Independent Qualitative Experiments on Sewage Sludge Thickening Using SNF Flocculant Polymers

KREMESTI ENVIRONMENTAL CONSULTING

PASSION FOR CHEMISTRY

By Rami E. Kremesti M.Sc., CSci, CEnv, CWEM

Introduction:

Six SNF polymers were independently tested on FST (Final Settlement Tank) sludge at an RBC (Rotating Biological Contactor) sewage treatment plant in Aylesbury, Bucks: three were PAM and three were QUAT. PAM polymer was fed as a powder. QUAT as an emulsion. Mixing was done for a short 15 second period and the mixture allowed to settle. Sludge samples were obtained using a sludge judge from the FST clarifier. The idea of the experiment was to test for the best polymer to potentially dose to FST sludge removed by the sludge pump and pumped to the PST (Primary Settling Tank). Sludge thickening from 3% to 9% can potentially increase de-sludge periods by a factor of 3 thus saving time, money and reducing CO_2 emissions during transport. Flocculants are normally dosed in the ppm range which makes them cost effective process intensification agents.

Photos of preliminary results below:

Control Sample 10 Minutes Sludge Settling on Its Own

Naturally formed flocs in final settling tanks are slow to settle which requires settling tanks to be designed to accommodate a slow rise rate in the water.

10 Minutes PAM (Poly AcrylaMide Flocculant)

Flocculants assist in the agglomeration of flocs and thus improve settleability and dewatering characteristics.

PAM FO 4440 Gives Best Volume Reduction

PAM FO 4650 VHM Gave the Thickest Flocs and Clearest Supernatant

PAM FO 4650 VHM Gave the Thickest Flocs and Clearest Supernatant

PAM FO 4650 VHM View from TOP

In conclusion, we have demonstrated with a minimal budget, qualitative, visual experiment that flocculants are an effective tool to improve settleability and dewatering characteristics of sludge.

We would like to stress the importance of chemistry in intensifying waste water/sludge treatment process with the ultimate goal of treating more waste water/sludge with the same assets and thus reducing CO2 emissions.

The author would like to acknowledge the generosity of SNF in providing free flocculent samples.

Disclaimer: There is no commercial agreement between KEC Ltd and SNF.

Kremesti Environmental Consulting Ltd is an independent consultancy specialising in the chemistry of water and waste water treatment.