



Importance of the water treatment in Boilers and Steam Generators

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Steam Generation is a rather usual process in the industry. It is used notably as a power generator through turbines (superheated steam) or in the heating systems in which saturated steam is used. Whichever use, the quality of the steam in these processes is fundamental and depends of the correct sizing of the distribution lines, of the blow-off systems, of the valves and so on and mainly of the good quality of the water used to produce such steam. Before proceeding further, we have to explain the 4 major enemies of a steam generation system ; these are : **Furring, Corrosion, Erosion and Priming.**

Furring is due to the increase of salt concentration as well as other substances dissolved or in suspension in the water, since such products are not ejected with the steam in the process of steam generation in normal conditions.

After having reached the saturation point, such substances --mostly calcium and magnesium salts (concentration of which is measured by the degree of hardness)---and silica precipitate and constitute a very solid and adhesive aggregate in the piping and heat exchange surfaces of the boilers.

As a consequence, one gets a diminution of heat transfers, an increase in the fuel consumption, a drop in steam production and this can even cause a rupture of the pipes due to overheating. To avoid such occurrence , one must proceed to a internal chemical treatment of the water in the equipment through the addition of dispersing and isolating agents **RELVAMINE®** and adopt an unloading program.

The return of condensate for the boiler is a highly recommended practice since the condensate has a much lower content of salts and a high temperature.

It is however of fundamental importance that the replacement water used in the boiler be pre-treated .

Corrosion in the boilers is generally caused by the presence in the water of dissolved gases (mainly oxygen) which chemically react with the iron present inside the steel of the equipment .

As a preventive measure, degassing of the incoming water into the boiler with a mechanical degassing system to be supplemented chemically by the addition of oxygen isolating agents such as **RELVAMINE®**.

As for the high pressure boilers, corrosion and erosion become the main reasons for the treatment since the pre-treatment of the water used in such boilers is compulsory and since that the furring usually observed has for origin the corrosion such as iron oxide.

In these high pressure boilers, other particular corrosion processes have been observed : caustic attack, fragilisation due to hydrogen, among others .

Erosion is the result of abrasive property of polluted steam and the acidity is a much aggravating factor because the phenomenon of formation of iron hydroxide, intermediate chemical to the magnetite, is impeded in acid environment. **RELVAMINE®** is essential to the formation of magnetite and to the passivation of metals : if the pH drops under 8,5, steel is no longer in the chemical conditions of passivation and corrodes.

Priming : it is the phenomenon characterised by a water trail in the steam conducts, causing several problems : furring in the super-heater, turbines, valves and accessories of the post-boiler section of the equipment, water-hammering in the piping, among others.

Priming is suppressed through a few simple but efficient processes : by using **RELVAMINE®** which is entirely volatile to avoid contamination by organic material, as well as excessive dosage of caustic soda.

