The mechanical seal paradise

Today, only mechanical seals are used for both drinking water and sanitation water seals, meeting all the requirements of pumps and filters.

The pumps are often submerged, some are circulating pumps and some are feed pumps.

Except in the event of heavy storms near a dam, no particular problem arises this quite constant product which has a somewhat limited lubricating capacity.

An enormous potential

Water towers, dams and other retention systems, sewage plants, in increasing numbers, backing up of equipment to ensure the continuity of supply constitute quite a potential market.

The long-term requirements of the population and economic activities give an idea of the enormous potential of this market which LATTY® has been exploring since 2001.

Reference case

B 14 ECO 2F

CARTseal® B 14 ECO 2F is the result of a leading-edge technology design and a most thorough analysis of the value.

By using a rotating part in silicium carbide that is prevented from rotating, CARTseal® B 14 ECO 2F offers extended functioning parameters.

Application

Food processing industry, water supply.

Fluid sealed

All corrosive, non-abrasive fluids

Temperature

-20 °C to +120 °C

Pressure

1 MPa (10 bar)

Speed

10 rpm nominal

This model has a lateral port improving product circulation around the faces, thus enabling an extended lifespan.
Strong polarity is one of the major chemical properties of water which, added to its capacity to form hydrogen links with anions, gives it the unique capability of acting as an ionic compound solvent.

The hardness of a water is given by its calcium salts (Ca) and magnesium (Mg) contents. There are three sorts of hardness:

- Total hardness (or solid) measured on a sample.
- Permanent hardness - measured after boiling.
- Calcic hardness representing the Ca++. The difference between hardness a and b – temporary hardness - is given by the bicarbonate content: in effect, under the effect of temperature, soluble bicarbonates are converted into insoluble carbonates (the limescale) in water.

The resins used in these cases are capable of working on all of the anions and cations and enable very pure water to be obtained (depending on the resins used) with a low electrical conductivity, degree of mineralisation, and level of dissolved salts.

Note that this water may not be free of bacteria and pyrogenics (products which can cause fever) which makes its use as it stands impossible in numerous pharmaceutical or food industry applications.

For boiler system applications, buffer salts and / or oxygen traps (hydrazine for example), must be added as this water is quite aggressive when it is at high temperature. There is no longer protection with regard to carbon steels due to the limescale, and even certain grades of stainless steel (ferrite content).

This quality of water is extremely pure, apyrogenic. The pH is generally acid 5 – 6.5 but varies greatly with the dissolved CO₂ content (contact with air).

Conductivity (μ S/cm): 1 – 2
Resistivity (MΩ/cm): 0.5 – 1
There is no longer any impurity but a highly variable dissolved CO₂ content. This pure water is aggressive and may attach the free silicium in carbides.

This water is obtained by distilling and recondensing; the use of an initial pre-treated water is necessary.

Water is classified by its content in dissolved minerals:

<table>
<thead>
<tr>
<th>WATER</th>
<th>Quantity of minerals dissolved / % density</th>
</tr>
</thead>
<tbody>
<tr>
<td>Soft</td>
<td>0 - 0.1</td>
</tr>
<tr>
<td>Brackish</td>
<td>0.1 - 1</td>
</tr>
<tr>
<td>Salty</td>
<td>1 - 10</td>
</tr>
<tr>
<td>Briney</td>
<td>&gt; 10</td>
</tr>
</tbody>
</table>

Types of water

- Softened water (filtered water)
- De-ionised water
- Distilled water / bi-distilled
- Osmosed water
- Residual water / Industrial water
- Mains water
- Oxygenated water

Usual terms

- Boiler water = Treated de-ionised water.
- De-ionised water = Treated de-ionised water.
- Softened water = A converted water but by extrapolation, a softened water is often "de-ionised".

**Water**
- **may behave like an acid or a as a base.**
- **Water**
  - **is an oxidising agent.**
- **Water**
  - **is a weak Lewis base which is at the base of its ability to "hydrolyse" other substances.**

**REMINDER**

Water is classified by its content in dissolved minerals:
Thanks to the correct choice of materials, in the right dimensional environment, the LATTY® seal U6810 has met the needs of the user. The user has since used them on other occasions, and they have since proven themselves.

Operating conditions are not extremely harsh, but fitting in the seal chamber without fluid circulation, also called the "dead-end" system, is generally not conducive to long seal lifespans.

The water industry

The standard and standardised seals may be used to fit large-dimensioned cartridge units, as is the case with the U 6810 series installed for sealing the ends of settling tanks.

Reference case

U 6810

Ø 90

Ø 95

Tested on Flocculator DEGREMONT

- Operating conditions are not extremely harsh, but fitting in the seal chamber without fluid circulation, also called the "dead-end" system, is generally not conducive to long seal lifespans.
- Thanks to the correct choice of materials, in the right dimensional environment, the LATTY® seal U6810 has met the needs of the user. The user has since used them on other occasions, and they have since proven themselves.

The water industry

The water industry

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<table>
<thead>
<tr>
<th>Fluid sealed</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Water laden with fibrous organic particles</td>
<td></td>
</tr>
<tr>
<td>Temperature</td>
<td>Ambient</td>
</tr>
<tr>
<td>Pressure</td>
<td>0.05 MPa (0.5 bar)</td>
</tr>
<tr>
<td>Speed</td>
<td>2 rpm</td>
</tr>
</tbody>
</table>
This cartridge is of the stationary type, with multiple springs isolated from the product with faces in solid large tungsten carbide and sized to withstand frequent stopping and starting.

This mechanical seal keeps pumps operational and avoids the ever-difficult and restricting repair operations.

Automatic grease injection along with regular maintenance optimises the mechanical seal performance.

The water industry

As the assemblies are subjected to heavy loads, an effective secondary seal is required in case of breakage of the main seal. For the cartridge system presented, a packing gland is used as a backup which means the pump can continue to run for a few hours before a programmed shutdown.

In this case, water circulation is compulsory in order to extend the lifespan of the main seals. In a technical-economical compromise with the manufacturer’s agreement, the secondary seal is provided by the LATTY® flon 4788 packing seal with a coated shaft sleeve.

This solution has the two-fold advantage of reliable safety in case of accidental breakage of the primary seal and facilitates for a rapid maintenance operations.

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**Reference case**

**B 10610**

BAGEMA pumps

In one of Europe’s biggest sand quarries, extraction and pumping in the water table using BAGEMA, these sand-laden water applications mean that the strength, design and materials requirements are stringent.

Here, the recommendation is for a B 10610 cartridge system with a diameter of 140 mm.

- This cartridge is of the stationary type, with multiple springs isolated from the product with faces in solid large tungsten carbide and sized to withstand frequent stopping and starting.
- This mechanical seal keeps pumps operational and avoids the ever-difficult and restricting repair operations.
- Automatic grease injection along with regular maintenance optimises the mechanical seal performance.

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**Application**

**B 23212 U2U3V**

+ Packing

Cement works are also very demanding fields regarding seal performance and reliability.

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**The combination of mechanical and packing seals may be considered as an effective and complementary concept.**
Complete range available on...

LATTY® Designations

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Cartridges Modules
Standard series and derivatives

Marine Energy

The water industry

Paper mills

Food industry

Energy

Cartridges

Modules

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Sealing technique

Selection of types of seals

Sealing technique

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