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THE QUEEN'S AWARD
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2009



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ENVIRONMENTAL TECHNOLOGY

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LabTecta™

“The 21st Century Bearing Protector”
PATENTED AND PATENT PENDING in over 39 countries.



IMPROVED	REDUCED
• Equipment life	• Bearing failures
• Process uptime	• Maintenance cost
• Operational profit	• Operational losses
• Environment	• Clean-up costs



“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”.

Heinz P. Bloch P.E.
Independent Professional Engineer

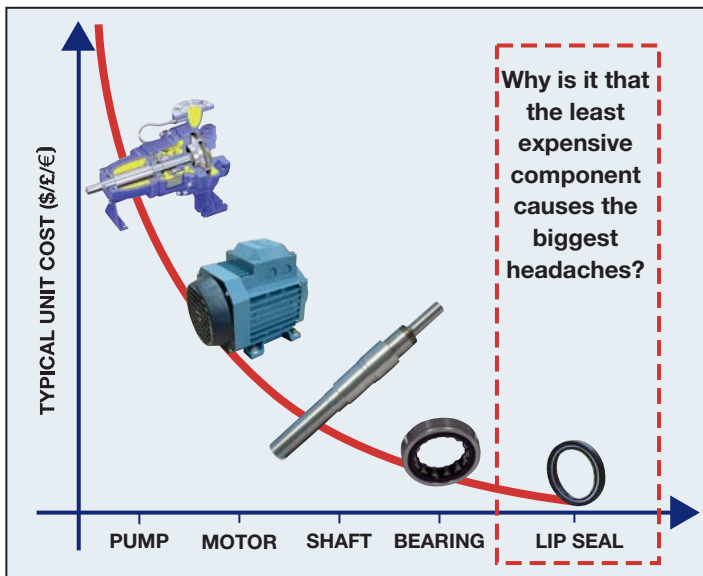
AESSEAL® - Company Overview



AESSEAL® is one of the leading global specialists in the design and manufacture of mechanical seals, support systems and bearing seals. With operations in six continents, AESSEAL® is the world's 4th largest supplier of mechanical seals, achieving growth through exceptional customer service and innovative products that provide real customer benefits.

Left: The AESSEAL® Global Technology Centre is one of over 69 Locations worldwide.
 Right: AESSEAL® have 6 branches in the USA - Rockford, Kingsport, Longview, Marion, Central Maine and Texas.

The Problem with Lip Seals - What is the TRUE Cost?



Lip Seals often have a short effective lifespan.

We use Lip Seals, despite the known problems, because we ignore the costs of shaft wear and premature bearing and equipment failure.

The LabTecta™ was designed to outperform Lip Seals and be inexpensive to repair.

The Lip Seal Water Ingress Test Results

A water jet was applied at 13.3 m/s (2,616 ft/min) in two separate tests to a 100mm (4.000”) Lip Seal at 382 rpm and 1,910 rpm.

Both tests were abandoned after an average of 3 hours due to the visual level of water in the housing. The housing oil was then analysed for percentage water contamination.

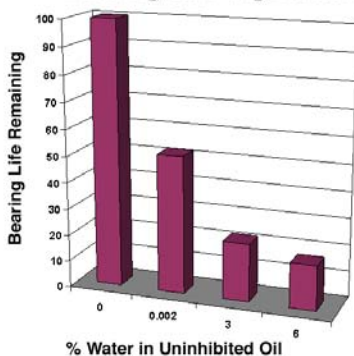
The Lip Seal test results, from a 3rd party laboratory showed **83%** (830,000 ppm) and **> 99%** (990,000 ppm) **water** contamination of the oil.



Lip Seal Test Certificates.

Lip Seal test: Oil sample bottles for laboratory analysis.

Water Contamination Reduces Bearing Life Significantly



From research done by a major academic institution water contamination as low as 0.002% (20 ppm) can reduce bearing life in some oils by as much as 48%.

Test Results Conclusion - A single acting Lip Seal cannot prevent forced water contamination.

Limitations of Lip Seals

- Lip Seals are ineffective at keeping contamination from bearing housings.
- Lip Seals can seriously wear shafts, causing extensive equipment damage and added cost.
- When Lip Seals leak, loss of lubrication causes catastrophic bearing and equipment failure.
- API610 9th edition, Section 5.10.2.7 recognizes this and states that **“Lip-type Seals shall not be used in centrifugal pumps”**.

LabTecta™ - Designed to be easily & economically repaired



With most competitor labyrinth designs the whole unit must be removed if it needs to be repaired. This means the “as designed” interference fit between the housing and the pump is damaged each time during removal. This can make the re-use of a labyrinth seal impossible because the close fit has been destroyed.

By design, the outer housing of the AESSEAL® LabTecta™ can be left inside the bearing housing while its internal components are replaced, as shown below.

Step 1 - Remove Face Shield



Step 2 - Remove External Components of LabTecta™



Step 3 - Replace Internal Components



Step 4 - Re-Install New External Components



Step 5 - Re-Install Face Shield



**REPAIR YOUR
LABTECTA™ WITHOUT
REMOVING IT FROM THE
EQUIPMENT HOUSING IN
5 EASY STEPS!**

**DESIGNED TO MAKE
LIP SEALS OBSOLETE**

LabTecta™ - No need for shaft refurbishment

REPLACING SHAFTS COSTS MONEY



Shaft damage from Lip Seals.



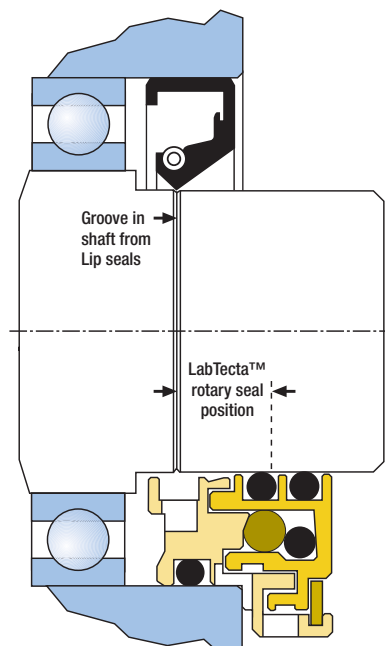
Shaft damage from a Labyrinth Seal.

The LabTecta™ Fits in the same space as a Lip Seal.

However, the LabTecta™ rotary elastomers are designed to sit on a shaft surface which was not previously damaged by a previous Lip Seal installation. This means that the customer shaft should not need to be replaced or refurbished when upgrading from a Lip Seal to a LabTecta™ bearing protector, thereby saving cost.

- **The twin rotary O-Ring design avoids worn Lip Seal grooves.**

Eliminate Shaft Refurbishment Costs



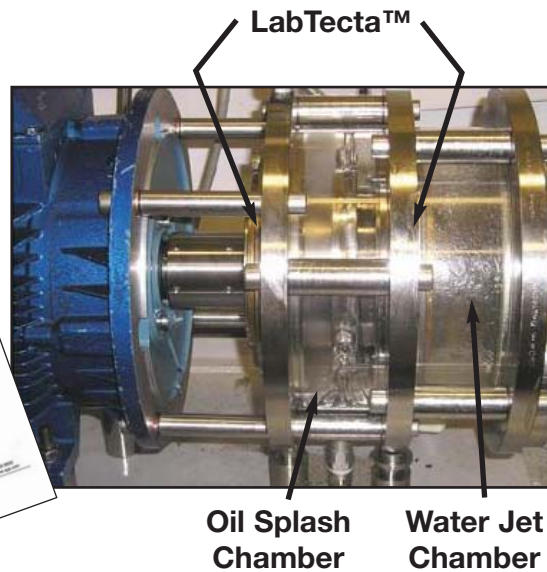
The LabTecta™ Water Contamination Test Results

In over 30 separate tests a 13.3 m/s (2,616 ft/min) water jet was directed at the LabTecta™ in a wide range of shaft sizes and operating speeds.

At 332 rpm the post test results of a 100mm (4.000") LabTecta™ showed 3 parts per million (3 ppm) water contamination.
At 1,910 rpm the results showed 0 ppm water contamination.

Conclusion - A LabTecta™ can and does prevent forced water contamination.

The LabTecta™ also has excellent performance on Grease lubrication and Dry Running conditions.



LabTecta™

LabTecta™ - A fundamentally superior bearing protector . . .



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 (3) 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 CHEMICALS
NEEDED FOR REPAIR**



**NO TORCHES/HEAT
NEEDED FOR REPAIR**

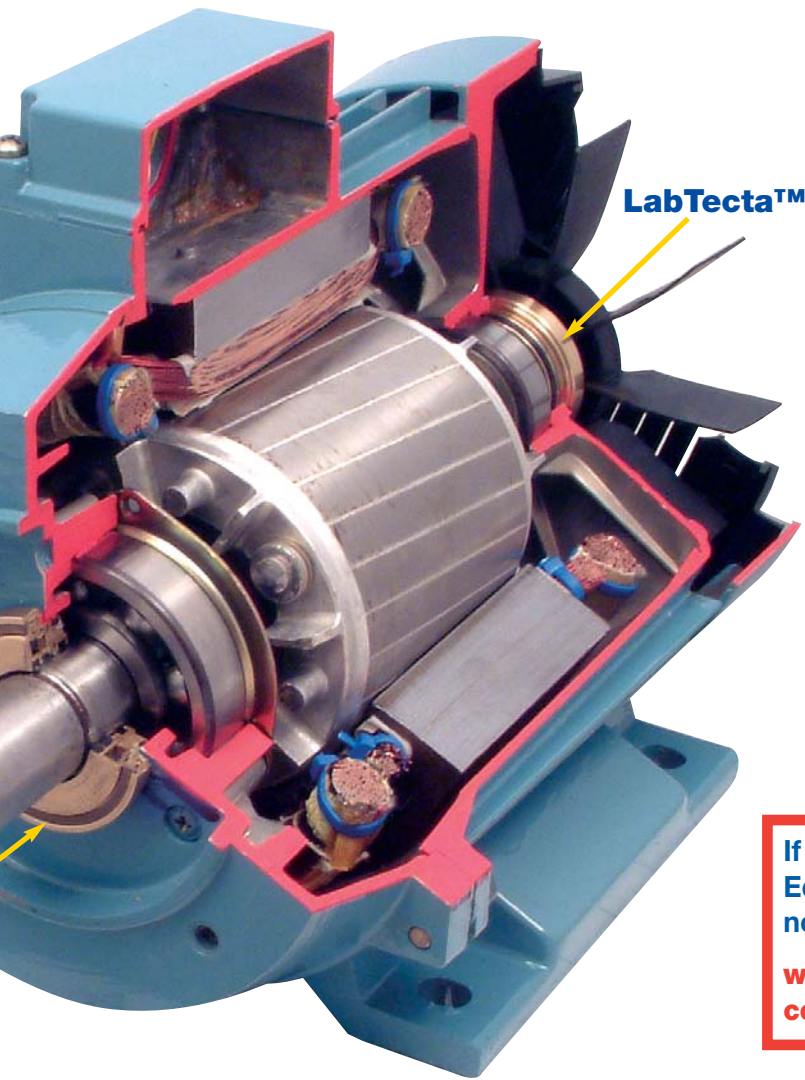


**NO PRESS/SPECIAL TOOLS
NEEDED FOR REPAIR**

IEEE Std 841-2001 Bearing Protection



When you fit LabTectas to your motors, you keep your motor clean, rotating and IP56 rated.



- Non contacting Seal ✓
- Ingress protection to IP56 ✓
- Easy to refurbish ✓
- Safe - Non sparking ✓
- Low cost ✓
- No shaft wear ✓



The LabTecta™ is independently certified to IP56 which exceeds the Ingress Protection requirement for IEEE Std 841-2001.

If the premium centrifugal pump standard, API 610 10th Edition, Section 5.10.2.7 dictates that Lip Seals shall not be used in such rotating equipment

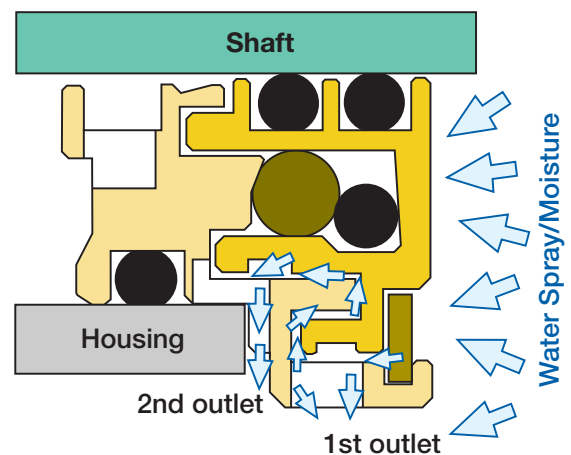
why do some Electric Motors manufacturers continue to use Lip Seals as the same issues apply?

Babylonian Terrace System - Designed to keep CONTAMINANTS OUT

External contaminants would have a tough time getting past the multi-tiered terraces designed into the LabTecta™.

There is a cascading effect and any water getting past the face shield is likely to be expelled in one of the two expulsion spaces. Like the famous hanging gardens of Babylon, these cascading segments are ingenious, dependable, and highly functional.

THE LABTECTA™ IS GUARANTEED TO LAST 3 TIMES LONGER THAN A CONVENTIONAL LIP SEAL



“ **Reliable Technology confirmed by rigorous testing and independent laboratory analysis** ”



“The elegant but ingenious simplicity of the LabTecta is an outstanding example of innovation, pushing forward the frontiers of seal design to overcome the problems and performance of traditional lip seals”.

Dr. Michael Harrison, MA, D.Phil
President of the Chartered Institute of Patent Agents.



Twin Rotary Drive

Murphy’s Law dictates, “if it can go wrong, it will go wrong”. The LabTecta’s “Twin Rotary Drive” construction means that the rotating O-Rings have twice the normal probability of fitting onto a clean and smooth shaft surface.

Furthermore, the twin rotary drive system provides 100% more drive integrity and optimizes the rotary stability during dynamic operation. This added stability must be considered essential when operating close-proximity labyrinth stator and rotor components.

The Arknian™ Shut-off Valve

The Arknian™ shut-off valve has an axial energizing member, which automatically adjusts the contact force on the primary shut-off valve. This contact force varies when the equipment is operating or idle. In operation a micro lift gap develops. At idle a static seal is formed.

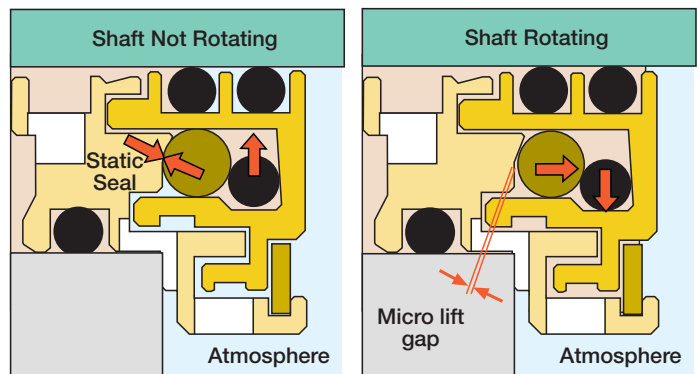
The shut-off valve member is manufactured from a wear-resistant material with low coefficient of friction.

This unique Arknian™ arrangement prevents moisture particles from being sucked back into the oil during cycles of bearing chamber breathing.

The Laws of Physics dictate that ALL contacting, counter-rotating components will wear. To minimize wear we need:

- Abrasion-resistant contacting materials with a low coefficient of friction.
- Self-adjusting contact force, depending on the shaft velocity.

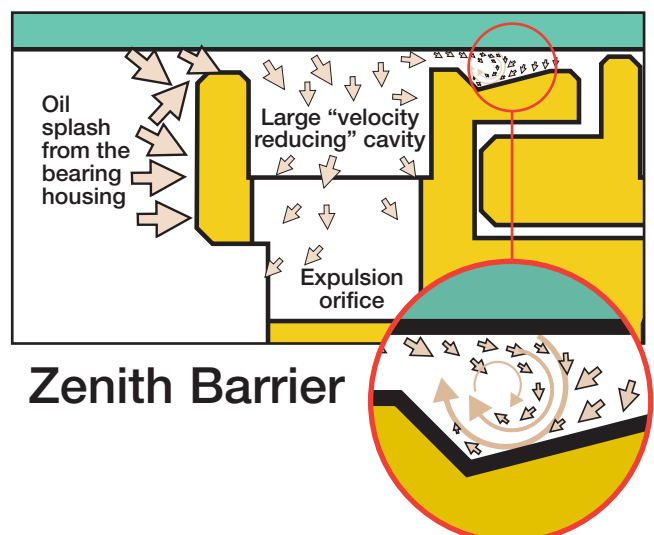
... exactly what the LabTecta™ provides.



Zenith Barrier - Designed to keep OIL IN

In dynamic shaft operation, the oil in the bearing housing must provide splash-lubrication for the equipment bearings. Most of the oil entering the LabTecta’s velocity-reducing stator cavity is expelled through the stator expulsion orifice. However, the Laws of Probability make it likely that some oil will get past this first cavity. As the oil particles now travel axially along the shaft, they are subject to centrifugal radial forces from the rotating shaft.

The radially accelerating oil particles are forced to contact the inclined stator surface and will move counter-axially towards the stator shoulder. The stator and shaft geometries and their relative proximity create a standing vortex. This standing vortex acts as an essential second physical barrier that prevents further oil egress.

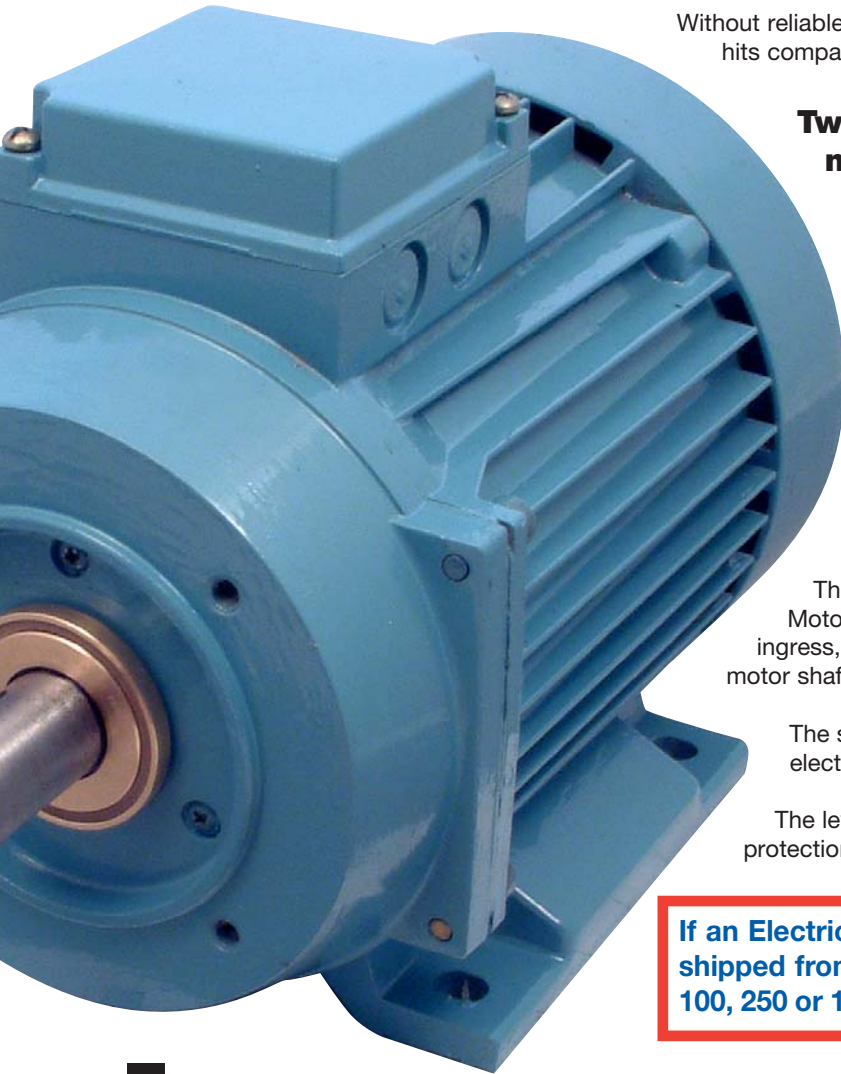


Zenith Barrier

Protecting Electric Motor Integrity

The Electric Motor is the most popular piece of rotating equipment in the world today.

Without reliable electric motors, loss of plant production and increased downtime hits company profits hard.



Two of the main factors in motor malfunction are:

1. Failure of the bearings causing seizure of the equipment.
2. Liquid contamination causing electrical shorting.

Not only can these cause damage to the motor windings and possible damage to the driven equipment, liquid ingress can be hazardous. Risk of electrocution may be present.

How are these risks reduced?

Like pumps, the first issue to address is prevention of premature bearing failure from contamination in the bearing chamber.

The traditional contamination prevention method employed in Electric Motors are Lip Seals. We know that Lip Seals will not prevent water ingress, as described earlier. However, like pumps, Lip Seals also damage motor shafts during dynamic operation escalating refurbishment costs.

The second issue of concern is that of plant safety as water and electricity do not mix.

The level of protection is dictated by an internationally recognized ingress protection (IP) standard as shown below.

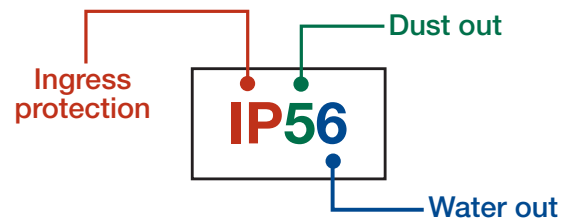
If an Electric Motor with Lip Seals fitted is IP55 rated when it is shipped from the factory, is it still IP55 qualified after it has run 100, 250 or 1000 hours given that we know ALL Lip Seals WEAR?

IP56 - Ingress (contamination) Protection for electrical equipment

'IP' rating stands for 'Ingress Protection'. An IP number, such as 56, is used to specify the sealing effectiveness of enclosures against the intrusion of foreign bodies (i.e. tools, dust, and moisture).

IEEE Std 841-2001

Requires IP55 Ingress Protection and the use of a 'non-contacting whilerotating' device like the LabTecta™.



1st digit: Protection against foreign objects

Provide a degree of protection against the following environmental conditions:	0	1	2	3	4	5
No protection	●					
Protection against solid objects up to 50mm (1.968") e.g. accidental touch by hands		●	●	●	●	●
Protected against solid objects up to 12mm (0.472") e.g. fingers			●	●	●	●
Protected against solid objects over 2.5mm (0.098") e.g. tools				●	●	●
Protected against solid objects over 1mm (0.039") e.g. wires					●	●
Protected against dust- limited ingress (no harmful deposit)						●

2nd digit: Protection against water

Provide a degree of protection against the following environmental conditions:	0	1	2	3	4	5	6
No protection	●						
Protected against vertically falling drops of water		●	●	●	●	●	●
Protected against direct sprays of water up to 15° from the vertical			●	●	●	●	●
Protected against sprays to 60° from the vertical				●	●	●	●
Protected against water sprayed from all directions - limited ingress permitted					●	●	●
Protected against jets of water from all directions- limited ingress permitted						●	●
Protected against strong jets of water from all directions- limited ingress permitted							●

No contacting Lip Seal can conform to IEEE Std 841-2001.

MagTecta™ - a bearing sealing revolution



The LabTecta™ is a non-contacting Labyrinth Bearing Protector ideally suited for high shaft speed or marginal lubrication applications.

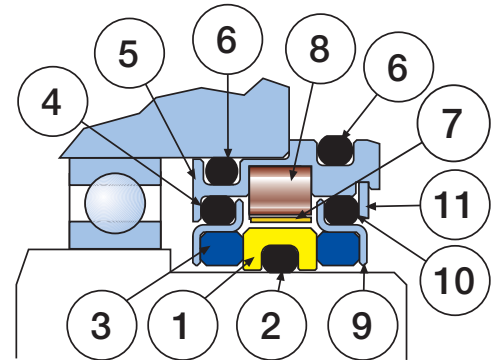
The LabTecta's sister products, the MagTecta™ and MagTecta-OM™, are contacting dual magnetic bearing seals which will seal the bearing chamber.

The patent pending MagTecta™ range is offered with true mechanical seal faces manufactured from blister resistant carbon and solid tungsten carbide, exactly the materials you would select for sealing oil.

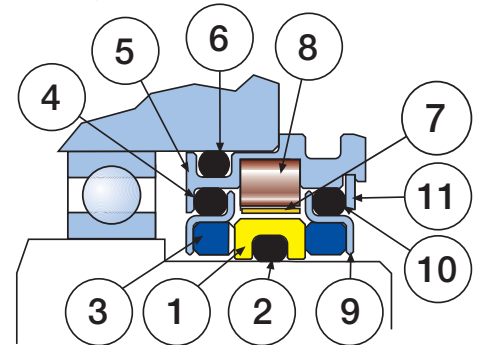
After many years of research and development, AESSEAL® is proud to offer these products which, in its opinion, are probably the most technologically advanced bearing protectors in the world.

The designs combine the latest AESSEAL® “pure innovation” with its world-leading, customer orientated, “modular” concept.

For further information, contact magtecta@aes seal.com or visit www.bearingprotection.com



MagTecta™ shown in normal orientation



MagTecta-OM™ shown in normal orientation

MagTecta™ Range Parts List

Item	Description	Material
1	Rotary Seal Face	Tungsten Carbide
2	Rotary Elastomer	Viton® / Aflas® / EPR / Kalrez®
3	Stationary Seal Face Assy	Ant.Car-S/S
4	Stationary Elastomer	Viton® / EPR
5	Outer Body	Stainless Steel
6	Outer Body Elastomer	Viton® / Aflas® / EPR / Kalrez®
7	Shroud	Phosphor Bronze
8	Magnet	Metal
9	Stationary Seal Face Assy	Ant.Car-S/S
10	Stationary Elastomer	Viton® / EPR
11	Circlip	Stainless Steel

FOR EXACT WORKING PARAMETERS OF ALL THESE PRODUCTS CONTACT THE AESSEAL® BEARING PROTECTION TEAM.

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 FOR FURTHER INFORMATION AND SAFE OPERATING LIMITS CONTACT OUR TECHNICAL SPECIALISTS AT THE LOCATIONS BELOW.



USE DOUBLE MECHANICAL SEALS WITH HAZARDOUS PRODUCTS. ALWAYS TAKE SAFETY PRECAUTIONS:

- GUARD YOUR EQUIPMENT
- WEAR PROTECTIVE CLOTHING



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INVESTOR IN PEOPLE

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