



Fluid Dynamics
Hard water solutions since 1973

Scale Prevention for Evaporative Condensers



Maintaining Efficiency and Reducing Costs





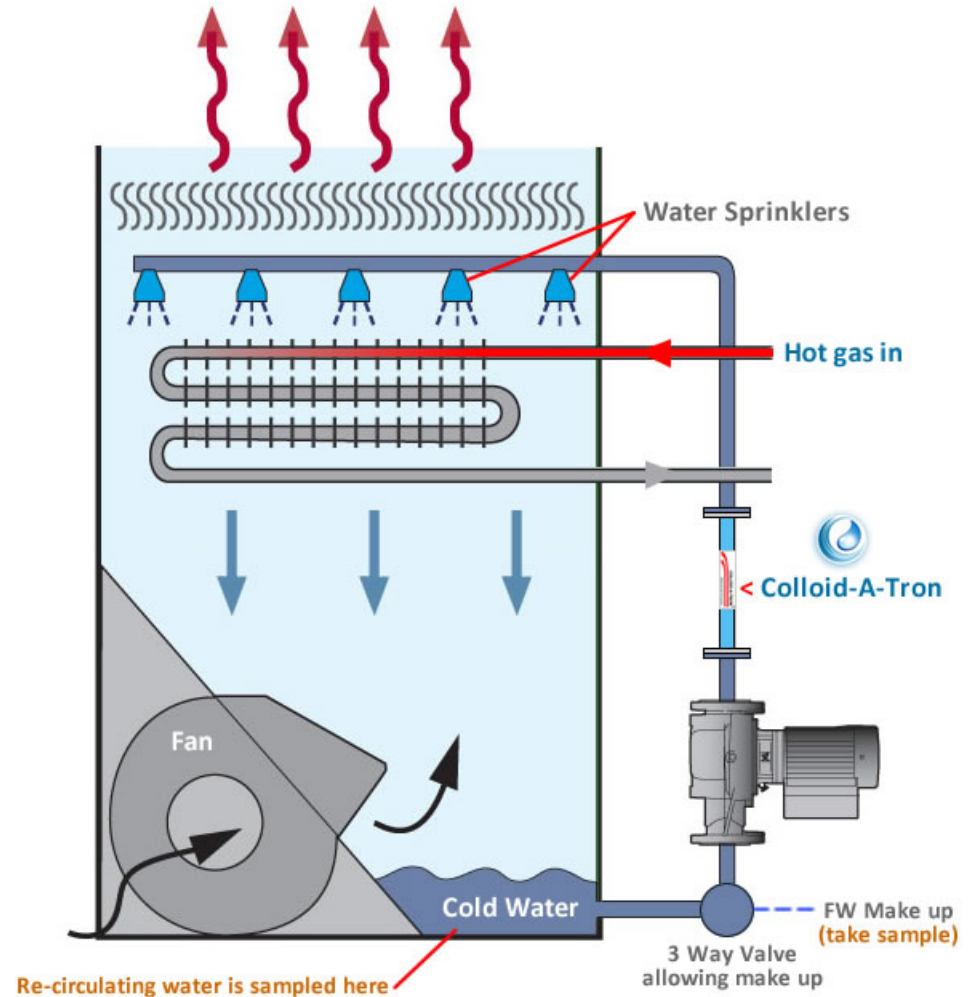
Evaporative Condensers

The Fluid Dynamics Colloid-A-Tron is a proven solution for preventing scale formation in evaporative condensers.

An installation example is shown on the right.

When hard water is used this type of equipment can be subjected to an aggressive build up of scale despite the use of scale prevention chemicals.

The build up of scale will not only increase the cost of maintenance but also decrease the efficiency of the condenser as the scale acts as an insulator preventing the heat transfer from taking place.





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Case Study



BETAGRO

Better Food Co. LTD.

Part of the Betagro Group





The Problem

Evaporative cooling is effective and economical. However, when hard untreated water is used, scale can deposit on the outside of the tubes which considerably slows the cooling process.

The example on the right shows a tube stack that carries hot gas. Water is sprayed via nozzles on to the hot tubes cooling the pipes and the gas within.

In the example shown the scale was hard and 2mm thick.



Scale thickness on tubes before installation was 2.00mm





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The Customer

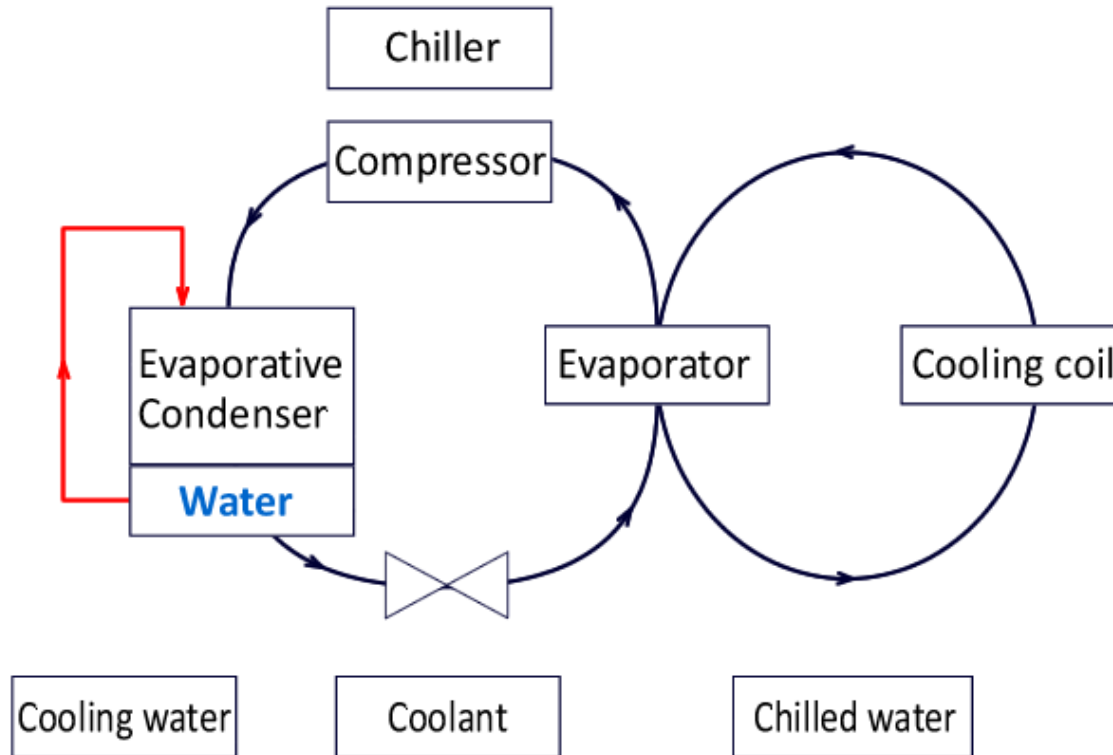


Betagro are Thailand's biggest food producer manufacturing a wide range of high quality food products for the south east Asia market. Eight large evaporative condensers cool gas that circulates between these condensers and the chillers that keep the packaged food and ingredients at the correct temperature.





The System





Installation



4" Colloid-A-Tron pictured on the inlet to the condenser

Once installed the condenser is still checked for any deposition on the condenser tubes. In most cases where scale has already built up this will start to soften and even drop off.

Any future deposition should not take the form of a hard scale but be a soft substance and can be removed without the need for chemicals.

In worst case scenarios where water is causing severe scaling total scale elimination may not take place but in all cases where Colloid-A-Tron is installed there is still a reduction in maintenance for scale cleaning and reduction in chemicals used.

In the case of Betagro their condenser number 8 had been a particular problem in the system, despite being treated with a chemical dosing system.





Installation (continued)

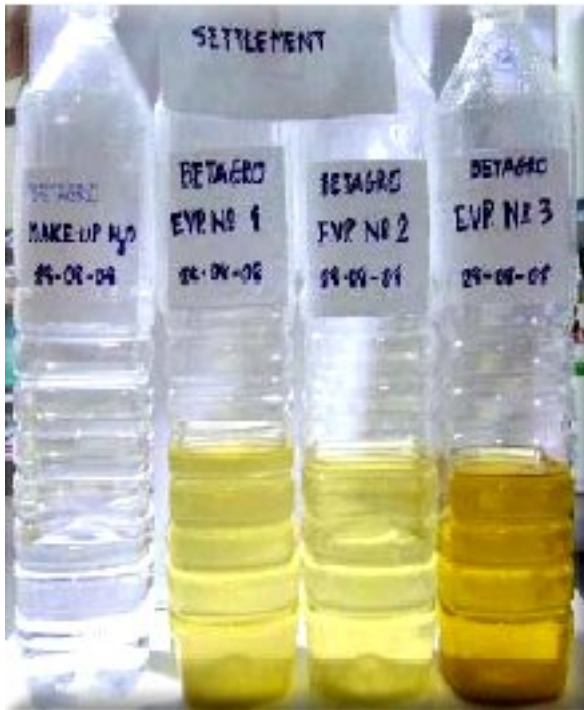


4" Colloid-A-Tron





The Results



Water samples were taken on a regular basis from each condenser. The bottle on the right labeled 3 is the sample taken from condenser no 8. Notice how the solution is a lot darker. This was as a result of deposits that had been absorbed by the treated water inside the condenser and was an encouraging sign that the Colloid-A-Tron was removing the existing scale on the tubes.





The Results (continued)



Scale thickness on tubes 75 days after installation was 0.05mm or less

After 6 months the condenser was opened up and examined. As can be seen from the pictures a majority of the scale has been removed by the treated water and the metal of the pipe has been exposed.

Cycles of concentration, the amount of fresh water that is added to the re-circulating system have also been increased by up to 200%. This means the condenser is using considerable less water saving the customer a considerable amount on water usage.

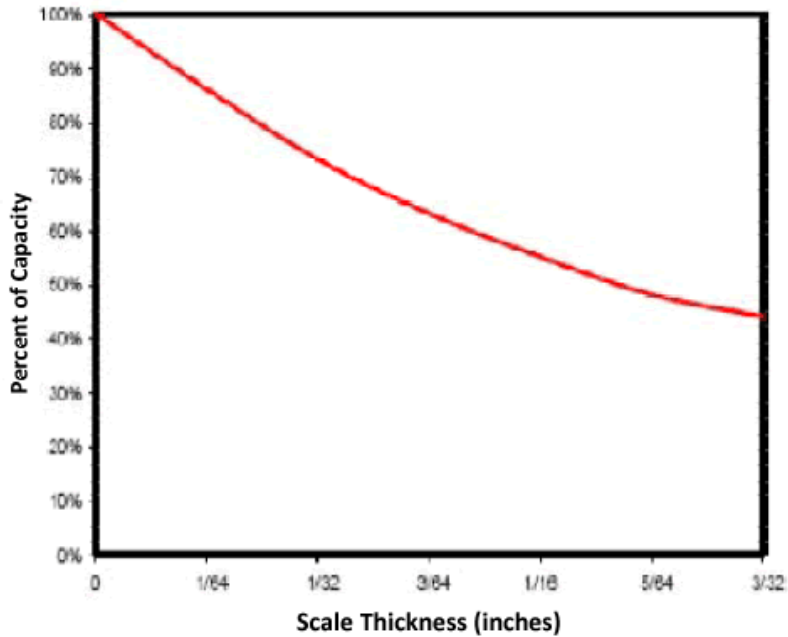
Further benefits including a decrease in power usage as detailed on the next page.



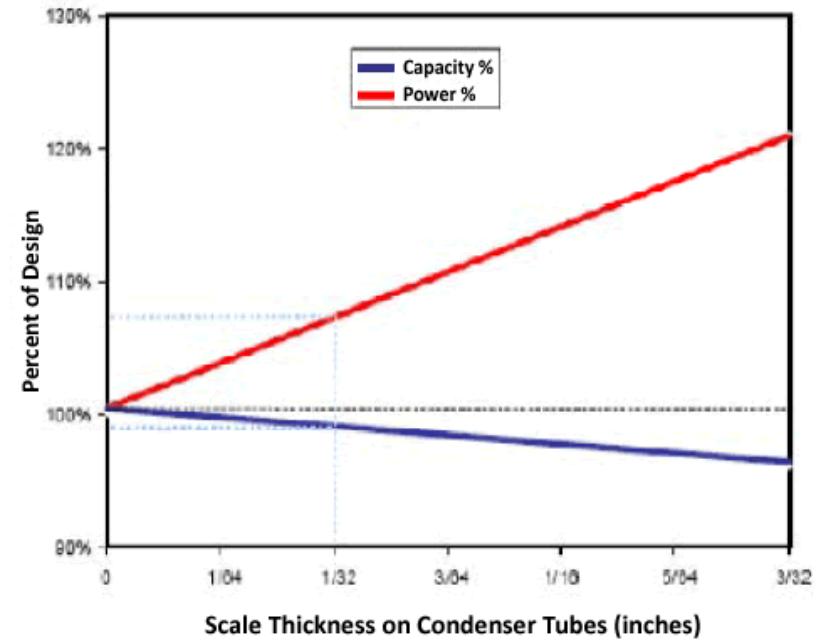


Energy Reduction

Condenser Performance with Scale



Compressor Capacity and Horsepower with Condenser Scale





A Proven Track Record of Success with Evaporative Condensers

RICO POLLO S. A. C. is a leading company in the rearing and then processing of poultry and pork, located in Arequipa, south of Peru at 2300 meters above sea level. For the processing and conservation of their products they use ice water plants, ice producers, refrigeration and freezing chambers, there are several screw compressors for low, medium and high temperature in the machine room, these use Ammonia gas (R-717) as a cooler, the high pressure and temperature compressed gases end up in an evaporative condenser, This new THETRACORP condenser, (model CE1000) has a capacity of 1'200,000 Kcal /hr with TC=+35°C, where it changes its gas state to liquid due to the extraction of heat by spraying water over the condenser tubes inside the tower.

RICO POLLO previously had serious calcium incrustation problems, which, due to repeated chemical cleaning with acids (to remove the calcium incrustation) damaged the tube blocks by making perforations on them making the condenser unusable. A 5" Colloid-A-Tron was supplied and installed, for the treatment of 140,000 liters of water per hour to prevent scaling caused by hard water, this unit has been working since March of 2007 with good results preventing calcium incrustation. The evaporative condenser uses well water for its supply this has a total hardness of 278 mg/l or ppm CaCO₃.



Equipment installed on feed pipe to condenser

