

Cooling water treatment - Controlled pH vs. free pH

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Abstract Several different cooling water treatment programs, both with controlled pH and free pH were tested in cooling systems of industrial ammonia and urea plants. In each case the corrosiveness of circulated cooling water against mild steel, stainless steel and copper alloys was monitored. The scaling tendency of the water was estimated using scale monitors, visual inspections and with the evaluation of the thermal flux transfer effectiveness in the heat exchangers.

Despite the lower corrosion rates obtained with free pH treatment programs, the scale control is poorer, especially when ammonia leakage from the process side occurs in the circulated water. With the controlled pH treatment programs, fairly good corrosion rates are obtained and also the scaling tendency of water is minimized. The drawbacks of this type of treatments are the extra costs with the acid dosage and the possibility of local high corrosion rates if acid mixing in the water bulk is poor.

Keywords: Cooling water treatment, heat exchangers, corrosion, scale, water chemistry, ammonia and urea plants.
