

Batch and automated SVI measurements based on short-term temperature variations

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Abstract

Effects of short-term temperature variations on the sludge volume index (SVI) are evaluated with batch and automated mixed liquor suspended solids (MLSS) settling tests. The test-cylinder environment and meteorological conditions have a direct influence on the MLSS sample temperature (T_s). A T_s change of 4.3°C over the 30 min settling test duration results in an inverse SVI change of 63.0 ml/g, at an average SVI decrease of 14.8 ml/g per 1°C T_s increase. T_s compensation or control during routine SVI tests is not common practice, partially due to a lack of temperature-controlled equipment and an absence of T_s -based MLSS settling models. A practical solution is found to reduce T_s variations experienced before and during batch MLSS settling tests. An automated MLSS settling meter is used to demonstrate a semi-continuous on-line method to determine SVI at the operational reactor temperature (T_r) of a full-scale plant. Basic and best-fit SVI models are obtained from the SVI data generated over diurnal periods, based on MLSS concentration and T_r fluctuations. These SVI models confirm the inverse dependence of SVI on temperature for the site-specific conditions. A diurnal T_r fluctuation of 1.8°C results in an SVI change of 26.6 ml/g, at an average -14.8 ml/g SVI change per 1°C T_r variation.

Keywords: activated sludge, mixed liquor suspended solids (MLSS), model, sludge volume index (SVI), settleability, temperature, wastewater