Effect of sludge return ratio on the treatment characteristics of high-efficiency sedimentation tank

Hongbo Wang*, Xiaodi Yu, Yingying Li, Yaqin Cui, Kefeng Zhang

School of Municipal and Environmental Engineering, Shandong JianZhu University, Ji’nan 250101, China
Tel. +86 13589052996; email: wanghbqhld@163.com
Received 2 December 2012; Accepted 21 August 2013

ABSTRACT
An advanced treatment experiment on secondary effluent water of the municipal wastewater treatment plant by utilizing a high-efficiency sedimentation tank was conducted. The removal efficiencies of suspended solids (SS), total phosphorus (TP) and chemical oxygen demand (COD) as well as the characteristics of sludge settling under different sludge reflux ratios were studied. In addition, the optimal working conditions were analyzed in this experiment. The experimental results show that sludge reflux ratio plays an influential role in contaminant removal and sludge settling. In case the reflux ratio is 50%, concentrations of SS, TP and COD in effluent water are 10, 0.48 and 49 mg/L, respectively. The effluent water is up to Grade 1A of the Standard (GB18918-2002), and the sludge can be settled well. The high-efficiency sedimentation tank presented a remarkable effect in removing suspended particles, as suspended substances with particle diameters above 3μm could be removed effectively and those with particle size(s) of or above 12μm could be completely removed. Experimental results show that the adoption of high-efficiency sedimentation tank significantly improves the treatment effects of SS, TP and COD in sewage. The experimental parameters acquired under the optimal working conditions can be served as references for the actual running of high density sedimentation tank in the municipal sewage treatment plant.

Keywords: High-efficiency sedimentation tank; Sludge reflux ratio; Suspended substance; Sludge settling

*Corresponding author.
Presented at the Conference on Water Resources and Urbanization Development, 26–27 September 2012, Tianjin, China

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