

INCORPORATING
PRODUCTS AWARDED
THE QUEENS AWARD
FOR ENTERPRIZE;
INNOVATION
2006 & 2009



THE QUEEN'S AWARDS
FOR ENTERPRIZE;
INNOVATION
2006 • 2009

reliability-focused-solutions.com

Reliability
Focused
Solutions



Bearing Protection Product Range



- **NON-CONTACTING LABYRINTH SEALS**
- **CONTACTING FACE SEALS**
- **GREASE, OIL SPLASH, FLOODED AND OIL MIST SOLUTIONS**
- **CONFORMS TO IEEE 841-2001 AND API 610**
- **RADIALLY SPLIT, ANGULAR MISALIGNMENT AND AXIAL MOVEMENT DESIGNS TO SUIT ALL TYPES OF ROTATING EQUIPMENT**
- **PATENT PENDING IN 39 COUNTRIES**

Detailed bearing protection case histories are available online in the applications section of www.aesseal.com. Recent examples include the following:



**Sulzer Pumps
(Sept. 2006)**

In September 2006, AESSEAL® provided a non-contacting bearing seal solution for a number of Sulzer MS double-ended pumps destined for a project in the Middle East.

The API610 9th Edition between-bearings pumps (BB3) rotates at 6,000rpm with Michell Four Lobed bearings, operating in a forced oil lubrication system.

After passing the OEM tests on the Sulzer test bay in the UK, three double-ended API610 BB3 pumps complete with the innovative LabTecta designs, were delivered to the end user plant in the Middle East.



**P.D.O.
(Oct. 2006)**

Since 2004, installed MagTecta™ bearing seals have operated very successfully in screw pumps in PDO, Oman, and are now the preferred standard for upgrade of such pumps.

Furthermore, the MagTecta™ has been installed since 2005 on pumps such as Byron Jackson and Sulzer MSD multi-stage pumps used on water injection in the onshore exploration plants in the Middle East.



**Petrobras Ricardo
Elicalde (Jan. 2003)**

A Coppus RLH 19 steam turbine in an Argentinian refinery suffered from premature failure every 6 to 12 months due to lubricant contamination and bearing damage. Clearly, this was not only a considerable inconvenience, which resulted in lost production, but also the associated costs of reactive maintenance were high.

In January 2003, AESSEAL® installed a 2.250" MagTecta-TXS™ to seal the bearing chamber of the turbine.

Bearing Protection - Industrial Case References



AESSEAL® is believed to be the only company that promotes the use of wholly owned and extensively inventoried non-contacting and contacting bearing seal technology for rotating equipment applications around the world. Examples include the following:

- **Power Generation:** Air Fans, Conveyors, Screw Feeders, Ash/Clinker Crushers, Gearboxes and Pumps.

- **Mining & Mineral Extraction:** Conveying Equipment, Slurry Pumps and Motors.

- **Steel & Metal Processing:** Rolls, Continuous Casters, Electric Motors and Gearboxes.

- **Pulp & Paper:** Steam Turbines and Refiners, Rolls, Hydropulper and Refiner Gearboxes, Pillow Blocks, Dryer Rolls, Digesters and Mixers.



Fraser Papers Inc.
(Aug. 2006)

Managing a machine shop in the paper industry provides opportunities to evaluate how products perform under extreme conditions. Having had prior outstanding results with Labtecta™ seals installed on Falk gear reducers, I found it necessary to give it the ultimate test. For years, we have experienced failures on our hydro pulper gearboxes primarily due to contamination and infiltration of paper stock and water entering these vertical shaft units. We converted from labyrinth to lip seals with no success. With AESSEAL® support, we modified our top seal-housing chamber to accept a Labtecta-TE™. This conversion occurred back in August 2006 and it surpassed our previous remedies and expectations. Several more hydro pulper gearbox conversions will be performed as they reach our repair shop, and all will have Labtecta-TE™ installed.

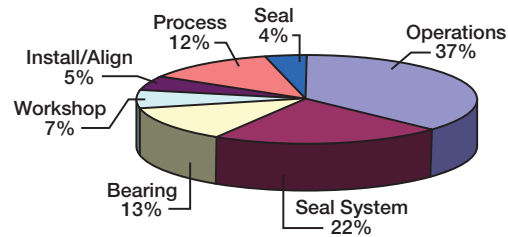
Daniel Dionne
Machine Shop Supervisor



Cariboo Pulp & Paper Company (Jan. 2008)

"I have tested most of the available bearing isolation devices on the market today and found the AESSEAL® LabTecta™ to provide the best performance and overall value."

Ben Staats
Reliability Engineer



Source: Stephen Flood "Mechanical Seal Reliability - What Realistically Can Be Achieved" presented at The Mechanical Sealing Technology Seminar, IMechE, London, April 2007.

13% of mechanical seals fail due to equipment bearing failure.
Fitting modern labyrinth seals should eliminate these problems.



- **Waste Water Production:** Motors, Screws, Microstrainers, Pumps, Cake Breakers and Gearboxes.
- **Pharmaceutical:** Pumps, Gearboxes and Motors.
- **Oil & Gas Processing:** BB3 Pumps, Electric Motors, Sundyne Pumps and Fin Fans.
- **Building Services:** Fans & Pillow Blocks, Rollers and Autoclave Rail Wheels.
- **Food & Beverage:** Rotary Valves, Airlocks, Gearboxes and Pumps.
- **Chemical & Plastics:** Fans, Gearboxes, Rotary Valves, Pumps and Screws.



- **Verification Tested contacting & non-contacting bearing seal designs.**
- Proven to increase equipment reliability in pumps, electric motors, fans, pillow blocks, steam turbines and gearboxes.
- Designs that conform to IEEE Std. 841-2001.
- No shaft wear. Retro-fittable on shafts previously worn by lip seals.
- Easily rebuildable with no special tools, chemicals or equipment.



Water contamination on a continuous digester prior to a LabTecta™ being installed (Case Ref: 3232).

Why do some bearing isolator suppliers promote devices that are not repairable?

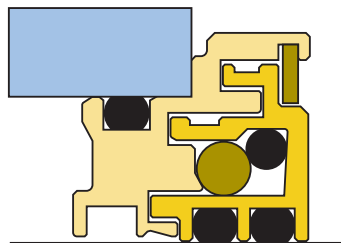
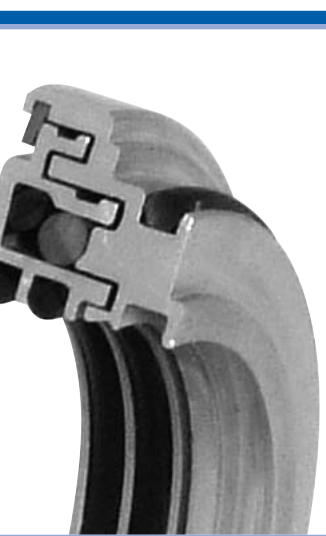
Shaft Not Rotating

Shaft Rotating

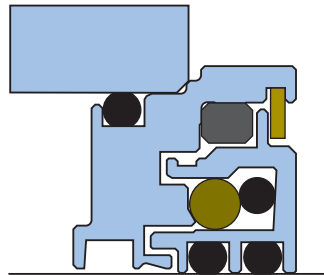
The LabTecta™ is field repairable in just three minutes for minimal cost.

A **true** non-contacting labyrinth design with a shut-off design that **really works**

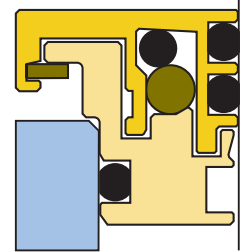
Non-Contacting Bearing Seals - LabTecta-SS™, LabTecta-TE™



LabTecta™ Section
(Full Phosphor Bronze Construction)



LabTecta-SS™ Section
(Full Stainless Steel Construction)



LabTecta-TE™ Section
(Top Entry)



The Laws of Economics tell us that maintenance costs are directly proportional to the number of replaceable parts, the simplicity of construction of these parts, the tools required to disassemble the parts and the time it takes to perform the component replacement task.

The LabTecta™ is field repairable in three minutes for the cost of two 'O' Rings and one face shield. No special disassembly tools are required, just one small conventional screwdriver and/or an 'O' Ring extraction tool.



NO PRESS/SPECIAL TOOLS NEEDED FOR REPAIR



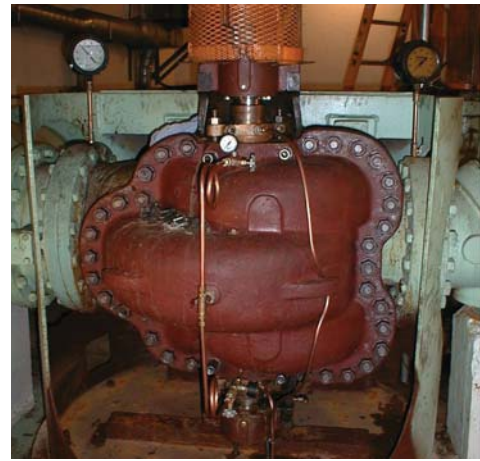
NO TORCHES/HEAT NEEDED FOR REPAIR



NO CHEMICALS NEEDED FOR REPAIR

- Installed in tens of thousands of applications worldwide.
- Dual-face magnetically attracted bearing seals.
- Magnets out of the lubrication media and atmosphere.
- Fits where a lip seal or labyrinth seal fits.

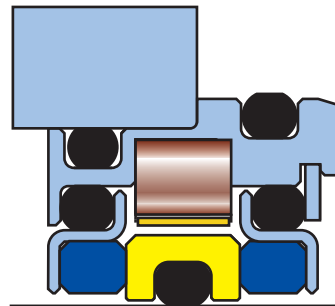
- Splash and flooded lubrication ✓
- Oil mist lubrication ✓
- Grease packed ✓
- Field repairable ✓



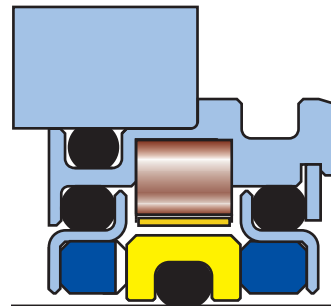
Vertical pump with MagTecta™ seals installed in 2003 (Case Ref: 1436).

Inventoried contacting and non-contacting bearing seal designs so you get the **right seal for the right application**

Contacting Face Seals - MagTecta™, MagTecta-OM™



MagTecta™ Section



MagTecta-OM™ Section

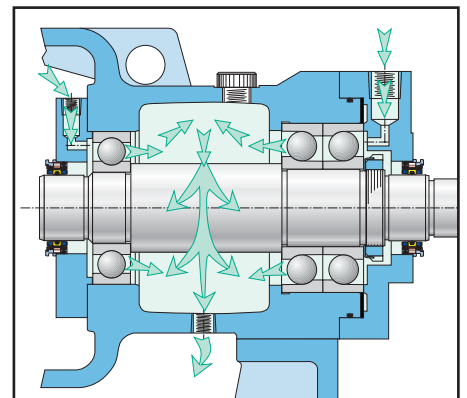


Innovative Technology

The MagTecta-OM™ is a face seal that prevents oil mist pollution and has been applied to **thousands of pieces of equipment** in the hydrocarbon processing industry.



The unique 'laser engraved' inboard face of the MagTecta-OM™ (shown left) allows oil mist to enter through its face grooves. Once inside, the oil mist liquefies to provide an oil splash environment at the external seal faces. This provides seal face lubrication, making the MagTecta-OM™ ideally suited for this environment.

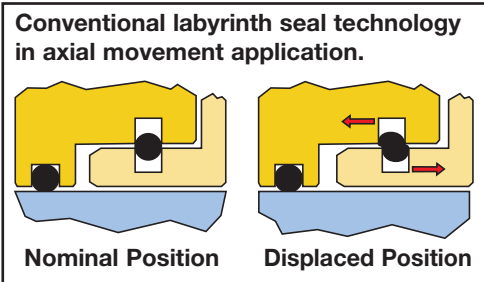


API preferred oil mist lubrication arrangement.

- No axial sliding movement on the shaft means the rotary drive integrity is not compromised.
- Superior protection against contamination ingress as the rotor to stator seal integrity is not affected by the axial movement.
- Standard LabTecta-AX™ design accommodates $\pm 2.5\text{mm}$ ($\pm 0.100''$) of axial movement; however, it can be designed to take any amount of movement that the application dictates.
- Unique dual rotor design with drivelock for superior reliability.

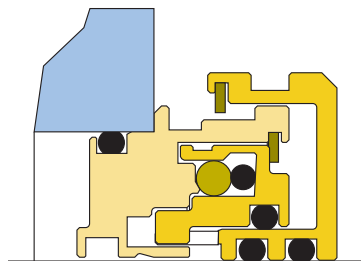
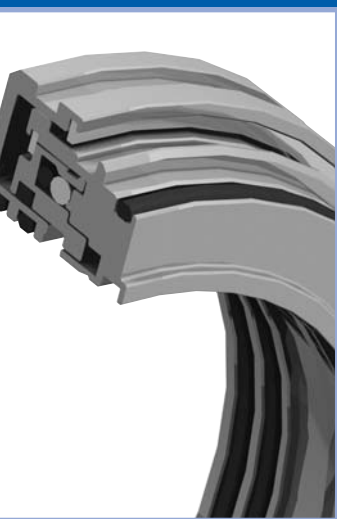


Sulzer MSD BB3 pump with MagTecta-OM-AX™ installed in 2006 (Case Ref: 3453).

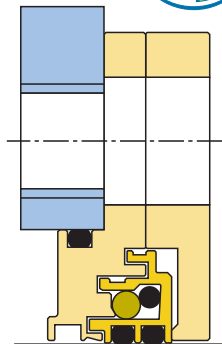


A bearing seal that is **engineered** to accommodate **axial shaft movement**

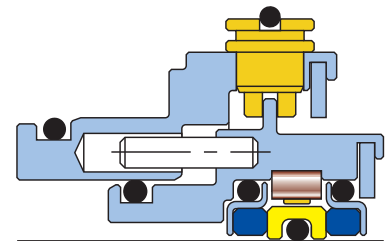
Axial Shaft Movement - LabTecta-AX™, LabTecta-AXX™, MagTecta-AX™



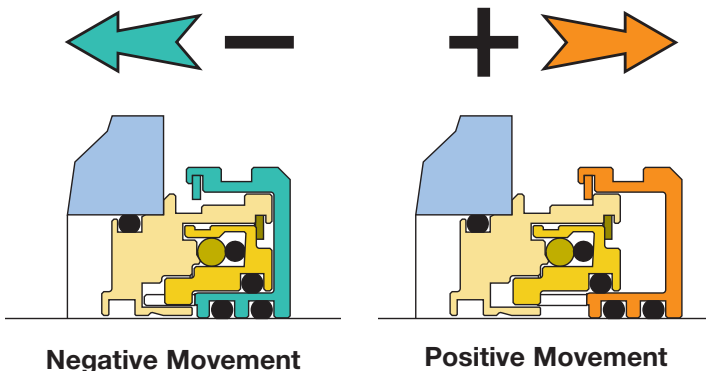
LabTecta-AX™ Section



LabTecta-AXX™ Section



MagTecta-AX™ Section



Innovative Technology

The LabTecta-AX™ design uses a unique sliding rotor that allows the seal to absorb axial movement internally. With this rotor design no axial sliding movement on the shaft exists that can cause shaft damage, drive-ring damage or allow contamination to pass under the drive 'O' ring.

The LabTecta-AX™ provides superior reliability by utilizing double drive rings to provide a secure grip on the shaft, reducing the chance of shaft slip and a dual-rotor design with a secure drivelock to ensure both rotors continuously follow the shaft.

- Engineered to absorb the angular misalignment of pillow/plummer bearing blocks.
- Accepts the same degree of angular misalignment as ANY standard seal offered by the OEM; one solution does all.
- Extended bearing and equipment life from better protection against bearing contamination.
- Reduced lubrication requirements through better lubricant retention and lower operating temperatures.



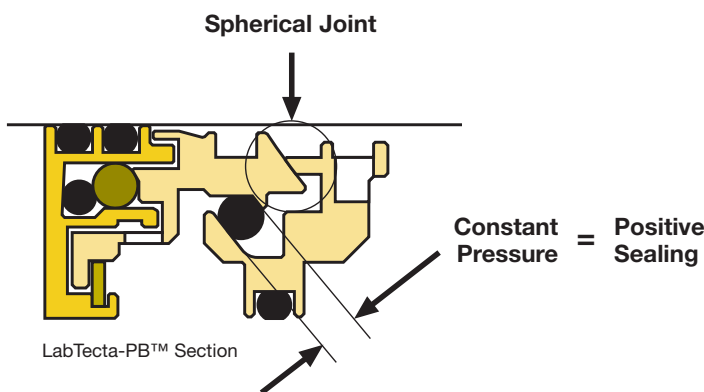
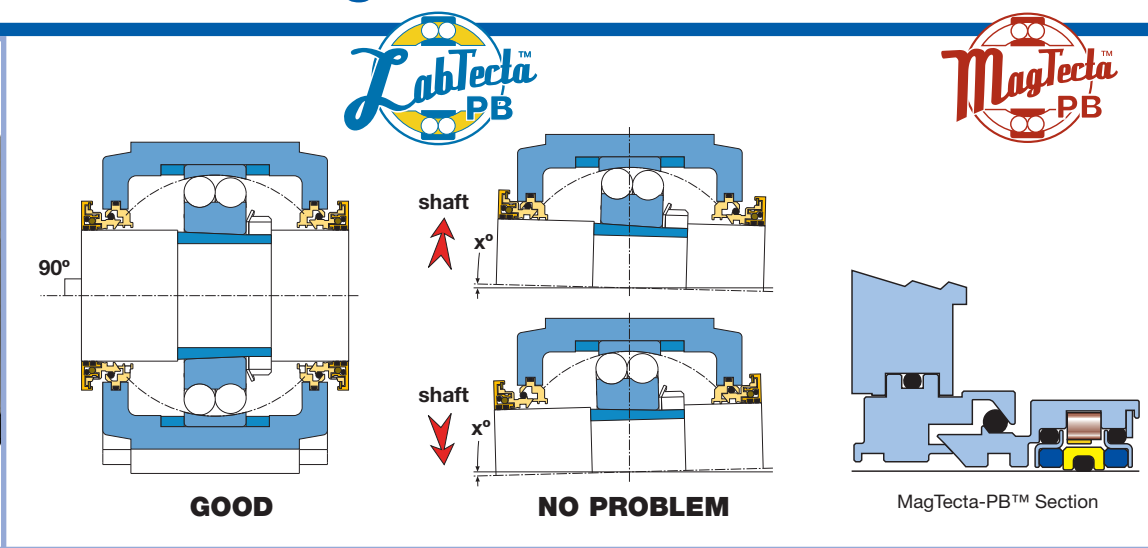
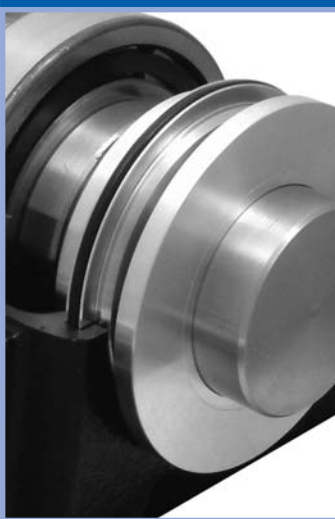
SKF pillow block with LabTecta-PB™ installed in 2006 (Case Ref: 3217).



Pillow block without LabTecta-PB™ technology.

A bearing seal that is **engineered** to accommodate **angular shaft movement**

Angular Shaft Misalignment - LabTecta-PB™, MagTecta-PB™



Innovative Technology

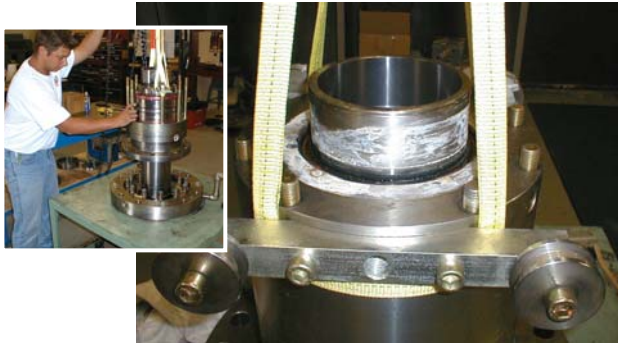
The LabTecta-PB™ utilizes a unique two-piece stator design that provides a self-aligning joint that allows the seal to align both to the bearing block and to the shaft.

The joint also provides constant pressure on the static elastomer to provide positive sealing throughout the range of motion.

- Extend bearing life of large, high maintenance cost equipment.
- Reliable protection against contamination ingress and lubricant egress.
- Easy installation - Radially split design.
- Positive lubricant retention for the life of the equipment.
- No shaft wear or damage to equipment.



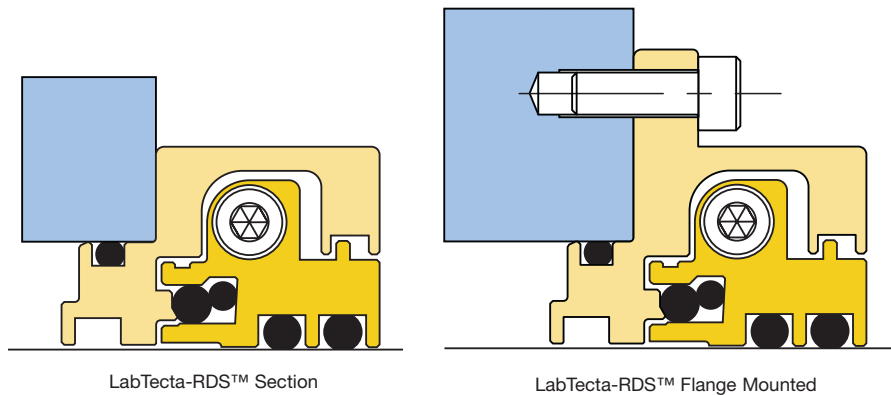
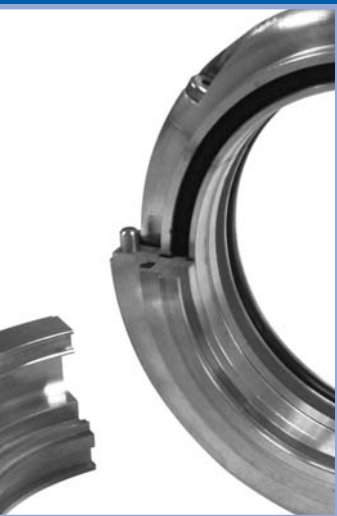
Flange mounted LabTecta-RDS™ installed on a double-ended pump in 2007 (Case Ref: 3304).



\$50,000 mixer seal destroyed by rainwater penetrating a \$20 lip seal (Case Ref: 3459).

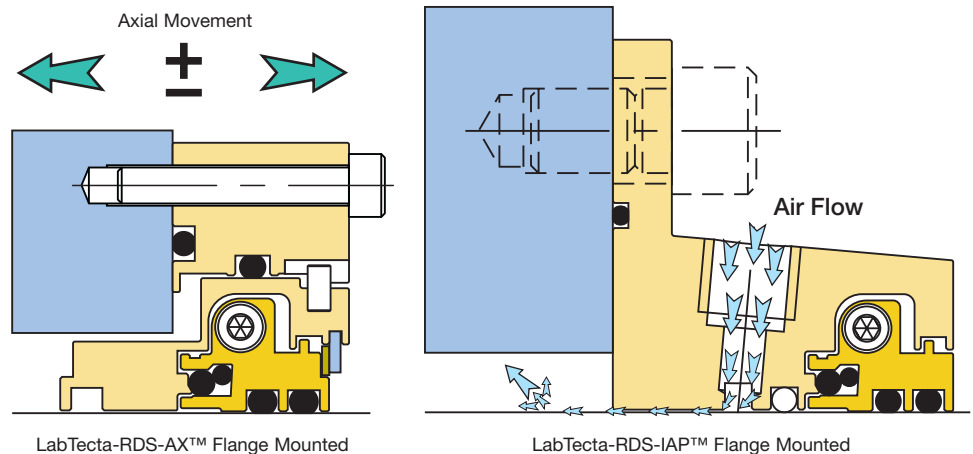
The only radially divided bearing seal available with **rotor/stator static sealing technology** as standard

Radially Divided Seals - LabTecta-RDS™



Innovation Technology

The LabTecta-RDS™ is available in several configurations including flange mounted, axial movement and internal air-purge, giving even greater flexibility and tailored to suit your specific application.



- Dramatically improve the equipment life of demanding applications.
- Prevent contamination across the seal.
- Maximize reliability with no heat generation, vibration or lubrication.



Multiple LabTecta-PB-OAP™ installed on a conveyor belt in the mining industry in 2006 (Case Ref: 3317).



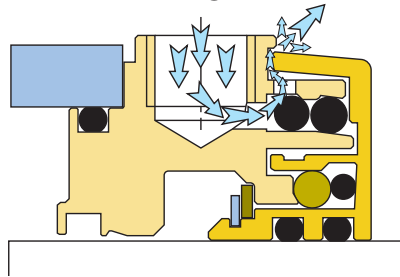
LabTecta-TE-OAP™ installed on a hydropulper gearbox in 2006 (Case Ref: 3327).

By changing the seal environment, even the most **challenging applications** can be **reliably sealed**

Air Purge Designs - LabTecta-OAP™, LabTecta-IAP™



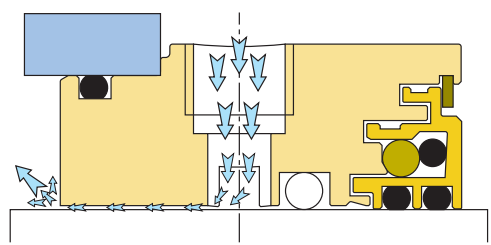
AIRFLOW



LabTecta-OAP™ Section (Outboard Air Purge)



AIRFLOW



LabTecta-IAP™ Section (Inboard Air Purge)

The LabTecta-OAP™ is specifically designed for use in extreme environments and applications where contamination may completely cover the seal/equipment. The unique design uses a positive air purge to enhance the performance of the labyrinth, with mechanical seal pressure balancing technology to maximize the performance of the seal and minimize air consumption.



LabTecta-OAP™ after three months running. Note: Air purge keeps the dust away from the stator to rotor interface.



LabTecta-OAP™ installed on a powder application (pre-start up) in Argentina.

- Range of bearing seals which operate in a totally flooded/submerged environment.
- Non-contacting seal designs that statically seal partly submerged/non-level equipment.
- Clipped and unitized designs for ease of installation.



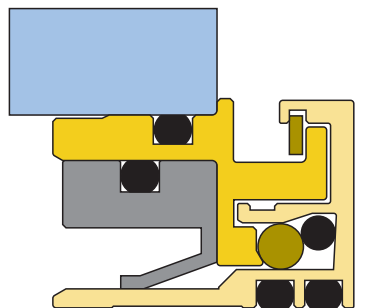
Archimedean screw fitted with AESSEAL® bearing seals in 2003 (Case Ref: 1348).



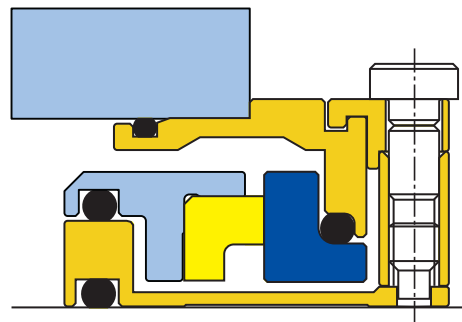
Leaking gearbox creating a fire hazard in a steel processing plant.

Three decades of mechanical seal experience applied to **seal flooded** bearing applications **correctly**

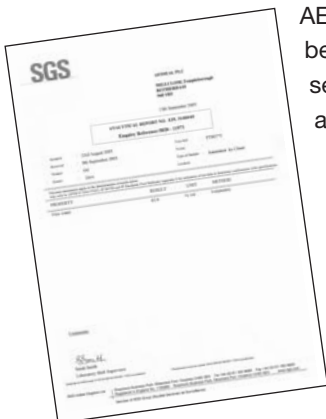
Flooded Applications - LabTecta-FS™, MagTecta-FS™



LabTecta-FS™ Section



MagTecta-FS™ Section



Lip Seal Test Certificate.

AESSEAL® bearing seals have been rigorously benchmark tested against other so-called sealing devices with results independently analyzed by third-party laboratories.



Lip Seal Test: Oil sample bottles for lab analysis.



Heinz P. Bloch P.E.
Independent Professional Engineer

“With bearing protection truly essential in a reliability focused plant, I have carefully analyzed both the new LabTecta™ design and the results of thorough testing.

I firmly conclude this ingenious field-repairable isolator will prove highly cost effective and lead to demonstrable equipment failure reductions.”

- Wide range of bearing chamber accessories is available to maximize equipment life.
- Cast bearing plates and sight glasses.
- Diaphragm sealed expansion chambers.
- Shaft driven forced lubrication systems.



Inventoried cast bearing plates to suit the range KSB CPK of process pumps (motor and pump sides).



Over-filled unbalanced lubricator presenting undue failure risk.

Accessorize the application to make further **reliability improvements**

Bearing Seal Accessories



PP/01 System
(Forced Lubrication System)



Diaphragm Expansion Chamber
Stock Code: EEC25-03



Sight Glass
Stock Code: L1108-12



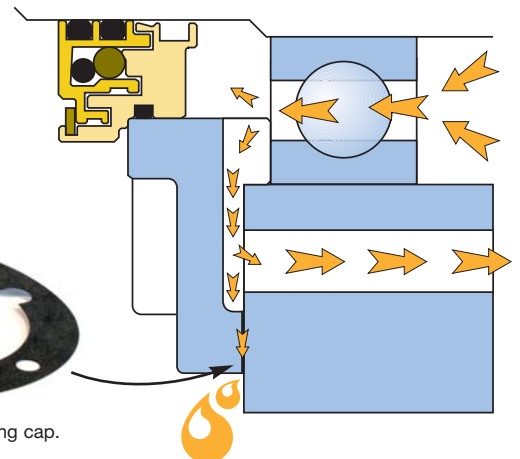
Bearing plate with 'O' ring seal.

If a pump is fitted with a paper gasket, apart from leaking bearing lubricant, it is probably allowing moisture to be ingested by the bearing chamber that will reduce bearing/equipment life.

A full range of inventoried bearing plates to suit the KSB CPK pump range is available with 'O' ring or gasket sealing options.



Paper gasket on the bearing cap.





ENVIRONMENTAL TECHNOLOGY

Our Purpose: *'To give our customers such exceptional service that they need never consider alternative sources of supply.'*

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