

Studies on Antiscaling Effect of Polyacrylic Acid on Boiler

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Abstract:

Polyacrylic acid (PAA), molecular weight of 7314 and 6242, was synthesized. Its effect as an antiscaling agent was studied on a small-scale electrically heated boiler for 0 to 40 h evaporation time at intervals of 10 h. Rate of evaporation of water was found to decrease with increase in time. Decrement in rate of evaporation decreased on addition of 100 ppm of PAA in water. Polymer with a molecular weight of 6242 showed better results in comparison to the polymer with a molecular weight of 7314. A similar trend was observed on addition of polymer once in water. The scale thickness of heating coil increased with time from 10 to 40 h, which is significantly less in case of polymer in water. The hardness of water (control) decreased with evaporation time, due to the coagulation of salts to form a hard layer on heating coil and boiler walls. While in the case of polymer, salts remained suspended in water due to their chelation reaction with polymer. The conductivity of residual water increased with evaporation time. However, polymer-added water showed higher conductivity than did the control, which is due to the presence of ions of PAA.

Keywords:

Polyacrylic acid, antiscaling, boilers, evaporation rate, hardness, conductivity

Link: <https://www.tandfonline.com/doi/abs/10.1080/03602550500209754>