Electronic Water Treatment Reduces Fouling In Heat Exchangers

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The deposition of material on heat transfer surfaces is called fouling which significantly impacts the thermal and mechanical performance of heat exchangers. Fouling increases the overall thermal resistance and lowers the overall heat transfer coefficient of heat exchangers as well as impeding fluid flow, accelerating corrosion and increasing pressure drop across the heat exchanger. The cleaning of fouled heat exchangers presents a significant challenge to maintenance and operation of heat exchangers in process industries.

The common fouling mechanisms are:

1. Particulate fouling – resulting from sediment of dust, rust, fine solids, and other entrained solids.
2. Crystallization fouling - Calcium carbonate is the predominant component of the hard and tenacious scale deposit from water and is particularly apparent in processes involving heat transfer. A concentration of dissolved solids by repeated partial evaporation of the water is the main factor that causes calcium carbonate scale. Even soft water will eventually become scale forming when concentrated numerous times, i.e. two, three, four, or even higher.
3. Biological fouling – Occurs when biological organisms grown on heat exchanger surfaces. Problems arise from algae to other microbes such as barnacles and zebra mussels. At certain times of the year when microbes

are said to bloom, colonies several inches thick may grow across the heat exchanger service affecting thermal performance.

4. Chemical reaction fouling – This type of fouling occurs when the depositions are formed as a result of chemical reaction.
5. Corrosion fouling - Results from a chemical reaction that involves the heat exchanger surface material.

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