EagleBurgmann®
Rely on excellence

Identifying and preventing damage to mechanical seals

The heart of a pump is its mechanical seal. A mechanical seal is a reliable component but its service life depends on being correctly fitted and properly used. Improper use and uncontrolled operating conditions can result in damage and failure.

You can help prolong a seal's running time by:
- ensuring the seal's materials are compatible with the pumped medium
- installing and commissioning the mechanical seal in accordance with the assembly and operating instructions
- not exceeding the operating limits for pressure, temperature and speed
- preventing harmful oscillations and vibrations
- carrying out regular inspections and maintenance

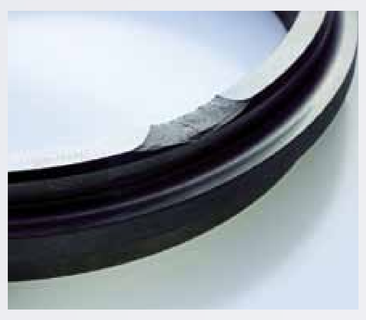
A damage analysis requires you to assess not only the mechanical seal, but also the condition of the machine, the condition of the supply system and any influencing factors from the production process. This is a matter of crucial importance. A systematic approach is needed to detect the mechanisms responsible for damage. This is the key to successful countermeasures.

With our many years of experience and multi-vendor expertise we will be glad to help you. From diagnostics, analysis, technical consulting and the drawing, up of improvement concepts to conversions, repairs and practical training courses – the full spectrum of our TotalSealCare™ Service is at your disposal. **www.TotalSealCare.com**

Damage due to fitting errors

Typical fitting errors
- Axial pre-tensioning of the spring-loaded unit outside the permitted tolerance
- Fitting dimensions of the connection parts outside the permissible tolerance
- Axial, radial run-outs or excentricity of the shaft
- Dirty sliding faces
- Torque transmission not properly installed
- Individual parts wrongly fitted or not fitted at all
- Assembly gauges not swiveled out
- Use of grease/oil when fitting rubber bellows seals

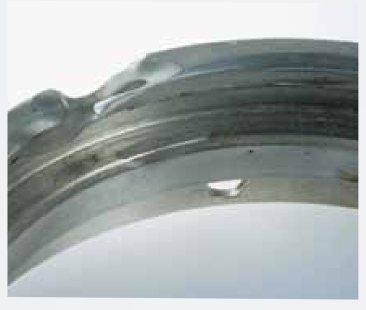
Contact with shaft during fitting
The seal face or seat touches the shaft during fitting or dismantling; shell-shaped spalling on the edges is typical of this type damage.



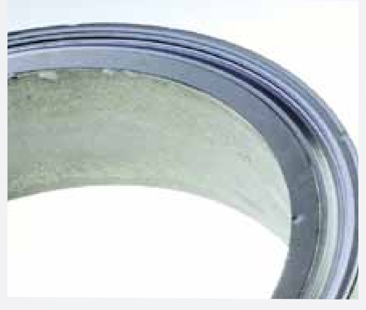
L-ring fitting errors
The rear L-ring is pushed off its seat during fitting of the rubber bellows. As a result, clamping is no longer sufficient; the shaft spins under the bellows.

Mechanical damage

Abrasive wear
Solids in conjunction with a strong material flow (turbulence) in the medium can erode material from the components. **Remedies:** Avoid narrow gaps, provide as much space as possible.



Running grooves
Causes: Solids in the medium, possibly in combination with lack of lubrication (dissolved or undissolved solids?) **Remedies:** If possible use wear-resistant materials, prevent insufficient lubrication and check the operation of the mechanical seal.



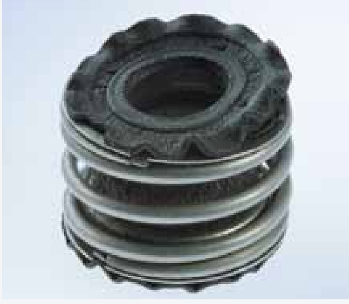
Damage due to oscillations
Causes: Shaft deflections, misalignment of the seat, evaporation in the sealing gap, axial/radial run-outs, excentricity. **Remedies:** Identify the causes for the oscillatons and eliminate them.

Gap extrusion on O-rings
Causes: Pressure or temperature operating limits of the O-ring are exceeded. At too high temperature the elastomer becomes soft and the pressure operating limit drops. O-rings can also overheat as the result of oscillations. Their stability (pressure resistance) is then reduced. Other possible causes: The gap is too large, the installation spaces are too small. **Remedies:** Observe the gap dimensions, provide supporting rings if necessary, adapt the hardness of the O-ring to the pressure conditions, observe the temperature and check the installation dimensions.

Chemical damage

Pitting corrosion
Causes: The material is not resistant to the medium/product or buffer medium (e.g. ingress of product into the buffer medium, e.g. M74-D). **Remedies:** Check resistance and prevent contact with the product if possible.

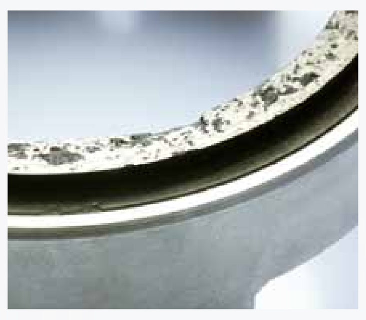
Chemically corroded bellows
Causes: The bellows material is not resistant to the medium/product, e.g., the product can diffuse into the material causing the bellows to swell. Resistance may also decrease as the temperature rises! **Remedies:** Check the resistance of the bellows material and observe the temperature operating limits.



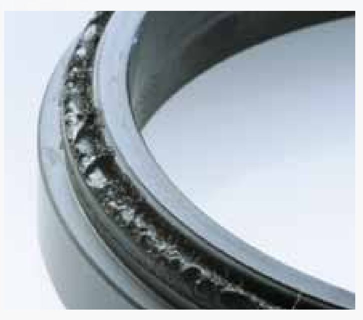
Chemically attacked O-ring
Causes: The material is not resistant to the medium/product, e.g. constituents can be extracted from the material, causing the O-ring to shrink. Resistance may also decrease as the temperature rises! **Remedies:** Check the resistance of the O-ring material, observe the temperature limits.

Thermal damage

Blistering
Causes: Unequal expansion of carbon constituents under the influence of temperature and expansion of the medium which has penetrated into the carbon. **Remedies:** Provide better heat dissipation, improve circulation, lower the viscosity of the buffer medium and check whether blistering-resistant materials can be used (e.g. SiC <-> SiC).



Melted bellows / O-ring
Causes: Overloading the elastomer by hot medium or hot contact surfaces, e.g. SiC seal face during dry running (damage is then confined to the contact area of the bellows or O-ring/seal face). **Remedies:** Identify the causes for the thermal overloading and eliminate.



Brittle bellows / O-ring
Causes: Overloading the elastomer by hot medium or hot contact surfaces, e.g. SiC seal face during dry running (damage is then confined to the contact area of the bellows or O-ring/seal face). **Remedies:** Identify the causes for the thermal overloading and eliminate.

Burgmann Industries GmbH & Co. KG
Aeussere Sauerlacher Strasse 6-10 · D-82515 Wolfratshausen · Phone +49 (0)8171 23 0 · info@de.eagleburgmann.com · **www.eagleburgmann.com**