

ScaMag



World's First ULF Electronic Boiler Water Treatment Clean and Green



History

CHEMICAL TREATMENT

The century old chemical treatment was the only means in boiler water treatment to control scaling and corrosion. It is a very human dependent task requiring special skill and close monitoring to produce good results. With the recent tighter environmental requirements and expectations, industries are moving away from conventional treatment to a productive, effective and environmentally friendly solution.

Present

ELECTRONIC TREATMENT

Advance electronics place many industrial practices and technologies into history. The same is now happening in the boiler water treatment. Through years of R&D work, a system utilizing the patented Ultra Low Frequency (ULF) technology to treat water electronically instead of chemicals has been developed. The ScaMag system controls scaling and corrosion with excellent results.

ScaMag

The ULF Technology

ScaMag converts electrical power into pulsed time varying Ultra Low Frequency (ULF) wave to treat water. ScaMag highly advanced electronics technology produces the most desirable and efficient frequency range to treat the boiler water either via inductor or emitter units. What makes the difference besides the ULF treatment is also the continuous non-stop electronics treatment process as opposed to the cyclical chemical dosing treatment. A specially developed computer software continuously monitor the system to ensure that the treatment system is functioning at its peak at all times without the need for human intervention.

When boiler feed water passes through the ULF wave treatment, the water molecules and ions in the water are energized to its most optimal energy state.

At this elevated energy level, the energized water force-precipitates the calcium carbonates in bulk water instead of heat exchange surface for scaling control. Concurrently, this energised water promotes the formation of a protective magnetite layer for corrosion control.



ScaMag

ULF Electronic

Boiler Water Treatment



The Scaling Control

The scaling control principle in the ULF electronics boiler water treatment is very different from the conventional concept. It does not rely on the concept of removing the calcium ions from water to control scales neither does it use the scale inhibitor to hold the calcium ions in the water.

ScaMag ULF electronics boiler water treatment treats water from the feed water tank before going into the boiler. The Ultra Low Frequency wave energises the water molecule which is bipolar and also other charged ions, carbonate ions etc. With the elevated energy condition, calcium carbonates will be force-precipitated in bulk water forming into a very fine micron size

powder which is called aragonite. These fine powder does not adhere to the tube surface, instead it is suspended in water and carried away by the flowing water or drained off when blowing down. In this case, it inhibits the formation of hard adhering calcium carbonate scale called calcite on heat exchange surface, thereby achieving very effective scaling control.

And unlike conventional chemical softener treatment which replaces the calcium with sodium ions, ScaMag does not require the removal of calcium ions or dissolved solids and therefore the dissolved composition of the water source is maintained such that discharging water is no longer an issue and yet perfect scaling control is achieved.



Perfect Scaling Control on Fire Tube, Water Tube and Boiler Drum

ULF Electronic Descaling Effect and Magnetite Generation

Descaling

ScaMag has an added advantage of descaling off the existing hard scale which is not achievable by conventional chemical water treatment.

In the descaling process, the ULF energized water gradually disintegrates the existing hard scale into fragments. The fragments can be collected at the drum bottom or removed by blow down.

By gradually dislodging the existing hard scale formed on the heat exchange surface such as boiler drum or tube surface, it improves the boiler heat exchange efficiency hence saves energy. It also avoids the corrosive periodic acid descaling which non-selectively dissolves the steel surface and shortens the equipment life.

Magnetite

Another unique feature of ULF electronics boiler water treatment is its superior boiler corrosion control effectiveness.

With the ULF treatment and under the highly energized water environment, steel surface in the boiler will form a high energy strong protective black magnetite Fe_3O_4 layer over the steel surface instead of the common red rust Fe_2O_3 . The magnetic magnetite layer adheres strongly on the steel surface and it is self repairing as long as the ULF treatment is switched ON.

With the magnetite protection, the corrosion rate and corrosion activities in the boiler are reduced to the minimum. This is evident by the very low dissolved Fe ions concentration of less than 1 ppm in the treated boiler which indicates the corrosion activities in the boiler has been controlled to a minimum level.



**Descaled Scale Fragment
from Fire Tube Boiler**



**The Disintegrating Tube
Surface Hard Scale**



**Magnetite Forms on Drum
and Tube Surface**

ScaMag Installation

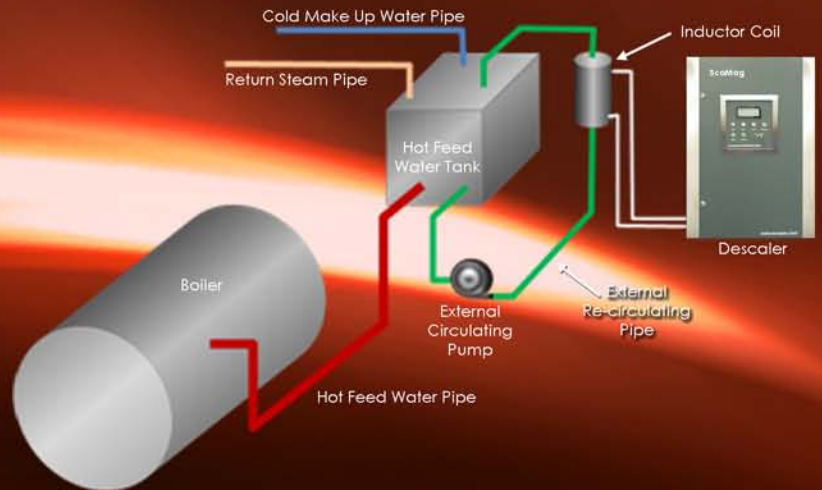
The simplicity and small footprint of the ScaMag system allows for easy fit in both retrofit and new installations.

It can be installed on all sizes of boilers ranging from large water tube boiler of >100 ton/hr to small fire tube boiler of <1 ton/hr.

ScaMag is also applicable for both closed and open loop steam systems.

In most smaller boiler installations, the feed water may be ULF treated, side stream in a separate loop to the feed water tank or inline treated in the feed water pipe entering the boiler. A separate feed water pump will be required for the side stream system.

For larger boiler installations, make up water, hot well and some of the condensate at the return lines may also be ULF treated depending on the steam and water system layout.



Applications

- ✓ Excellent for food industries
- ✓ Captive power plants
- ✓ Refineries heating plants
- ✓ Process plants heating
- ✓ Laundries
- ✓ Palm oil mills
- ✓ District heating plants
- ✓ For small to large size boiler >100 ton/hr
- ✓ Water tube or fire tube steam boilers
- ✓ Hot water heating boilers
- ✓ Hot water distribution system
- ✓ Open or closed loop steam processes

ScaMag Continuous Monitoring

Another unique feature of ScaMag electronics treatment is the system comes with computerized monitoring system. It monitors the output of the ScaMag ULF treatment system and ensuring it performs the treatment continuously and achieving the maximum treatment efficacy at all times.

It is a simple central control system does not require special skill to operate the system.

Driver No.	Working Status	Monitoring Status	Driver Output	Inductor	Driver Output Current (Amps)
1	Normal	Normal	Normal	Normal	11.55
2	Normal	Normal	Normal	Normal	11.96
3	Normal	Normal	Normal	Normal	11.36
4	Normal	Normal	Normal	Normal	11.76
5	Normal	Normal	Normal	Normal	12.15
6	Normal	Normal	Normal	Normal	11.66
7	Normal	Normal	Normal	Normal	11.76
8	Normal	Normal	Normal	Normal	12.06
9	Normal	Normal	Normal	Normal	08.21
10	Normal	Normal	Normal	Normal	09.10

Benefits

- ✓ No chance of chemical contamination makes ScaMag the "Best Solution" for boiler water treatment in the food processing industries
- ✓ Does not add chemicals or Total Dissolved Solids (TDS) into boiler water resulting in less hot boiler water blow down, hence saving energy
- ✓ The unique descaling effect saves energy
- ✓ No periodic acid washing required hence preserving the equipment life and eliminating the costs of acid wash
- ✓ Save chemicals cost, no storage and handling of hazardous chemicals
- ✓ Low operating electronics power cost
- ✓ Non-stop 24 hours electronics treatment
- ✓ Non human skill dependent and no cyclical treatment performance deficiency issue



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