

ENVIRONMENTAL FOOTPRINT COMPARISON TOOL

A tool for understanding environmental decisions related to the pulp and paper industry



EFFECTS OF DECREASED WATER USE ON DISCHARGES TO WATER

Limitations on Effluent Temperatures

One of the effects of increased water reuse is often an increase in wastewater temperatures. At some level, an increase in wastewater temperature can affect wastewater treatment operations.

Temperature affects chemical reaction kinetics and microbiological growth (NCASI 1985). The mesophilic temperature range (20-35°C) is optimal for the growth of bacteria. In the thermophilic temperature range (> 50°C) organisms form difficult-to-remove spores. Dissolved oxygen begins to decrease in the range of 49-55°C, reducing the growth of aerobic bacteria and promoting the growth of anaerobic bacteria (Gudlauski 1996). Sulfate-reducing bacteria produce odorous toxic and explosive gases (H₂S and H₂), which can react with ferrous ions, accelerating corrosion (Von Holy 1988).

Flippin and Eckenfelder (1994) examined the effects of final effluent temperatures on the performance of an activated sludge plant treating pulp mill effluents. Their major conclusions were temperatures exceeding 40°C adversely impact treatment plant performance by 1) suppressed BOD removal; 2) increased effluent solids concentration; and 3) poorer sludge settleability.

In some cases, the adverse impact was noted at temperatures as low as 32°C.

References

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Von Holy, A. 1988. Microbiologically induced corrosion – Are we on target? *Paper Southern Africa* 2:23-27.