HELAMIN®

Filming Polyamines for Boiler Water & Steam Treatment

Optimal boiler water treatment and steam purity are of utmost importance in order to optimize overall operational efficiency of industrial installations.

HELAMIN® is the Swiss original “All-in-one” technology, based on filming polyamines, representing the State-of-the-Art standard in boiler water & steam treatment.

Introduction to HELAMIN® unique corrosion & scale inhibitors

The environmentally friendly “Green” alternative to conventional treatment with hydrazine and phosphates for:

- Water-steam circuit
- Hot water systems
- District heating networks
- Cooling circuits
- All boiler types & pressure range
- Boilers with Turbines
- Wet conservation of boilers
- Boiling out

Most reliable protection against corrosion and deposits within the entire installation:

HELAMIN® is the pioneer and inventor of a unique polyamines filming technology to prevent scale & corrosion in water/steam cycle systems (turbines included), as well as in cooling systems (open or closed).

HELAMIN® is thus equally providing optimum protection in feed water tanks, boilers, steam pipes, turbines and condensates return lines.

Action mode based on the combination of 3 actions:

1. HELAMIN® contains polyamines which are adsorbed on the boiler or pipe surfaces to form a film. The metal is protected against corrosion; deposits are prevented to build up.
2. Optimum pH control thanks to a blend of neutralizing alkalinizing amines.
3. Hardness regulation with dispersion of scale forming salts.

Application of HELAMIN®:

HELAMIN® single solution is dosed into the feed water upstream of the feed pump. The dosing requirement is much lower as compared to conventional treatments as it is proportional to the make-up water and independent of oxygen concentration.

Analysis:

A simple Titration test kit is available to measure the HELAMIN® concentration left in the bulk solution, thus ensuring economical use. Measurement by Photometric method is also possible.

Health & Environment aspects:

HELAMIN® is a “Green” product free of Hydrazine and non toxic, free of Phosphates and easily biodegradable as per OECD guide lines.

Market recognition:

HELAMIN® applications address the needs of all sorts of Industries, such as Oil Refineries, Petrochemicals, Power Plants, Sugar Mills, Paper Mills, Food Industry, Textile Industry, Automotive Industry, District Heating, among others.

The results of many years of Research & Development activities and excellent users feedback are available on request. As such, the HELAMIN® treatment is considered as THE reference of the Market whenever talking of Filming Polyamines for Boiler water & steam treatment.
How HELAMIN® works: Principle

HELAMIN® products are proprietary formulations of a perfect blend of components that include (1) surface-active fatty alkyl protective (filmimg) polyamines, (2) volatile (alkalinizing) amines and (3) polycarboxylates (dispersants) working in a synergistic way to provide an optimum protection and passivation of all ferrous & non ferrous metal surfaces in the entire water & steam circuit. HELAMIN® is thus forming a monomolecular, continuous and hydrophobic protective film on metal surfaces, acting as a barrier between water and metal to prevent corrosion.

Furthermore, HELAMIN® is able to recover and maintain heat transfer efficiency by decreasing the thick layer of old oxide & scale deposits, while being very efficient in dispersing scale forming salts, thus preventing formation of scale.

The use of HELAMIN® to treat water & steam circuits has many advantages over conventional conditioning which requires several substances to be added at various locations and needs regular monitoring. HELAMIN® “All-in-one treatment” is replacing conventional treatments such as combinations of phosphates (corrosion transport problems, environment unfriendly), hydrazine (highly toxic), ammonia (acidic early condensate) with much better results.

Whenever used in steam generators, warm & hot water networks, turbines and cooling systems, HELAMIN® is the most efficient, highly economical and ecological solution to the difficult problem of corrosion and scaling.

How HELAMIN® works: On-line cleaning

In the boiler water of steam generators the polycarboxylates (as sodium salt) have a synergistic effect and cause, at every temperature, an alkalinization because of hydrolysis. As a polyelectrolyte it has greater affinity to bivalent cations (i.e. Fe²⁺ or Ca²⁺), like a weak acidic ion exchanger. Hence, quite stable calcium or iron salts are formed which can be removed by blow down. Furthermore any residual hardness is kept into solution and any additional quantities are sequestered, suspended and dispersed (i.e. prevented from crystallizing and forming scale or any other deposits).

The polyamines have a greater tendency to be adsorbed at the interfaces and in addition to the corrosion-protecting effect of the film, it is also preventing calcium carbonate crystals from growing on the metal surface, especially in the area of heat transfer. Corrosion products which are transported into the boiler are also prevented from accumulating and any existing deposits can be gently removed.
The advantages of HELAMIN®

**USER FRIENDLY**
- Easy application, all-in-one solution
- Only one dosing point & easy monitoring
- Able to handle water-feed quality fluctuations
- Dosage independent from oxygen concentration
- Non toxic

**ECOLOGICAL**
- Environment friendly
- Biodegradable
- Free of phosphate
- Free of hydrazine

**TECHNOLOGY**
- Most efficient & reliable filming technology
- High stability protective film up to 600°C / 220 bar
- Protection for entire water-steam circuits & cooling systems
- Progressive & controlled cleaning of boilers & cooling circuits
- The salt content of boiler water is not increased
- Avoids carry-over into the steam system

**ECONOMIC**
- Reduced maintenance & running costs
- Increased output & revenues
- Superior life time of installations
- Reduced blow-down rate
- Energy-saving as improved heat transfer
- Small quantity of product needed
- Faster start-up time

**ADDED VALUE**
- Pioneer & specialized in polyamines filming technology
- Inventor of a successful polyamines treatment
- Swiss know-how since 1986
- 25 years track records, worldwide references
- Patented formulation, unequalled
Are all filming Amines the same?

**HELAMIN®** Polyamines provide a much superior metal protection than commercially available filming Amines that are mainly based on Monoamines.

**FILM-FORMATION WITH MONOAMINES**

- Smaller number of amino groups in contact with metal surface that makes the bonding less efficient.
- Molecular carbon chains are directed more vertically to the metal surface, resembling «Hair brush style», that makes the film formation less stable.
- Due to much less compact molecular arrangements, corrosive agents can access to bare metal.

**FILM-FORMATION WITH POLYAMINES (HELAMIN®)**

- Much larger number of amino groups in contact with metal surface makes the bonding more efficient resulting in stronger film adherence.
- Molecular carbon chains are directed more horizontally to the metal surface that makes the film formation much more stable.
- Due to extremely compact molecular arrangements, corrosive agents cannot access to bare metal.
## For use in water & steam circuits

<table>
<thead>
<tr>
<th>Product &amp; Description</th>
<th>pH</th>
<th>Composition</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>HELAMIN® BRW 150 H</strong> For steam &amp; hot water systems with raw or slightly treated feed water</td>
<td>pH = 12</td>
<td>Mixture of filming polyamines, alkalinizing volatile amines and polycarboxylates dispersants in aqueous solution</td>
</tr>
<tr>
<td><strong>HELAMIN® 906 H</strong> For steam &amp; hot water systems with softened feed water</td>
<td>pH = 12</td>
<td>Mixture of filming polyamines, alkalinizing volatile amines and polycarboxylates dispersants in aqueous solution</td>
</tr>
<tr>
<td><strong>HELAMIN® 90 H TURB</strong> For steam &amp; hot water systems with demineralized feed water (incl. Turbines)</td>
<td>pH = 12</td>
<td>Mixture of filming polyamines and alkalinizing volatile amines in aqueous solution</td>
</tr>
<tr>
<td><strong>HELAMIN® HAL AO</strong> For steam &amp; hot water systems (suitable for Food industry)</td>
<td>pH = 12</td>
<td>Mixture of oxygen scavengers, alkalinizing volatile agents and dispersants in aqueous solution</td>
</tr>
</tbody>
</table>

## For use in district heating

<table>
<thead>
<tr>
<th>Product &amp; Description</th>
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</tr>
</thead>
<tbody>
<tr>
<td><strong>HELAMIN® HS 190 H</strong> For warm and hot water networks</td>
<td>pH = 12</td>
<td>Mixture of filming polyamines, alkalinizing volatile amines and polycarboxylates dispersants in aqueous solution</td>
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## For use in cooling systems

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<th>Product &amp; Description</th>
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<tr>
<td><strong>HELAMIN® 9100 MK</strong> For open cooling systems, cooling towers, air humidifiers with raw or slightly treated feed water</td>
<td>pH = 3</td>
<td>Mixture of polyelectrolytes acting as corrosion inhibitors and dispersants in aqueous solution</td>
</tr>
<tr>
<td><strong>HELAMIN® 9800 CT</strong> For open cooling systems &amp; cooling towers that require microorganisms control</td>
<td>pH = 7</td>
<td>Mixture of polyelectrolytes acting as corrosion inhibitors and dispersants, including biocides, in aqueous solution</td>
</tr>
<tr>
<td><strong>HELAMIN® RW 47 H</strong> For closed cooling systems</td>
<td>pH = 12</td>
<td>Mixture of filming polyamines, alkalinizing volatile amines and polycarboxylates dispersants in aqueous solution</td>
</tr>
</tbody>
</table>

## Complementary products

<table>
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<tr>
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</tr>
</thead>
<tbody>
<tr>
<td><strong>HELAMIN® 9018</strong> Oxygen scavenger and dispersant for iron oxides</td>
<td>pH = 9</td>
<td>Mixture of organic oxygen scavenger and organic polymer dispersant in aqueous solution</td>
</tr>
<tr>
<td><strong>HELAMIN® 2024 HUM</strong> Dispersant for hard water</td>
<td>pH = 12</td>
<td>Mixture of organic polymers dispersants in aqueous solution</td>
</tr>
</tbody>
</table>

Above recommended products are for guidance purpose and most appropriate products to be confirmed after consulting with us. HELAMIN® products are manufactured as per NF EN ISO 9001: 2008 standards.