LINEPROOF®

ENGINEERING INDIA PVT. LTD.

we are loyal to our customers...

www.lineproofengg.com

About Us

Lineproof Engineering has made significant contributions in the process industry over the past 30 years. Our knowledge, skills & vast experiences have supported the company to acquire eminent position among the most reliable manufacturers of Mechanical Seals and Sealing Systems. Our legacy of 30+ years has driven us constantly to grow with the challenging needs of superior sealing technology.

We have wide range of products in mechanical seals including balanced as well as unbalanced version for pumps, compressors, blowers, reactors, vessels, agitators etc. We cater to the requirement of Pharmaceuticals & Petrochemical, Food & Beverages, Oil & Gas, Paper & Pulp, Steel Plant & Power Plant, Mining & Minerals, Marine and virtually all those industries where rotating equipment's are used.

Our profound infrastructure facility with machinery and allied tools facilitate us in meeting the complete product needs of our clients successfully. The expertise and in-depth knowledge of our team assist us in carrying out designing and manufacturing requirements.

Our Company Design incorporate many advances & Innovation over the originals and outlast these original by many times over, without compromising performance or cost effectiveness.

Being a quality caution organization, we always give profound importance to quality to ensure the best. We conduct stringent quality checks, starting from the procurement of raw materials till the delivery of the finished products and after sales customer satisfaction.

Based on our customers feedback, we were able to design & manufacture customize mechanical seals & Sealing Systems which performed equally well to the other expensive mechanical seals brands.

We have qualified and technically trained engineers in design and development as well as quality control department, engaged in continuous development to ensure the best quality and to keep the system updated to meet the changing trends of the global markets.

Our Service Commitment

We are passionate about providing world-class service experiences. Our reputation rests equally on our creative design approach, as well as our technical expertise and attention to detail to turn your visions into reality. We pride ourselves on delivering a proactive service designed to ensure we meet your needs consistently. Retaining customer base is important for any enterprise, it takes great effort to make good customer relationship and minute error can ruin it. Owing to our outstanding customer service we have maintained 80 % customer retention rate. We monitor our service performance continuously to make sure customer consistently judge us to be the benchmark within the industry.

At Lineproof we believe that it's our people that make our company what it is – and we have a great team built on a shared vision, mission, and values.

Our Values

Service: We are passionate about delivering excellent service to every customer.
Relationships: We value productive, long lasting relationships with our customers.
Teamwork: We work together to deliver great results.

Lineproof Service Promise to Customers:

Inspire their imaginations
Connect with a smile
Engage them emotionally
Grow their knowledge

Our Service Values

1. We do what we say by providing the best solution for our customers concern.
2. We listen to customer needs and concerns, and act on what they tell us.
3. We will display a passion for all we do, taking ownership and managing customer relations.
4. We offer new ideas to improve our business and customer relations.
5. We are empowered to inspire each other to delight our customers and achieve our goals.
6. We will connect with our customers through honest, focused and straightforward conversations.
7. We use every opportunity to grow our knowledge.

***We also make Custom Made Items as per the requirement of our customers.**

WHY CHOOSE US

We Want You To Be Our Next Satisfied Customer

- Technical Assesment
- Management Support System
- Designing Organization
- Quick Development
- Global Connectivity
- Quality & Reliability
- Technical Expert
- Technical Process

Industrial Applications

REFINERY

The processing of crude oil in refineries is a complex and multi-stage process in which crude oil is transformed into refined, high-quality end products or feed materials for petrochemical industry. Sealing technology for such diverse applications have to meet challenges in various respects; risk of insufficient lubrication and dry running, media with a diversity of physical properties, high and low temperature ranges and the handling of hazardous substances and all other conditions which need to be controlled with absolute reliability. With a comprehensive range of API-compliant quality seals and supply systems, Lineproof is playing a key role towards ensuring the reliability and safety of refinery processes.

Typical Applications

- Discharge Pump
- Gas Oil Pump
- GLP Delivery Pump
- Quench Oil Pump
- Residual Oil Pump

SUGAR

Sugar campaigns are over in a relatively short time. For optimum economy and ecology it is all the more important, therefore to have a reliable sealing systems. In the past it was normal for juice pumps to be equipped with double seals to cope with the tendency to crystallization and carbonation. Today the use of single seals is possible in most of the cases due to availability of modern materials and new seal compartment geometries.

Typical Applications

- Flume Water Pump
- Juice Circulating Pump
- Worm Agitator
- Mash Pump

PHARMACEUTICAL

In addition to meeting technical requirements a seal has to display many other characteristics in connection with cleanliness, health and general legislation. These include for example materials which are compatible with food, smooth and abrasion-proof surfaces which are easy to clean, complete units which can be sterilized and cleaned without having to be dismantled (SIP/CIP). Lineproof mechanical seals have been used for such demanding applications with great success in sterile processes. Our range of mechanical seals includes a broad spectrum of high-quality, specifically optimized sealing solutions ranging from standard solutions to specialized system solutions for nearly any application in the pharmaceutical industry.

Typical Applications

- Agglomerator
- Spherical Dryer
- Eccentric Pump
- Sterile Pump
- Centrifugal Pump
- Filter Dryer
- Food Pump

POWER

Sealing systems featuring maximum operational reliability, convenient maintenance and low leakage rates with necessary environmental protective measures are standard requirements in modern power stations. The product range includes mechanical seals and supply systems for auxiliary and secondary pumps, boiler circulation pumps and feedwater pumps as well as mechanical seals and carbon floating ring seals for turbines, compressors and fans.

Typical Applications

- Boiler Circulating Pump
- Feed Pump
- Flue Gas Desulphurisation
- Residue Evacuation Pump
- Condensate Pump

PAPER & PULP

Wood is the most important raw material for the pulp and paper industry. It is either digested to chemical pulp in digesters or reduced to mechanical pulp in grinders or refiners. The pulp produced this way is then graded, bleached and washed and conveyed to the paper machine. There it passes through the various stages such as head box, wire part, press section, drying section and reeling section.

Typical Applications

- Pressure Grinder
- Pulp Pump
- Digesting & Bleaching Pump
- Deinking Pump

HOT WATER

Hot water is conveyed by pumps for a variety of purposes in thermal energy generating systems, district heating systems, home heating systems and so on. The suitability of a mechanical seal for such applications depends on many different parameters, e.g. pressure to be sealed, temperature at the seal, sliding velocity, power consumption, water quality (pHvalue, O2-dose, conductivity, operating mode), water additives such as corrosion inhibitors etc.

CHEMICAL & PETROCHEMICAL

The materials used in the chemical/petrochemical industry need to be capable of coping with the large array of media, many of them explosive or toxic and others which could become when mixed. An increased awareness of environmental risks calls for a maximum reliability and operational safety, especially from sealing systems. Against this background, the sealing systems used in applications involving what are in many cases explosive, toxic or aggressive media have to ensure optimum tightness. On the other hand they should also help optimize processes and thus be of advantage where the economic aspects are concerned as well. From non-critical sealing points – for which standard solutions are deployed – right through to highly complex system solutions required where particularly difficult operating conditions are concerned.

Typical Applications

- Agitator Bead Mill
- Chemical Pump
- Eccentric Screw Pump
- Gear Pump
- Glass Lined Reactor
- Thin Film Evaporator
- Centrifuge
- Chemical Reactor

QUARRYING & COIL MINING

The cutter heads on quarrying and mining machines are fed with water, not only for cooling purposes but also for settling the dust and extinguishing any sparks produced by the cutting tools. Mechanical Seals perform the dual function of a rotary joint and a seal for the cutter and roller heads. Sealing systems used on these equipment are exposed to abrasive and chemically aggressive media. In some applications, high temperature and pressure make conditions even more challenging. Despite the harsh operating environment, users expect high reliability to avoid costly downtime.

Typical Applications

- Cutter Head Seal
- Mining Machine
- Roller Head Seal
- Rotary Joint For Carbide Cutter

ONSHORE

To be able to cope with sand, water and gases found in crude oil, pumping systems for mineral oil require heavy duty pumps with reliable engineered mechanical seals that feature durable sliding faces with good emergency running characteristics. Often it is necessary to seal pressures in excess of 100 bar and sliding velocities of over 60 m/s. The ideal seal face combination for such conditions have proven to be high-strength carbons running against silicon carbide.

Typical Applications

- Crude Oil Pump
- Pipeline Pump
- Water Injection Pump

OFFSHORE

Adverse environmental conditions, high rotational speed and pressure levels as well as corrosive media constituents place demanding requirements on sealing technology used in the offshore production and subsequent conveyance of oil and gas. Not only that but in many cases highly abrasive mixtures of crude oil, water, gas and sand cause a high degree of wear. Lineproof has proven itself with its heavy-duty mechanical seals with innovative and tailor made seal components with high-strength seal faces , guaranteeing longer service life even in highly stressed pumps.

Typical Applications

- Main Oil Export Pump
- Multiphase Pump
- Water Injection Pump

COMPRESSORS

High speed machines whose trouble free availability constitutes a major precondition for many process engineering operations. Key criteria for the selection and design of compressors are the working medium, the compression ratio, the volume flow, the number of intermediate inputs & outputs and the design of the shaft seal which assumes critical importance.

Typical Applications

- Ammonia Compressor
- CO Compressor
- Oven Gas Compressor
- Ethylene Compressor
- Flash Turbine
- Screw Compressor

COAL GASIFICATION

There were times, particularly during the oil-crisis years, when coal gasification centered on the process of hydrogenation, e.g. to produce motor fuels. Nowadays the driving force behind its further development is the generation of electricity by combination-type power stations with integrated coal gasification. Here the main objectives are to lower Co2 emissions, to raise fuel efficiency and to stretch existing resources.

Typical Applications

- Coal Feed Screw

Certificate of Compliance

We hereby declare that the technical file of product complied with the requirement of Directive Machinery Directive 2006/42/EEC.

Manufactured by:

LINE PROOF ENGINEERING

PLOT NO. 17, SETHIA INDUSTRIAL PARK, VASAI PHATA, SURVEY NO. 20, VASAI EAST -401208, MAHARASHTRA, INDIA

Products: More Details As Per Annexure No. 1

Certificate No. : 9513/CE/R001

Certificate of Compliance

Annexure – No. 1 to Certificate No. : 9513/CE/R001

Manufacturer by:

LINE PROOF ENGINEERING

PLOT NO. 17, SETHIA INDUSTRIAL PARK, VASAI PHATA, SURVEY NO. 20, VASAI EAST -401208, MAHARASHTRA, INDIA

BRAND NAME : LINEPROOF ENGINEERING

This certificates referred to above covers the following products:

VARRIOUS TYPES OF SEAL & VARIENTS

- ENGINEERING & MECHANICAL SEALS
- SINGLE SPRING SEAL
- CONICAL SPRING SEAL
- MULTI SPRING SEAL
- CARBON FLOATING SEAL
- WAVE SPRING SEAL
- CARTRIDGE SEAL
- RUBBER BELLOW SEAL
- TEFLON BELLOW SEAL
- SPLIT SEAL
- DRY SEAL
- DRY RUNNING SEAL
- AGITATOR SEAL
- SINGLE CARTRIDGE SEAL
- METAL BELLOW SEAL

Certificate of Compliance

This is to certify that

LINE PROOF ENGINEERING

PLOT NO. 17, SETHIA INDUSTRIAL PARK, VASAI PHATA, SURVEY NO. 20, VASAI EAST - 401208, MAHARASHTRA, INDIA

has been independently assessed by IPQC and is compliant with the requirements of "Good Manufacturing Practice"

GMP

Good Manufacturing Practice

For the following scope :

MANUFACTURING & SUPPLY OF MECHANICAL SHAFTS SEAL & COMPONENTS

CERTIFICATE NO.: 21775/GMP/23

Certificate of Registration

This is to certify that

LINE PROOF ENGINEERING

PLOT NO. 17, SETHIA INDUSTRIAL PARK, VASAI PHATA, SURVEY NO. 39, VASAI EAST -401208, MAHARASHTRA, INDIA

has been independently assessed by QRO and is compliant with the requirement of:

ISO 14001:2015

Environmental Management System

For the following scope of activities:

MANUFACTURER & SUPPLIER OF MECHANICAL SHAFTS SEAL & OTHER COMPONENTS

Date of Certification: 4th January 2025
1st Surveillance Audit Due: 3rd January 2026
2nd Surveillance Audit Due: 3rd January 2027
Certificate Expiry: 3rd January 2028

Certificate Number: 305024020240

Certificate of Registration

This is to certify that

LINE PROOF ENGINEERING

PLOT NO. 17, SETHIA INDUSTRIAL PARK, VASAI PHATA, SURVEY NO. 39, VASAI EAST -401208, MAHARASHTRA, INDIA

has been independently assessed by QRO and is compliant with the requirement of:

ISO 45001:2018

Occupational Health and Safety Management System

For the following scope of activities:

MANUFACTURER & SUPPLIER OF MECHANICAL SHAFTS SEAL & OTHER COMPONENTS

Date of Certification: 2nd February 2024
1st Surveillance Audit Due: 1st February 2025
2nd Surveillance Audit Due: 1st February 2026
Certificate Expiry: 1st February 2027

Certificate Number: 305024020240

Certificate of Registration

This is to certify that

LINE PROOF ENGINEERING

PLOT NO. 17, SETHIA INDUSTRIAL PARK, VASAI PHATA, SURVEY NO. 39, VASAI EAST -401208, MAHARASHTRA, INDIA

has been independently assessed by QRO and is compliant with the requirement of:

ISO 9001:2015

Quality Management System

For the following scope of activities:

MANUFACTURER & SUPPLIER OF MECHANICAL SHAFTS SEAL & OTHER COMPONENTS

Date of Certification: 4th January 2025
1st Surveillance Audit Due: 3rd January 2026
2nd Surveillance Audit Due: 3rd January 2027
Certificate Expiry: 3rd January 2028

Certificate Number: Draft

Where quality matters think about **LINEPROOF**

INDEX

Product List	Page No.

Series LP10U & LP15U

STANDARD STYLE

FACE MATERIAL

Carbon, ceramic,
Silcon Carbide, Tungsten Carbide, Lecrolloy

METAL PARTS

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

SECONDARY SEAL

FKM, FFKM, EPDM, NBR, PTFE.

APPLICATION

Petrochemicals
Petroleum refinery
General chemicals
Light hydrocarbons

SEAL CHARACTERISTICS

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

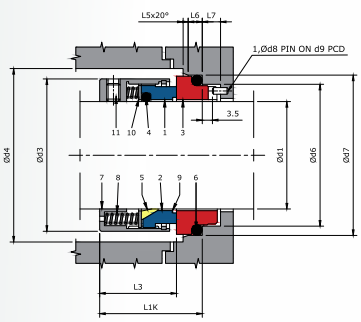
OPERATING LIMIT

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

SHRINK FIT ARRANGMENT

Temperature Limits:

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



PART NO.	DESCRIPTION
1	SEAL RING
2	SEAL RING
3	MATING RING
4	O-RING
5	WEDGE
6	O-RING
7	RETAINER
8	SPRING
9	SNAP RING
10	THRUST RING
11	GRUB SCREW

SERIES LP20 & LP21

STANDARD STYLE

FACE MATERIAL

Carbon, ceramic,
Silcon Carbide, Tungsten Carbide, Lecrolloy

METAL PARTS

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

SECONDARY SEAL

FKM, FFKM, EPDM, NBR, PTFE.

APPLICATION

Petrochemicals
Petroleum refinery
General chemicals
Light hydrocarbons

SEAL CHARACTERISTICS

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

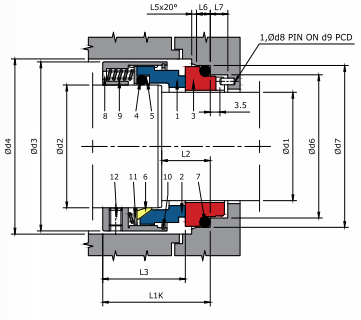
OPERATING LIMIT

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

SHRINK FIT ARRANGMENT

Temperature Limits:

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



PART NO.	DESCRIPTION
1	SEAL RING
2	SEAL RING
3	MATING RING
4	O-RING
5	BACK-UP RING
6	WEDGE
7	O-RING
8	RETAINER
9	SPRING
10	SNAP RING
11	THRUST RING
12	GRUB SCREW

SERIES LP30 & LP35U

STANDARD STYLE

FACE MATERIAL

Carbon, ceramic,
Silcon Carbide, Tungsten Carbide, Lecrolloy

METAL PARTS

SS 316, SS 304,

SECONDARY SEAL

LP30U : Elastomers
LP35U : PTFE, GFT

APPLICATION

Petrochemicals
Petroleum refinery
General chemicals
Light hydrocarbons

SEAL CHARACTERISTICS

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

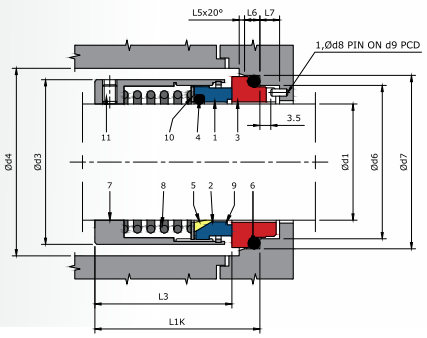
OPERATING LIMIT

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

SHRINK FIT ARRANGMENT

Temperature Limits:

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



PART NO.	DESCRIPTION
1	SEAL RING
2	SEAL RING
3	MATING RING
4	O-RING
5	WEDGE
6	O-RING
7	RETAINER
8	SPRING
9	SNAP RING
10	THRUST RING
11	GRUB SCREW

SERIES LP40 & LP41

STANDARD STYLE

FACE MATERIAL

Carbon, ceramic,
Silcon Carbide, Tungsten Carbide, Lecrolloy

METAL PARTS

SS 316, SS 304,

SECONDARY SEAL

LP40 : Elastomers
LP41 : PTFE, GFT

APPLICATION

Petrochemicals
Petroleum refinery
General chemicals
Light hydrocarbons

SEAL CHARACTERISTICS

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

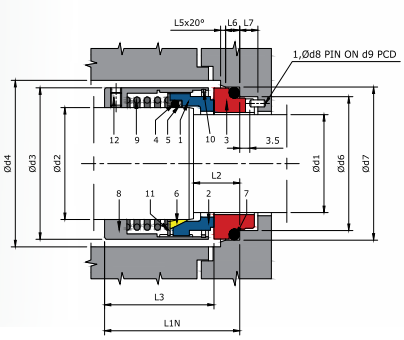
OPERATING LIMIT

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

SHRINK FIT ARRANGMENT

Temperature Limits:

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



PART NO.	DESCRIPTION
1	SEAL RING
2	SEAL RING
3	MATING RING
4	O-RING
5	BACK-UP RING
6	WEDGE
7	O-RING
8	RETAINER
9	SPRING
10	SNAP RING
11	THRUST RING
12	GRUB SCREW

SERIES LP60 & LP62R

STANDARD STYLE

FACE MATERIAL

LP60 : GFT / Ceramic
LP62R : GFT / Ceramic
Silicon Carbide / Ceramic
Carbon / Ceramic
Silicon Carbide / Silicon Carbide

METAL PARTS

SS 316, SS 304 Hastelloy-c

SPRING

Hastelloy-c

SECONDARY SEAL

PTFE Bellows

APPLICATION

Extremely corrosive services

SEAL CHARACTERISTICS

Single acting
Outside mounted
Independent of direction of rotation

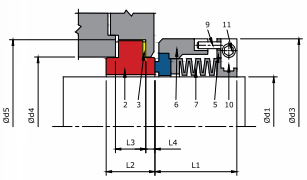
OPERATING LIMIT

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

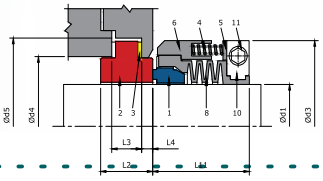
LP60

LP62R

LP60



LP62R



PART NO.	DESCRIPTION
1	SEAL RING
2	MATING RING
3	GASKET
4	SPRING
5	THRUST RING
6	SPRING HOLDER
7	BELLOWS
8	BELLOWS
9	DRIVE PIN
10	CLAMP RING
11	ALLEN SCREW

SERIES LPE80 & LPE85

STANDARD STYLE

FACE MATERIAL

Carbon, ceramic,
Silcon Carbide, Tungsten Carbide, Lecrolloy

METAL PARTS

SS 316, SS 304,

SECONDARY SEAL

LPE 80 : PTFE, GFT
LPE 85 : Elastomers

APPLICATION

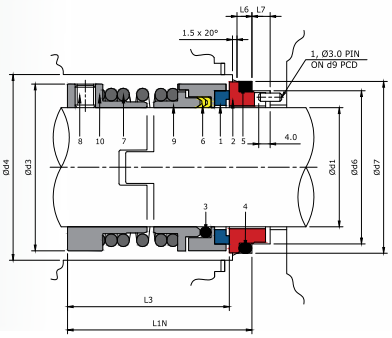
Crystallizing Slurry
Suspended Solids Slurry
Saturated Chemical Slurry
General Chemicals Slurry

SEAL CHARACTERISTICS

Single acting
Unbalanced
Inside mounted
Independent of direction of rotation
Universal chemical compatability due to PTFE elastomer

OPERATING LIMIT

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



PART NO.	DESCRIPTION
1	SEAL RING
2	MATING RING
3	O-RING
4	O-RING
5	M RING PACKING
6	V-PACKING
7	SPRING
8	GRUB SCREW
9	SPRING HOLDER
10	DRIVE COLLAR

SERIES LP83N

STANDARD STYLE

FACE MATERIAL

Carbon graphite

METAL PARTS

SS 316, SS 304,

SECONDARY SEAL

EPDM, NBR, FKM, FFKM

APPLICATION

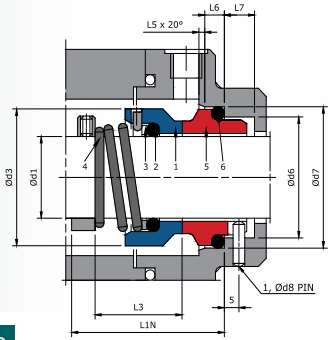
- Chemical industry
- Pulp and paper industry
- Water and waste water technology
- Building services industry
- Food and beverage industry
- Sugar industry
- Low solids content media
- Water and sewage water pumps
- Submersible pumps
- Chemical standard pumps
- Eccentric screw pumps
- Cooling water pumps
- Basic sterile applications

SEAL CHARACTERISTICS

- For plain shafts
- Single seal
- Unbalanced
- Rotating conical spring
- Dependent on direction of rotation

OPERATING LIMIT

Shaft Diameter	d1 : 6mm...80mm
Pressure	p : 10 bar (max)
Temperature	t : -20 + 140°C
Velocity	v : 15 m/sec



PART NO.	DESCRIPTION
1	SEAL FACE
2	O-RING
3	THRUST RING
4	RIGHT HAND SPRING LEFT HAND SPRING
5	SEAT
6	O-RING

SERIES LP87N

STANDARD STYLE

FACE MATERIAL

Silicon carbide, Carbon graphite

METAL PARTS

SS 316, SS 304, Duplex 2205

SECONDARY SEAL

EPDM, NBR, FKM, FFKM

APPLICATION

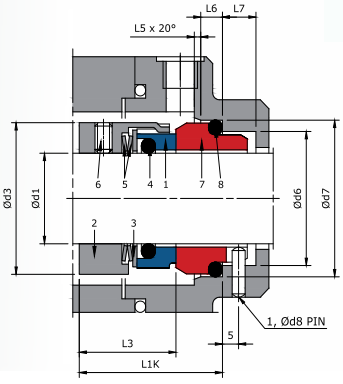
- Process industry
- Chemical industry
- Pulp and paper industry
- Water and waste water technology
- Shipbuilding
- Food and beverage industry
- Lube oils
- Low solids content media
- Water / sewage water pumps
- Chemical standard pumps
- Vertical screw pumps
- Gear wheel feed pumps
- Multistage pumps (drive side)
- Circulation of printing colors with viscosity
- 500 … 15,000 mm2/s

SEAL CHARACTERISTICS

- For plain shafts
- Single seal
- Unbalanced
- Super-Sinus-spring or multiple springs rotating
- Independent on direction of rotation
- Pumping screw for media with higher viscosity
- Variant with PTFE secondary seals for high chemical resistance

OPERATING LIMIT

Shaft Diameter	d1 : 14mm...100mm
Pressure	p : 25 bar (max)
Temperature	t : -50 + 220°C
Velocity	v : 20 m/sec



PART NO.	DESCRIPTION
1	SEAL FACE
2	DRIVE COLLAR
3	THRUST RING
4	O-RING
5	SPRING
6	SET SCREW
7	SEAT
8	O-RING

SERIES LP89HN

STANDARD STYLE

FACE MATERIAL

Carbon graphite
Silcon Carbide, Aluminium oxide

METAL PARTS

SS 316, SS 304,Duplex

SECONDARY SEAL

EPDM, NBR, FKM, FFKM

APPLICATION

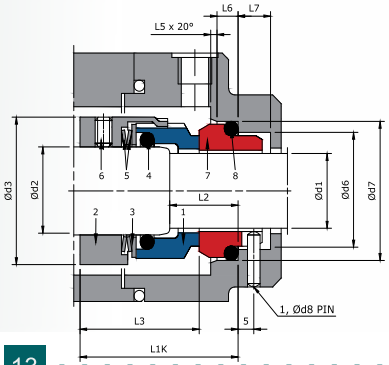
- Process industry
- Oil and gas industry
- Refining technology
- Petrochemical industry
- Chemical industry
- Power plant technology
- Pulp and paper industry
- Food and beverage industry
- Hot water applications
- Light hydrocarbons
- Boiler feed pumps
- Process pumps

SEAL CHARACTERISTICS

- For stepped shafts
- Single seal
- Balanced
- Super-Sinus-spring or multiple springs rotating
- Independent of direction of rotation
- Integrated pumping device available
- Variant with seat cooling available

OPERATING LIMIT

Shaft Diameter	d1	: 14mm...100mm
Pressure	p	: 10 bar (max)
Temperature	t	: -50 + 220°C
Velocity	v	: 20 m/sec



PART NO.	DESCRIPTION
1	SEAL FACE
2	DRIVE COLLAR
3	THRUST RING
4	O-RING
5	SPRING
6	SET SCREW
7	SEAT
8	O-RING

SERIES LP90D

STANDARD STYLE

FACE MATERIAL

Silicon carbide, Carbon graphite

METAL PARTS

SS 316, SS 304,

SECONDARY SEAL

EPDM, NBR, FKM, FFKM

APPLICATION

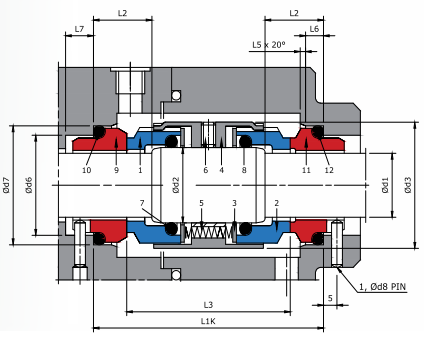
- Process industry
- Oil and gas industry
- Refining technology
- Petrochemical industry
- Chemical industry
- Pulp and paper industry
- Power plant technology
- Low solids content and low abrasive media
- Toxic and hazardous media
- Media with poor lubrication properties
- Adhesives
- Chemical standard pumps

SEAL CHARACTERISTICS

- For stepped shafts
- Dual seal
- Balanced
- Rotating multiple springs
- Independent of direction of rotation
- Seal concept based on the H7 range
- Variant with pumping screw available (H74F-D)

OPERATING LIMIT

Shaft Diameter	d1	: 14mm...100mm
Pressure	p	: 25 bar
Temperature	t	: -50 + 220°C
Velocity	v	: 20 m/sec



PART NO.	DESCRIPTION
1	SEAL FACE
2	SEAL FACE
3	THRUST RING
4	DRIVE COLLAR
5	SPRING
6	SET SCREW
7	O-RING
8	O-RING
9	SEAT
10	O-RING
11	SEAT
12	O-RING

SERIES LP92RN

STANDARD STYLE

FACE MATERIAL
Silicon carbide, Carbon graphite

METAL PARTS
SS 316, SS 304,

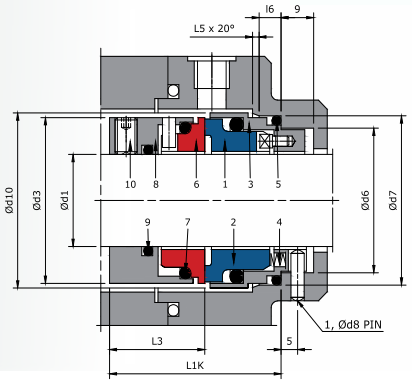
SECONDARY SEAL
EPDM, NBR, FKM, FFKM

APPLICATION
- Pulp and paper industry
- Water and waste water technology
- Dirty, abrasive and solid containing media
- Fugitive hydrocarbons (no API seal!)
- Sticky and stringy media
- Chemical standard pumps
- Sewage pumps

SEAL CHARACTERISTICS
- Single seal
- Balanced
- Independent of direction of rotation
- Stationary springs
- Dual seals in tandem as well as back-to-back arrangements (also in combination with H10 seal)

OPERATING LIMIT

Shaft Diameter	d1 : 18mm...100mm
Pressure	p : 25 bar
Temperature	t : -40 +220°C
Velocity	v : 20 m/sec



PART NO.	DESCRIPTION
1	SEAL RING
2	O-RING
3	RETAINER
4	SPRING
5	O-RING
6	SEAT
7	O-RING
8	DRIVE COLLAR
9	O-RING
10	SET SCREW

SERIES LP92N

STANDARD STYLE

FACE MATERIAL
Silicon carbide, Carbon graphite

METAL PARTS
SS 316, SS 304,

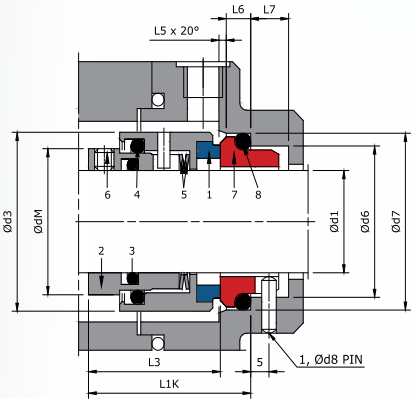
SECONDARY SEAL
EPDM, NBR, FKM, FFKM

APPLICATION
- Pharmaceutical industry
- Power plant technology
- Pulp and paper industry
- Water and waste water technology
- Mining industry
- Food and beverage industry
- Sugar industry
- Contaminated, abrasive and solids containing media
- Thick juice (70 … 75 % sugar content)
- Raw sludge, sewage slurries
- Raw sludge pumps
- Thick juice pumps
- Conveying and bottling of dairy products

SEAL CHARACTERISTICS
- For unstepped shafts
- Single seal
- Balanced
- Independent of direction of rotation
- Encapsulated rotating spring

OPERATING LIMIT

Shaft Diameter	d1 : 18mm...100mm
Pressure	p : 25 bar
Temperature	t : -50 +220°
Velocity	v : 20 m/sec



PART NO.	DESCRIPTION
1	SEAL FACE
2	DRIVE COLLAR
3	O-RING
4	O-RING
5	SPRING
6	SET SCREW
7	SEAT
8	O-RING

SERIES LP98N

STANDARD STYLE

FACE MATERIAL

Silicon carbide, Carbon graphite

METAL PARTS

SS 316, SS 304,

SECONDARY SEAL

EPDM, NBR, FKM, FFKM

APPLICATION

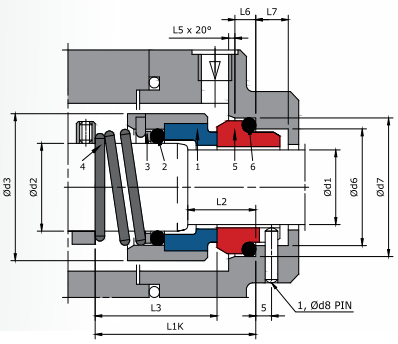
- Chemical industry
- Pulp and paper industry
- Water and waste water technology
- Low solids content media (H17GN)
- Hot water
- Chemical standard pumps
- Water and sewage pumps

SEAL CHARACTERISTICS

- For Stepped shafts
- Single seal
- Balanced
- Dependent of direction of rotation
- Torque transmission via conical spring

OPERATING LIMIT

Shaft Diameter	d1	: 10mm...80mm
Pressure	p	: 25 bar
Temperature	t	: -50 +220°C
Velocity	v	: 15 m/sec



PART NO.	DESCRIPTION
1	SEAL FACE
2	O-RING
3	THRUST RING
4	RIGHT HAND SPRING LEFT HAND SPRING
5	SEAT
6	O-RING

SERIES LP100

STANDARD STYLE

FACE MATERIAL

Carbon graphite, Silicon carbide

METAL PARTS

SS 316, SS 304, Duplex
Bellows: Inconel 625

SECONDARY SEAL

FKM

APPLICATION

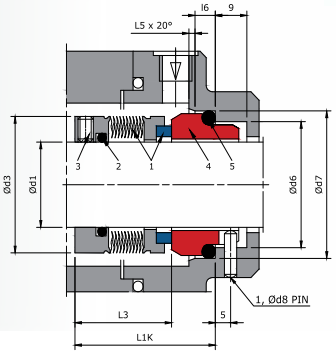
- Process industry
- Refining technology
- Petrochemical industry
- Chemical industry
- Hot media
- Cold media
- Highly viscous media
- Pumps
- Special rotating equipment

SEAL CHARACTERISTICS

- For unstepped shafts
- Rotating bellows
- Single seal
- Balanced
- Independent of direction of rotation

OPERATING LIMIT

Shaft Diameter	d1	: 20mm...100mm
Pressure	p	: 25 bar
Temperature	t	: -40 +220°C
Velocity	v	: 20 m/sec



PART NO.	DESCRIPTION
1	SEAL FACE WITH BELLOW UNIT
2	O-RING
3	SET SCREW
4	SEAT
5	O-RING

SERIES LP101

STANDARD STYLE

FACE MATERIAL

Carbon graphite antimony impregnated,
Silicon carbide

METAL PARTS

SS 316, SS 304, Duplex
Bellows: Inconel 718

SECONDARY SEAL

FKM

APPLICATION

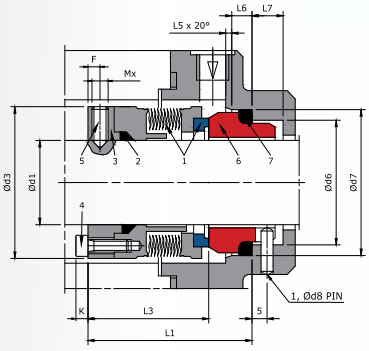
- Process industry
- Oil and gas industry
- Refining technology
- Petrochemical industry
- Chemical industry
- Pulp and paper industry
- Hot media
- Highly viscous media
- Pumps
- Special rotating equipment

SEAL CHARACTERISTICS

- For unstepped shafts
- Rotating bellows
- Single seal
- Balanced
- Independent of direction of rotation
- Metal bellows

OPERATING LIMIT

Shaft Diameter	d1	: 16mm...100mm
Pressure	p	: 25 bar
Temperature	t	: -20 +400°C
Velocity	v	: 20 m/sec



PART NO.	DESCRIPTION
1	SEAL FACE WITH BELLOW UNIT
2	SEALING RING
3	DRIVE COLLAR
4	HSH CAP SCREW
5	SET SCREW
6	SEAT
7	SEALING RING

SERIES LP200

STANDARD STYLE

FACE MATERIAL

Silicon carbide, Carbon graphite

METAL PARTS

SS 316, SS 304,

SECONDARY SEAL

EPDM, NBR, FKM, FFKM

SEAL CHARACTERISTICS

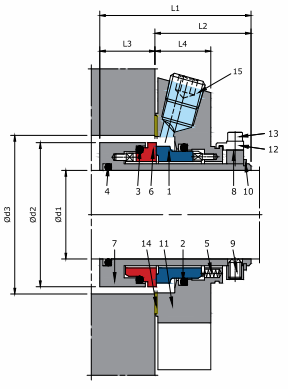
- Single seal
- Cartridge
- Balanced
- Independent of direction of rotation
- Single seals without connections (-SNO), with flush (-SN) and with quench combined with lip seal (-QN) or throttle ring (-TN)
- Additional variants available for ANSI pumps (e. g.-ABPN) and eccentric screw pumps (-Vario)

APPLICATION

- Process industry
- Petrochemical industry
- Chemical industry
- Pharmaceutical industry
- Power plant technology
- Pulp and paper industry
- Water and waste water technology
- Mining industry
- Food and beverage industry
- Sugar industry
- Universally applicable
- Centrifugal pumps
- Eccentric screw pumps
- Process pumps

OPERATING LIMIT

Shaft Diameter	d1	: 25mm...100mm
Pressure	p	: 25 bar
Temperature	t	: -40 +220°C
Velocity	v	: 16 m/sec



PART NO.	DESCRIPTION
1	SEAL RING
2	O-RING
3	O-RING
4	O-RING
5	SPRING
6	SEAT
7	SHAFT SLEEVE
8	DRIVE COLLAR
9	SET SCREW
10	SNAP RING
11	HOUSING
12	ASSEMBLY FIXTURE
13	SCREW
14	GASKET
15	SCREW PLUG
16	LIP SEAL (-QN), THROTTLE RING (-TN)

SERIES LP201

STANDARD STYLE

FACE MATERIAL

Silicon carbide, graphite resin impregnated, Tungsten carbide

METAL PARTS

SS 316, SS 304,

SECONDARY SEAL

EPDM, FKM, FFKM, PTFE

SEAL CHARACTERISTICS

- Dual seal
- Cartridge
- Balanced
- Independent of direction of rotation
- Double pressure balanced
- Integrated pumping device
- Variant for eccentric screw pumps available (-Vario)

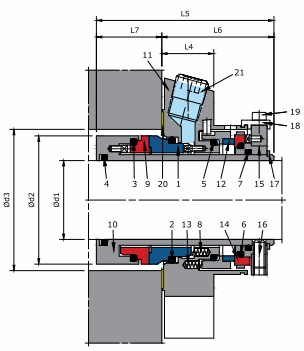
APPLICATION

- Petrochemical industry
- Chemical industry
- Pharmaceutical industry
- Power plant technology
- Pulp and paper industry
- Mining industry
- Food and beverage industry
- Sugar industry
- Centrifugal pumps
- Eccentric screw pumps
- Universally applicable

OPERATING LIMIT

Shaft Diameter	d1 : 25mm...100mm
Pressure	p : 25 bar
Temperature	t : -40 +220°C
Velocity	v : 16 m/sec

PART NO.	DESCRIPTION
1	SEAL FACE
2	O-RING
3	O-RING
4	O-RING
5	O-RING
6	O-RING
7	O-RING
8	SPRING
9	SEAT
10	SHAFT SLEEVE
11	COVER
12	SEAL FACE
13	SPRING
14	SEAT
15	DRIVE COLLAR
16	SET SCREW
17	SNAP RING
18	ASSEMBLY FIXTURE (REMOVE AFTER INSTALLATION)
19	HSH CAP SCREW
20	GASKET
21	SCREW PLUG



SERIES ANSI LP300

STANDARD STYLE

FACE MATERIAL

Silicon carbide, Carbon graphite resin impregnated, Tungsten carbide

METAL PARTS

SS 316, SS 304,

SECONDARY SEAL

EPDM, FKM, FFKM, PTFE

SEAL CHARACTERISTICS

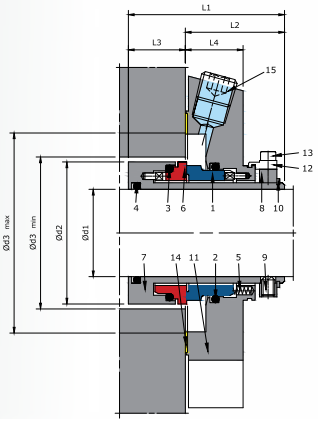
- Single seal
- Available for standard (LP300-ASPN) and big bore (LP300-ABPN) seal chambers
- Cartridge
- Balanced
- Independent of direction of rotation
- Single seals with flush (-ASPN, -ABPN) and with quench combined with lip seal (-ASQN, -ABQN) or throttle ring (-ASTN, -ABTN)

APPLICATION

Shaft Diameter	d1 : 1.000" ... 3.750"
Pressure	p : 25 bar
Temperature	t : -40 +220°C
Velocity	v : 16 m/sec

OPERATING LIMIT

- Process industry
- Petrochemical industry
- Chemical industry
- Pharmaceutical industry
- Power plant technology
- Pulp and paper industry
- Water and waste water technology
- Mining industry
- Food and beverage industry
- Universally applicable
- ANSI process pumps



PART NO.	DESCRIPTION
1	SEAL FACE
2	O-RING
3	O-RING
4	O-RING
5	SPRING
6	SEAT
7	SHAFT SLEEVE
8	DRIVE COLLAR
9	SET SCREW
10	SNAP RING
11	COVER
12	ASSEMBLY FIXTURE
13	SCREW
14	GASKET
15	SCREW PLUG
16	LIP SEAL (-QN) THROTTLE RING (-TN)

SERIES ANSI LP301

STANDARD STYLE

FACE MATERIAL

Silicon carbide, Carbon graphite resin impregnated, Tungsten carbide

METAL PARTS

SS 316, SS 304,

SECONDARY SEAL

FKM, EPDM, FFKM, PTFE

SEAL CHARACTERISTICS

- Cartridge
- Balanced
- Independent of direction of rotation
- Stationary multiple springs
- Springs and pin located on the atmospheric side

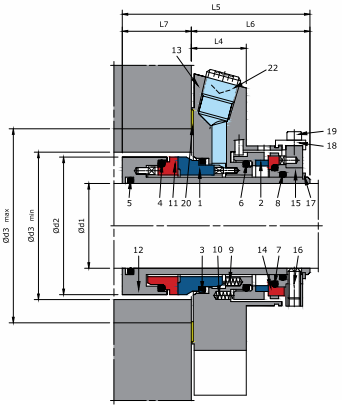
APPLICATION

- Process industry
- Petrochemical industry
- Chemical industry
- Pharmaceutical industry
- Power plant technology
- Pulp and paper industry
- Water and waste water technology
- Mining industry
- Food and beverage industry
- Universally applicable
- ANSI process pumps

OPERATING LIMIT

Shaft Diameter	d1	: 1.000" ... 3.750"
Pressure	p	: 25 bar
Temperature	t	: -40 +220°C
Velocity	v	: 16 m/sec

PART NO.	DESCRIPTION
1	SEAL FACE
2	SEAL FACE
3	O-RING
4	O-RING
5	O-RING
6	O-RING
7	O-RING
8	O-RING
9	SPRING
10	SPRING
11	SEAT
12	SHAFT SLEEVE
13	COVER
14	SEAT
15	DRIVE COLLAR
16	SET SCREW
17	SNAP RING
18	ASSEMBLY FIXTURE
19	HSH CAP SCREW
20	GASKET
21	GASKET
22	SCREW PLUG



SERIES LP305

STANDARD STYLE

FACE MATERIAL

Carbon graphite resin impregnated, Silicon carbide

METAL PARTS

SS 316, SS 304,

SECONDARY SEAL

FKM, EPDM

SEAL CHARACTERISTICS

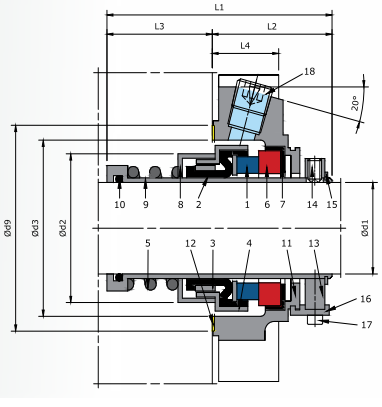
- Single cartridge seal
- Elastomer bellows
- Unbalanced
- Independent of direction of rotation
- Stationary seat, rotating spring
- Bellows and spring free from torsion
- Metric and inch sizes available

APPLICATION

- Chemical industry
- Pulp and paper industry
- Water and waste water technology
- Cold and hot water
- Cooling fluids
- Beverages
- Diluted lyes and acids
- Suspensions with low solids content
- Circulating pumps
- Water and waste water pumps
- Production of pressure oils for bio diesel fuels

OPERATING LIMIT

Shaft Diameter	d1	: 25mm...75mm
Pressure	p	: 12 bar
Temperature	t	: -20 +140°C
Velocity	v	: 10 m/sec



PART NO.	DESCRIPTION
1	SEAL FACE
2	BELLOWS
3	DRIVE COLLAR
4	"L"-RING (SPRING COLLAR
5	SPRING
6	SEAT
7	O-RING OR CORNER SLEEVE
8	SPACER RING
9	SHAFT SLEEVE
10	O-RING
11	COVER
12	GASKET
13	DRIVE COLLAR
14	SET SCREW
15	SNAP RING
16	ASSEMBLY FITURE
17	HSH CAP SCREW
18	SCREW PLUG

SERIES LP320

STANDARD STYLE

FACE MATERIAL

Carbon graphite resin impregnated,
Silicon carbide

METAL PARTS

SS 316, SS 304,Duplex
Bellows: Inconel 718

SECONDARY SEAL

FKM, EPDM, FFKM, PTFE

SEAL CHARACTERISTICS

- Single seal
- Cartridge
- Balanced
- Independent of direction of rotation
- Metal bellows
- Single seal with quench and lip seal (-QN) or throttle ring (-TN)
- Version available with multipoint injection ring (-QNM, -TNM)
- Supply connections for flush (A) and quench (B)

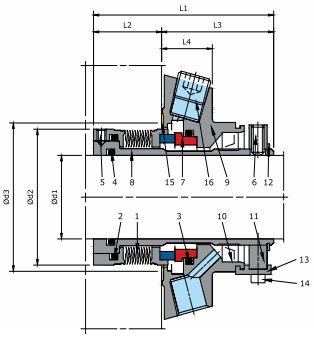
APPLICATION

- Process industry
- Chemical industry
- Hot media
- Cold media
- Highly viscous media
- Pumps
- Special rotating equipment

OPERATING LIMIT

Shaft Diameter	d1	: 25mm...80mm
Pressure	p	: 25 bar
Temperature	t	: -40 +220°C
Velocity	v	: 20 m/sec

PART NO.	DESCRIPTION
1	BELLOW UNIT
2	O-RING
3	O-RING
4	O-RING
5	SET SCREW
6	SET SCREW
7	SEAT
8	SHAFT SLEEVE
9	COVER
10	LIP SEAL OR THROTTLE RING
11	DRIVE COLLAR
12	SNAP RING
13	ASSEMBLY FIXTURE
14	HSH CAP SCREW
15	GASKET
16	SCREW PLUG



SERIES LPM322

STANDARD STYLE

FACE MATERIAL

Carbon graphite, Silicon carbide,
Tungsten carbide

METAL PARTS

SS 316, SS 304, Duplex
Bellows: Inconel 718

SECONDARY SEAL

FPM, EPDM, FFKM

SEAL CHARACTERISTICS

- Double seal
- Mtex-DN: API Plan 52 (53/54)
- Mtex9-DN: API Plan 53/54
- Cartridge
- Balanced
- Independent of direction of rotation
- Metal bellows
- Stationary O-Ring
- Pumping device independent of direction of rotation

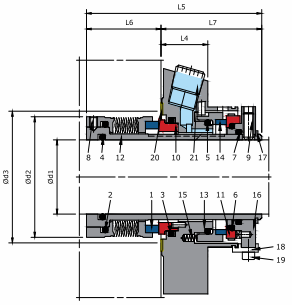
APPLICATION

- Process industry
- Chemical industry
- Hot media
- Cold media
- Highly viscous media
- Pumps
- Special rotating equipment

OPERATING LIMIT

Shaft Diameter	d1	: 25mm...80mm
Pressure	p	: 25 bar
Temperature	t	: -40 +220°C
Velocity	v	: 20 m/sec

PART NO.	DESCRIPTION
1	BELLOW UNIT
2	O-RING
3	O-RING
4	O-RING
5	O-RING
6	O-RING
7	O-RING
8	SET SCREW
9	SET SCREW
10	SEAT
11	SEAT
12	SHAFT SLEEVE
13	HOUSING
14	SEAL FACE
15	SPRING
16	DRIVE COLLAR
17	SNAP RING
18	ASSEMBLY FIXTURE
19	HSH CAP SCREW
20	GASKET
21	SCREW PLUG



SERIES LP330

STANDARD STYLE

FACE MATERIAL

Blister resistant carbon,
Silicon carbide SSiC

METAL PARTS

SS 316, SS 304

SECONDARY SEAL

EPDM, NBR, FKM, FFKM

SEAL CHARACTERISTICS

- Single seal
- Cartridge unit
- Category 1, Type A, Arrangement 1
- Balanced
- Independent direction of rotation
- Shrink-fitted seal faces
- Solid mating ring

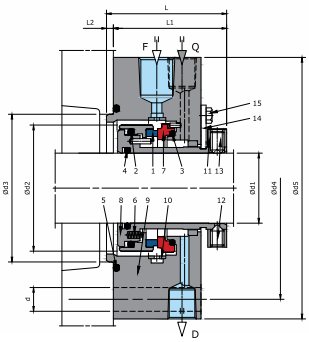
APPLICATION

- Process industry
- Oil and gas industry
- Refining technology
- Petrochemical industry
- Chemical industry
- Highly volatile hydrocarbons
- Toxic and hazardous media
- Media with poor lubrication properties
- Low solids content and low abrasive media
- Vertical and horizontal ANSI chemical standard pumps

OPERATING LIMIT

Shaft Diameter	d1	: 20mm...110mm
Pressure	p	: 22 bar
Temperature	t	: -40 +176°C
Velocity	v	: 23 m/sec

PART NO.	DESCRIPTION
1	SEAL RING
2	O-RING
3	O-RING
4	O-RING
5	O-RING
6	SPRING
7	MATING RING
8	SEAL SLEEVE
9	GLAND PLATE
10	FLOW DISTRIBUTOR
11	SET RING
12	SET SCREW
13	SET SCREW
14	SETTING DEVICE
15	HEXAGON BOLT



SERIES LP350

STANDARD STYLE

FACE MATERIAL

Blister resistant carbon,
Silicon carbide SSiC

METAL PARTS

SS 316, SS 304

SECONDARY SEAL

EPDM, NBR, FKM, FFKM

SEAL CHARACTERISTICS

- Dual seal
- Cartridge unit
- Category 1, Type A, Arrangement 2 or 3
- Balanced
- Independent direction of rotation
- Shrink-fitted seal faces
- Solid mating ring

APPLICATION

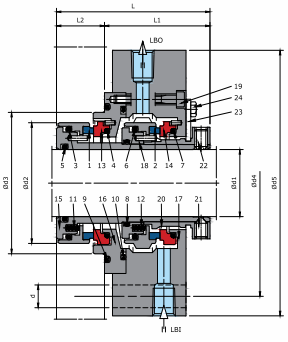
- Process industry
- Oil and gas industry
- Refining technology
- Petrochemical industry
- Chemical industry
- Highly volatile hydrocarbons
- Toxic and hazardous media
- Media with poor lubrication properties
- Low solids content and low abrasive media
- Vertical and horizontal ANSI chemical standard pumps

OPERATING LIMIT

Shaft Diameter	d1	: 20mm...110mm
Pressure	p	: 22 bar
Temperature	t	: -40 +176°C
Velocity	v	: 23 m/sec

PART NO.	DESCRIPTION
1	SEAL RING
2	SEAL RING
3	O-RING
4	O-RING
5	O-RING
6	O-RING
7	O-RING
8	O-RING
9	O-RING
10	O-RING
11	SPRING
12	SPRING
13	MATING RING
14	MATING RING
15	SEAL SLEEVE
16	GLAND PLATE
17	GLAND PLATE
18	DRIVER
19	HSH CAP SCREW
20	SET RING
21	SET SCREW
22	SET SCREW
23	SETTING DEVICE
24	HEXAGON BOLT

LBO Liquid buffer/barrier OUT
LBI Liquid buffer/barrier IN



SERIES LP95VK

STANDARD STYLE

FACE MATERIAL

Silicon carbide, Carbon graphite

METAL PARTS

SS 316, SS 304,

SECONDARY SEAL

EPDM, NBR, FKM, FFKM

APPLICATION

- Oil and gas industry
- Refining technology
- Petrochemical industry
- Power plant technology
- Light volatile and highly viscous hydrocarbons
- API 610/ISO 13709 pumps
- Process pumps

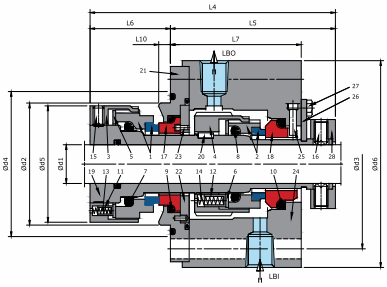
SEAL CHARACTERISTICS

- Dual seal
- Cartridge unit
- Design acc. to API 682/ISO 21049
- Category 2 and 3, Type A, Arrangement 2 or 3
- Bi-directional design available
- Rotating multiple springs
- Integrated pumping device
- Suitable for pressure reversals

OPERATING LIMIT

Shaft Diameter	d1	: 20mm...110mm
Pressure	p	: 40 bar
Temperature	t	: -40 +220°C
Velocity	v	: 23 m/sec

PART NO.	DESCRIPTION
1	SEAL FACE
2	SEAL FACE
3	DRIVE COLLAR
4	DRIVE COLLAR
5	THRUST RING
6	THRUST RING
7	O-RING
8	O-RING
9	O-RING
10	O-RING
11	SLEEVE
12	SLEEVE
13	SPRING
14	SPRING
15	SET SCREW
16	SET SCREW
17	SEAT
18	SEAT
19	SHAFT SLEEVE
20	KEY
21	RETAINER
22	WASHER
23	PIN
24	HOUSING
25	HSH CAP SCREW
26	ASSEMBLY FIXTURE
27	HEXAGON BOLT
28	SET RING



SERIES LP95VN

STANDARD STYLE

FACE MATERIAL

Silicon carbide, Carbon graphite

METAL PARTS

SS 316, SS 304,

SECONDARY SEAL

EPDM, NBR, FKM, FFKM

APPLICATION

- Process industry
- Oil and gas industry
- Refining technology
- Petrochemical industry
- Power plant technology
- Hot water
- Light hydrocarbons
- API 610/ISO 13709 pumps
- Process pumps

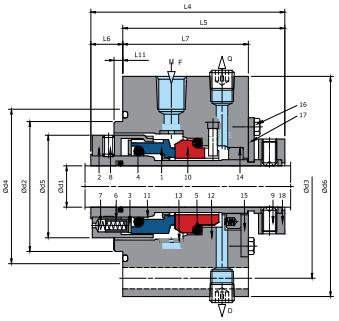
SEAL CHARACTERISTICS

- Single seal
- Cartridge unit available
- Design acc. to API 682/ISO 21049
- Category 2 and 3, Type A, Arrangement 1
- Independent of direction of rotation
- Rotating multiple springs
- Integrated pumping device available (H75VP)

OPERATING LIMIT

Shaft Diameter	d1	: 20mm...110mm
Pressure	p	: 40 bar
Temperature	t	: -40 +220°C
Velocity	v	: 23 m/sec

PART NO.	DESCRIPTION
1	SEAL FACE
2	DRIVE COLLAR
3	THRUST RING
4	O-RING
5	O-RING
6	SLEEVE
7	SPRING
8	SET SCREW
9	SET SCREW
10	SEAT
11	SHAFT SLEEVE
12	HOUSING
13	INSERT
14	THROTTLE RING
15	WASHER
16	ASSEMBLY FIXTURE
17	HEXAGON BOLT
18	SET RING



SERIES LP360

STANDARD STYLE

FACE MATERIAL

Carbon graphite antimony impregnated,
Carbon graphite resin impregnated,
Silicon carbide, Tungsten carbide,

METAL PARTS

SS 316, SS 304

SECONDARY SEAL

NBR, EPDM, FKM, HNBR

APPLICATION

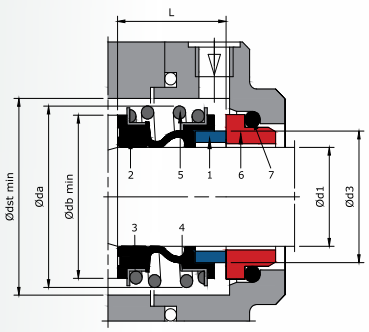
- Process industry
- Chemical industry
- Pulp and paper industry
- Water and waste water technology
- Food and beverage industry
- Sugar industry
- Oil applications
- Water, waste water, slurries (up to 5 % by weight)
- Pulp (up to 4 % otro)
- Latex
- Dairies, beverages
- Sulfide slurries
- Chemicals
- Oils
- Chemical standard pumps
- Helical screw pumps
- Stock pumps
- Circulating pumps
- Submersible pumps
- Water and waste water pumps

SEAL CHARACTERISTICS

- For plain shafts
- Single and dual seal
- Elastomer bellows rotating
- Unbalanced
- Independent of direction of rotation
- No torsion on bellows

OPERATING LIMIT

Shaft Diameter	d1	: 10mm...100mm
Pressure	p	: 16 bar
Temperature	t	: -20 +140°C
Velocity	v	: 10 m/sec



PART NO.	DESCRIPTION
1	SEAL FACE
2	BELLOWS
3	"L"-RING (SPRING COLLAR)
4	"L"-RING (SPRING COLLAR)
5	SPRING
6	SEAT
7	O-RING OR RUBBER CUP

SERIES LPE365

STANDARD STYLE

FACE MATERIAL

Carbon graphite resin impregnated,
Silicon carbide

METAL PARTS

SS 316, SS 304

SECONDARY SEAL

NBR, FKM

APPLICATION

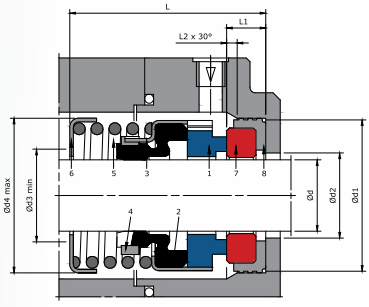
- Process industry
- Chemical industry
- Water and waste water technology
- Glycols
- Oils
- Industrial pumps/equipment
- Submersible pumps
- Engine pumps
- Circulating pumps

SEAL CHARACTERISTICS

- Single seal
- Loosely inserted seal face provides self-adjusting capability
- In-house manufactured sliding parts

OPERATING LIMIT

Shaft Diameter	d	: 8mm...50mm
Pressure	p	: 7 bar
Temperature	t	: -20 +100°C
Velocity	v	: 5 m/sec



PART NO.	DESCRIPTION
1	SEAL FACE
2	BELLOWS
3	SPRING COLLAR
4	DRIVE COLLAR
5	SPRING
6	SPRING HOLDER
7	SEAT
8	CORNER SLEEVE

SERIES LP385

STANDARD STYLE

FACE MATERIAL

Silicon carbide, carbon

METAL PARTS

SS 316L, Duplex

SECONDARY SEAL

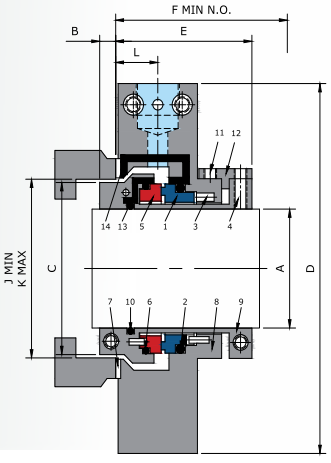
VITON, AFLAS

APPLICATION

- Chemical Processing
- Food Processing
- Industry
- Mining
- Pharmaceutical
- Power Generation
- Petrochemical
- Pulp and Paper
- Refining
- Water and waste Management

OPERATING LIMIT

Shaft Diameter	d1	: 45mm...219mm
Pressure	p	: 17 bar
Temperature	t	: 175°C
Speed	v	: 3600 RPM



PART NO.	DESCRIPTION
1	SEAL RING
2	O-RING
3	SPRING
4	SET SCREW
5	SEAT
6	O-RING
7	GASKET
8	GLAND PLATE
9	SLEEVE
10	O-RING
11	ALLEN CAP SCREW
12	ASSEMBLY FIX.
13	GASKET
14	GASKET

SERIES LP380 & LP381

STANDARD STYLE

FACE MATERIAL

Carbon, Silcon Carbide

METAL PARTS

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

SECONDARY SEAL

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

APPLICATION

- Food Products
- Pharmaceutical Products

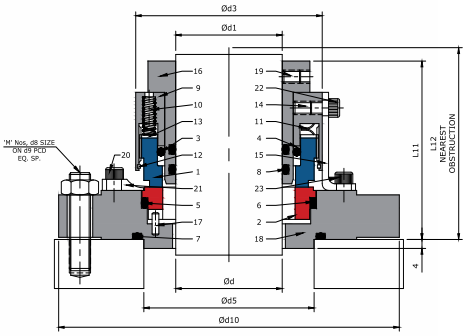
SEAL CHARACTERISTICS

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

OPERATING LIMIT

Shaft Diameter	d	: 15mm...100mm
Pressure	p	: 10 bar
Temperature	t	: Amb....120°C
Speed	n	: 320 rpm

PART NO.	DESCRIPTION
1	SEAL RING
2	MATING RING
3	O-RING
4	BACKUP RING
5	O-RING
6	PACKING
7	O-RING
8	O-RING
9	RETAINER
10	SPRING
11	WAVE SPRING
12	SNAP RING
13	THRUST RING
14	GRUB SCREW
15	LOCATION PLATE
16	SLEEVE
17	PIN
18	M. R. HOUSING
19	GRUB SCREW
20	ALLEN SCREW
21	M. R. CLAMP
22	ALLEN SCREW
23	ALLEN SCREW



SERIES LPMIX 400

STANDARD STYLE

FACE MATERIAL

Carbon graphite, Silicon carbide

METAL PARTS

metal parts according to application
and customer's specifications.

APPLICATION

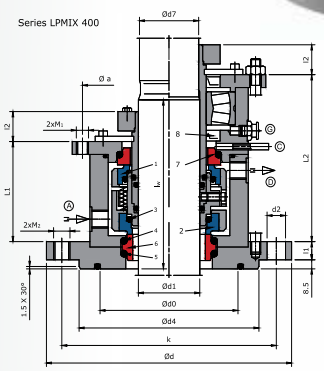
- Refining technology
- Petrochemical industry
- Chemical industry
- Pharmaceutical industry
- Food and beverage industry
- Agitators
- Mixers
- Reactors

SEAL CHARACTERISTICS

- For top entry drives
- For steel vessels acc. to DIN resp. Non-DIN
- Nitrogen pressurized dual seal, single seal optional
- Balanced
- Independent of direction of rotation
- Multiple springs rotating
- Dry running
- Cartridge unit

OPERATING LIMITS

Shaft Diameter	d1 : 40mm...200mm
Pressure	p : 6 bar
Temperature	t : -20 + 150°C
Velocity	v : 2 m/sec



PART NO.	DESCRIPTION
1	SEAL FACE, ATMOSPHERE SIDE
2	SEAL FACE, PRODUCT SIDE
3	O-RING
4	O-RING
5	O-RING
6	SEAT PRODUCT SIDE
7	SEAT ATMOSPHERE SIDE
8	LIP SEAL

SERIES LPMIX 410

STANDARD STYLE

FACE MATERIAL

Carbon graphite, Silicon carbide

SECONDARY SEAL

metal parts according to application
and customer's specifications.

APPLICATION

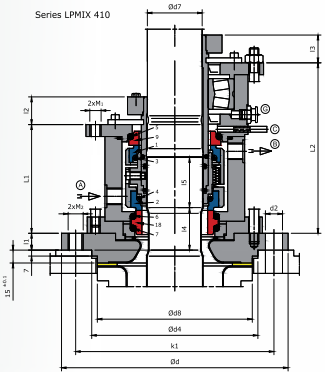
- Refining technology
- Petrochemical industry
- Chemical industry
- Pharmaceutical industry
- Food and beverage industry
- Agitators
- Mixers
- Reactors

SEAL CHARACTERISTICS

- For top entry drives
- For glass-lined vessels acc. to DIN resp. Non-DIN
- Dry running
- Nitrogen pressurized dual seal
- Balanced
- Multiple springs rotating
- Independent of direction of rotation

OPERATING LIMITS

Shaft Diameter	d1 : 40mm...200mm
Pressure	p : 6 bar
Temperature	t : -20 + 150°C
Velocity	v : 2 m/sec



PART NO.	DESCRIPTION
1	SEAL FACE, ATMOSPHERE SIDE
2	SEAL FACE, PRODUCT SIDE
3	O-RING
4	O-RING
5	O-RING
6	O-RING
7	O-RING
8	SEAT PRODUCT SIDE
9	SEAT ATMOSPHERE SIDE

SERIES LPE WD100

STANDARD STYLE

FACE MATERIAL

Carbon graphite

METAL PARTS

SS 316, SS 304,Duplex

APPLICATION

- Chemical industry
- Waste incineration and removal industry
- Petrochemical industry
- Food processing industry
- Metal production and processing
- Clean gases*
- Water
- Medium-sized and large fans/blowers
- Mixers, agitators, mills, dryers

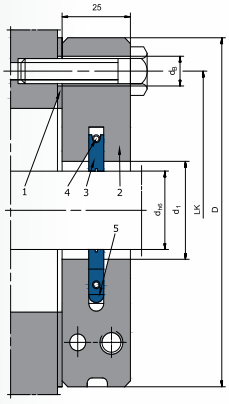
* Not applicable for toxic, solids containing gases and exhaust gas

OPERATING LIMIT

Shaft Diameter	dh6	: 40mm...300mm
Pressure	p	: 2 bar (max)
Temperature	t	: -120 + 500°C
Velocity	v	: 150 m/sec

SEAL CHARACTERISTICS

- Split housing design
- Multi-part seal rings, radially cut
- Very small operation gap – low leakage
- Dry running
- Self-adjusting seal rings
- Seal rings bear radial shaft movements
- Compensates axial shaft movements
- No sealing components mounted on the shaft and hence no additional shaft vibrations
- Seal rings running contact-free – sliding faces and machine consume no additional power



PART NO.	DESCRIPTION
1	FLAT SEAL
2	HOUSING, 2 PIECE
3	SEAL RING
4	TENSION
5	DETENT

SERIES LPE WD200

STANDARD STYLE

FACE MATERIAL

Carbon graphite

METAL PARTS

SS 316, SS 304,Duplex

APPLICATION

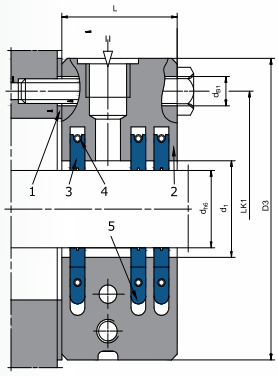
- Chemical industry
- Waste incineration and removal industry
- Power plant technology
- Petrochemicl industry
- Food processing industry
- Metal production and processing
- Gases
- Fumes and exhaust, solids containing, flammable (ATEX), acid containing and toxic gases
- (Solids containing) steams/liquid mist
- Oil mist/penetrating oil
- Water
- Medium-sized and large fans/blowers
- Bearing seals (gear box, motors)
- Steam turbines
- Mixers, agitators, mills, dryers

OPERATING LIMIT

Shaft Diameter	dh7	: 45mm...340mm
Pressure	p	: 20 bar (max)
Temperature	t	: -120 + 800°C
Velocity	v	: 150 m/sec

SEAL CHARACTERISTICS

- Multi-part seal rings, radially cut
- Split housing design
- Very small operation gap – low leakage
- Dry running
- Self-adjusting seal rings
- Seal rings bear radial shaft movements
- Compensates axial shaft movements
- No sealing components mounted on the shaft and hence no additional shaft vibrations
- Seal rings running contact-free – sliding faces and machine consume no additional power



PART NO.	DESCRIPTION
1	FLAT SEAL
2	HOUSING, 2 PIECE
3	SEAL RING
4	TENSION SPRING
5	DETENT

SERIES LPE WD200 /500

STANDARD STYLE

FACE MATERIAL

Carbon graphite

METAL PARTS

SS 316, SS 304,Duplex

APPLICATION

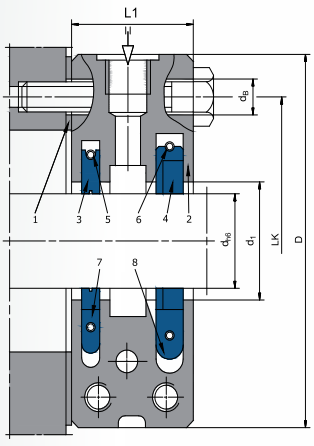
- Chemical industry
- Waste incineration and removal industry
- Metal production and processing
- Pulp and paper industry
- Lime, cement and gypsum industry
- Food processing industry
- Power plant technology
- Machinery and plant building
- Gases
- Fumes and exhaust, solids containing, flammable (ATEX), acid containing and toxic gases
- (Solids containing) steams/liquid mist
- Oil mist/penetrating oil
- Water
- Medium-sized and large fans/blowers
- Bearing seals (gear box, motors)
- Steam turbines
- Mixers, agitators, dryers
- Mills (ball, hammer, beater mills)
- Centrifuges
- Cantilever pumps

OPERATING LIMIT

Shaft Diameter	dh6	: 45mm...300mm
Pressure	p	: 3 bar (max)
Temperature	t	: -120 + 500°C
Velocity	v	: 40 m/sec

SEAL CHARACTERISTICS

- Multi-part seal rings, radially cut on process side, overlapped mortised with gas tight joints on atmosphere side (adjusting)
- Split housing design
- Lowest possible operation gap – lowest leakage
- Dry running
- Self-adjusting seal rings
- Seal rings bear radial shaft movements
- Compensates axial shaft movements
- Short axial installation length
- No sealing components mounted on the shaft and hence no additional shaft vibrations



PART NO.	DESCRIPTION
1	FLAT SEAL
2	HOUSING, 2-PIECE
3	SEAL RING WD500
4	SEAL RING WD500
5	TENSION SPRING WD200
6	TENSION SPRING WD200
7	DETENT WD200
8	DETENT WD200

SERIES LPE WD500

STANDARD STYLE

FACE MATERIAL

Carbon graphite

METAL PARTS

SS 316, SS 304,Duplex

APPLICATION

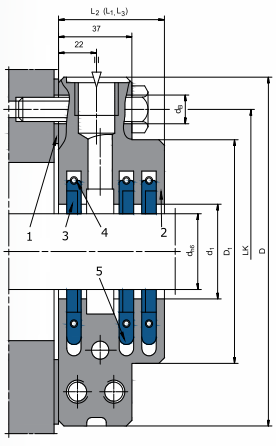
- Chemical industry
- Waste incineration and removal industry
- Pulp and paper industry
- Lime, cement and gypsum industry
- Mining industry
- Water and waste water technology
- Gases
- Fumes and exhaust, solids containing, flammable (ATEX), acid containing and toxic gases
- (Solids containing) steams/liquid mist
- Oil mist/penetrating oil
- Water
- Medium-sized and large fans/blowers
- Bearing seals (gear box, motors)
- Steam turbines
- Mixers, agitators, dryers
- Mills (ball, hammer, beater mills)
- Centrifuges

OPERATING LIMIT

Shaft Diameter	dh6	: 45mm...300mm
Pressure	p	: 3 bar (max)
Temperature	t	: -120 + 500°C
Velocity	v	: 40 m/sec

SEAL CHARACTERISTICS

- Multi-part seal rings, overlapped mortised with gas tight joints (adjusting)
- Split housing design
- Lowest possible operation gap – lowest leakage
- Dry running
- Self-adjusting seal rings
- Seal rings bear radial shaft movements
- Compensates axial shaft movements
- Short axial installation length
- No sealing components mounted on the shaft and hence no additional shaft vibrations



PART NO.	DESCRIPTION
1	FLAT SEAL
2	HOUSING, 2 PIECE
3	SEAL RING
4	TENSION SPRING
5	DETENT

SERIES LPE WDK -BHS

STANDARD STYLE

FACE MATERIAL

Carbon graphite

METAL PARTS

SS 316, SS 304,Duplex

APPLICATION

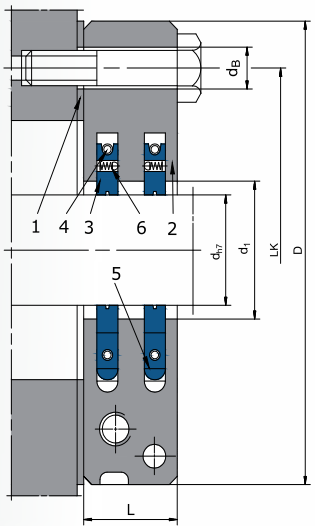
- Shipbuilding
- Drive shafts in ships, bulkheads
- Sea water, water

APPLICATION

- Multi-part seal rings, radially cut
- Split housing design
- Short axial installation length (max. 36 mm)
- Very small operation gap
- Dry running
- Self-adjusting seal rings
- Seal rings bear radial shaft movements
- Compensates axial shaft movements
- Seals on both sides of the shaft
- Resistant to sea water
- No sealing components mounted on the shaft and hence no additional shaft vibrations
- Seal rings running contact-free – sliding faces and machine consume no additional power

OPERATING LIMIT

Shaft Diameter	dh7	: 40mm...300mm
Pressure	p	: 1.5 bar (max)
Temperature	t	: 225 °C
Velocity	v	: 40 m/sec



PART NO.	DESCRIPTION
1	FLAT SEAL
2	HOUSING, 2 PIECE
3	SEAL RING
4	TENSION SPRING
5	DETENT
6	SPRING

SERIES LPE WDKS

STANDARD STYLE

FACE MATERIAL

Carbon graphite

METAL PARTS

SS 316, SS 304,Duplex

APPLICATION

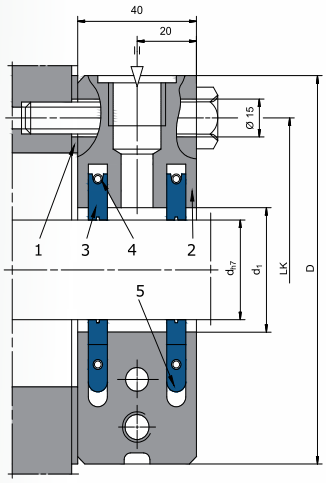
- Chemical industry
- Metal production and processing
- Pulp and paper industry
- Food processing industry
- Power plant technology
- (Solids containing) gases
- (Solids containing) steams/liquid mist
- Oil mist/penetrating oil
- Water
- Small and medium-sized fans/blowers
- Bearing seals (gear box, motors)
- Mixers, agitators, mills, dryers

OPERATING LIMIT

Shaft Diameter	dh7	: 45mm...160mm
Pressure	p	: 1.5 bar (max)
Temperature	t	: -120 + 500°C
Velocity	v	: 150 m/sec

SEAL CHARACTERISTICS

- Multi-part seal rings, radially cut
- Split housing design
- Very small operation gap – low leakage
- Dry running
- Self-adjusting seal rings
- Seal rings bear radial shaft movements
- Compensates axial shaft movements
- No sealing components mounted on the shaft and hence no additional shaft vibrations
- Seal rings running contact-free – sliding faces and machine consume no additional power



PART NO.	DESCRIPTION
1	FLAT SEAL
2	HOUSING, 2 PIECE
3	SEAL RING
4	TENSION SPRING
5	DETENT

Vition Rubber used for mechanical and physical properties at end-use temperature -30°C to 210°C.

Silicon Rubber used for mechanical and physical properties at end-use temperature -86°C to 156°C.

EPDM Rubber used for mechanical and physical properties at end-use temperature -50°C to 156°C.

Aflas used for mechanical and physical properties at end-use temperature -156°C to 256°C.

Kalrez used for mechanical and physical properties at end-use temperature -200°C to 396°C.

Viton & Silicon Rubber Product

Teflon Product

Teflon exhibit excellent mechanical and physical properties at end-use temperature up to 300°C. Teflon is also excellent candidate for specialized chemical and industrial application like, Chemical, Petrochemical, Food & Beverages & Other Industries

Carbon/graphite is the ideal material for steam turbine packing rings, and Carbon is the perfect source for high-performance segmented seal rings. Our rings feature precision manufacturing and special material grades for optimum sealing performance and service life.

These carbon/graphite grades have a fine-grain structure with excellent mechanical properties. Retaining (or "garter") springs are made from Inconel (for temperatures above 700° F) or stainless steel.

Segmented Carbon Seal Ring

Graphite Product

Graphite has the good property of good resistant corrosion, high thermal conductivity and lower frictions, good self-lubrication, & smaller expansion. They can be made into the seal faces, Bearings & so on. It is ideal to choose it as the frictional mating rings. Application as up to 200°C for use with predominantly neutral to acidic medium & up to 550°C for use with predominantly neutral to alkaline medium.

Shaft & Sleeve

Metal Component:
S.S 304, S.S 316.

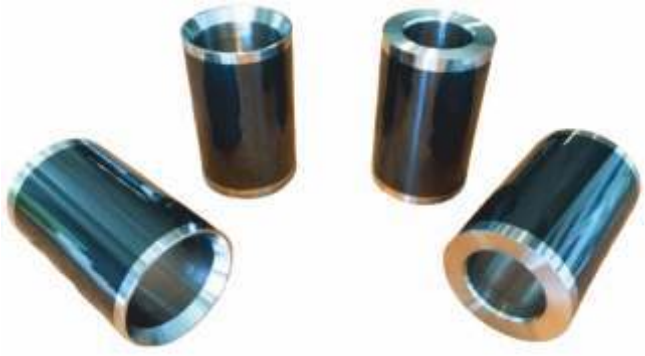
Pumping Ring

Metal Component:
S.S 304, S.S 316

Chromeoxide Coated Shaft

Metal Component:
S.S 304, S.S 316, CI.

Chromeoxide Coated Sleeve



Metal Component:
S.S 304, S.S 316.

Ceramic Coated Sleeve

Metal Component:
S.S 304, S.S 316.

Tungsten Coated Sleeve

Metal Component:
S.S 304, S.S 316.

Rotary Joint

The **LP-RJ050** Rotary Joint Series gives trouble free service with easy maintenance. The anti-torque lug prevent rotation of housing during operation. The special carbon graphite bearing is lubricated by the process fluid and sometimes addition lubrication is required. The extra long siphon pipe support, removes the load from the siphon pipe thread / packing. So the pipe last longer. The **LP-RJ050** series can be repaired or replaced on site within short span of time.

Material :

Body	:	C.I. / M.S. / S.S. / Brass
Assembly Plate	:	C.I. / M.S. / S.S. / Brass
Nipple	:	C.I. / M.S. / 304 / 316 / 410
Seal Ring	:	Silicon Carbide, TC
Guide Ring	:	Carbon Graphite (IMP)
Spring	:	S.S / Spring Steel
Gasket	:	Compressed Asbestos
Elastomer	:	Viton, PTFE

Operating Limit :

Max. Water Pressure	:	150 bar
Max. Water Temperature	:	150° C
Max. Steam Pressure	:	10 bar
Max. Steam Temperature	:	180° C
Max. Hot Oil Pressure	:	8 bar
Max. Hot Oil Temperature	:	180° C

NOTE:

When Ordering please Specify : Size, Type, Application , MOC, Single Flow, Dual Flow & Syphon Size of Rotary Joint

When Ordering please Specify : Nipple Thread (BSP / NPT) (R.H / L.H)
For Size Above 2-1/2" Flange End we will **Require Flange Details**

Thermosyphon System

Thermosyphon Cooling System is designed to dissipate the heat from mechanical seal during operation. Thermosyphon is a method of passive heat exchange, based on natural convection, which circulates a fluid without the necessity of a mechanical pump. The barrier/buffer fluid is circulated to the seal and back to the system by the Thermosyphon effect which means the hotter, lower density water will rise while the cooler, higher density water will sink. It is used for double mechanical seal 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.

Material:

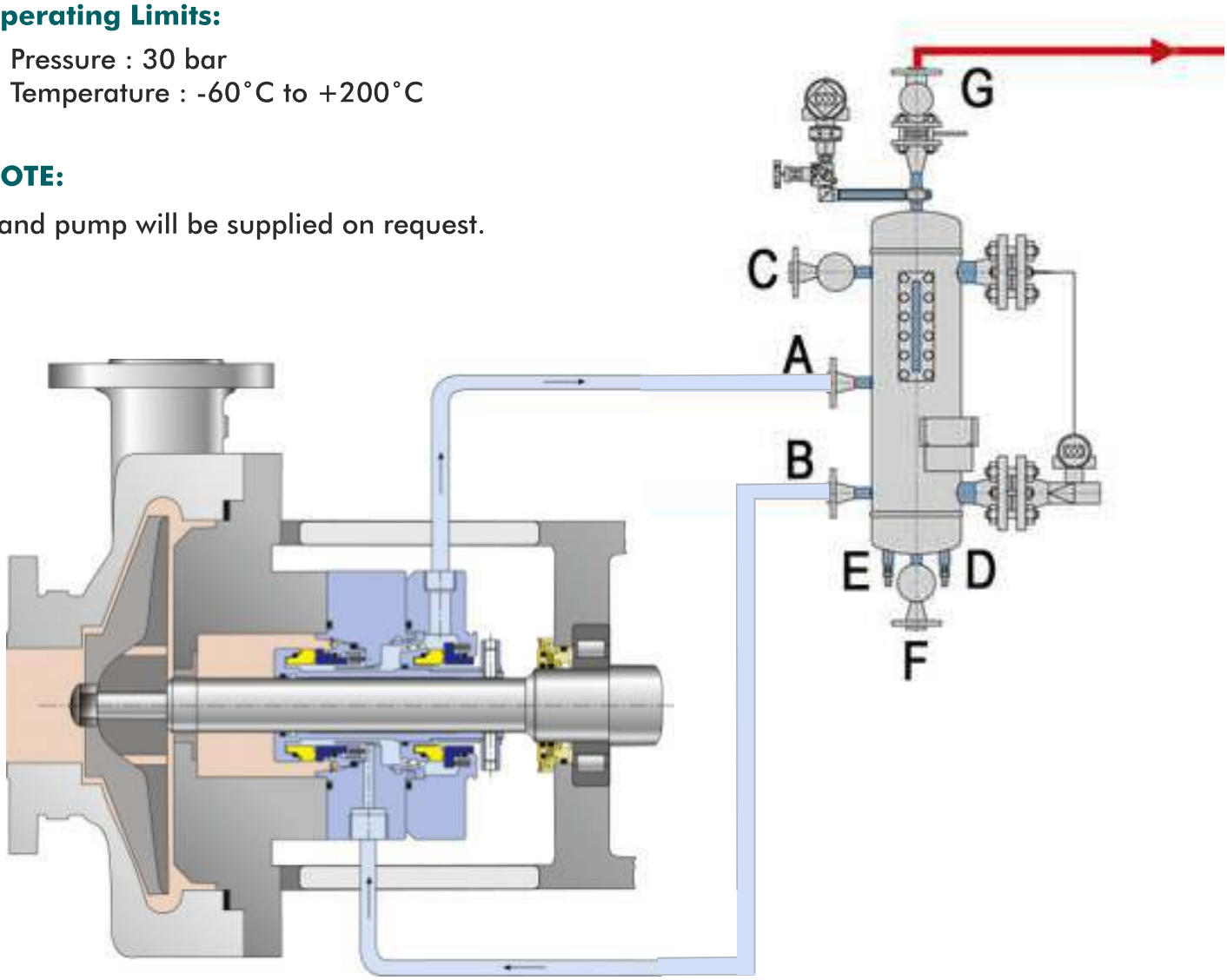
- M.S / SS-304 / SS-316.

Operating Limits:

- Pressure : 30 bar
- Temperature : -60°C to +200°C

NOTE:

Hand pump will be supplied on request.



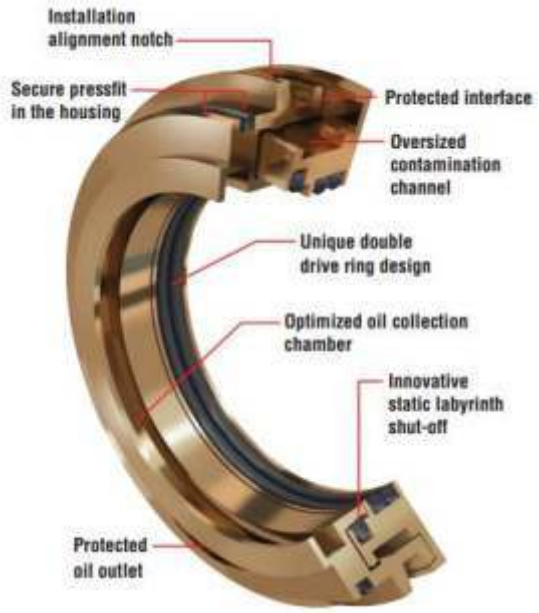
Bearing Isolator

A bearing isolator is a non-contact, non-wearing, permanent bearing protection device. It has a rotor and a stator, and the two are unitized, so that they don't separate from one another while in use. Typically, the rotor turns with a rotating shaft, while the stator is pressed into a bearing housing. The two components interact to keep contamination out of the bearing enclosure and the lubricant in. Bearing isolators do not require lubrication or any particular shaft finish or condition.

The best bearing isolators are made of metal, usually bronze, and they utilize a vapor -blocking feature, which inhibits the free transfer of vapor contamination when the rotating equipment is cycled on and off.

Specifications:

- **Standard Material** : Bronze / Bronze
- **Movement** : Axial +/- 0.2mm / Radial -+/ 0.4mm
- **Temperature** : - 40 to + 200
- **Elastomer** : Viton Standard
- **Pressure** : 0 psi (Bar) Speed : 8000 rpm
- **Shaft Size** : 10mm to 200mm



Advantage:

- It prevents friction.
- Reduces heat generation.
- Increases life of Bearing.
- Wear and tear resistance.
- Reduces Energy Consumption.

Applications:

- Pumps
- Motor
- Turbines
- Gear Box
- Blower

Bearing Bush

Bearing Bush / Bushings (sometimes called plain bearings, plain bushings, or sleeve bearings) reduce friction between two surfaces sliding against each other. Bushings are akin to thin tube or sleeve most commonly used for machinery with rotating or sliding shafts to improve efficiency and reduce vibration and noise.

Rubber diaphragms are flexible seals that preven unwanted transmission of substances between two places. These substances can be liquids, gases or solutions. They are characteristically tough, dynamic and essential in many flow control applications. The rubber molding tolerances for rubber diaphragms are complaint with rubber molding industry standard RMA A2 Precision tolerances.

Materials:

- NBR, Buna, EPDM, Viton, HNBR, Silicone, Fluorosilicone, PU SBR, Neoprene, ACM, AEM.

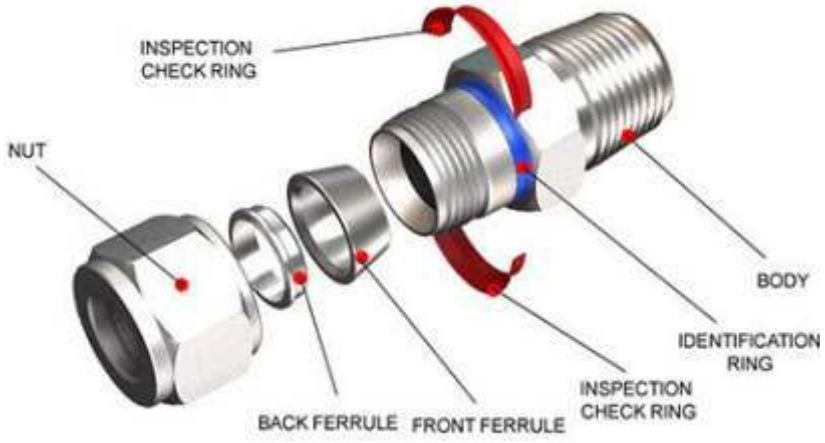
Application:

- Power Generation
- Fluid handling
- Aerospace
- Chemical Industries
- Process Industries
- Irrigation
- Automotive tier
- Foods & Beverages

Lineproof Engineering designs leak free tube fitting connections for Process, Power & Instrumentation applications and in chemical, petroleum, power generating, pulp & paper plants. These tube fittings are manufactured with high quality standards & available in different sizes, materials and configurations.

Lineproof Engineering Tube fittings have also found special application in other fields where pressure is high. If more specific information is required, including heat code traceability, Lineproof Engineering will provide details.

Stainless steel tube fittings work reliably on both seamless & welded - redrawn, fully annealed type 304, 306 & 316L tubing. **Lineproof** Engineering Tube Fittings are available in SS316, SS316L, SS304, Carbon Steel, Brass, Monel, and Hastelloy. Straight fittings are machined from cold finished bar stock & Complex fittings are machined by high quality forging.



Braided Hose Pipe

A hose is a flexible hollow tube designed to carry fluids from one location to another. Hoses are also sometimes called pipes (the word pipe usually refers to a rigid tube, whereas a hose is usually a flexible one), or more generally tubing. The shape of a hose is usually cylindrical (having a circular cross section).

Hose design is based on a combination of application and performance. Common factors are size, pressure rating, weight, length, straight hose or coil hose, and chemical compatibility.

Materials:

- Nylon, Polyurethane, Polyethylene, special grades of polyethylene (LDPE and especially LLDPE), PVC, Synthetic or Natural Rubbers, PTFE (Teflon), Stainless Steel & Other Metals.

Table of Material

Face Materials (Item 1/2)

Synthetic Carbons

A	Carbon graphite antimony impregnated
B	Carbon graphite resin impregnated, approved for foodstuffs
B3	Carbon graphite resin impregnated
B4	Electrographite resin impregnated
B5	Carbon, resin bonded
C	Electrographite antimony impregnated

Metals

E	Cr-Steel
G	CrNiMo-Steel
S	Special cast CrMo-Steel

Carbides

U = Tungsten carbides

U1	Tungsten carbide, Co-binder
U2	Tungsten carbide, Ni-binder
U22	Tungsten carbide, Ni-binder (shrunk-in)
U3	Tungsten carbide, NiCrMo-binder
U37	Tungsten carbide, NiCrMo-binder (shrunk-in)
U7	Tungsten carbide, binder-free

Q = Silicon carbides

Q1	SiC, silicon carbide, sintered pressureless
Q12	SiC, silicon carbide, sintered pressureless (shrunk-in)
Q2	SiC-Si, reaction bonded
Q22	SiC-Si, reaction bonded(shrunk-in)
Q3	SiC-C-Si, carbon silicon impr.
Q32	SiC-C-Si, carbon silicon impr.
Q6	SiC-C, SiC, sintered pressureless with carbon
Q4	C-SiC, carbon surface silicated
Q19	SiC,DLC- coated
Q15	SiC,Diamond face

Standards followed:
EN 12756
ISO 1629

Metal Oxides (Ceramics)

V	Al-Oxide > 99%
V2	Al-Oxide > 96%
X	Steatite (Magnesia silicate)

Plastics

Y1	PTFE, glassfiber reinforced
Y2	PTFE, Carbon reinforced

Secondary Seal Components (Item 3)

Elastomers, not wrapped

B	Butyl rubber
E	Ethylene propylene rubber
K	Perfluorocarbon rubber
N	Chloroprene rubber
P	Nitrile-butadiene-rubber
S	Silicone rubber
V	Fluorocarbon rubber
X	HNBR

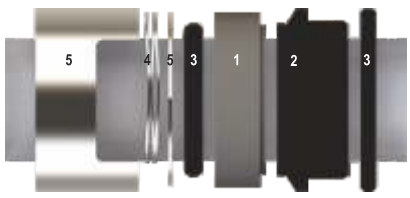
Elastomers, wrapped

M1	FKM, double PTFE wrapped
M2	EPDM, double PTFE wrapped
M3	VMQ, double PTFE wrapped
M4	CR, double PTFE wrapped
M5	FKM, FEP wrapped
M7	FKM, double PTFE wrapped/ PTFE solid

Differing Materials

U1	Perfluorocarbon rubber/PTFE

Material code designation example



Item	1	2	3	4	5
Material code	Seal face	Stat. face	Secondary Seals	Spring	Other parts
acc.to EN 12756	Q1	B	V	G	G

Example : Sealmatic U700N/d, Q1 B V G G

Non-Elastomers

G	Pure graphite
T	PTFE (Polytetrafluoroethylene)
T2	PTFE glass fiber reinforced
T3	PTFE carbon reinforced
T12	PTFE carbon-graphite reinforced

Spring and Construction Mat. (Item 4/5)

Spring Materials

G	1.4571	CrNiMo Steel
M	2.4610	Hastelloy® C-4 Nickel-base alloy
M5	2.4819	Hastelloy® C-276

Construction Materials

D	St	C steel
E	1.4122	Cr steel
F	1.4301	CrNi steel
F	1.4308	CrNi cast steel
F1	1.4313	Special cast CrNi steel
G	1.4401	CrNiMo steel
G	1.4404	CrNiMo steel
G	1.4571	CrNiMo steel
G	1.4581	CrNiMo cast steel
G1	1.4462	CrNiMo steel - Duplex
G1	1.4460	CrNiMo steel-Duplex
G4	1.4410	CrNiMo steel surperduplex
G4	1.4501	CrNiMoCu steel - Superduplex
G3	1.4539	NiCrMo steel

M = Nickel-base alloy

M	2.4610	Hastelloy® C-4
M1	2.4617	Hastelloy® B-2
M3	2.4660	Carpenter® 20 Cb3
M4	2.4375	Monel® alloy K500
M5	2.4819	Hastelloy® C-276
M6	2.4668	Inconel® 718

T = Other materials

T1	1.4505	CrNiMoCuNb steel
T2	3.7035	Pure Titanium
T3	2.4856	Inconel® 625
T4	1.3917	Carpenter® 42
T5	1.4876	Inconel® 800
T6	-	AM350

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