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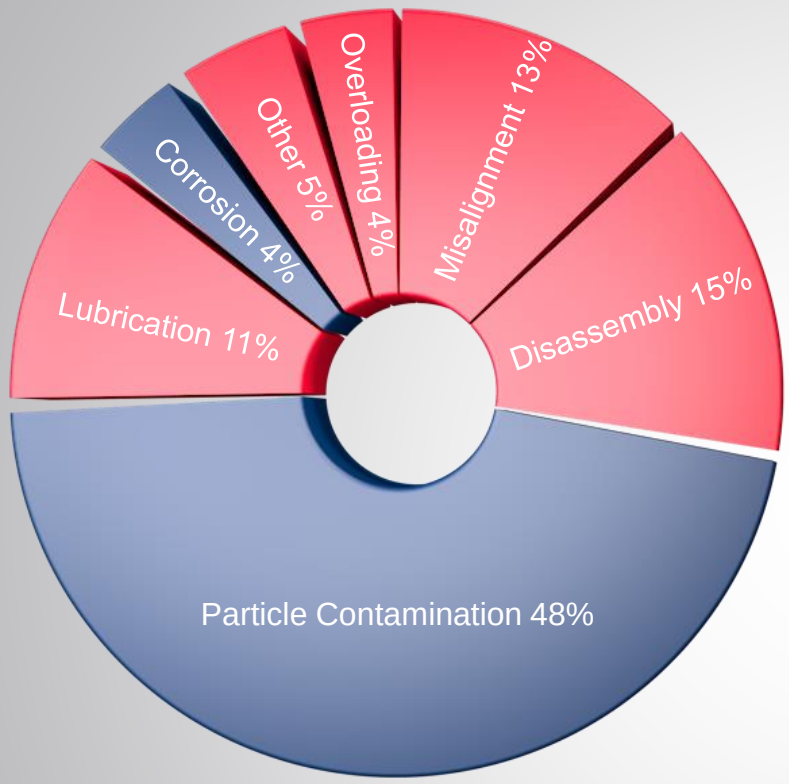
Extending Bearing Life

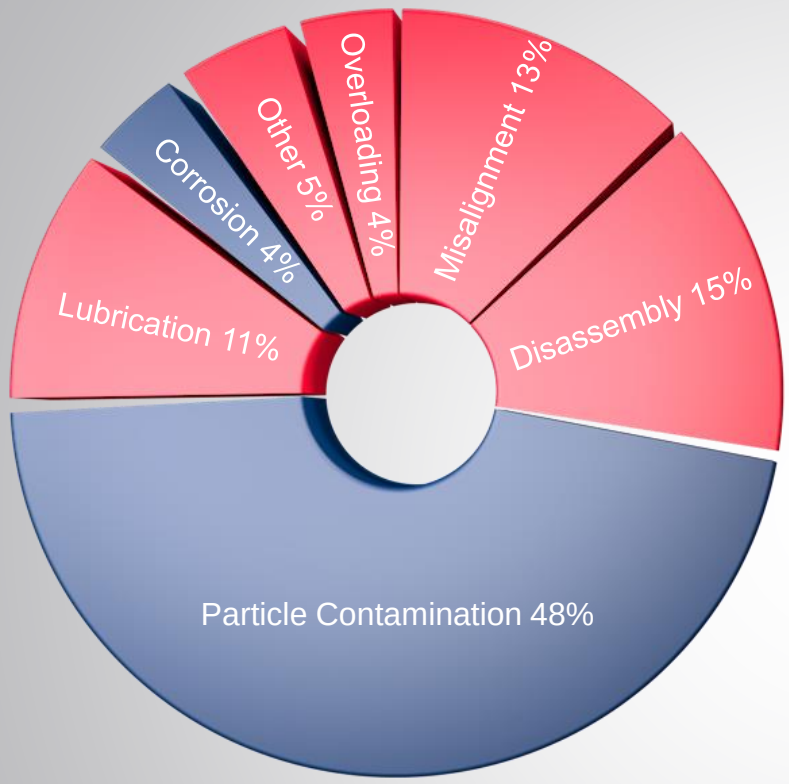


It is estimated that bearing failure is responsible for 21% of all rotating equipment failures.

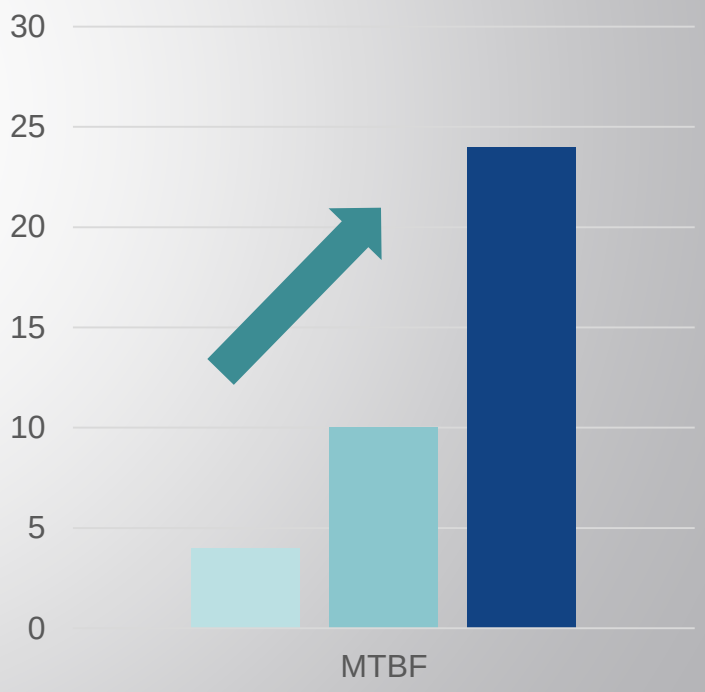
52% of ALL bearing failures are caused by contamination of the bearing oil

48% from particle contamination
4% from corrosion caused by liquid contamination

Bearing Failure



Therefore the use of effective sealing solutions to prevent the contamination of the bearing lubricant is a key success factor in improving the MTBFs.



Bearing Failure

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Typical sources of contamination:

- Harsh equipment environment
  (dust, sand, rain)
- Product residues
  e.g. when primary seals fail on pumps or mixers
  (pulp, chemicals, steam, slurries ect…)
- Cleaning operations
  (jet cleaning, cleaning agents, ect…)

Typical ways of contamination:

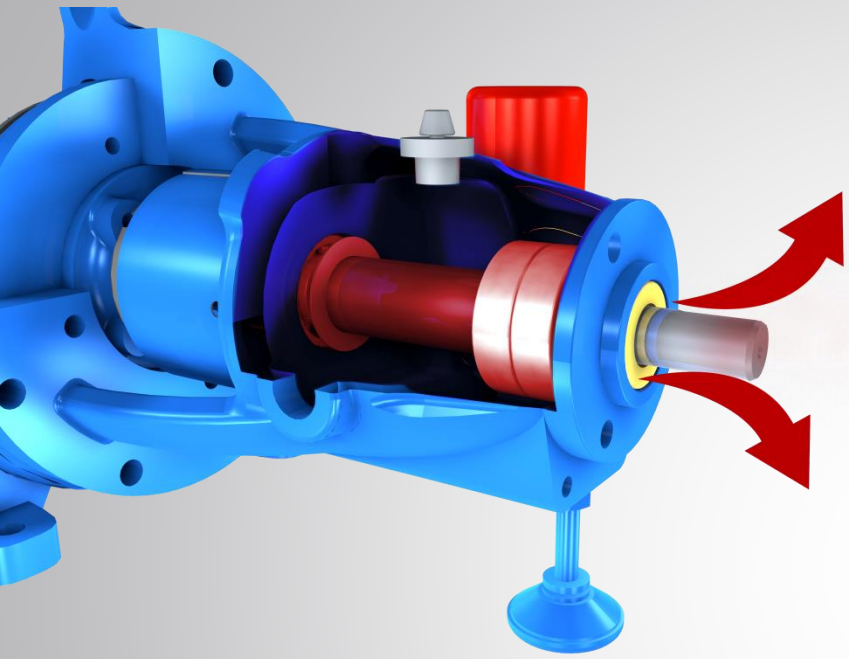
- Typically through the sealing of the rotating shaft.

Sources of contamination

Contamination through sealings of the rotating shaft:

- High pressure/ flow (jet cleaning, pressurized air) forcing particles or liquids through the bearing sealings.
- Inappropriate shaft sealings
- Breathing effect of the housing/ equipment.

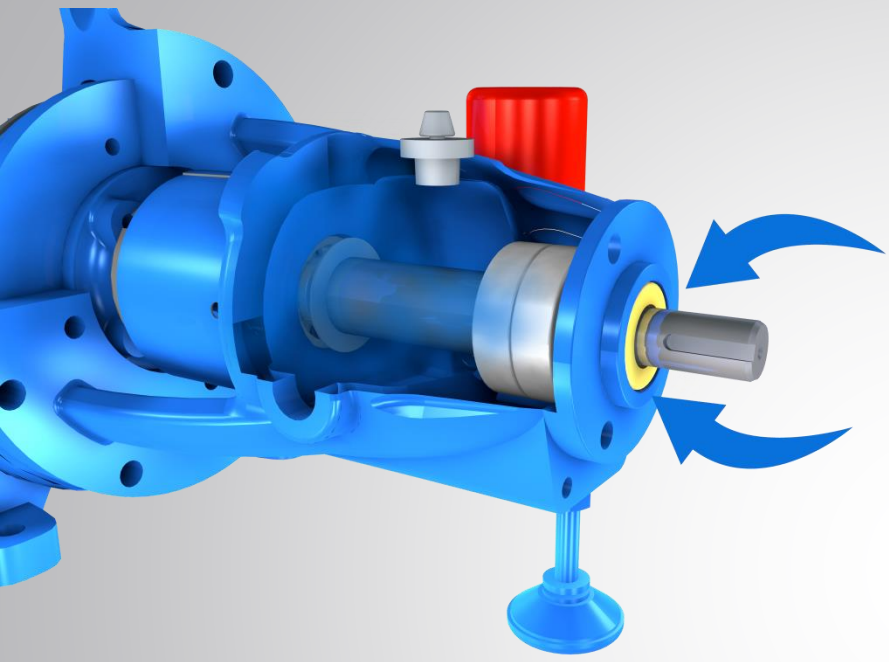
Sources of contamination



The breathing process is one of the significant contributors to bearing oil contamination

When the equipment rotates the bearing housing heats up and the oil/air mixture expands & is forced through the seal or a special breather

The breathing process



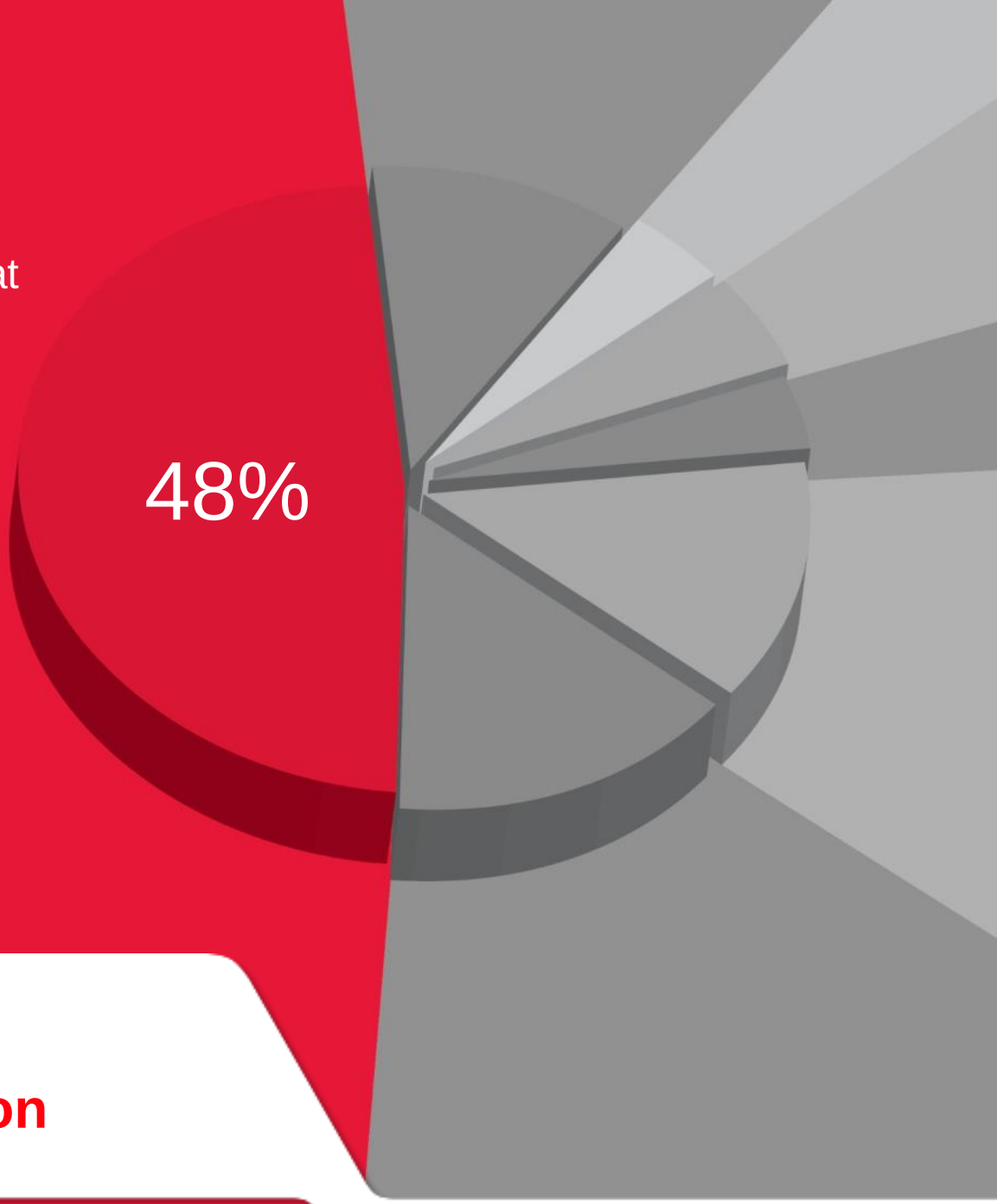
The real problem arises when the equipment cools

The oil/air mixture cools and contracts sucking air from the external environment through the bearing seal & back into the housing.

This air sucked in the housing can be humid and can also contain particles.

The breathing process

Independent research shows that water contamination **as low as 0.002% (20ppm)** can degrade oil properties that much, that it can reduce bearing life by up to 48% depending to the type of oil.



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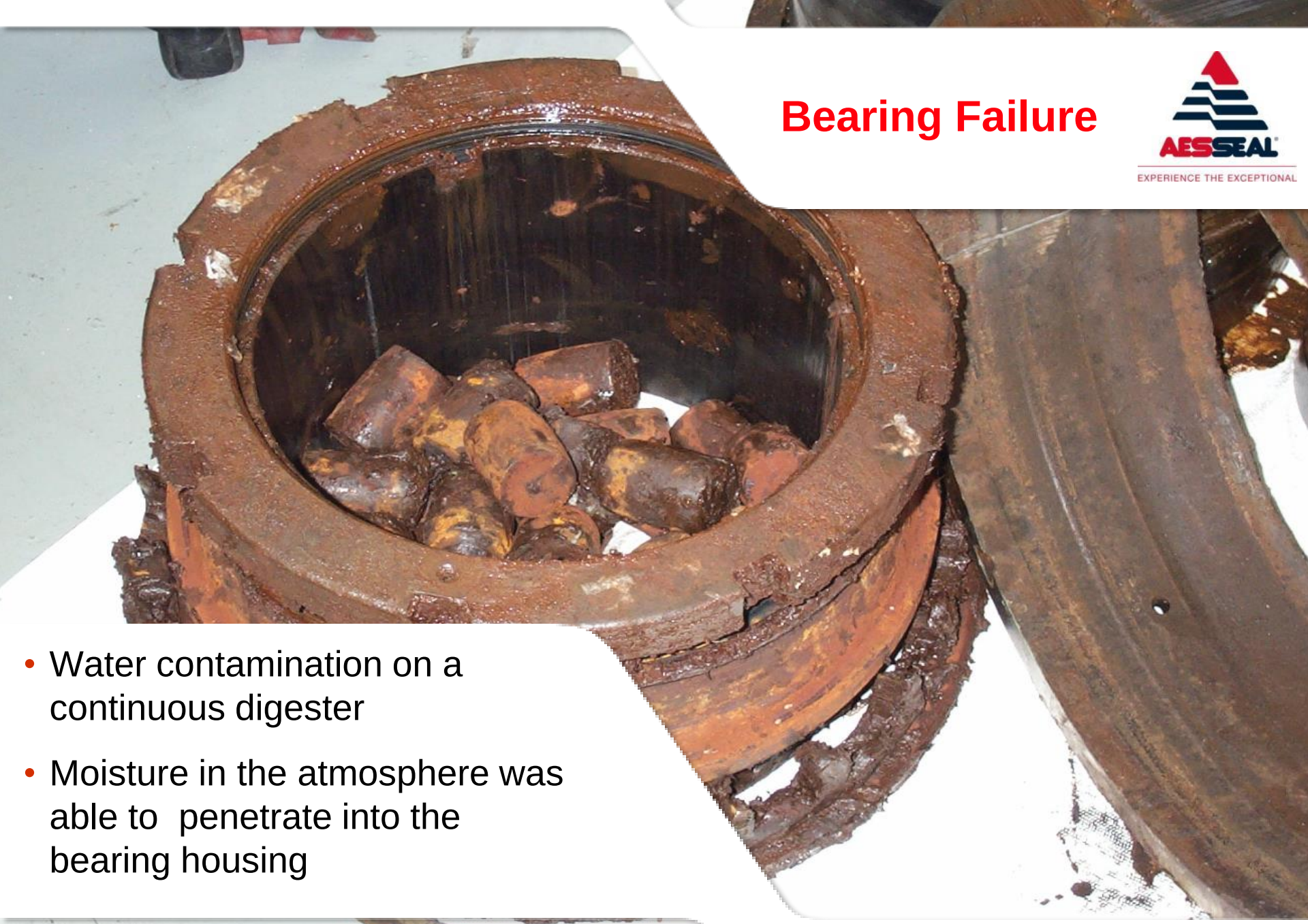
Moisture Contamination

Bearing Failure



- Water contamination on a continuous digester
- Moisture in the atmosphere was able to penetrate into the bearing housing

- The most common method of bearing protection is to use a lip seal
  - Inexpensive initial cost means they are still widely applied
- However they can't fully protect the bearings from moisture or particle ingress
- Main design target of lip seals is to keep the bearing oil in the housing.
- Can't be used in API applications

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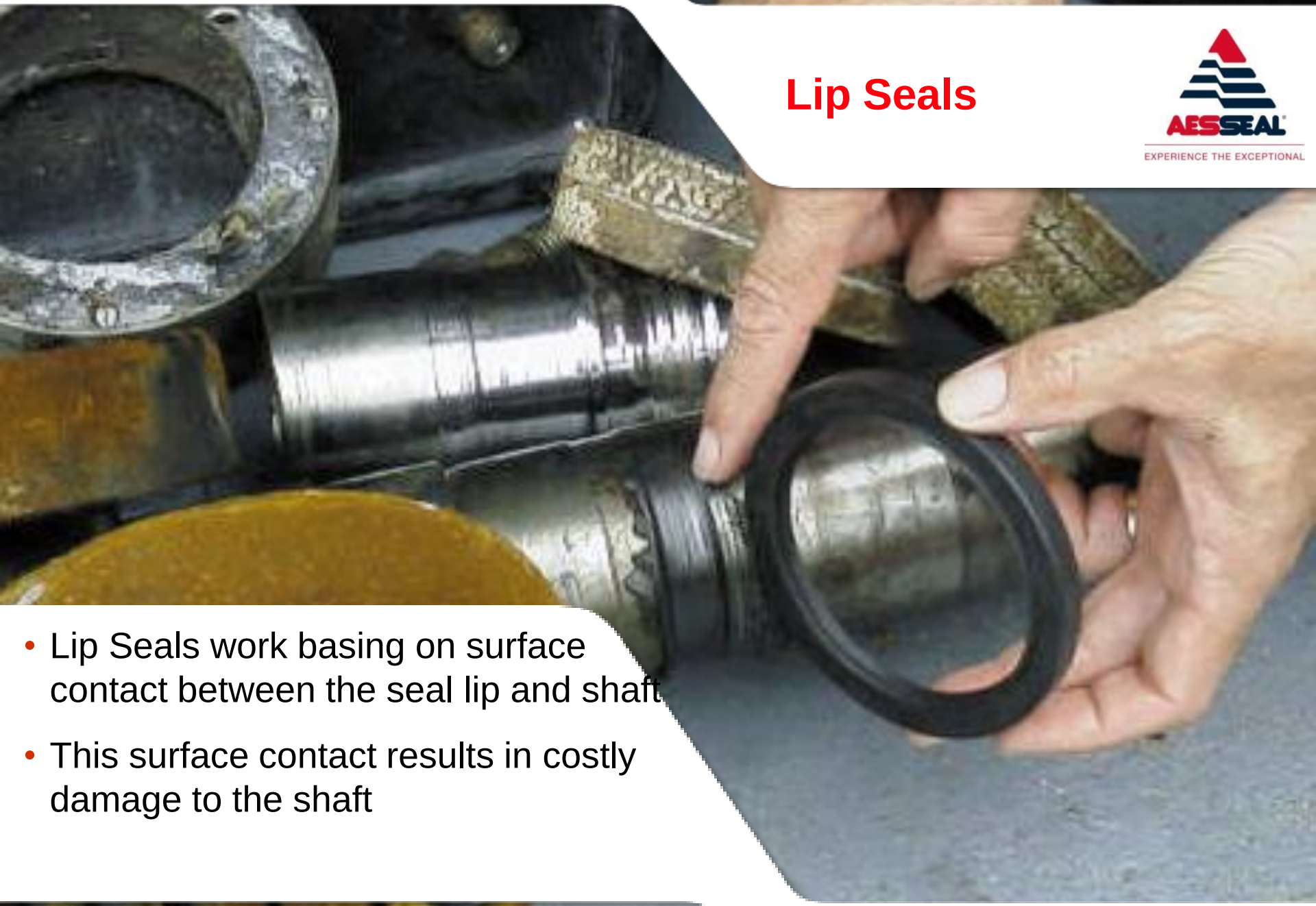
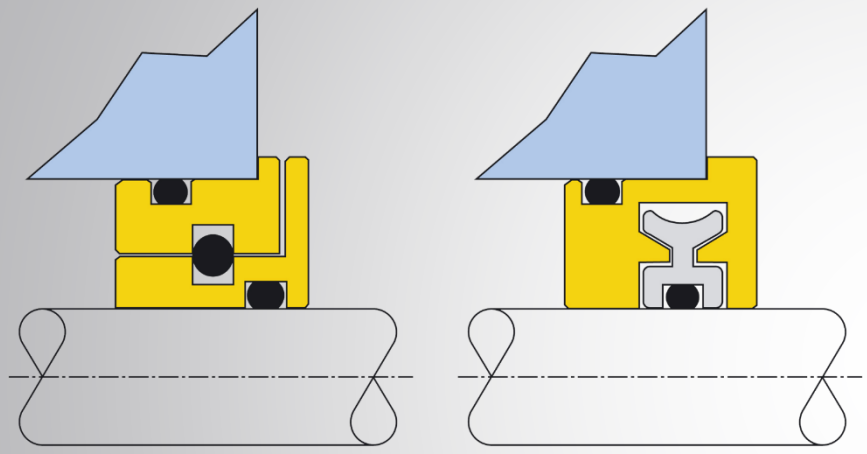
Lip Seals

Lip Seals



- Lip Seals work basing on surface contact between the seal lip and shaft
- This surface contact results in costly damage to the shaft



Bearing protector seals are an alternative to lip seals and the designs vary significantly

These components often wear or don't effectively seal the bearing housing

Many of these designs are now viewed as outdated

Also different types of labyrinth seals can be found on the market, but often they require special housing design and are complicated to install.

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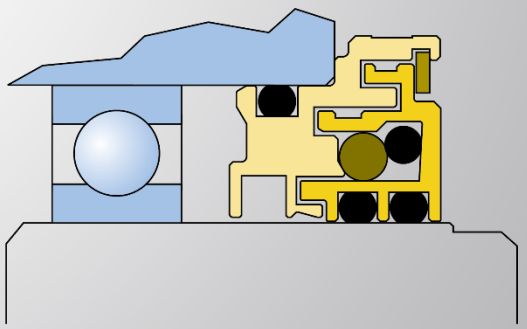
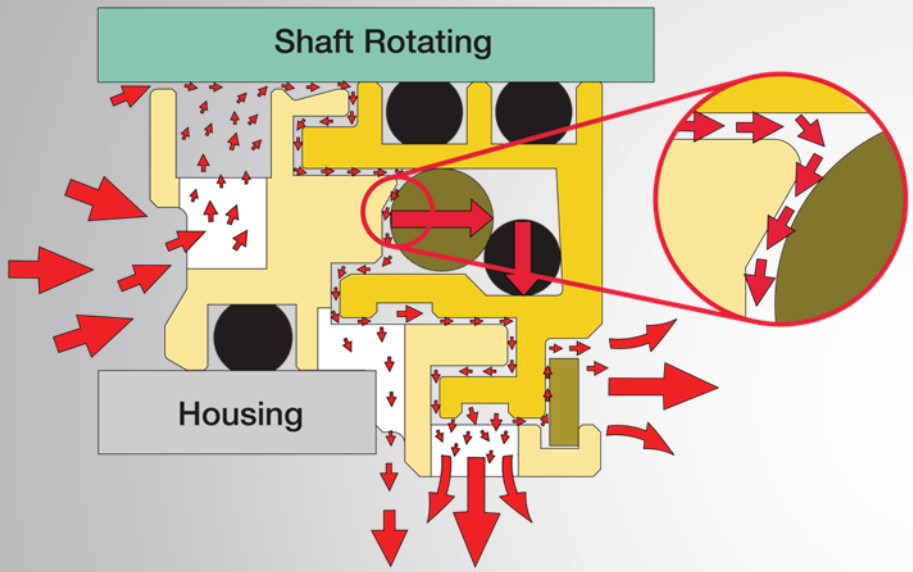
Bearing protector seals

Bearing Protection

- LabTecta successfully eliminates bearing oil contamination
- Suitable for use in pumps, motors, gearboxes, fans & turbines
- Is non contacting in operation

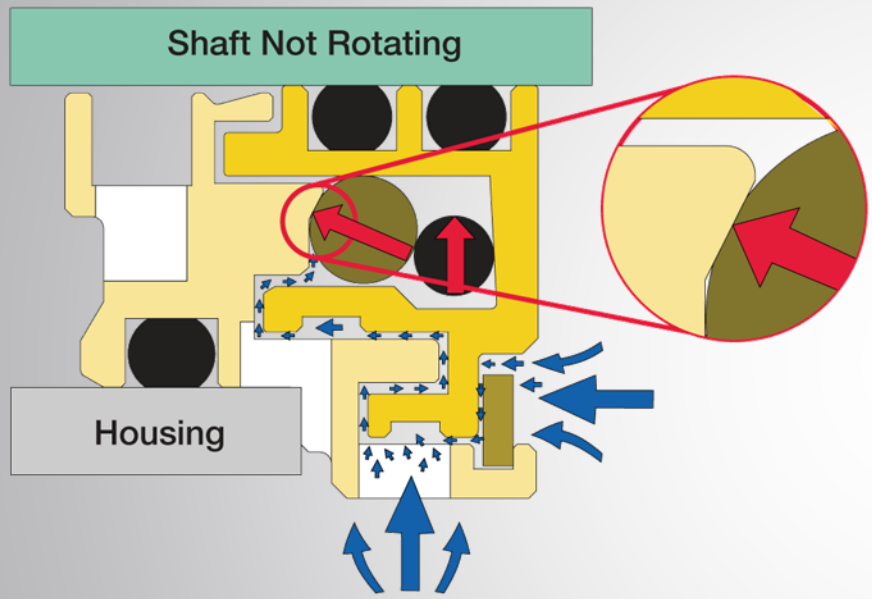




Cross-section of a standard LabTecta® 66

Centrifugal force of the rotating shaft allows a temporary micro gap to open allowing the equipment to breathe.

Dynamic Lift Technology



When the equipment stops rotating & the micro gap is immediately closed

This forms a perfect seal against dust and moisture, eliminating bearing oil contamination

Dynamic Lift Technology

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- Ingress protection rated to IP66
- Reduces the water contamination significantly (up to >99,99%) compared to most other sealing solutions (even with jet cleaning or other wet environments)
- ATEX certified (both Bronze and stainless steel versions)
- Positioned differently on the shaft to lip seals meaning damaged shafts often don't have to be replaced
- Besides the standard LabTecta® 66 type, there are many application optimised types, like a Top Entry, Fully Submerged, AXial displacement, Radially Diveded Seal, ect…

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LabTecta

LabTecta Success

Year	Quantity Supplied	Number of Returns
2006	5182	5
2007	11721	1
2008	17714	5
2009	14245	10
2010	16925	8
2011	20993	7
2012	20132	6
2013 (Aug)	13785	10
Note: All reported failures were attributed to installation errors. None of the instances were design or wear failures		

- Launched 2006
- 175,000+ supplied
- No failure due to design or wear issues

LabTecta Success

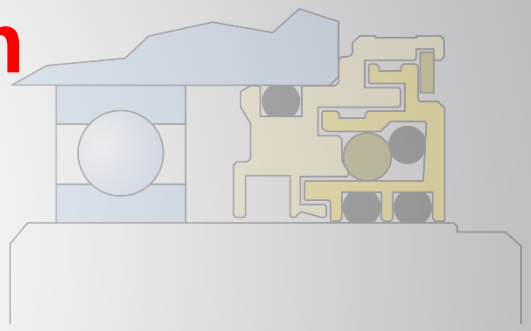
- Water ingress on a customer's machine rolls
- LabTecta-AX can accommodate axial movement of +/- 4.5 mm
- Successfully sealed since 2008

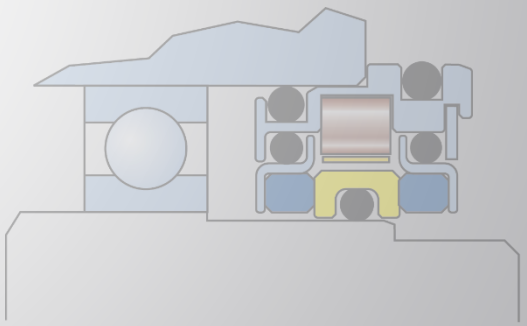
LabTecta Success

- Paint leaking out of a badly aligned bottom entry mixer. Motor damaged every two month.
- LabTecta ® TE installed in 2006 & still working today

- MTBF increased by 500%
- Saving €6000 per year in maintenance cost.
- Saves 9.5 days per year in lost production.

www.LabTecta.com





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Further Information

Questions