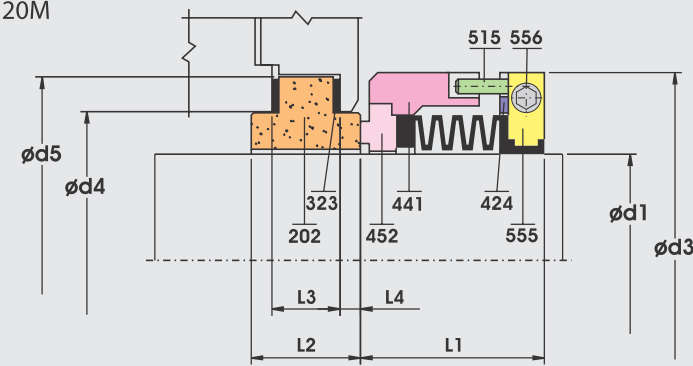
Shaft Diameter d1 : 0.75" 4.0"
 Pressure p : 6 bar (max)
 Temperature t : -45+120°C
 Velocity v : 20 m/sec

Series 20M & LPT20R are designed for extremely corrosive chemicals, including concentrated acids, salts, strong oxidising & reducing agents, and chemically active organic compounds. All components which come in contact with the liquid being sealed are made of chemically inert material. Metallic components, clamping ring and springs are located outside the media.

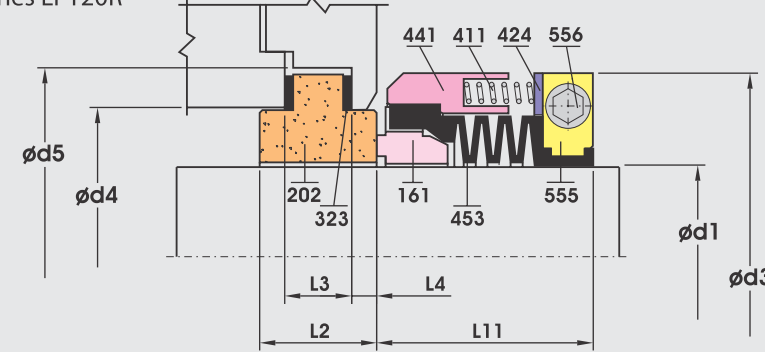
Series 20M : In this seal series Glass filled PTFE face is composite moulded with highly flexible PTFE bellows.

Series LPT20R : This seal is designed with replaceable sealing faces and is positively driven by integral lugs on bellows. These lugs impart smooth drive to the face. Replacement of faces can be done easily.

Series 20M



Series LPT20R



Part No.	Description
161	Seal Ring
202	Mating Ring
323	Gasket
411	Spring
424	Thrust Ring
441	Spring Holder
452	Bellows
453	Bellows
515	Drive Pin
555	Clamp Ring
556	Allen Screw

SEAL SIZE		d3	d4 ^{HB}	d5	L1 ^{±0.5}	L2	L3	L4	L11 ^{±0.5}
inch	mm								
0.750	19.05	52.4	33.50	43.0	22.2	20.7	12.7	4.0	33.0
0.875	22.22	55.2	36.50	46.5	22.2	20.7	12.7	4.0	33.0
1.000	25.40	57.2	39.50	49.5	25.4	20.7	12.7	4.0	33.0
1.125	28.58	60.3	43.00	54.5	27.0	20.7	12.7	4.0	35.0
1.250	31.75	66.7	46.00	56.0	27.0	20.7	12.7	4.0	36.0
1.375	34.92	69.9	49.00	63.0	28.6	22.3	12.7	4.8	38.5
1.500	38.10	73.0	52.50	65.5	28.6	22.3	12.7	4.8	39.0
1.625	41.28	76.2	60.00	73.5	34.9	22.3	12.7	4.8	38.5
1.750	44.45	79.4	61.00	76.0	34.9	22.3	12.7	4.8	38.5
1.875	47.62	85.7	66.50	79.5	34.9	22.3	12.7	4.8	38.5
2.000	50.80	88.9	70.00	86.0	34.9	25.5	15.9	4.8	38.5
2.125	53.98	92.1	75.00	91.0	42.9	25.5	15.9	4.8	42.8
2.250	57.15	95.3	75.00	91.0	42.9	25.5	15.9	4.8	42.8
2.375	60.32	98.4	79.50	95.5	42.9	25.5	15.9	4.8	42.8
2.500	63.50	101.6	83.00	98.5	42.9	25.5	15.9	4.8	42.8
2.625	66.68	104.8	85.50	102.0	42.9	25.5	15.9	4.8	42.8
2.750	69.85	108.0	89.00	105.0	42.9	25.5	15.9	4.8	42.8
2.875	73.02	111.1	92.00	108.5	42.9	25.5	15.9	4.8	42.8
3.000	76.20	114.3	95.50	111.5	42.9	25.5	15.9	4.8	42.8
3.125	79.38	123.8	98.50	114.5	42.9	25.5	15.9	4.8	42.8
3.250	82.55	127.0	101.50	118.0	42.9	25.5	15.9	4.8	42.8
3.375	85.72	130.2	105.00	121.0	42.9	25.5	15.9	4.8	42.8
3.500	88.90	133.4	108.00	124.0	42.9	25.5	15.9	4.8	53.0
3.625	92.08	136.5	111.00	127.5	42.9	25.5	15.9	4.8	53.0
3.750	95.25	139.7	114.50	130.5	42.9	25.5	15.9	4.8	56.0
3.875	98.42	142.9	117.50	133.5	42.9	25.5	15.9	4.8	56.0
4.000	101.60	146.1	120.50	137.0	42.9	25.5	15.9	4.8	56.0



SINCE 1973
 SERIES 20M & LPT 20R

Unbalanced Seal

Single Acting, Independent of Direction of Rotation

Mechanical Seal

Series 110U & 115U



Seals are also available as per DIN 24960 standard



Seal with cartridge construction

Standard Style

Face Materials

Carbon, Ceramic, Stellite, Silicon Carbide, Tungsten Carbide, Lecrolloy

Metal Parts

SS 316, SS 304

Secondary Seal

110U : Elastomers
115U : PTFE, GFT

Applications

- Light Abrasive slurry
- Light Sewage water
- High viscosity fluid
- General & light chemicals
- Hydrocarbons

Seal Characteristics

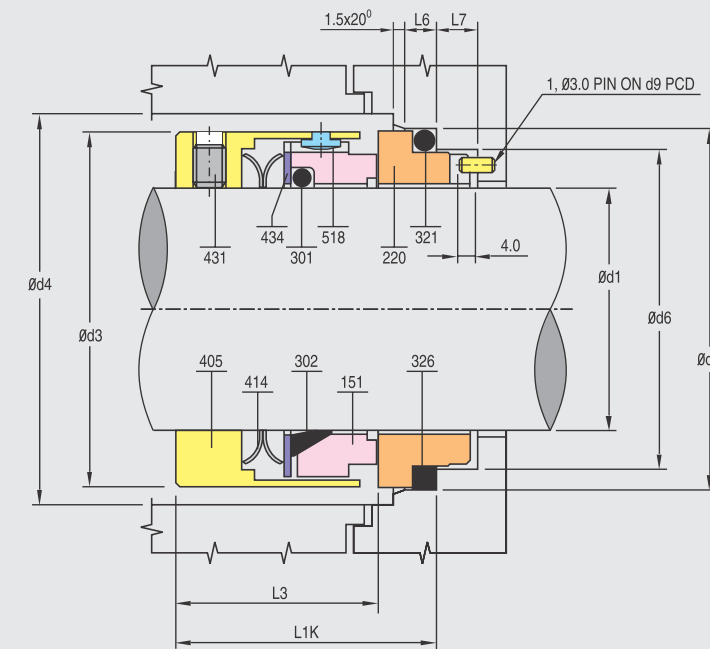
- Single acting
- Unbalanced
- Inside mounted
- Independent of direction of rotation
- Wave spring loaded

Operating Limits

Shaft Diameter d1 : 0.75" 4.0"
Pressure p : 10 bar (max)
Temperature t : -45 ... +180°C
Velocity v : 20 m/sec

Series 110U & 115U are single wave spring seals suitable for most general application. Major advantage of these seals is due to use of single wave spring. It is of compact design with reduced axial length. These seals can also be used in dirty application as spring clogging does not occur. Torque transmission from retainer shell to seal ring is through drive pin.

Series 110U



Series 115U

Part No.	Description
151	Seal Ring
220	Mating Ring
301	O - Ring
302	Wedge
321	O - Ring
326	M.Ring Packing
405	Retainer
414	Wave Spring
431	Grub Screw
434	Thrust Ring
518	Drive Pin

SEAL SIZE		d3	d4	d6 ^{+0.1} ₀	d7 ^{±0.05}	d9	L3 ^{±0.5}	L6	L7	L1K
d1 ^{+0.00} _{-0.05}										
inch	mm									
0.750	19.05	34.0	38.0	29.07	34.57	25.4	26.0	4.6	5.6	33.0
0.875	22.22	37.5	41.5	32.25	37.75	28.6	26.0	4.6	5.6	33.0
1.000	25.40	40.5	44.5	35.35	40.85	31.6	28.5	4.6	5.6	35.5
1.125	28.58	43.5	47.5	38.52	44.02	34.6	28.5	4.6	5.6	38.0
1.250	31.75	47.0	51.0	41.70	47.20	38.0	28.5	4.6	5.6	38.0
1.375	34.92	50.0	54.0	44.80	50.37	41.2	28.5	4.6	5.6	38.0
1.500	38.10	55.0	59.0	48.05	53.55	44.4	31.0	4.6	5.6	38.0
1.625	41.28	58.5	62.5	54.40	59.90	50.6	31.0	5.0	5.8	39.4
1.750	44.45	61.5	65.5	60.75	66.25	57.0	31.0	5.0	5.8	39.4
1.875	47.62	65.0	69.0	63.92	69.42	61.0	31.0	5.0	5.8	39.4
2.000	50.80	68.0	72.0	63.92	69.42	61.0	32.5	5.0	5.8	40.9
2.125	53.98	71.0	75.0	73.45	78.95	70.2	32.5	5.5	6.6	41.7
2.250	57.15	78.0	82.0	76.62	82.12	72.8	37.5	5.5	6.6	46.7
2.375	60.32	81.5	85.5	76.62	82.12	72.8	37.5	5.5	6.6	46.7
2.500	63.50	84.5	88.5	79.80	85.30	76.0	37.5	5.5	6.6	46.7
2.625	66.68	87.5	91.5	79.80	85.30	76.0	37.5	5.5	7.4	47.5
2.750	69.85	91.0	95.0	82.97	88.47	79.2	42.0	5.5	7.4	52.0
2.875	73.02	97.0	101.0	86.22	91.72	81.5	42.0	5.5	7.4	52.0
3.000	76.20	100.0	104.0	89.04	97.60	85.4	42.0	7.5	5.5	53.6
3.125	79.38	104.0	108.0	95.39	103.95	91.8	41.8	7.5	5.5	53.6
3.250	82.55	106.5	110.5	95.39	103.95	91.8	41.8	7.5	5.5	53.6
3.375	85.72	110.0	114.0	98.57	107.13	95.0	41.8	7.5	5.5	53.6
3.500	88.90	113.0	117.0	102.10	110.66	98.5	46.8	7.5	5.5	53.6
3.625	92.08	116.0	120.0	104.92	113.48	100.5	46.8	7.5	6.0	59.7
3.750	95.25	119.5	123.5	108.09	116.65	104.6	47.8	7.5	6.0	60.7
3.875	98.42	112.5	116.5	111.62	120.18	107.0	47.8	7.5	6.0	60.7
4.000	101.60	125.5	129.5	114.44	123.00	110.8	47.8	7.5	6.0	60.7



SERIES 110U / 115U

Balanced Seal

Single Acting, Independent of Direction of Rotation

Mechanical Seal

Series 82 & 82/CG



Seals are also available as per DIN 24960 standard



Seal with cartridge construction

Standard Style

Face Materials

Carbon / Silicon Carbide
Silicon Carbide / Silicon Carbide
Tungsten Carbide / Silicon Carbide

Metal Parts

SS 316, SS 304, Hastelloy-C

Secondary Seal

Elastomers, FEP

Applications

- Food Industry
- Chemical Industry
- Mining Industry
- Water Treatment
- Media Containing Slurry

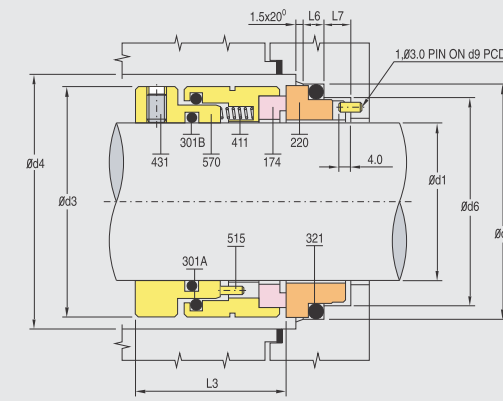
Seal Characteristics

- Single Acting
- Balanced
- Independent of direction of rotation
- Springs are Outside Media
- Stable Drive-pins / Lugs
- No Shaft Fretting

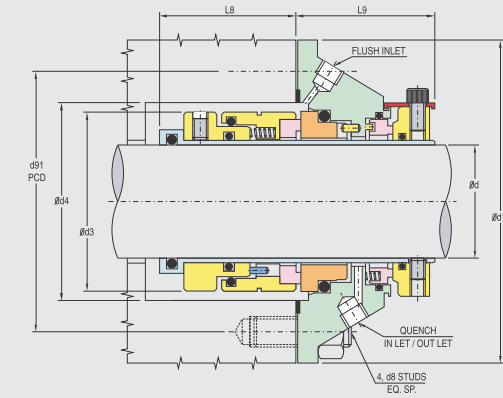
Operating Limits

Shaft Diameter d : 14 95 mm
Pressure p : 25 bar (max)
Temperature t : -20.....180°C
Velocity v : 20 m/sec

Series 82



Series 82/CG



Part No.	Description
174	Seal Ring
220	Mating Ring
301A	O - Ring
301B	O - Ring
321	O - Ring
411	Spring
431	Grub Screw
515	Drive Pin
570	Drive Collar

SHAFT d ^{-0.05}	SHAFT $d1$ ^{0.05}	d3	d4	$d6$ ^{+0.1 -0.0}	$d7$ ^{±0.05}	d8	d9	d91	d10	$L3$ ^{±0.5}	L6	L7	L8	L9
14.0	20.0	32.0	36.0	32.25	37.75	M10	28.6	67.0	90.0	27.5	4.6	5.6	32.0	55.0
16.0	22.0	34.0	38.0	32.25	37.75	M10	28.6	67.0	90.0	27.5	4.6	5.6	32.0	55.0
18.0	24.0	36.0	40.0	35.35	40.85	M10	31.6	67.0	90.0	30.0	4.6	5.6	32.0	55.0
20.0	25.0	38.0	40.0	35.35	40.85	M10	31.6	67.0	90.0	30.0	4.6	5.6	32.0	55.0
22.0	28.0	40.0	44.0	38.52	44.02	M10	34.6	67.0	90.0	32.5	4.6	5.6	32.0	55.0
25.0	30.0	44.0	46.0	41.70	47.20	M10	38.0	73.0	105.0	32.5	4.6	5.6	35.0	55.0
27.0	32.0	46.0	48.0	41.70	47.20	M10	38.0	73.0	105.0	32.5	4.6	5.6	35.0	55.0
28.0	33.0	47.0	49.0	44.84	50.37	M10	41.2	73.0	105.0	32.5	4.6	5.6	37.0	55.0
30.0	35.0	49.0	51.0	44.84	50.37	M10	41.2	73.0	105.0	32.5	4.6	5.6	37.0	55.0
33.0	38.0	54.0	58.0	48.05	53.55	M10	44.4	85.0	115.0	34.0	4.6	5.6	37.0	55.0
35.0	40.0	56.0	60.0	54.40	59.90	M10	50.6	85.0	115.0	34.0	5.0	5.8	38.0	55.0
38.0	43.0	59.0	63.0	57.57	63.07	M12	53.8	95.0	125.0	34.0	5.0	5.8	34.5	61.0
40.0	45.0	61.0	65.0	60.75	66.25	M12	57.0	95.0	125.0	34.0	5.0	5.8	34.5	61.0
43.0	48.0	64.0	68.0	63.92	69.42	M12	61.0	95.0	125.0	34.0	5.0	5.8	34.5	61.0
45.0	50.0	66.0	70.0	63.92	69.42	M12	61.0	95.0	125.0	34.5	5.0	5.8	34.5	61.0
48.0	53.0	69.0	73.0	70.27	75.77	M14	66.6	106.0	135.0	34.5	5.5	6.6	35.5	61.0
50.0	55.0	71.0	75.0	73.45	78.95	M14	70.2	106.0	135.0	34.5	5.5	6.6	41.0	61.0
53.0	58.0	78.0	83.0	76.62	82.12	M14	72.8	114.0	140.0	39.5	5.5	6.6	41.0	61.0
55.0	60.0	80.0	85.0	76.62	82.12	M14	72.8	114.0	140.0	39.5	5.5	6.6	41.0	61.0
58.0	63.0	83.0	88.0	79.80	85.30	M14	76.0	114.0	140.0	39.5	5.5	6.6	46.0	61.0
60.0	65.0	85.0	90.0	79.80	85.30	M14	76.80	114.0	140.0	39.5	5.5	7.4	47.5	61.0
63.0	68.0	88.0	93.0	82.97	88.47	M14	79.2	127.0	155.0	45.0	5.5	7.4	42.5	66.0
65.0	70.0	90.0	95.0	82.97	88.47	M14	79.2	127.0	155.0	45.0	5.5	7.4	42.5	66.0
70.0	75.0	99.0	104.0	89.04	97.6	M14	85.4	127.0	155.0	45.0	7.5	5.5	47.5	66.0
75.0	80.0	104.0	109.0	95.39	103.95	M14	91.8	137.0	160.0	45.0	7.5	5.5	47.5	66.0
80.0	85.0	109.0	114.0	98.57	107.13	M14	95.0	137.0	160.0	49.5	7.5	5.5	47.5	66.0
85.0	90.0	114.0	119.0	104.92	113.48	M14	101.4	146.0	176.0	49.5	7.5	6.0	54.0	66.0
90.0	95.0	119.0	124.0	108.09	116.65	M14	104.6	146.0	176.0	49.5	7.5	6.0	54.0	66.0
95.0	100.0	124.0	129.0	114.44	123.00	M14	110.8	153.0	190.0	49.5	7.5	6.0	54.0	66.0

Series 82 : This is a multiple springs unit specially developed for slurry application. The springs are protected from media by means of dynamic O-ring. Although being a balance seal no need to maintain step sleeve. The sleeve of unbalanced seal can be used for this seal series without modification. Torque transmission to the seal ring is given by strong multiple drive pins / lugs.

Series 82/CG : This is cartridge construction factory assembled slide on unit. It requires tightening of stuffing box studs, nuts and detaching of location plate before starting the equipment. No dimensional measurement are to be done at site. It can be installed by even a non skill person.



SERIES 82 & 82/CG

Reverse Balanced Seal

Single Acting, Independent of Direction of Rotation

Mechanical Seal

Series 88B2, Series LPW 821



Series 88B2



Series LPW 821

Standard Style

Face Materials

Carbon, Ceramic,
Silicon Carbide, Tungsten Carbide.

Metal Parts

SS 316, SS 304 Hastelloy-C,
Monel, Alloy - 20

Secondary Seal

88B2 : Elastomers, FEP - Multi Springs Seal
LPW 821 : Elastomers, FEP - Wave Spring Seal

Applications

- Corrosive Chemicals
- Hydrocarbons
- General & Light Chemicals

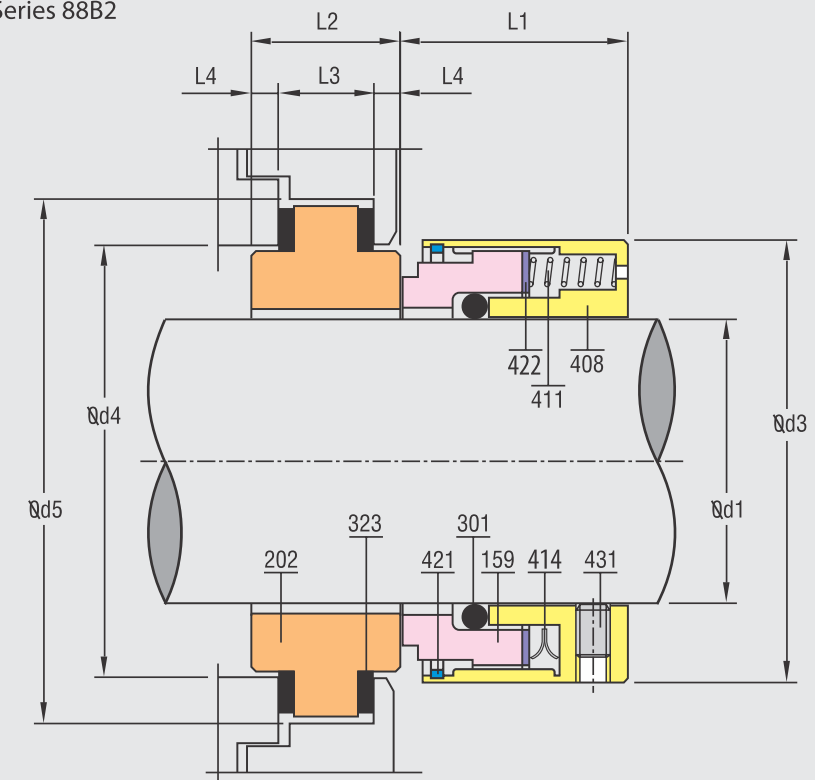
Seal Characteristics

- Single acting
- Reverse Balanced
- Outside mounted
- Independent of direction of rotation

Operating Limits

Shaft Diameter d1 : 0.75" 4.0"
Pressure p : 25 bar (max)
Temperature t : -45 ... +180°C
Velocity v : 20 m/sec

Series 88B2



Series LPW 821

Part No.	Description
159	Seal Ring
202	Mating Ring
301	O - Ring
323	Gasket
408	Retainer
411	Spring
414	Wave Spring
421	Snap Ring
422	Thrust Ring
431	Grub Screw

SEAL SIZE		d3	d4 ^{H8}	d5	L1 ^{±0.5}	L2	L3	L4
d1 ^{+0.00} -0.05								
inch	mm							
0.750	19.05	41.2	33.5	43.0	30.0	20.7	12.7	4.0
0.875	22.22	44.3	36.5	46.5	30.0	20.7	12.7	4.0
1.000	25.40	47.5	39.5	49.5	30.0	20.7	12.7	4.0
1.125	28.58	50.7	43.0	55.0	30.0	20.7	12.7	4.0
1.250	31.75	53.8	46.0	56.0	30.0	20.7	12.7	4.0
1.375	34.92	58.4	49.0	63.5	30.0	22.3	12.7	4.8
1.500	38.10	61.6	52.5	65.5	30.0	22.3	12.7	4.8
1.625	41.28	64.8	60.0	73.5	30.0	22.3	12.7	4.8
1.750	44.45	71.2	61.0	76.5	40.0	22.3	12.7	4.8
1.875	47.62	74.3	66.5	79.5	40.0	22.3	12.7	4.8
2.000	50.80	77.5	70.0	86.0	40.0	25.5	15.9	4.8
2.125	53.98	81.2	75.0	91.0	40.0	25.5	15.9	4.8
2.250	57.15	84.4	75.0	91.0	40.0	25.5	15.9	4.8
2.375	60.32	87.6	79.5	95.5	40.0	25.5	15.9	4.8
2.500	63.50	90.8	83.0	98.5	40.0	25.5	15.9	4.8
2.625	66.68	93.9	85.5	102.0	40.0	25.5	15.9	4.8
2.750	69.85	97.1	89.0	105.0	40.0	25.5	15.9	4.8
2.875	73.02	100.3	92.0	108.5	40.0	25.5	15.9	4.8
3.000	76.20	103.5	95.5	111.5	40.0	25.5	15.9	4.8
3.125	79.38	106.6	98.5	114.5	40.0	25.5	15.9	4.8
3.250	82.55	109.8	101.5	118.0	40.0	25.5	15.9	4.8
3.375	85.72	113.0	105.0	121.0	40.0	25.5	15.9	4.8
3.500	88.90	116.2	108.0	124.0	40.0	25.5	15.9	4.8
3.625	92.08	119.3	111.0	127.5	40.0	25.5	15.9	4.8
3.750	95.25	122.5	114.5	130.5	40.0	25.5	15.9	4.8
3.875	98.42	125.7	117.5	133.5	40.0	25.5	15.9	4.8
4.000	101.60	128.9	120.5	137.0	40.0	25.5	15.9	4.8

Series 88B2 - multiple springs seal and series LPW 821 - Wave spring seal are externally mounted reverse balanced seal with O-ring as secondary sealing member. Various seal face materials and elastomers can be offered for wide service application. This seal can also be used for corrosive services as the metallic components do not come in contact with liquid to be sealed. This seal can also install in double back to back arrangement as a internal seal. Even if barrier fluid pressure goes down this seal will not allow process fluid to mix with barrier fluid, Hence it is called reverse balanced seal.



SERIES 88B2, SERIES LPW 821



Unbalanced Seal

Single Acting, Independent of Direction of Rotation

Mechanical Seal

Series 90U & 95U, Series LPW 901 & LPW 951



Series 90U & 95U



Series LPW 901 & LPW 951

Standard Style

Face Materials

Carbon, Ceramic,
Silicon Carbide, Tungsten Carbide, Lecrolloy

Metal Parts

SS 316, SS 304, Hastelloy-C,
Monel, Alloy - 20

Secondary Seal

90U : Elastomers } Multi Springs Seals
95U : PTFE, GFT }
LPW 901 : Elastomers } Wave Spring Seals
LPW 951 : PTFE, GFT }

Applications

- Petrochemicals
- Petroleum refinery
- General chemicals
- Light hydrocarbons

Seal Characteristics

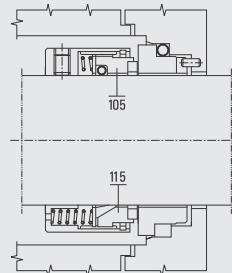
- Single acting
- Unbalanced
- Inside mounted
- Independent of direction of rotation

Operating Limits

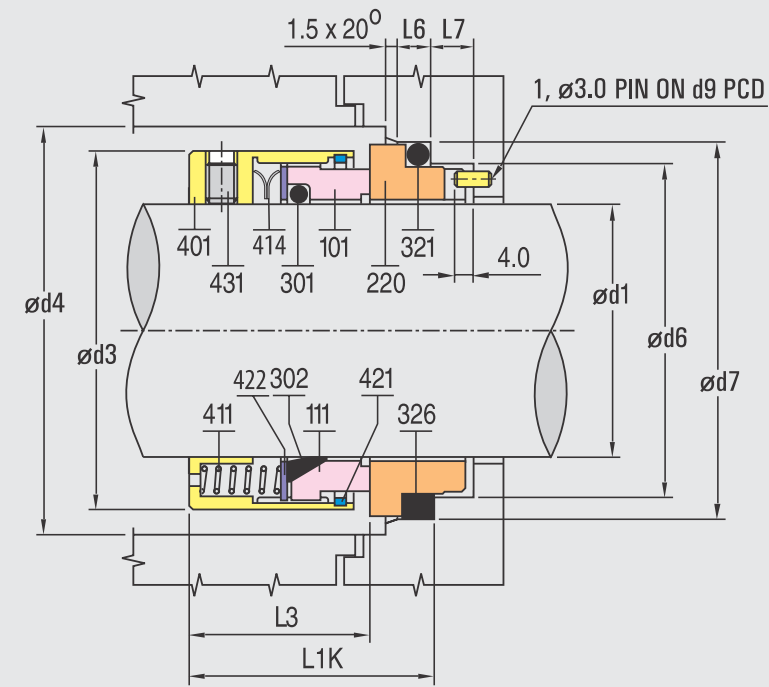
Shaft diameter d1 : 0.625" 4.0"
Pressure p : 10 bar (max)
Temperature t : - 60 ... +200°C
Velocity v : 20 m/sec

Shrink Fit Arrangement

Temperature Limits:
SS 304 110°C
SS 316 110°C
Hastelloy-C 175°C
Carpenter - 42 350°C



Series 90U, Series LPW 901



Series 95U, Series LPW 951

Part No.	Description
101	Seal Ring
105	Seal Ring
111	Seal Ring
115	Seal Ring
220	Mating Ring
301	O - Ring
302	Wedge
321	O - Ring
326	M. Ring Packing
401	Retainer
411	Spring
414	Wave Spring
421	Snap Ring
422	Thrust Ring
431	Grub Screw

SEAL SIZE		d3	d4	d6 ^{+0.1 -0.0}	d7 ^{±0.05}	d9	L3 ^{±0.5}	L6	L7	L1K
d1 ^{+0.00 -0.05}										
inch	mm									
0.625	15.87	31.0	34.0	22.72	28.22	19.0	19.1	4.6	5.6	26.1
0.750	19.05	34.0	37.0	25.90	31.40	22.2	19.1	4.6	5.6	26.1
0.875	22.22	37.3	40.5	29.07	34.57	25.4	22.2	4.6	5.6	29.2
1.000	25.40	40.8	44.0	32.25	37.75	28.6	22.2	4.6	5.6	29.2
1.125	28.58	43.3	46.5	32.25	37.75	28.6	22.2	4.6	5.6	29.2
1.250	31.75	48.3	51.5	35.35	40.85	31.6	25.4	4.6	5.6	32.4
1.375	34.92	51.4	54.5	38.52	44.02	34.6	27.0	4.6	5.6	34.0
1.500	38.10	54.8	58.0	41.70	47.20	38.0	27.0	4.6	5.6	34.0
1.625	41.28	60.3	64.0	44.84	50.37	41.2	28.6	4.6	5.6	35.6
1.750	44.45	64.1	67.0	48.05	53.55	44.4	28.6	4.6	5.6	35.6
1.875	47.62	67.3	70.5	54.40	59.90	50.6	34.9	5.0	5.8	43.3
2.000	50.80	70.3	73.5	60.75	66.25	57.0	34.9	5.0	5.8	43.3
2.125	53.98	76.8	80.0	63.92	69.42	61.0	34.9	5.0	5.8	43.3
2.250	57.15	79.3	82.5	63.92	69.42	61.0	34.9	5.0	5.8	43.3
2.375	60.32	83.0	86.0	73.45	78.95	70.2	42.9	5.5	6.6	52.1
2.500	63.50	86.3	89.5	76.62	82.12	72.8	42.9	5.5	6.6	52.1
2.625	66.68	89.6	92.5	76.62	82.12	72.8	42.9	5.5	6.6	52.1
2.750	69.85	92.9	96.0	79.80	85.30	76.0	42.9	5.5	6.6	52.1
2.875	73.02	96.0	99.0	79.80	85.30	76.0	42.9	5.5	7.4	52.9
3.000	76.20	97.3	100.5	82.97	88.47	79.2	42.9	5.5	7.4	52.9
3.125	79.38	101.3	104.5	86.22	91.72	81.5	42.9	5.5	7.4	52.9
3.250	82.55	105.3	108.5	89.04	97.60	85.4	42.9	7.5	5.5	54.7
3.375	85.72	108.3	111.5	95.39	103.95	91.8	42.9	7.5	5.5	54.7
3.500	88.90	112.0	115.0	95.39	103.95	91.8	42.9	7.5	5.5	54.7
3.625	92.08	114.0	117.0	98.57	107.13	95.0	42.9	7.5	5.5	54.7
3.750	95.25	118.2	121.5	102.10	110.66	98.5	42.9	7.5	5.5	54.7
3.875	98.42	121.0	124.0	104.92	113.48	100.5	42.9	7.5	6.0	55.8
4.000	101.6	124.8	128.0	108.09	116.65	104.6	42.9	7.5	6.0	55.8

Series 90U / 95U multiple springs and LPW 901 / LPW 951 wave spring units developed for universal application. Their compact design permits their use in all types of centrifugal pumps. Torque transmission from retainer shell to seal ring is done through drive lugs. All components are held together by a snap ring which helps in easier installation and removal. As all parts are interchangeable, one can convert series 90U to 95U by changing only the seal ring and the secondary seal. This concept is ideal for stock rationalisation.



Balanced Seal

Single Acting, Independent of Direction of Rotation

Mechanical Seal

Series 90B & 95B, Series LPW 902 & LPW 952



Series 90B & 95B



Series LPW 902 & LPW 952

Standard Style

Face Materials

Carbon, Ceramic,
Silicon Carbide, Tungsten Carbide, Lecrolloy

Metal Parts

SS 316, SS 304, Hastelloy-C,
Monel, Alloy - 20

Secondary Seal

90B : Elastomers } Multi Springs Seals
95B : PTFE, GFT }
LPW 902 : Elastomers } Wave Spring Seals
LPW 952 : PTFE, GFT }

Applications

- Petrochemicals
- Petroleum refinery
- General chemicals
- Light hydrocarbons

Seal Characteristics

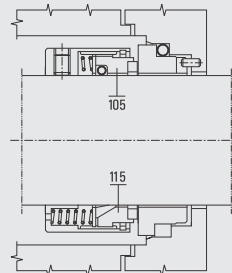
- Single acting
- Balanced
- Inside mounted
- Independent of direction of rotation

Operating Limits

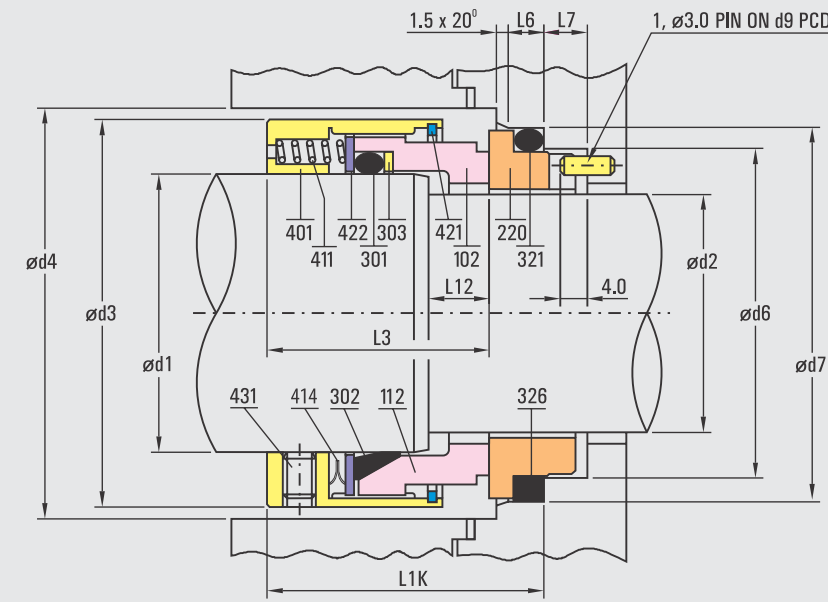
Shaft diameter d1 : 0.625" 4.0"
Pressure p : 35 bar (max)
Temperature t : - 60 ... +200°C
Velocity v : 20 m/sec

Shrink Fit Arrangement

Temperature Limits:
SS 304 110°C
SS 316 110°C
Hastelloy-C 175°C
Carpenter - 42 350°C



Series 90B, Series LPW 902



Series 95B, Series LPW 952

Part No.	Description
102	Seal Ring
106	Seal Ring
112	Seal Ring
116	Seal Ring
220	Mating Ring
301	O - Ring
302	Wedge
303	Back-up Ring
321	O - Ring
326	M. Ring Packing
401	Retainer
411	Spring
414	Wave Spring
421	Snap Ring
422	Thrust Ring
431	Grub Screw

SEAL SIZE		d2 ^{+0.00} _{-0.05}	d3	d4	d6 ^{+0.1} _{-0.0}	d7 ^{+0.05}	d9	L3 ^{±0.5}	L6	L7	L12	L1K
d1 ^{+0.00} _{-0.05}	inch											
0.625	15.87	12.70	31.0	34.0	22.72	28.22	19.0	28.6	4.6	5.6	6.0	35.6
0.750	19.05	15.88	34.0	37.0	25.90	31.40	22.2	30.2	4.6	5.6	6.0	37.2
0.875	22.22	19.05	37.3	40.5	29.07	34.57	25.4	30.2	4.6	5.6	7.9	37.2
1.000	25.40	22.22	40.8	44.0	32.25	37.75	28.6	33.3	4.6	5.6	8.7	40.3
1.125	28.58	25.40	43.3	46.5	35.35	40.85	31.6	35.0	4.6	5.6	8.7	42.0
1.250	31.75	28.58	48.3	51.5	38.52	44.02	34.6	35.0	4.6	5.6	8.7	42.0
1.375	34.92	28.58	51.4	54.5	38.52	44.02	34.6	36.5	4.6	5.6	8.7	43.5
1.500	38.10	31.75	54.8	58.0	41.70	47.20	38.0	36.5	4.6	5.6	8.7	43.5
1.625	41.28	34.92	60.3	64.0	44.84	50.37	41.2	44.5	4.6	5.6	11.0	51.5
1.750	44.45	38.10	64.1	67.0	48.05	53.55	44.4	44.5	4.6	5.6	11.0	51.5
1.875	47.62	41.28	67.3	70.5	54.40	59.90	50.6	44.5	5.0	5.8	11.0	52.9
2.000	50.80	44.45	70.3	73.5	60.75	66.25	57.0	44.5	5.0	5.8	11.0	52.9
2.125	53.98	47.62	76.8	80.0	63.92	69.42	61.0	52.5	5.0	5.8	12.7	60.9
2.250	57.15	50.80	79.3	82.5	63.92	69.42	61.0	52.5	5.0	5.8	12.7	60.9
2.375	60.32	53.98	83.0	86.0	73.45	78.95	70.2	52.5	5.5	6.6	12.7	61.7
2.500	63.50	57.15	86.3	89.5	76.62	82.12	72.8	52.5	5.5	6.6	12.7	61.7
2.625	66.68	60.32	89.6	92.5	76.62	82.12	72.8	52.5	5.5	6.6	12.7	61.7
2.750	69.85	63.50	92.9	96.0	79.80	85.30	76.0	52.5	5.5	6.6	12.7	61.7
2.875	73.02	66.68	96.0	99.0	79.80	85.30	76.0	52.5	5.5	7.4	12.7	62.5
3.000	76.20	69.85	97.3	100.5	82.97	88.47	79.2	52.5	5.5	7.4	12.7	62.5
3.125	79.38	73.02	101.3	104.5	86.22	91.72	81.5	52.5	5.5	7.4	14.3	62.5
3.250	82.55	76.20	105.3	108.5	89.04	97.60	85.4	52.5	7.5	5.5	14.3	64.3
3.375	85.72	79.38	108.3	111.5	95.39	103.95	91.8	52.5	7.5	5.5	14.3	64.3
3.500	88.90	82.55	112.0	115.0	95.39	103.95	91.8	52.5	7.5	5.5	14.3	64.3
3.625	92.08	85.72	114.0	117.0	98.57	107.13	95.0	52.5	7.5	5.5	14.3	64.3
3.750	95.25	88.90	118.2	121.5	102.10	110.66	98.5	52.5	7.5	5.5	14.3	64.3
3.875	98.42	92.08	121.0	124.0	104.92	113.48	100.5	52.5	7.5	6.0	14.3	65.4
4.000	101.60	95.25	124.8	128.0	108.09	116.65	104.6	52.5	7.5	6.0	14.3	65.4

Series 90B / 95B multiple springs and LPW 902 / LPW 952 wave spring units developed for universal application. Their compact design permits their use in all types of centrifugal pumps. Torque transmission from retainer shell to seal ring is done through drive lugs. All components are held together by a snap ring which helps in easier installation and removal. As all parts are interchangeable, one can convert series 90B to 95B by changing only the seal ring and the secondary seal. This concept is ideal for stock rationalisation.

Unbalanced Seal

Single Acting, Independent of Direction of Rotation

Mechanical Seal

Series 80U & 85U, Series LPW 801 & LPW 851



Series 80U & 85U



Series LPW 801 & LPW 851

Standard Style

Face Materials

Carbon, Ceramic,
Silicon Carbide, Tungsten Carbide, Lecrolloy

Metal Parts

SS 316, SS 304, Hastelloy-C,
Monel, Alloy - 20

Secondary Seal

80U : Elastomers } Multi Springs Seals
85U : PTFE, GFT }
LPW 801 : Elastomers } Wave Spring Seals
LPW 851 : PTFE, GFT }

Applications

- Petrochemicals
- Petroleum refinery
- General chemicals
- Light hydrocarbons

Seal Characteristics

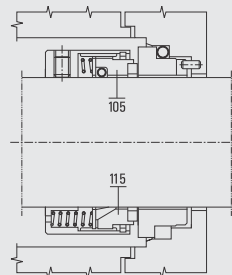
- Single acting
- Unbalanced
- Inside mounted
- Independent of direction of rotation

Operating Limits

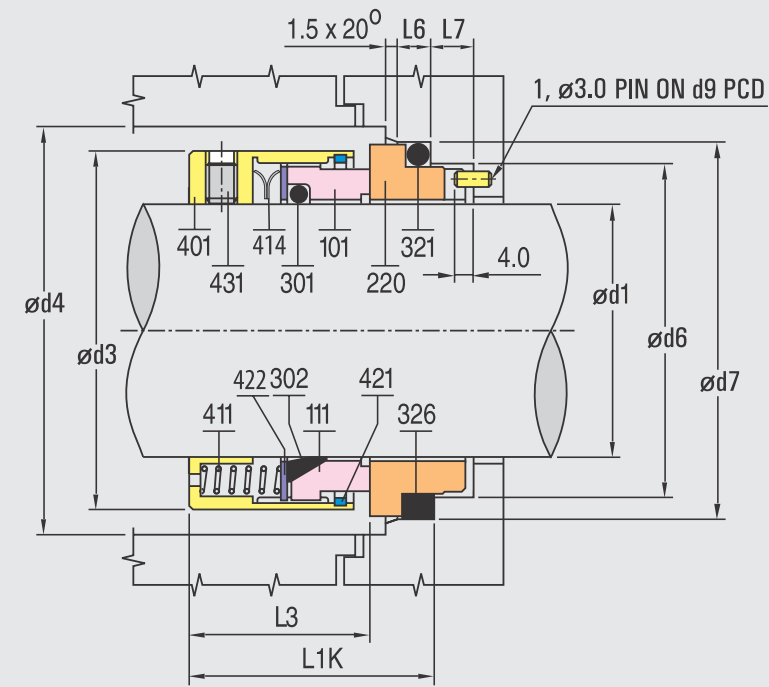
Shaft diameter d1 : 0.5" 4.0"
Pressure p : 10 bar (max)
Temperature t : - 60 ... +200°C
Velocity v : 20 m/sec

Shrink Fit Arrangement

Temperature Limits:
SS 304 110°C
SS 316 110°C
Hastelloy-C 175°C
Carpenter - 42 350°C



Series 80U, Series LPW 801



Series 85U, Series LPW 851

Part No.	Description
101	Seal Ring
105	Seal Ring
111	Seal Ring
115	Seal Ring
220	Mating Ring
301	O - Ring
302	Wedge
321	O - Ring
326	M. Ring Packing
401	Retainer
411	Spring
414	Wave Spring
421	Snap Ring
422	Thrust Ring
431	Grub Screw

SEAL SIZE		d3	d4	d6 ^{+0.1 -0.0}	d7 ^{±0.05}	d9	L3 ^{±0.5}	L6	L7	L1K
d1 ^{+0.00 -0.05}										
inch	mm									
0.500	12.70	23.8	25.8	22.72	28.22	19.0	19.1	4.6	5.6	26.1
0.625	15.87	27.0	29.0	25.90	31.40	22.2	19.1	4.6	5.6	26.1
0.750	19.05	30.5	32.5	29.07	34.57	25.4	22.2	4.6	5.6	29.2
0.875	22.22	33.6	35.6	32.25	37.75	28.6	22.2	4.6	5.6	29.2
1.000	25.40	36.8	38.8	35.35	40.85	31.6	25.4	4.6	5.6	32.4
1.125	28.58	40.0	43.0	38.52	44.02	34.6	27.0	4.6	5.6	34.0
1.250	31.75	43.2	46.2	41.70	47.20	38.0	27.0	4.6	5.6	34.0
1.375	34.92	49.5	52.5	44.84	50.37	41.2	28.6	4.6	5.6	35.6
1.500	38.10	52.7	55.7	48.05	53.55	44.4	28.6	4.6	5.6	35.6
1.625	41.28	57.4	60.4	54.40	59.90	50.6	34.9	5.0	5.8	43.3
1.750	44.45	59.2	62.2	60.75	66.25	57.0	34.9	5.0	5.8	43.3
1.875	47.62	62.5	65.5	63.92	69.42	61.0	34.9	5.0	5.8	43.3
2.000	50.80	66.5	69.5	63.92	69.42	61.0	34.9	5.0	5.8	43.3
2.125	53.98	71.5	74.5	73.45	78.95	70.2	42.9	5.5	6.6	52.1
2.250	57.15	73.5	76.5	76.62	82.12	72.8	42.9	5.5	6.6	52.1
2.375	60.32	76.6	79.6	76.62	82.12	72.8	42.9	5.5	6.6	52.1
2.500	63.50	79.7	82.7	79.80	85.30	76.0	42.9	5.5	6.6	52.1
2.625	66.68	83.0	86.0	79.80	85.30	76.0	42.9	5.5	7.4	52.9
2.750	69.85	86.1	89.1	82.97	88.47	79.2	42.9	5.5	7.4	52.9
2.875	73.02	89.3	92.3	86.22	91.72	81.5	42.9	5.5	7.4	52.9
3.000	76.20	92.5	95.5	89.04	97.60	85.4	42.9	7.5	5.5	54.7
3.125	79.38	95.6	98.6	95.39	103.95	91.8	42.9	7.5	5.5	54.7
3.250	82.55	98.8	101.8	95.39	103.95	91.8	42.9	7.5	5.5	54.7
3.375	85.72	101.9	104.9	98.57	107.13	95.0	42.9	7.5	5.5	54.7
3.500	88.90	105.1	108.1	102.10	110.66	98.5	42.9	7.5	5.5	54.7
3.625	92.08	108.3	111.3	104.92	113.48	100.5	42.9	7.5	6.0	55.8
3.750	95.25	111.5	114.5	108.09	116.65	104.6	42.9	7.5	6.0	55.8
3.875	98.42	114.6	117.6	111.62	120.18	107.0	42.9	7.5	6.0	55.8
4.000	101.60	118.5	121.5	114.44	123.00	110.8	42.9	7.5	6.0	55.8

Series 80U / 85U multiple springs and LPW 801 / LPW 851 wave spring units developed for universal application. Their compact design permits their use in all types of centrifugal pumps. Torque transmission from retainer shell to seal ring is done through drive lugs. All components are held together by a snap ring which helps in easier installation and removal. As all parts are interchangeable, one can convert series 80U to 85U by changing only the seal ring and the secondary seal. This concept is ideal for stock rationalisation.

Balanced Seal

Single Acting, Independent of Direction of Rotation

Mechanical Seal

Series 80B & 85B, Series LPW 802 & LPW 852



Series 80B & 85B



Series LPW 802 & LPW 852

Standard Style

Face Materials

Carbon, Ceramic,
Silicon Carbide, Tungsten Carbide, Lecrolloy

Metal Parts

SS 316, SS 304, Hastelloy-C,
Monel, Alloy - 20

Secondary Seal

80B : Elastomers } Multi Springs Seals
85B : PTFE, GFT }
LPW 802 : Elastomers } Wave Spring Seals
LPW 852 : PTFE, GFT }

Applications

- Petrochemicals
- Petroleum refinery
- General chemicals
- Light hydrocarbons

Seal Characteristics

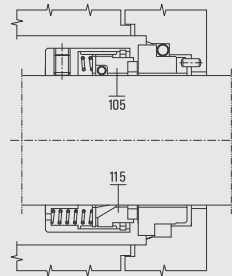
- Single acting
- Balanced
- Inside mounted
- Independent of direction of rotation

Operating Limits

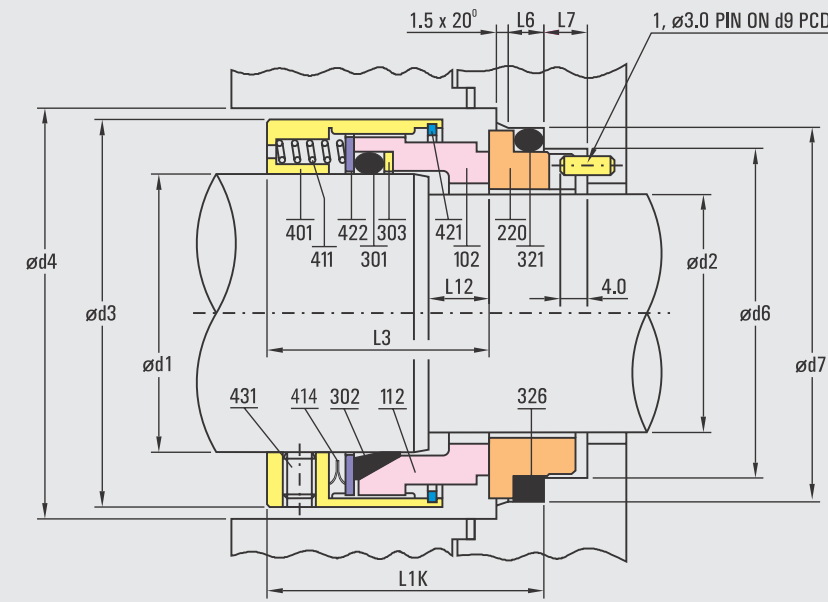
Shaft diameter d1 : 0.625" 4.0"
Pressure p : 35 bar (max)
Temperature t : - 60 ... +200°C
Velocity v : 20 m/sec

Shrink Fit Arrangement

Temperature Limits:
SS 304 110°C
SS 316 110°C
Hastelloy-C 175°C
Carpenter - 42 350°C



Series 80B, Series LPW 802



Series 85B, Series LPW 852

Part No. Description

102	Seal Ring
106	Seal Ring
112	Seal Ring
116	Seal Ring
220	Mating Ring
301	O - Ring
302	Wedge
303	Back-up Ring
321	O - Ring
326	M. Ring Packing
401	Retainer
411	Spring
414	Wave Spring
421	Snap Ring
422	Thrust Ring
431	Grub Screw

SEAL SIZE		d2 ^{+0.00 -0.05}	d3	d4	d6 ^{+0.1 -0.0}	d7 ^{±0.05}	d9	L3 ^{±0.5}	L6	L7	L12	L1K
d1 ^{+0.00 -0.05}	inch											
0.625	15.87	12.70	27.0	29.0	22.72	28.22	19.0	28.6	4.6	5.6	6.0	35.6
0.750	19.05	15.88	30.5	32.5	25.90	31.40	22.2	30.2	4.6	5.6	6.0	37.2
0.875	22.22	19.05	33.5	35.5	29.07	34.57	25.4	30.2	4.6	5.6	7.9	37.2
1.000	25.40	22.22	36.7	38.7	32.25	37.75	28.6	33.3	4.6	5.6	8.7	40.3
1.125	28.58	25.40	40.0	43.0	35.35	40.85	31.6	35.0	4.6	5.6	8.7	42.0
1.250	31.75	28.58	43.2	46.2	38.52	44.02	34.6	35.0	4.6	5.6	8.7	42.0
1.375	34.92	28.58	49.5	52.5	38.52	44.02	34.6	36.5	4.6	5.6	8.7	43.5
1.500	38.10	31.75	52.7	55.7	41.70	47.20	38.0	36.5	4.6	5.6	8.7	43.5
1.625	41.28	34.92	57.4	60.2	44.84	50.37	41.2	44.5	4.6	5.6	11.0	51.5
1.750	44.45	38.10	59.2	62.2	48.05	53.55	44.4	44.5	4.6	5.6	11.0	51.5
1.875	47.62	41.28	62.5	65.5	54.40	59.90	50.6	44.5	5.0	5.8	11.0	52.9
2.000	50.80	44.45	66.5	69.5	60.75	66.25	57.0	44.5	5.0	5.8	11.0	52.9
2.125	53.98	47.62	71.5	74.5	63.92	69.42	61.0	52.5	5.0	5.8	12.7	60.9
2.250	57.15	50.80	73.5	76.5	63.92	69.42	61.0	52.5	5.0	5.8	12.7	60.9
2.375	60.32	53.98	76.6	79.6	73.45	78.95	70.2	52.5	5.5	6.6	12.7	61.7
2.500	63.50	57.15	79.7	82.7	76.62	82.12	72.8	52.5	5.5	6.6	12.7	61.7
2.625	66.68	60.32	83.0	86.0	76.62	82.12	72.8	52.5	5.5	6.6	12.7	61.7
2.750	69.85	63.50	86.1	89.1	79.80	85.30	76.0	52.5	5.5	6.6	12.7	61.7
2.875	73.02	66.68	89.3	92.3	79.80	85.30	76.0	52.5	5.5	7.4	12.7	62.5
3.000	76.20	69.85	92.5	95.5	82.97	88.47	79.2	52.5	5.5	7.4	12.7	62.5
3.125	79.38	73.02	95.6	98.6	86.22	91.72	81.5	52.5	5.5	7.4	14.3	62.5
3.250	82.55	76.20	98.8	101.8	89.04	97.60	85.4	52.5	7.5	5.5	14.3	64.3
3.375	85.72	79.38	101.9	104.9	95.39	103.95	91.8	52.5	7.5	5.5	14.3	64.3
3.500	88.90	82.55	105.1	108.1	95.39	103.95	91.8	52.5	7.5	5.5	14.3	64.3
3.625	92.08	85.72	108.3	111.3	98.57	107.13	95.0	52.5	7.5	5.5	14.3	64.3
3.750	95.25	88.90	111.5	114.5	102.10	110.66	98.5	52.5	7.5	5.5	14.3	64.3
3.875	98.42	92.08	114.6	117.6	104.92	113.48	100.5	52.5	7.5	6.0	14.3	65.4
4.000	101.60	95.25	118.5	121.5	108.09	116.65	104.6	52.5	7.5	6.0	14.3	65.4

Series 80B / 85B multiple springs and LPW 802 / LPW 852 wave spring units developed for universal application. Their compact design permits their use in all types of centrifugal pumps. Torque transmission from retainer shell to seal ring is done through drive lugs. All components are held together by a snap ring which helps in easier installation and removal. As all parts are interchangeable, one can convert series 80B to 85B by changing only the seal ring and the secondary seal. This concept is ideal for stock rationalisation.

Unbalanced Seal

Single Acting, Independent of Direction of Rotation

Mechanical Seal

Series LPS 150 & LPS 155



Seals are also available as per DIN 24960 standard

Standard Style

Face Materials

Carbon, Ceramic, Silicon Carbide, Tungsten Carbide, Lecrolloy

Metal Parts

SS 316, SS 304

Secondary Seal

LPS 150 : PTFE, GFT
LPS 155 : Elastomers

Applications

- Crystallizing Slurry
- Suspended Solids Slurry
- Saturated Chemical Slurry
- General Chemicals Slurry

Seal Characteristics

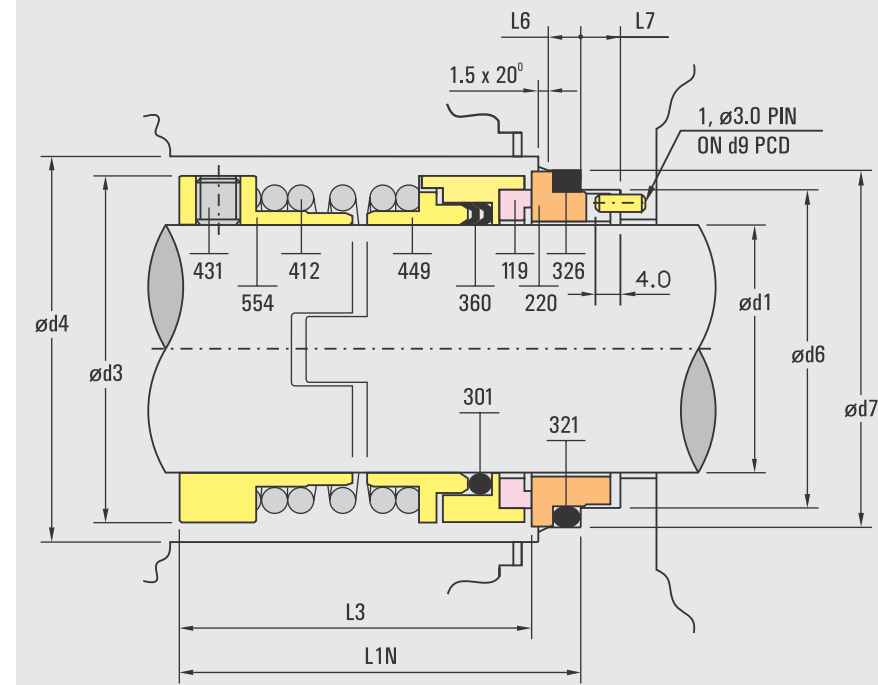
- Single acting
- Unbalanced
- Inside Mounted
- Independent of direction of rotation
- Universal chemical compatibility due to PTFE elastomer

Operating Limits

Shaft Diameter d1 : 0.875" 3.5"
Pressure p : 14 bar (max)
Temperature t : -23 ... +200°C
Velocity v : 20 m/sec

Series LPS 150 & LPS 155 are single helical coil spring, bi-directional seals developed for dirty media and clogging type applications. Torque transmission from drive collar to spring holder and seal rings is done through sturdy drive lugs. The PTFE double V-packings are spring energised to give perfect dynamic sealing. As all parts are interchangeable, one can convert series LPS 155 to LPS 150 by changing only secondary seal. This concept is ideal for stock rationalisation.

Series LPS 150



Series LPS 155

Part No.	Description
119	Seal Ring
220	Mating Ring
301	O - Ring
321	O - Ring
326	M. Ring Packing
360	V - Packing
412	Spring
431	Grub Screw
449	Spring Holder
554	Drive Coller

SEAL SIZE d1 ^{-0.05}		d3	d4	d6 ^{+0.1 -0.0}	d7 ^{±0.05}	d9	L3 ^{±0.5}	L6	L7	L1N
inch	mm									
0.875	22.22	37.0	40.0	32.25	37.75	28.6	48.0	4.6	5.6	55.0
1.000	25.40	40.0	43.0	35.35	40.85	31.6	48.0	4.6	5.6	55.0
1.125	28.58	43.0	46.0	38.52	44.02	34.6	49.0	4.6	5.6	56.0
1.250	31.75	47.5	50.5	41.70	47.2	38.0	52.0	4.6	5.6	59.0
1.375	34.92	49.0	52.0	44.84	50.37	41.2	55.0	4.6	5.6	62.0
1.500	38.10	53.0	56.0	48.05	53.55	44.4	55.0	4.6	5.6	62.0
1.625	41.28	55.0	59.0	54.40	59.90	50.6	55.0	5.0	5.8	63.4
1.750	44.45	59.0	63.0	60.75	66.25	57.0	55.0	5.0	5.8	63.4
1.875	47.62	63.5	67.5	63.92	69.42	61.0	64.0	5.0	5.8	72.4
2.000	50.80	66.2	70.0	63.92	69.42	61.0	67.0	5.0	5.8	75.4
2.125	53.98	72.0	76.0	73.45	78.95	70.2	72.0	5.5	6.6	81.2
2.250	57.15	76.0	79.5	76.62	82.12	72.8	72.0	5.5	6.6	81.2
2.375	60.32	80.0	84.0	76.62	82.12	72.8	75.7	5.5	6.6	84.9
2.500	63.50	83.5	87.5	79.80	85.30	76.0	75.7	5.5	6.6	84.9
2.625	66.68	88.0	92.0	79.80	85.30	76.0	75.7	5.5	7.4	85.7
2.750	69.85	91.5	95.5	82.97	88.47	79.2	75.7	5.5	7.4	85.7
2.875	73.02	96.0	100.0	86.22	91.72	81.5	79.0	5.5	7.4	89.0
3.000	76.20	100.0	104.0	89.04	97.60	85.4	79.0	7.5	5.5	90.8
3.125	79.38	103.0	107.0	95.39	103.95	91.8	79.0	7.5	5.5	90.8
3.250	82.55	106.5	110.5	95.39	103.95	91.8	79.0	7.5	5.5	90.8
3.375	85.72	110.0	114.0	98.57	107.13	95.0	79.0	7.5	5.5	90.8
3.500	88.90	113.0	117.0	102.10	110.66	98.5	79.0	7.5	5.5	90.8

*For seal sizes above 3.5" consult Leak-Proof



SERIES LPS 150 / LPS155

Balanced Seal

Single Acting, Independent of Direction of Rotation

Mechanical Seal

Series 70B & 75B



Seals are also available as per DIN 24960 standard



Seal with cartridge construction

Standard Style

Face Materials:
Carbon, Ceramic,
Silicon Carbide, Tungsten Carbide, Lecrolloy.

Metal Parts

SS 316, SS 304

Secondary Seal

70B: Elastomers
75B: PTFE, GFT

Applications

- Petrochemicals
- Petroleum refinery
- General chemicals
- Light hydrocarbons

Seal Characteristics

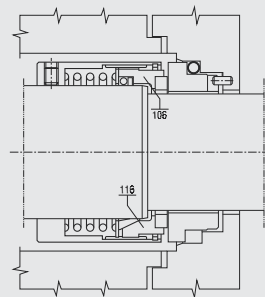
- Single acting
- Balanced
- Inside mounted
- Independent of direction of rotation

Operating Limits

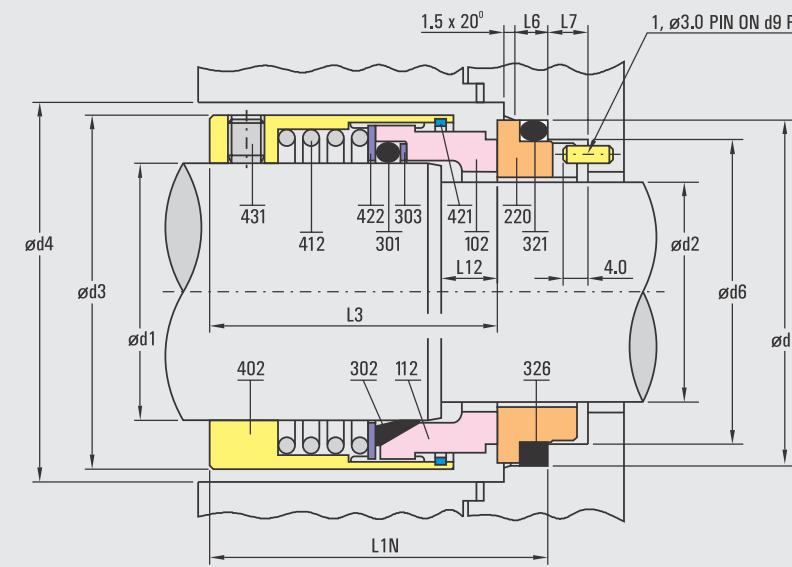
Shaft Diameter d1 : 0.625" 4.0"
Pressure p : 35 bar (max)
Temperature t : -60....+200°C
Velocity v : 20 m/sec

Shrink Fit Arrangement

Temperature Limits:
SS 304 110°C
SS 316 110°C
Hastelloy-C 175°C
Carpenter - 42 350°C



Series 70B



Series 75B

Part No.	Description
102	Seal Ring
106	Seal Ring
112	Seal Ring
116	Seal Ring
220	Mating Ring
301	O - Ring
302	Wedge
303	Back-up Ring
321	O - Ring
326	M. Ring Packing
402	Retainer
412	Spring
421	Snap Ring
422	Thrust Ring
431	Grub Screw

SEAL SIZE		d1	d2	d3	d4	d6	d7	d9	L3	L6	L7	L12	L1N
inch	mm												
0.625	15.87	12.70	27.0	29.0	22.72	28.22	19.0	40.0	4.6	5.6	6.0	47.0	
0.750	19.05	15.88	30.5	32.5	25.90	31.40	22.2	43.4	4.6	5.6	6.0	50.4	
0.875	22.22	19.05	33.5	35.5	29.07	34.57	25.4	43.4	4.6	5.6	7.9	50.4	
1.000	25.40	22.22	36.7	38.7	32.25	37.75	28.6	49.5	4.6	5.6	8.7	56.5	
1.125	28.58	25.40	40.0	43.0	35.35	40.85	31.6	51.3	4.6	5.6	8.7	58.3	
1.250	31.75	28.58	43.2	46.2	38.52	44.02	34.6	51.3	4.6	5.6	8.7	58.3	
1.375	34.92	28.58	49.5	52.5	38.52	44.02	34.6	59.4	4.6	5.6	8.7	66.4	
1.500	38.10	31.75	52.7	55.7	41.70	47.20	38.0	59.4	4.6	5.6	8.7	66.4	
1.625	41.28	34.92	57.4	60.4	44.84	50.37	41.2	66.5	4.6	5.6	11.0	73.5	
1.750	44.45	38.10	59.2	62.2	48.05	53.55	44.4	66.5	4.6	5.6	11.0	73.5	
1.875	47.62	41.28	62.5	65.5	54.40	59.90	50.6	66.5	5.0	5.8	11.0	74.9	
2.000	50.80	44.45	66.5	69.5	60.75	66.25	57.0	66.5	5.0	5.8	11.0	74.9	
2.125	53.98	47.62	71.5	74.5	63.92	69.42	61.0	76.3	5.0	5.8	12.7	84.7	
2.250	57.15	50.80	73.5	76.5	63.92	69.42	61.0	76.3	5.0	5.8	12.7	84.7	
2.375	60.32	53.98	76.6	79.6	73.45	78.95	70.2	76.3	5.5	6.6	12.7	85.5	
2.500	63.50	57.15	79.7	82.7	76.62	82.12	72.8	76.3	5.5	6.6	12.7	85.5	
2.625	66.68	60.32	83.0	86.0	76.62	82.12	72.8	76.3	5.5	6.6	12.7	85.5	
2.750	69.85	63.50	86.1	89.1	79.80	85.30	76.0	76.3	5.5	6.6	12.7	85.5	
2.875	73.02	66.68	89.3	92.3	79.80	85.30	76.0	76.3	5.5	7.4	12.7	86.3	
3.000	76.20	69.85	92.5	95.5	82.97	88.47	79.2	76.3	5.5	7.4	12.7	86.3	
3.125	79.38	73.02	95.6	98.6	86.22	91.72	81.5	76.3	5.5	7.4	14.3	86.3	
3.250	82.55	76.20	98.8	101.8	89.04	97.60	85.4	76.3	7.5	5.5	14.3	88.1	
3.375	85.72	79.38	101.9	104.9	95.39	103.95	91.8	76.3	7.5	5.5	14.3	88.1	
3.500	88.90	82.55	105.1	108.1	95.39	103.95	91.8	76.3	7.5	5.5	14.3	88.1	
3.625	92.08	85.72	108.3	111.3	98.57	107.13	95.0	76.3	7.5	5.5	14.3	88.1	
3.750	95.25	88.90	111.5	114.5	102.10	110.66	98.5	76.3	7.5	5.5	14.3	88.1	
3.875	98.42	92.08	114.6	117.6	104.92	113.48	100.5	76.3	7.5	6.0	14.3	89.2	
4.000	101.60	95.25	118.5	121.5	108.09	116.65	104.6	76.3	7.5	6.0	14.3	89.2	

Series 70B & 75B are single helical coil spring seals developed for dirty media and clogging type applications. Torque transmission from retainer shell to seal ring is done through drive lugs. All components are held together by a snap ring which helps in easier installation and removal. As all parts are interchangeable, one can convert series 70B to 75B by changing only the seal ring and the secondary seal. This concept is ideal for stock rationalisation.

Unbalanced Seal

Single Acting, Independent of Direction of Rotation

Mechanical Seal

Series 70U & 75U



Seals are also available as per DIN 24960 standard



Seal with cartridge construction

Standard Style

Face Materials

Carbon, Ceramic, Silicon Carbide, Tungsten Carbide, Lecrolloy

Metal Parts

SS 316, SS 304

Secondary Seal

70U : Elastomers
75U : PTFE, GFT

Applications

- Petrochemicals
- Petroleum Refinery
- General Chemicals
- Light Hydrocarbons

Seal Characteristics

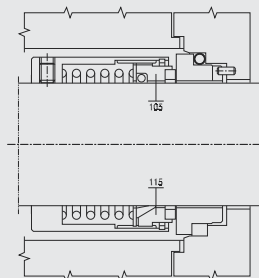
- Single acting
- Unbalanced
- Inside mounted
- Independent of direction of rotation

Operating Limits

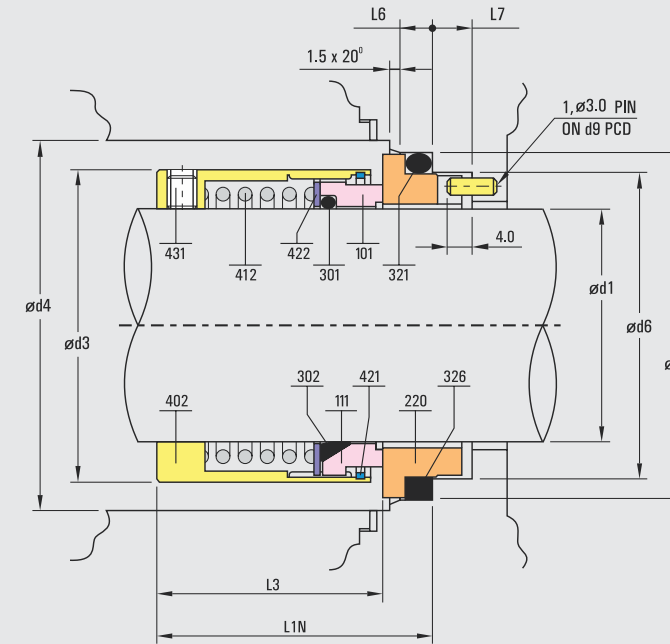
Shaft Diameter d1 : 0.5" 4.0"
Pressure p : 10 bar (max)
Temperature t : -60 ... +200°C
Velocity v : 20 m/sec

Shrink Fit Arrangement

Temperature Limits:
SS 304 110°C
SS 316 110°C
Hastelloy-C 175°C
Carpenter - 42 350°C



Series 70U



Series 75U

Part No.	Description
101	Seal Ring
105	Seal Ring
111	Seal Ring
115	Seal Ring
220	Mating Ring
301	O - Ring
302	Wedge
321	O - Ring
326	M. Ring Packing
402	Retainer
412	Spring
421	Snap Ring
422	Thrust Ring
431	Grub Screw

SEAL SIZE		d3	d4	d6 ^{+0.1 -0.0}	d7 ^{±0.05}	d9	L3 ^{±0.5}	L6	L7	L1N
d1 ^{+0.00 -0.05}										
inch	mm									
0.500	12.70	23.8	25.8	22.72	28.22	19.0	32.0	4.6	5.6	39.0
0.625	15.87	27.0	29.0	25.90	31.40	22.2	32.0	4.6	5.6	39.0
0.750	19.05	30.5	32.5	29.07	34.57	25.4	35.4	4.6	5.6	42.4
0.875	22.22	33.6	35.6	32.25	37.75	28.6	35.4	4.6	5.6	42.4
1.000	25.40	36.8	38.8	35.35	40.85	31.6	41.0	4.6	5.6	48.0
1.125	28.58	40.0	43.0	38.52	44.02	34.6	42.8	4.6	5.6	49.8
1.250	31.75	43.2	46.2	41.70	47.20	38.0	42.8	4.6	5.6	49.8
1.375	34.92	49.5	52.5	44.84	50.37	41.2	50.8	4.6	5.6	57.8
1.500	38.10	52.7	55.7	48.05	53.55	44.4	50.8	4.6	5.6	57.8
1.625	41.28	57.4	60.4	54.40	59.90	50.6	55.6	5.0	5.8	64.0
1.750	44.45	59.2	62.2	60.75	66.25	57.0	55.6	5.0	5.8	64.0
1.875	47.62	62.5	65.5	63.92	69.42	61.0	55.6	5.0	5.8	64.0
2.000	50.80	66.5	69.5	63.92	69.42	61.0	55.6	5.0	5.8	64.0
2.125	53.98	71.5	74.5	73.45	78.95	70.2	66.7	5.5	6.6	75.9
2.250	57.15	73.5	76.5	76.62	82.12	72.8	66.7	5.5	6.6	75.9
2.375	60.32	76.6	79.6	76.62	82.12	72.8	66.7	5.5	6.6	75.9
2.500	63.50	79.7	82.7	79.80	85.30	76.0	66.7	5.5	6.6	75.9
2.625	66.68	83.0	86.0	79.80	85.30	76.0	66.7	5.5	7.4	76.7
2.750	69.85	86.1	89.1	82.97	88.47	79.2	66.7	5.5	7.4	76.7
2.875	73.02	89.3	92.3	86.22	91.72	81.5	66.7	5.5	7.4	76.7
3.000	76.20	92.5	95.5	89.04	97.60	85.4	66.7	7.5	5.5	78.5
3.125	79.38	95.6	98.6	95.39	103.95	91.8	66.7	7.5	5.5	78.5
3.250	82.55	98.8	101.8	95.39	103.95	91.8	66.7	7.5	5.5	78.5
3.375	85.72	101.9	104.9	98.57	107.13	95.0	66.7	7.5	5.5	78.5
3.500	88.90	105.1	108.1	102.10	110.66	98.5	66.7	7.5	5.5	78.5
3.625	92.08	108.3	111.3	104.92	113.48	100.5	66.7	7.5	6.0	79.6
3.750	95.25	111.5	114.5	108.09	116.65	104.6	66.7	7.5	6.0	79.6
3.875	98.42	114.6	117.6	111.62	120.18	107.0	66.7	7.5	6.0	79.6
4.000	101.60	118.5	121.5	114.44	123.00	110.8	66.7	7.5	6.0	79.6

Series 70U & 75U are single helical coil spring seals developed for dirty media and clogging type applications. Torque transmission from retainer shell to seal ring is done through drive lugs. All components are held together by a snap ring which helps in easier installation and removal. As all parts are interchangeable, one can convert series 70U to 75U by changing only the seal ring and the secondary seal. This concept is ideal for stock rationalisation.



SERIES 70U & 75U

Unbalanced Seal

Single Acting, Dependent of Direction of Rotation

Mechanical Seal

Series 2U



Seals are also available as per DIN 24960 standard

Standard Style

Face Materials:

Carbon, Ceramic, Tungsten Carbide, Silicon Carbide, Lecrolloy

Metal Parts

SS 316, SS 304

Secondary Seal

Elastomers, PTFE

Applications

- Water Pumps
- Circulation Pumps for central heating
- Chemical Process Pumps
- Sewage & Submersible pumps

Seal Characteristics

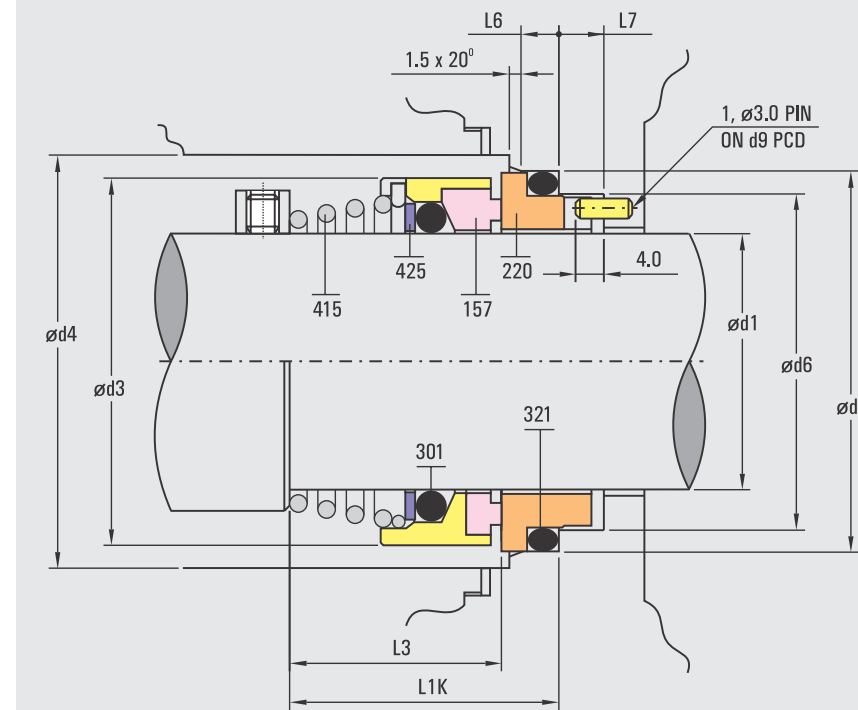
- Single acting
- Unbalanced
- Inside mounted
- Dependent of direction of rotation

Operating Limits

Shaft Diameter d1 : 0.5" 3.0"
 Pressure p : 10 bar (max)
 Temperature t : -20 + 120°C
 Velocity v : 20 m/sec

Series 2U is a single conical helical spring, unbalanced seal with 'O' ring as secondary sealing member. Various seal face materials and elastomers can be offered for wide service application. As the torque transmission is done by conical helical spring these seals are dependent of the direction of rotation. Direction of rotation is seen from the drive end of the shaft. Clockwise rotating shaft requires right handed spring and anticlockwise rotating shaft requires left-handed spring. For easier fitting, the conical helical spring should be pushed on the shaft with a twisting motion in the sense of the spring unwinding. This movement enlarges the diameter of the spring, enabling easy fitment.

Series 2U



Part No.	Description
157	Seal Ring
220	Mating Ring
301	O - Ring
321	O - Ring
415	Spring
425	Thrust Ring

SEAL SIZE		d3	d4	d6 ^{+0.1 -0.0}	d7 ^{±0.05}	d9	L3 ^{±0.5}	L6	L7	L1K
d1 ^{+0.00 -0.05}	mm									
0.500	12.70	23.0	26.0	22.72	28.22	19.0	17.5	4.6	5.6	24.5
0.625	15.87	26.0	29.0	25.90	31.40	22.2	19.5	4.6	5.6	26.5
0.750	19.05	33.0	36.0	29.07	34.57	25.4	22.0	4.6	5.6	29.0
0.875	22.22	36.0	39.0	32.25	37.75	28.6	23.5	4.6	5.6	30.5
1.000	25.40	40.0	43.0	35.35	40.85	31.6	26.5	4.6	5.6	33.5
1.125	28.58	42.0	45.0	38.52	44.02	34.6	26.5	4.6	5.6	33.5
1.250	31.75	46.0	49.0	41.70	47.20	38.0	28.5	4.6	5.6	35.5
1.375	34.92	49.0	52.0	44.84	50.37	41.2	28.5	4.6	5.6	35.5
1.500	38.10	54.0	57.0	48.05	53.55	44.4	32.5	4.6	5.6	39.5
1.625	41.28	58.0	61.0	54.40	59.90	50.6	37.5	5.0	5.8	45.9
1.750	44.45	61.0	64.0	60.75	66.25	57.0	39.5	5.0	5.8	47.9
1.875	47.62	64.0	67.0	63.92	69.42	61.0	44.5	5.0	5.8	52.9
2.000	50.80	67.0	70.0	63.92	69.42	61.0	46.0	5.0	5.8	54.4
2.125	53.98	70.0	73.0	73.45	78.95	70.2	49.0	5.5	6.6	58.2
2.250	57.15	77.0	80.0	76.62	82.12	72.8	52.0	5.5	6.6	61.2
2.375	60.32	79.0	82.0	76.62	82.12	72.8	53.0	5.5	6.6	62.2
2.500	63.50	82.0	85.0	79.80	85.30	76.0	53.0	5.5	6.6	62.2
2.625	66.68	87.0	90.0	79.80	85.30	76.0	55.0	5.5	7.4	65.0
2.750	69.85	90.0	93.0	82.97	88.47	79.2	56.5	5.5	7.4	66.5
2.875	73.02	94.0	97.0	86.22	91.72	81.5	56.5	5.5	7.4	66.5
3.000	76.20	99.0	102.0	89.04	97.60	85.4	56.5	7.5	5.5	68.3
3.125	79.38	103.0	106.0	95.39	103.95	91.8	59.5	7.5	5.5	71.3
3.250	82.55	106.0	109.0	95.39	103.95	91.8	59.5	7.5	5.5	71.3
3.375	85.72	109.0	112.0	98.57	107.13	95.0	61.0	7.5	5.5	72.8
3.500	88.90	112.0	115.0	102.10	110.66	98.5	61.0	7.5	5.5	72.8



Unbalanced Seal

Single Acting, Independent of Direction of Rotation

Mechanical Seal

Series LPR 200 & LPR 205



Standard Style

Face Materials

Silicon Carbide / Silicon Carbide
Carbon / Silicon Carbide
Carbon / Lecrolloy
Carbon / Ceramic

Metal Parts

SS 316, SS 304

Secondary Seal

Nitrile, Viton

Applications

- Water pumps
- Mixers
- Compressors
- Blenders

Seal Characteristics

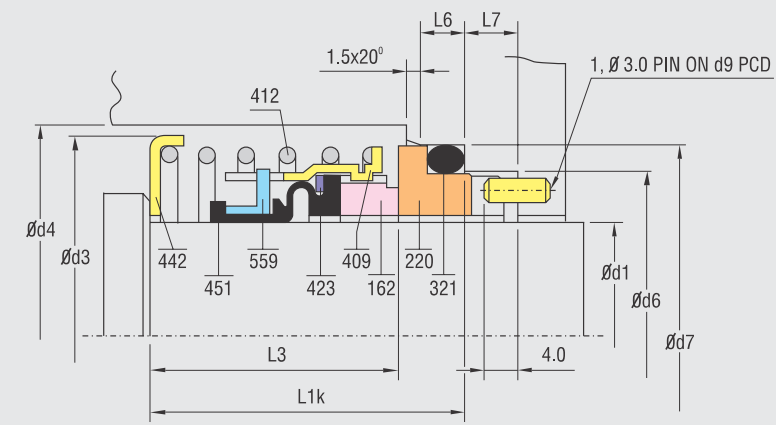
- Single acting
- Unbalanced
- Single helical coil Spring
- Independent of direction of rotation
- Torque transmission by drive ring

Operating Limits

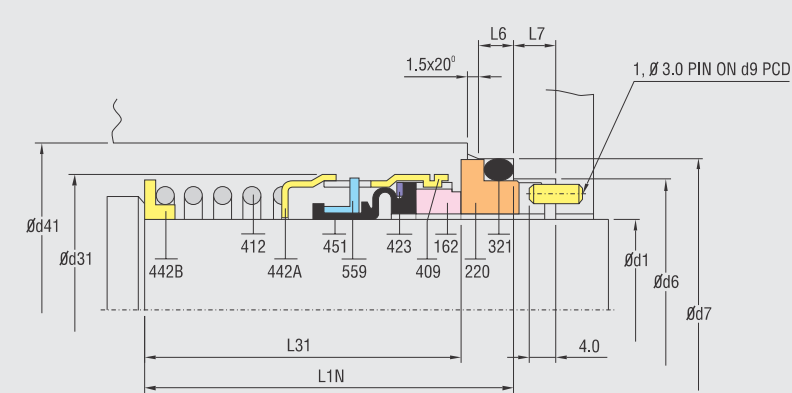
Shaft Diameter d1 : 0.625" 3.0"
Pressure p : 18 bar (max)
Temperature t : -20 ... +180°C
Velocity v : 20 m/sec

Series LPR 200 & LPR 205 is single coil spring rubber bellow seal used for Petrochemicals, Food processing, Pulp & Paper and other demanding applications. This seal is mainly used in compressors. Seal has self aligning feature which compensates abnormal shaft end play & run-out, which leads to improved service life. Elastomeric bellow protect shaft / sleeve from fretting. Drive to the seal faces is given through notches provided on retainer. Due to single coil spring, seal will not get clogged in effluent containing particles. Seal can be used for higher speed as well as for higher pressure. Seal can be repaired in field with minimum spares minimising the downtime cost.

Series LPR 200



Series LPR 205



Part No.	Description
162	Seal Ring
220	Mating Ring
321	O - Ring
409	Retainer
412	Spring
423	Thrust Ring
442	Spring Holder
451	Bellow
559	Drive Ring

Part No.	Description
162	Seal Ring
220	Mating Ring
321	O - Ring
409	Retainer
412	Spring
423	Thrust Ring
442	ASpring Holder
442	BSpring Holder
451	Bellow
559	Drive Ring

SEAL SIZE		d3	d4	d6 ^{+0.1 -0.0}	d7 ^{±0.5}	d9	L3 ^{±0.5}	L6	L7	L1K	L31	D41	L31 ^{±0.5}	L1N
inch	mm													
0.625"	15.87	35.5	38.5	25.90	31.40	22.2	23.0	4.6	5.6	30.0	29.0	33.0	44.0	51.0
0.75"	19.05	39.0	42.0	29.07	34.57	25.4	23.0	4.6	5.6	30.0	32.0	36.0	44.0	51.0
0.875"	22.22	43.5	46.5	32.25	37.75	28.6	25.0	4.6	5.6	32.0	35.0	39.0	44.0	51.0
1.0"	25.40	46.0	49.0	35.35	40.85	31.6	25.0	4.6	5.6	32.0	38.0	42.0	44.0	51.0
1.125"	28.58	49.0	52.0	38.52	44.02	34.6	28.0	4.6	5.6	35.0	46.0	49.0	60.0	67.0
1.25"	31.75	52.5	55.5	41.70	47.20	38.0	28.0	4.6	5.6	35.0	49.0	52.0	60.0	67.0
1.375"	34.92	57.0	60.0	44.84	50.37	41.2	30.0	4.6	5.6	37.0	51.0	54.0	60.0	67.0
1.5"	38.10	59.5	62.5	48.05	53.55	44.4	30.0	4.6	5.6	37.0	53.0	56.0	60.0	67.0
1.625"	41.28	66.0	69.0	54.40	59.90	50.6	33.0	5.0	5.8	41.4	57.5	63.0	60.0	68.4
1.75"	44.45	70.5	73.5	60.75	66.25	57.0	36.0	5.0	5.8	44.4	61.0	68.0	71.0	79.4
1.875"	47.62	73.0	76.0	63.92	69.42	61.0	39.0	5.0	5.8	47.4	64.5	72.0	71.0	79.4
2.0"	50.80	75.5	78.5	63.92	69.42	61.0	39.0	5.0	5.8	47.4	68.0	72.0	71.0	79.4
2.125"	53.98	82.5	85.5	73.45	78.95	70.2	42.5	5.5	6.6	51.7	71.5	81.0	71.0	80.2
2.25"	57.15	86.0	89.0	76.62	82.12	72.8	42.5	5.5	6.6	51.7	74.5	84.0	71.0	80.2
2.375"	60.32	87.5	90.5	76.62	82.12	72.8	42.5	5.5	6.6	51.7	79.0	84.0	71.0	80.2
2.5"	63.50	92.0	95.0	79.80	85.30	76.0	42.5	5.5	6.6	51.7	82.0	87.0	71.0	80.2
2.625"	66.68	98.5	101.5	79.80	85.30	76.0	49.0	5.5	7.4	59.0	85.0	88.0	70.0	80.0
2.75"	69.85	101.5	104.5	82.97	88.47	79.2	49.0	5.5	7.4	59.0	89.0	92.0	70.0	80.0
2.875"	73.02	109.0	112.0	86.22	91.72	81.5	52.0	5.5	7.4	62.0	93.0	96.0	73.0	83.0
3.0"	76.20	110.0	113.0	89.04	97.60	85.4	52.0	7.5	5.5	63.8	95.0	101.0	73.0	84.8

*For seal sizes above 3.0" consult **Leak-Proof**



SERIES LPR 200 / LPR 205

Unbalanced Seal

Single Acting, Independent of Direction of Rotation

Mechanical Seal

Series 73 & 73L



Seals are also available as per DIN 24960 standard



Seal with cartridge construction

Standard Style

Face Materials

- Carbon / Lecrolloy
- Carbon / Ceramic
- Carbon / Silicon carbide
- Silicon Carbide / Silicon Carbide

Metal Parts

SS 316, SS 304

Secondary Seal

Nitrile, Viton

Applications

- Water Pumps
- Submersible Pumps

Seal Characteristics

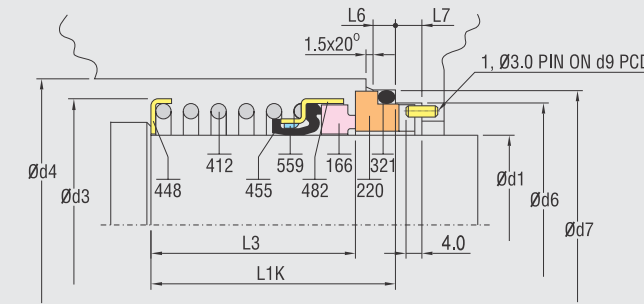
- Single acting
- Unbalanced
- Single helical coil Spring
- Independent of Direction of Rotation
- Torque Transmission by Elastomer bellow

Operating Limits

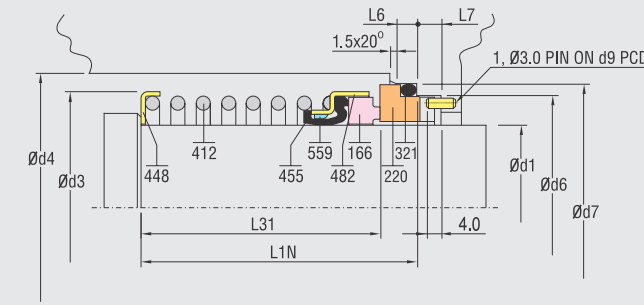
Shaft Diameter d1 : 0.5" 4.0"
 Pressure p : 12 bar (max)
 Temperature t : -20 +180°C
 Velocity v : 20 m/sec

Series 73 & 73L are single coil springs with elastomeric bellows for water, Oil and light duties. This seal has self aligning feature which compensate abnormal shaft end play and run out, which leads to improved service life. Elastomeric bellow protect shaft and sleeve from fretting. Drive to the seal faces is given through notches - provided on retainer. Seal can be repaired in field with minimum spares minimising the down time cost.

Series 73



Series 73L



Part No.	Description
166	Seal Ring
220	Mating Ring
321	O - Ring
412	Spring
448	Spring Holder
455	Bellow
482	Retainer
559	Drive Ring

SEAL SIZE		d3	d4	d6 ^{+0.1 -0.0}	d7 ^{+0.5}	d9	L3 ^{±0.5}	L6	L7	L1K	L31 ^{±0.5}	L1N
d1 ^{+0.00 -0.05}	inch											
0.500	12.70	24.0	27.0	22.72	28.22	19.0	26.5	4.6	5.6	33.5	30.0	37.0
0.625	15.87	26.0	29.0	25.90	31.40	22.2	26.5	4.6	5.6	33.5	33.5	40.5
0.750	19.05	31.5	34.5	29.07	34.57	25.4	27.5	4.6	5.6	34.5	33.5	40.5
0.875	22.22	32.5	35.5	32.25	37.75	28.6	27.5	4.6	5.6	34.5	35.0	42.0
1.000	25.40	38.0	41.0	35.35	40.85	31.6	30.0	4.6	5.6	37.0	40.0	47.0
1.125	28.58	40.0	43.0	38.52	44.02	34.6	32.5	4.6	5.6	39.5	41.5	48.5
1.250	31.75	45.5	48.5	41.70	47.20	38.0	32.5	4.6	5.6	39.5	41.5	48.5
1.375	34.92	48.5	51.5	44.84	50.37	41.2	32.5	4.6	5.6	39.5	43.0	50.0
1.500	38.10	52.5	55.5	48.05	53.55	44.4	34.0	4.6	5.6	41.0	43.0	50.0
1.625	41.28	56.0	59.0	54.40	59.90	50.6	34.0	5.0	5.8	42.5	51.0	59.5
1.750	44.45	61.0	64.0	60.75	66.25	57.0	34.0	5.0	5.8	42.5	51.0	59.5
1.875	47.62	64.0	67.0	63.92	69.42	61.0	34.0	5.0	5.8	42.5	54.0	62.5
2.000	50.80	66.0	69.0	63.92	69.42	61.0	34.5	5.0	5.8	43.5	54.0	62.5
2.125	53.98	71.0	74.0	73.45	78.95	70.2	34.5	5.5	6.6	43.5	60.0	69.0
2.250	57.15	78.0	81.0	76.62	82.12	72.8	39.5	5.5	6.6	48.5	60.0	69.0
2.375	60.32	80.0	83.0	76.62	82.12	72.8	39.5	5.5	6.6	48.5	63.5	72.5
2.500	63.50	83.0	86.0	79.80	85.30	76.0	39.5	5.5	6.6	48.5	63.5	72.5
2.625	66.68	88.0	91.0	79.80	85.30	76.0	37.5	5.5	7.4	47.5	70.0	80.0
2.750	69.85	90.0	93.0	82.97	88.47	79.2	45.0	5.5	7.4	55.0	70.0	80.0
2.875	73.02	93.0	96.0	86.22	91.72	81.5	45.0	5.5	7.4	55.0	73.0	83.0
3.000	76.20	96.0	99.0	89.04	97.60	85.4	45.0	7.5	5.5	57.0	73.0	85.0
3.125	79.38	102.0	105.0	95.39	103.95	91.8	44.5	7.5	5.5	56.5	80.0	92.0
3.250	82.55	107.0	110.0	95.39	103.95	91.8	44.5	7.5	5.5	56.5	80.0	92.0
3.375	85.72	107.0	110.0	98.57	107.13	95.0	44.5	7.5	5.5	56.5	80.0	92.0
3.500	88.90	112.0	115.0	102.10	110.66	98.5	49.5	7.5	5.5	61.5	80.0	92.0
3.625	92.08	117.0	120.0	104.92	113.48	100.50	49.5	7.5	6.0	62.5	82.5	95.5
3.750	95.25	117.0	120.0	108.09	116.65	104.60	49.5	7.5	6.0	62.5	82.5	95.5
3.875	98.42	124.0	127.0	111.62	120.18	107.00	48.5	7.5	6.0	61.5	86.0	99.0
4.000	101.60	124.0	127.0	114.44	123.00	110.80	48.5	7.5	6.0	61.5	86.0	99.0



SERIES 73 & 73L

Rotary Joints

Monoflow and Dualflow

Rotary Joints

Series LPMF 101/LPDF 201



Series LPMF 101



Series LPDF 201

Standard Style

Face Materials

Carbon / Silicon Carbide

Metal Parts

SS 304, Brass, Aluminium

Secondary Seal

Elastomer

Applications

- Water
- Coolant
- Oil
- Steam
- Air

Operating Limits

Pressure p : 10 bar
 Temperature t : 120°C
 Size Range : 3/8" to 2.0"

Speed up to

3500 RPM for Straight threads 3/4" size & below
 3000 RPM for Straight threads 1" size
 2500 RPM for Straight threads 1.1/2" & 1.1/4" size
 750 RPM for Straight threads 2" size

Rotor connection options

BSP, NPT, UNF, UNC, METRIC THREAD are available.
 Built in Flange connection and quick change
 Flange connection are also available.

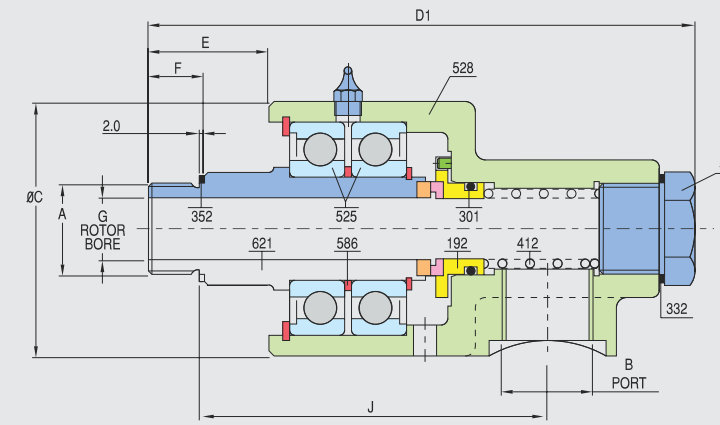
No External support required

Self supporting on two precision Ball Bearings far
 enough to reduce vibration & wobbling.

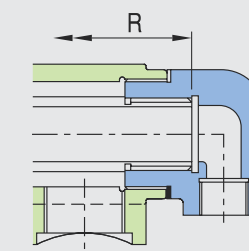
Balanced Mechanical Seal

Minimises operating torque & enhances life. Seal
 faces are self lubricating. Carbon
 (Resin impregnated) and Silicon Carbide with
 suitable elastomeric secondary sealing. Or as per
 the requirement.

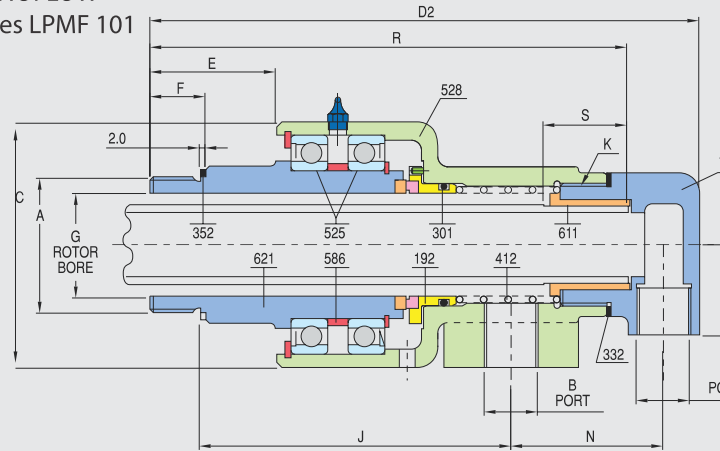
MONOFLOW Series LPMF 101



DUAL FLOW with FIXED SUPPLY PIPE



MONOFLOW Series LPMF 101



Part No. Description

192	Seal Ring
301	O - Ring
332	Gasket
352	Gasket
412	Spring
525	Bearing
528	Bearing Housing
586	Spacer
590	Plug
611	Bush
621	Rotor
707	Elbow

Part No. Description

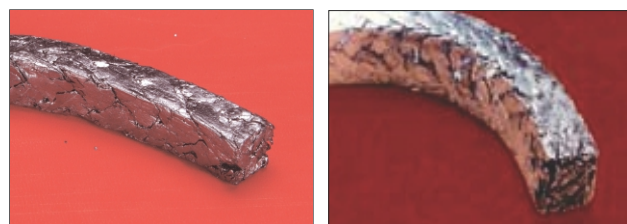
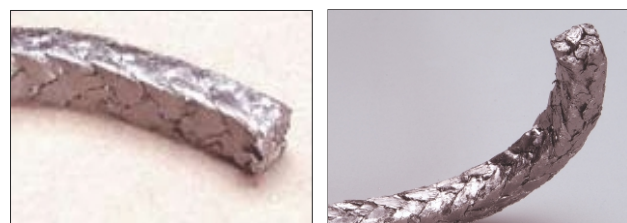
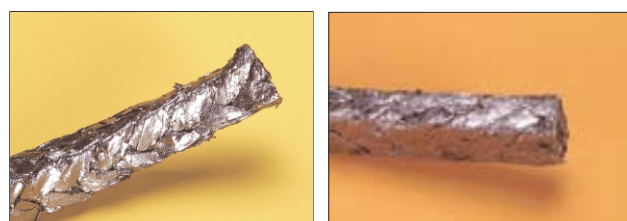
Body	Brass / Aluminium
Rotor	SS 304
Elbow	SS 304
Plug	SS 304
Spring	SS 304
Bush	CFT
Faces	Carbon-R/Sic in SS 304
Elastomers	Viton
	Nitrile
	Neoprene

A Rotor Thread	B Port	C	D1	E	F	NOM. SIZE G ROTOR BORE	J	Dualflow											
								D2	K	M	N	O PORT	Fixed Supply Pipe			Rotating Supply Pipe			
													Threads	Pipe OD	R	Pipe Size	Pipe DIA	S	R
3/8" BSP	3/8" BSP	55	132	26	16.0	10.0	85.5	145	3/8" BSP	18	35	1/4" BSP	---	---	---	6.35	6.00 5.95	18	123
1/2" SP	1/2" BSP	55	148	34	19.0	13.0	91.0	168	1/2" BSP	18	46.5	3/8" BSP	1/8" BSP	10.3	137	1/8" NB	9.42 9.40	25	143
3/4" BSP	3/4" BSP	66	155	34	19.0	18.0	97.5	182	3/4" BSP	26	53	1/2" BSP	1/4" BSP	13.7	142	1/4" NB	12.60 12.57	30	155
1" BSP	1" BSP	80	182	42	21.5	24.0	114.0	210	1" BSP	27	62	1/2" BSP	3/8" BSP	17.1	167	3/8" NB	15.80 15.75	35	183
1 1/4" BSP	1 1/4" BSP	102	220	54	27.0	30.0	136.0	251	1 1/4" BSP	35	72	3/4" BSP	1/2" BSP	21.3	200	1/2" NB	19.92 19.87	38	218
1 1/2" BSP	1 1/2" BSP	108	240	61	28.6	36.0	149.5	272	1 1/2" BSP	38	78	3/4" BSP	3/4" BSP	26.7	220	3/4" NB	25.40 25.35	45	236.5
1 3/4" BSP	1 3/4" BSP	114	245	63	28.6	42.0	153.5	285	1 3/4" BSP	38	87	3/4" BSP	3/4" BSP	26.7	230	3/4" NB	25.40 25.35	44	249
2" BSP	2" BSP	124	258	65	28.6	47.0	164.0	295	2" BSP	38	87	1" BSP	3/4" BSP	26.7	241	3/4" NB	25.40 25.35	44	259



SINCE 1973
SERIES LPMF 101 / LPDF 201

GRAFOIL Products

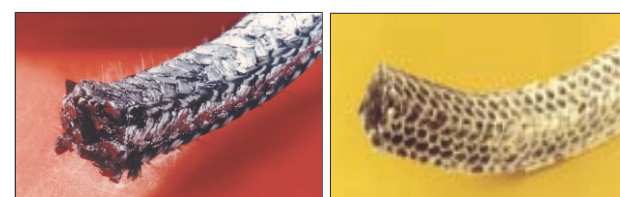
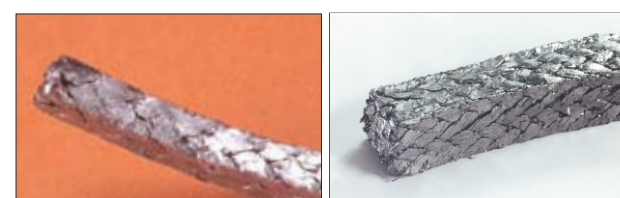
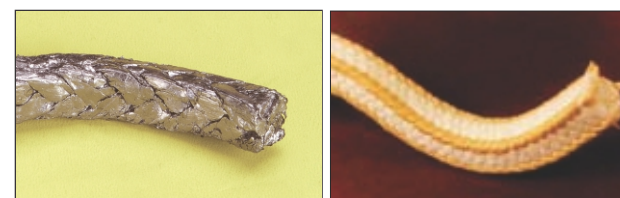


GRAFOIL is pure graphite. No fillers or no binders, nothing to leach out or harden. It is free from corrosion, embrittlement and aging. The gaskets and packing made from Grafoil can perform successfully even under extreme conditions.

- * They can withstand from -200°C to 1850°C or as high as 3000°C in the absence of oxygen.
- * They are resistant to all aggressive media such as highly concentrated acids, solvents and hot oils.
- * They are resilient across entire temperature range of any length of time.
- * They are not susceptible to cold or hot flow at the highest permitted surface pressure.
- * They are unaffected by radiation and are recommended for use in nuclear plants.
- * They are permitted to use in conjunction with oxygen.
- * They are physiologically inert.
- * Flange distortions are compensated.

Operating Parameters

Temperature : -270° to 3000°C
 Pressure : up to 685 Kg/cm^2 .
 pH Value : 0 to 14.
 Vacuum : 710 mm of Hg.



Advantages

Grafoil is available in a variety of forms for versatile maintenance and OEM applications.

- As endless or split gland packing rings and self sealing rings.
- As cut gaskets to suit specific requirement of pipe flange gaskets, bonnet gaskets, sight gage glass gaskets etc
- As self adhesive gasket tape for flanges, pressure vessels, heat exchangers etc.
- As pipe thread sealants

Benefits

Maximum Sealability.
 Absolute Reliability.
 No Fluid Losses.
 Negligible Downtime
 Extended Equipment Life.
 Enhanced Plant Safety.
 Long Service Life.
 Minimum maintenance.

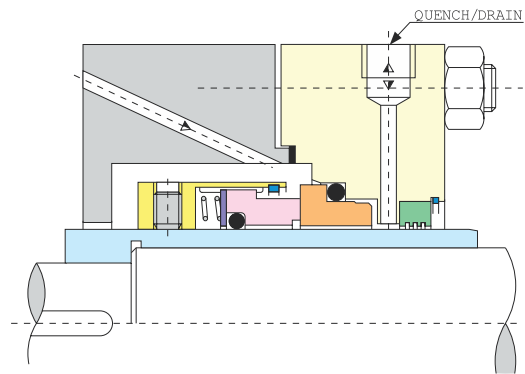
Applications

- Petrochemicals
- Refineries
- Nuclear Power Plants
- Thermal Power Stations
- Fertilizers



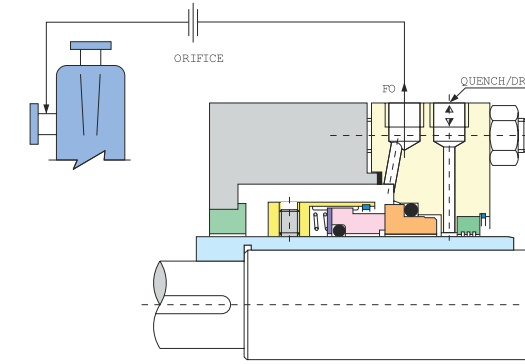
FLUSHING PLANS AS PER API 682 3rd Edition

FLUSHING PLANS AS PER API 682 3rd Edition



Seal Flush Plan 01

- Integral recirculation pump discharge to seal chamber.
- Recommended for clean pumpage only.
- Care must be taken to ensure that Integral recirculation is sufficient to maintain stable face conditions.

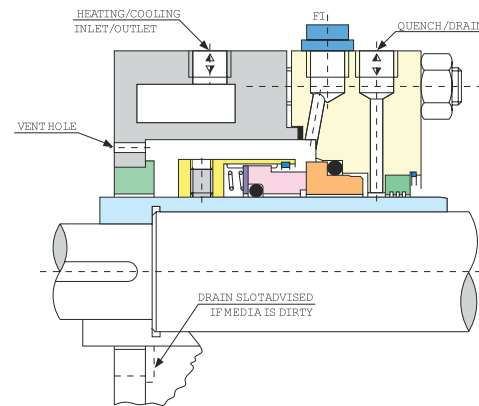


Seal Flush Plan 13

- Recirculation from pump seal chamber through a flow control orifice and back to the pump suction.
- Mainly applicable for vertical pumps.
- Connection FO for flushing outlet.

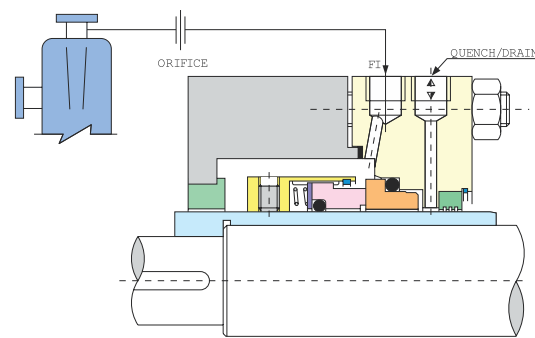
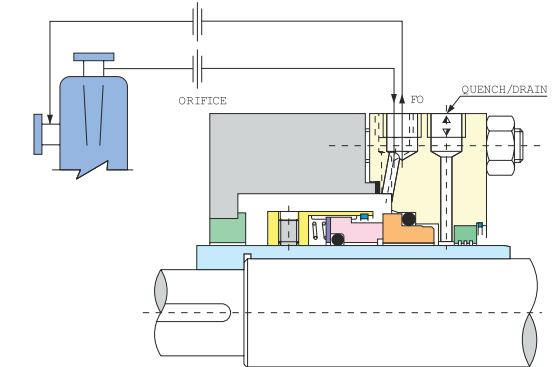
Seal Flush Plan 02

- Dead ended seal chamber with no circulation of flushed fluid.
- Jacketed seal chamber and throat bushing required when specified.
- Connection FI plugged for possible future connection.



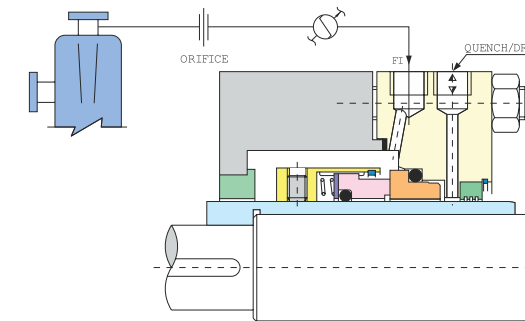
Seal Flush Plan 14

- Recirculation from pump discharge through a flow control orifice to the seal and simultaneously from seal chamber through a control orifice (if required) to pump suction.
- This allows fluid to enter the seal chamber and provide cooling while continually venting and reducing the pressure in the seal chamber.
- Connection FI for flushing inlet and FO for flushing outlet.



Seal Flush Plan 11

- Recirculation from pump discharge through a flow control orifice to the seal.
- The flow enters the seal chamber adjacent to the mechanical seal faces, flushes the faces, and flows across the seal back in to the pump.
- Connection FI for flushing inlet.

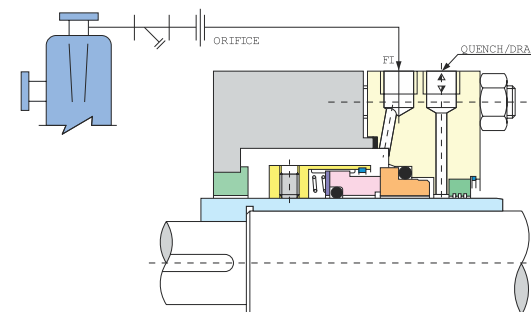


Seal Flush Plan 21

- Recirculation from pump discharge through a flow control orifice and heat exchanger, then in to the seal chamber.
- Connection FI for flushing inlet.

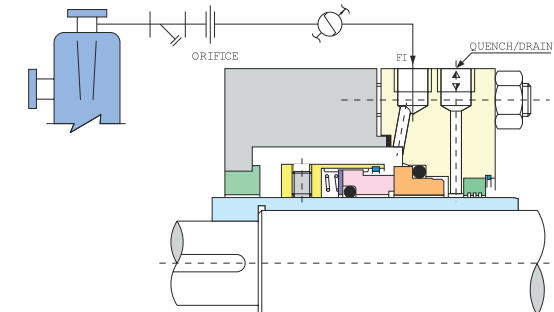
Seal Flush Plan 12

- Recirculation from pump discharge through a strainer and flow control orifice to the seal.
- This plan is similar to plan 11 but with the addition of a strainer to remove occasional particles.
- Connection FI for flushing inlet.

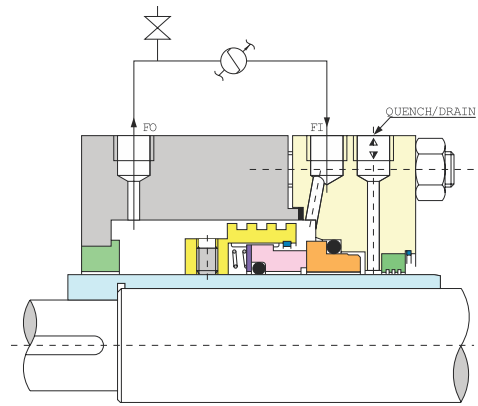


Seal Flush Plan 22

- Recirculation from pump discharge through a strainer, a flow control orifice, a cooler and then into the seal chamber.
- Connection FI for flushing inlet.



FLUSHING PLANS AS PER API 682 3rd Edition

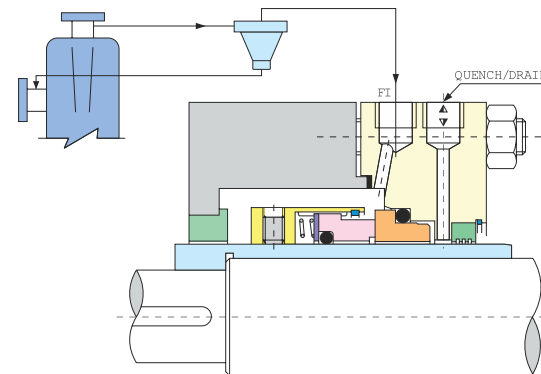


Seal Flush Plan 23

- Recirculation from a pumping ring in the seal chamber through a cooler and back in to the seal chamber.
- This plan can be used on hot applications to minimize the heat load on the cooler by cooling only the small amount of liquid that is recirculated.
- Connection FI for flushing inlet and FO for flushing outlet.

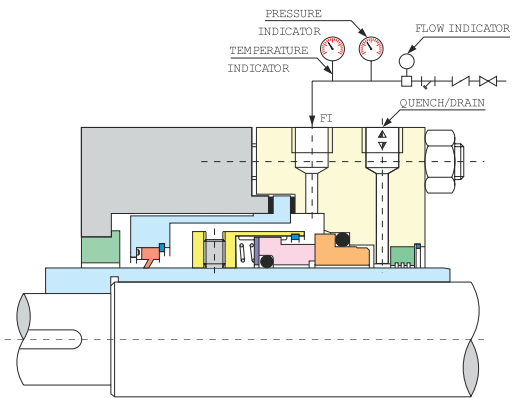
Seal Flush Plan 31

- Recirculation from pump discharge through a cyclon separator delivering the clean fluid to the seal chamber.
- The solids are delivered to the pump suction.
- Connection FI for flushing inlet.



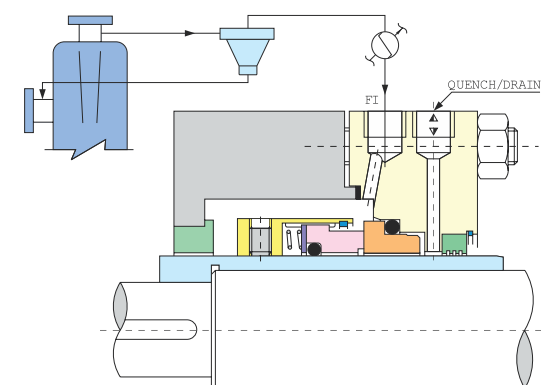
Seal Flush Plan 32

- Flush is injected in to the seal chamber from an external source.
- Care must be exercised in choosing a proper source of seal flush to eliminate potential for vaporization of the injected fluid and to avoid contamination of the fluid being pumped with the injected flush.
- Connection FI for flushing inlet.

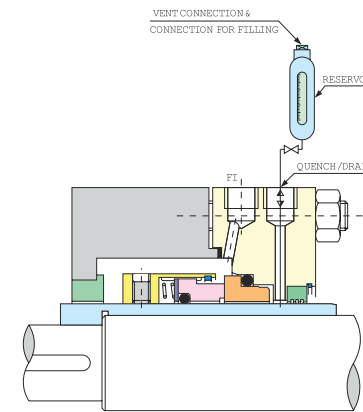


Seal Flush Plan 41

- Recirculation from pump discharge through a cyclon separator delivering the clean fluid to a seal cooler and then to the seal chamber.
- The solids are delivered to the pump suction.
- Connection FI for flushing inlet.



FLUSHING PLANS AS PER API 682 3rd Edition

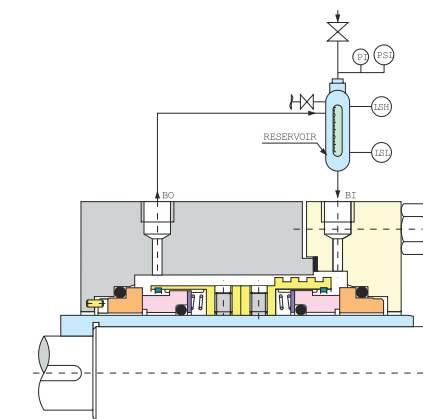
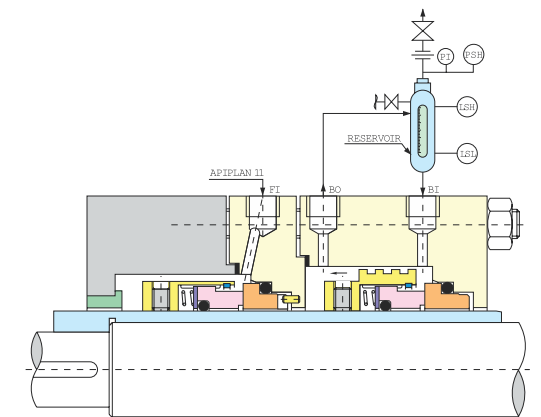


Seal Flush Plan 51

- External reservoir providing a dead ended blanket for fluid to the quench connection of the gland.
- Connection FI for flushing inlet.

Seal Flush Plan 52

- External reservoir providing buffer liquid for the outer seal of an Arrangement 2 seal.
- During normal operation, circulation is maintained by an internal pumping ring. The reservoir is usually continuously vented to a vapour recovery system.
- The reservoir is maintained at a pressure less than the pressure in the seal chamber.
- Connection FI for flushing inlet, BI for buffer inlet and BO for buffer outlet.

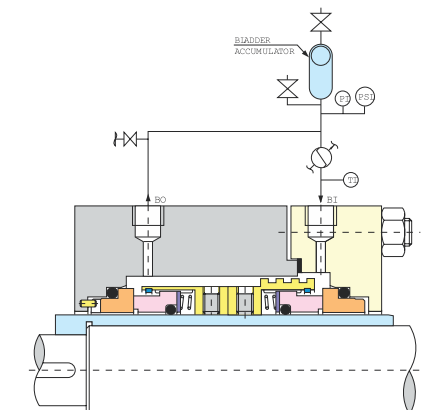


Seal Flush Plan 53A

- Pressurized external barrier fluid reservoir supplying clean fluid to the seal chamber. Circulation is by an internal pumping ring.
- Reservoir pressure is greater than the process fluid being sealed.
- Connection BI for barrier inlet and BO for barrier outlet.

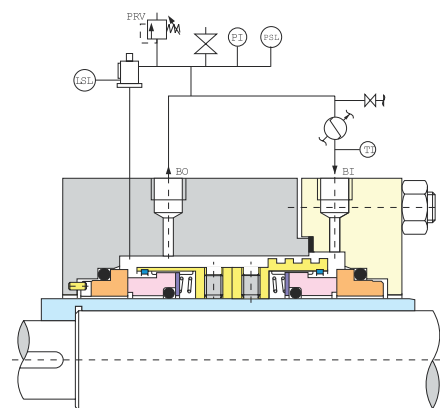
Seal Flush Plan 53B

- External piping provides fluid to the seal chamber of a pressureized dual seal Arrangement. Pre-pressurized bladder accumulator provides pressure to the circulation system.
- Flow is maintain by an internal pumping ring. Heat is removed from the circulation system by an air-cooled or water-cooled heat exchanger.
- Connection BI for barrier inlet and BO for barrier outlet.



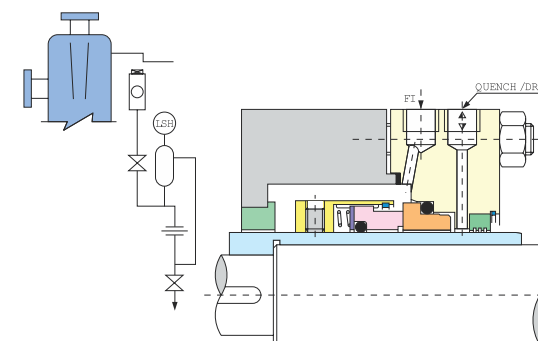
FLUSHING PLANS AS PER API 682 3rd Edition

FLUSHING PLANS AS PER API 682 3rd Edition



Seal Flush Plan 53C

- External piping provides fluid to the seal chamber of a pressureized dual seal Arrangement. Reference line from the seal chamber to a piston accumulator provides pressure to the circulation system.
- Flow is maintained by an internal pumping system. Heat is removed from the circulation system by an air-cooled or water-cooled heat exchanger.
- Connection BI for barrier inlet and BO for barrier outlet.

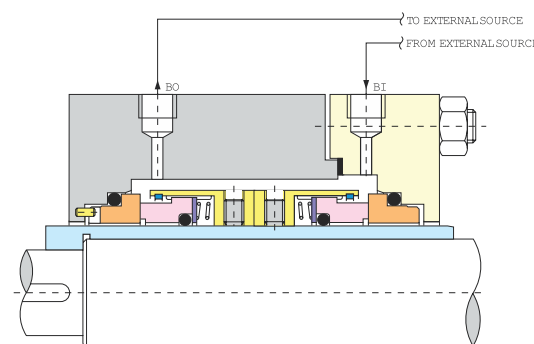


Seal Flush Plan 65

- External drain piping is arranged to alarm on high seal leakage, measured by a float type level switch.
- The orifice downstream of the level switch is typically 5 mm and is located in a vertical piping leg.

Seal Flush Plan 54

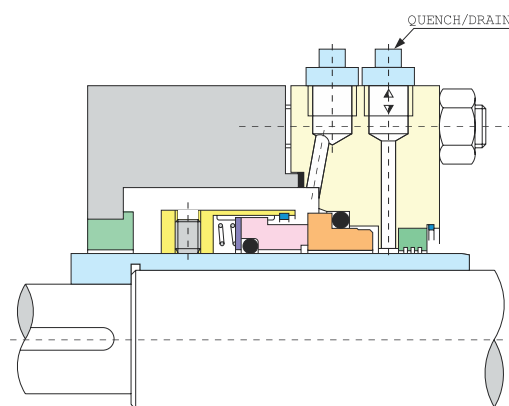
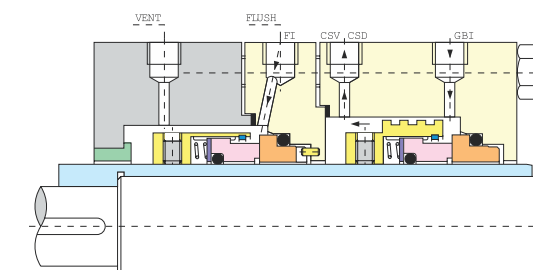
- Pressurized external barrier fluid reservoir or system supplying clean fluid to the seal chamber.
- Circulation is by an external pump or pressure system.
- Reservoir pressure is greater than the process pressure being sealed.
- Connection BI for barrier inlet and BO for barrier outlet.



Seal Flush Plan 71

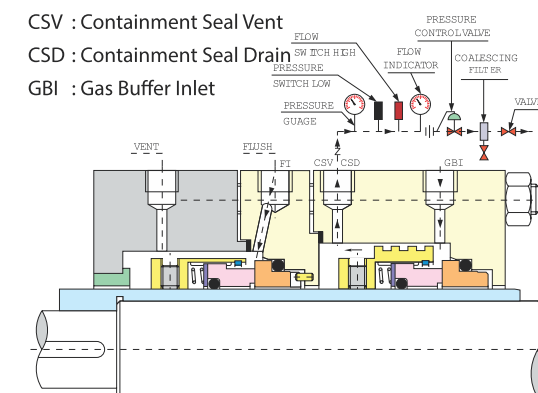
- Tapped connections for purchaser use.
- Typically this plan is used, when the purchaser may use buffer gas in the future.

CSV : Containment Seal Vent
CSD : Containment Seal Drain
GBI : Gas Buffer Inlet



Seal Flush Plan 61

- Tapped and plugged connections for the purchaser's use. Typically this plan is used when the purchaser is to provide fluid (such as steam, gas or water) to an external sealing device



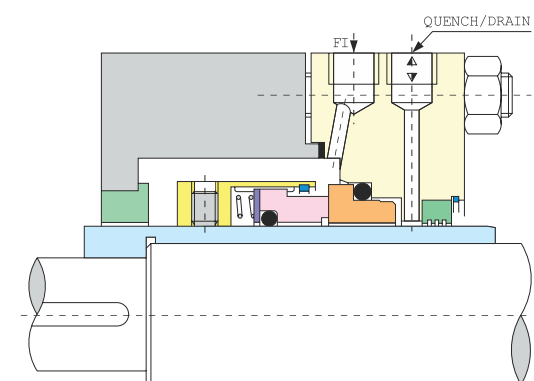
CSV : Containment Seal Vent
CSD : Containment Seal Drain
GBI : Gas Buffer Inlet

Seal Flush Plan 72

- Externally supplied gas buffer for arrangement 2 seals.
- Buffer gas may be used alone to dilute seal leakage or in conjunction with plan 75 or 76 to help sweep leakage in to close connection system.
- Pressure of buffer gas is lower than process side pressure of inner seal.

Seal Flush Plan 62

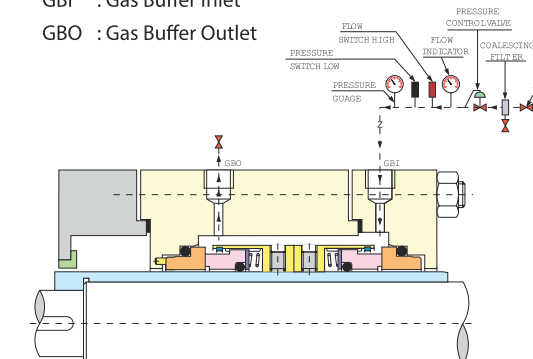
- Exterior source providing a quench.
- The quench may be required to prevent solids from accumulating on the atmospheric side of the seal.
- Typically used with a close clearance throttle bush.
- Connection FI for flush inlet if required.



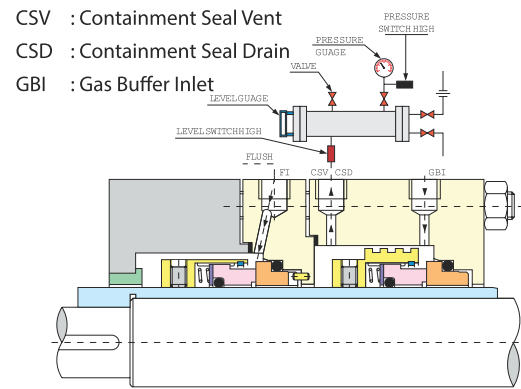
Seal Flush Plan 74

- Externally supplied barrier gas used to positively prevent process fluid from leaking to atmosphere.
- Pressure of barrier gas is higher than process side of inner seal.
- Venting of the seal chamber may be required prior to start up and operation to avoid the collection of gas in the pump.

GBI : Gas Buffer Inlet
GBO : Gas Buffer Outlet

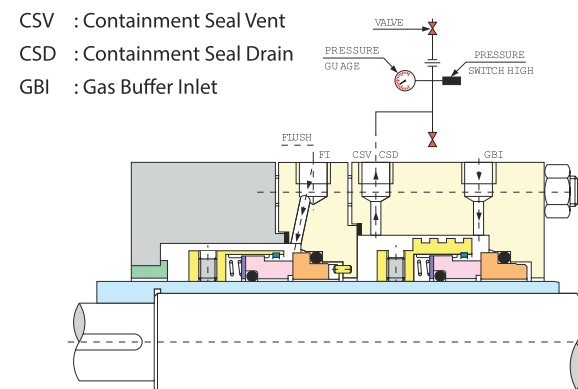


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Seal Flush Plan 75

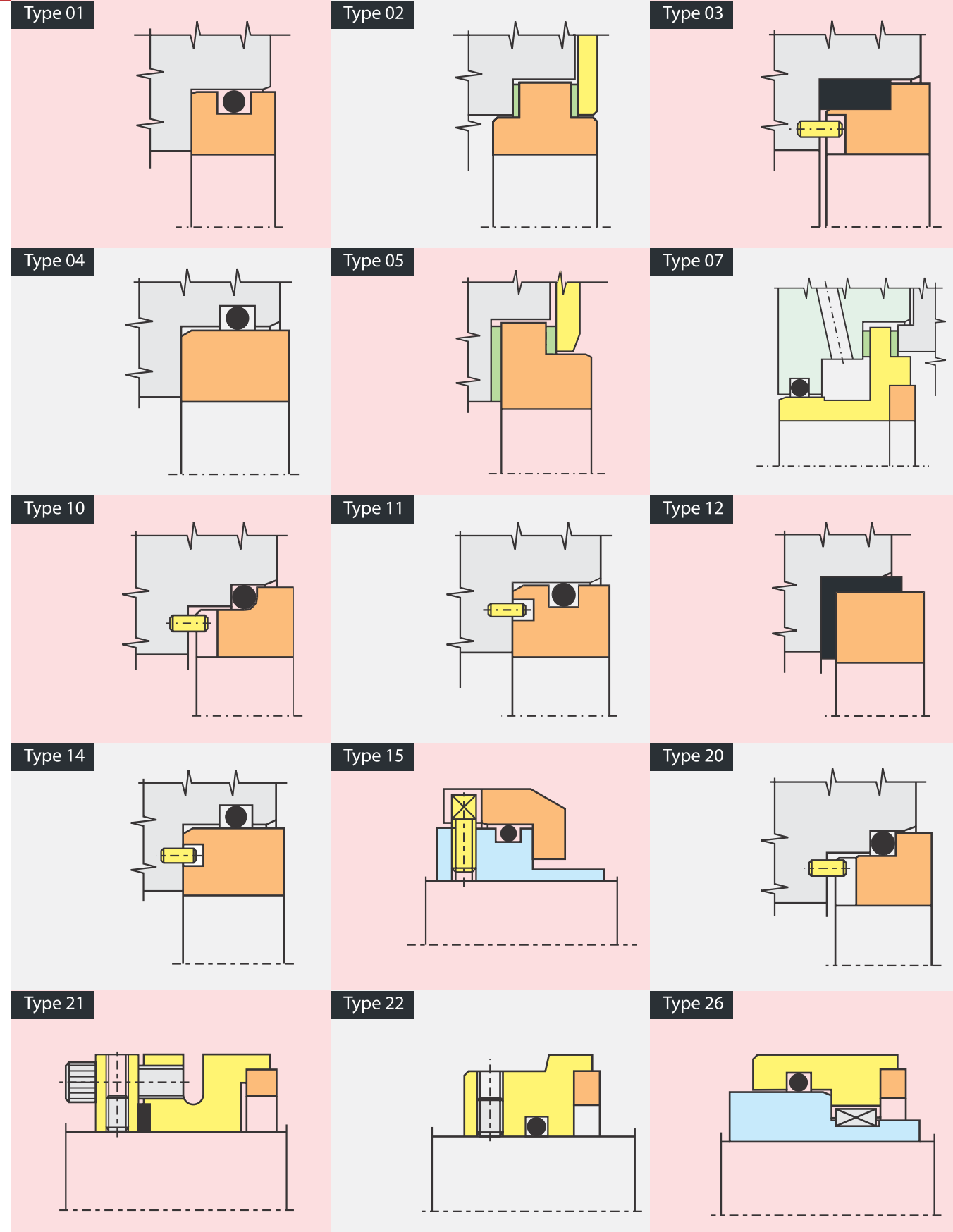
- Containment seal chamber drain for condensing leakage on arrangement 2 seal.
- Pump fluid condenses at ambient temperatures.
- Valves to be installed for operator use, relative to ground clearance and other obstructions.

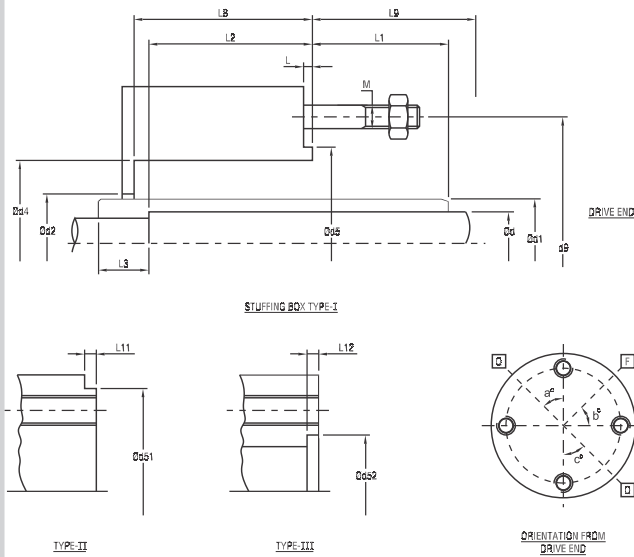


Seal Flush Plan 76

- Piping / instrument harness shall be supported from overhead structure or side stand such that no strain is put on tubing connected to seal gland.
- Containment seal chamber drain from non-condensing leakage on arrangement 2 seal.
- Pump fluid does not condense at ambient temperatures.

STANDARD MATING RING TYPES





- d - Shaft OD
d1 - Sleeve OD
d2 - Stuffing Box ID
d4 - Stuffing Box bore
d5 - Spigot dia d51 d52
d9 - Bolt Circle
M - No. of Bolts Size
L - Raised collar L11 L12
L1 - Sleeve Extention
L2 - Shaft hub
L3 - Impeller sleeve length
L8 - Stuffing Box depth
L9 - Nearest obstruction
a - b - c -
Stud holes on axis / off axis
Stuffing box cover jacketed / non jacketed

Client
Address

Pump Data

Make Bearing Bracket
Model Item/Tag No
Material of Construction Existing Seal

Operating Parameters

Total Head Suction pressure Discharge pressure Box pressure
Speed Direction of rotation (Viewed from Drive End) CW/CCW

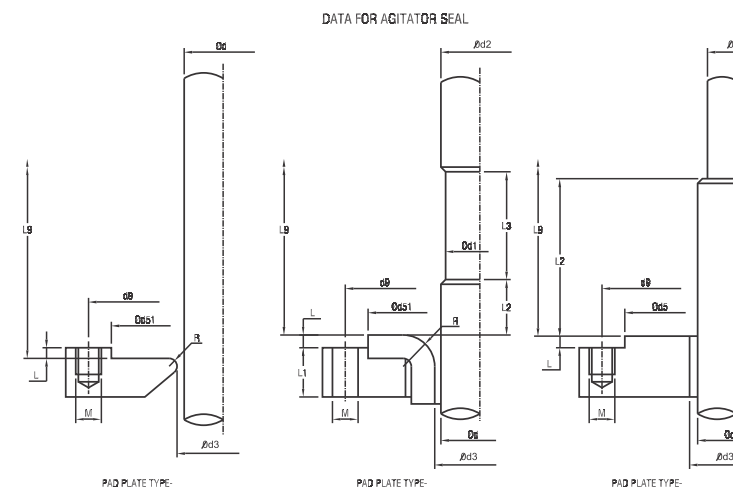
Fluid Details

Fluid
Pumping temperature Maximum temperature
Specific Gravity Viscosity
Boiling Point Freezing point
Fluid Description a. Clean b. Dirty c. Abrasive d. Slurry e. Toxic
Percentage of solids Grain Size

API Plans

- a) Whether seal flushing by external fluid acceptable? If yes, What Fluid
b) Recommended buffer fluid for double seal Temperature
c) Recommended API Plan # Plan 52 (Non Pressurised Thermosyphon) # Plan 53 (Pressurised Thermosyphon) # Plan 54 (Buffer Fluid Circulation by external pump/source) #* Plan 32 (Fluid Injection by external pump/source) #* Plan 02 (Dead ended with no circulation of buffer fluid & with cooling jacket)

Other Remarks



- d - Shaft OD
d1 - Shaft OD
d2 - Shaft OD
d3 - Pad plate ID
d5 - Spigot d51
d9 - Bolt Circle
M - No. of Bolts Size
L - Raised collar
L1 - Thickness
L2 - Shaft step from Pad
L3 - Distance between two steps
L9 - Nearest obstruction
R - Radius

Client
Address

Agitator Data

Make Model
Item / Tag No. Matl of Construction

Existing seal arrangement Gland Packing / Mechanical Seal

If mechanical seal, seal make & type
Existing mechanical seal working satisfactory Yes / No
If No, give details of seal failure in brief in remarks column.

Operating Parameters

Vessel Pressure Speed
Direction of rotation from drive end CW / CCW

Fluid Details

Fluid
Temperature Specific Gravity Viscosity
Boiling Point Freezing Point
Fluid Description a. Clean b. Dirty c. Abrasive d. Slurry e. Toxic
Percentage of solids Grain size

API Plans

- A) Recommended buffer fluid Temperature
B) Recommended API Plan # Plan 52 (Non Pressurised Thermosyphon), # Plan 53 (Pressurised Thermosyphon), # Plan 54 (Buffer Fluid Circulation by external pump/source)

Remarks



Technical Notes

TECHNICAL NOTES

Barrier Fluid

Externally supplied fluid, At a pressure above the pump seal chamber pressure.

Buffer Fluid

Externally supplied fluid, At a pressure lower than the pump seal chamber pressure.

Flush

Fluid which is introduced into the seal chamber on the process fluid side in close proximity to the sealing faces and typically used for cooling and lubricating the seal faces.

Quench

Neutral fluid, usually water or steam, introduced on the atmospheric side of the seal to retard formation of solids that may interfere with seal movement.

Flashing

Rapidly changing fluid state, from liquid to gas.

Crystallizing Fluid

Fluid which is in the process of forming solids or which may form solids due to dehydration or chemicals reaction.

Floating Bushing

Bushing that fits around the shaft or sleeve and has sufficient clearance around the outside diameter so it can move or float radially.

A spring pushes the bushing axially against a sealing surface of the housing, seal chamber, or gland plate to force the fluid to pass through the small clearance between the shaft and bushing instead of going in between the circumference of the bushing and the housing. A floating design can be used for the throat or throttle bushings. The radial float allows the diametrical clearance between the bushing ID and the shaft or sleeve OD to be very tight.

Personal notes:

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- JORDAN • INDONESIA • VENEZUELA • TURKEY • NEW-ZEALAND • SPAIN • S. AFRICA • ARGENTINA • U.K. • BANGLADESH

Manufacturing Unit



API 682 Testing Facility

