



NEW TOOLS TO OPTIMISE WASTEWATER SLUDGES COAGULATION /FLOCCULATION PROCESSES

C. PEUCHOT*, Managing Director - christophe.peuchot@ifts-sls.com
P. GINISTY, Research Manager, pascal.ginisty@ifts-sls.com

Institute of Filtration and Techniques of Separation

ABSTRACT

With the expansion of urbanization and the increase in wastewater treatment facilities, and advancement of treatment technologies, sludge quantities generated from wastewater treatment plants have been increasing in recent years. Their volume is reduced by thickening and/or dewatering treatments. Sludge flocculation is the key step of every process involving solids concentration. Polymers are commonly used to aggregate fine particles of the sludge and to improve solid/liquid separation.

Owing to the large number of commercially available chemicals and diversity of sludge and treatment techniques the choice of the best flocculation conditions is difficult but necessary for economical reasons: i.e. improvement of productivity, decrease of water pollution, reduction of sludge volume and decrease of transport and valorization costs, and the reduction of polymer consumption.

The nature of flocculants, their dosage and their mixing conditions with sludge control flocs size and the mechanical stress resistance they undergo in the separation device. The research of the best conditions are time consuming at plant scale and several quick and easy tests have to be available to screen chemicals and their dosage at laboratory scale, to narrow the number of products to be tested in full scale experiments and to adapt flocculation to the sludge variability.

A methodology of sludge flocculation has been developed to produce flocs in quantified and repeatable conditions during polymer dispersion and flocs growing phases. The role of all mixing parameters (speed and time mixing, addition point, impeller design, characteristics of polymer and sludge) was identified and controlled by following kinetics growth with Turbiscan apparatus.

Floc characterization tests should be related to the thickening or dewatering equipment used at plant scale. The paper reviews the standardized tests (CST, settleability, filtration-compression, flowability...) used at laboratory scale for assessing flocs behaviour in the industrial device: static decanter, draining table, centrifuge decanter, filter-press and belt filter.

Sludge flocculation comparisons between laboratory scale and wastewater treatment plant scale were carried out and are described in this paper. The study points out the role of hydrodynamic conditions at plant scale with experiment results obtained with different kinds of injectors, addition points and in-line mixers used for sludge treatment, with different technologies.