Thermophilic sludge digestion

Application

25 % more COD conversion and up to 50% more biogas from your sludge digestion unit.

The treatment of WWTP sludge represents a considerable cost for a sewage purification plant. In case the sludge amount is lowered the associated costs can be reduced.

An efficient way for the reduction of the sludge amount is thermophilic sludge digestion. When compared with conventional mesophilic digestion thermophilic conditions take care of degradation of an much higher amount of the organic fraction (10-25% more conversion). The (additional) amount of biogas thus produced can be utilised (after S-removal using Bidox®) for the production of electricity and heat using a CHP (combined heat & power) installation. This has a direct positive impact on the energy balance of the sewage purification plant.

Thermophilic sludge digestion is directly applicable for existing as well as for new sewage purification plants. An additional advantage is the fact that both systems can be equipped with the DIGESTMIX® system for optimal mixing and heating. This configuration facilitates a more stable and also more efficient digestion process with the option to feed the system with concentrated sludges. As a result the overall size of a new digestion system can be reduced or more sludge can be processed in an existing WWTP installation. This advantage opens possibilities for sludge digestion even for smaller WWTP installations.

Process

Sludge digestion represents a biological process, whereby organic substrates in (primary and/or secondary) sludge are converted under anaerobic conditions into biogas (CH_4 & CO_2) and water.

As a result of the increased temperature during thermophilic digestion (50-55^{o}C) more nitrogen (NH_4^+) is released in the medium. After digestion and sludge separation the rejection water (containing high levels of NH_4^+) can be readily subjected to selective nitrogen removal treatment (e.g. with AMFER® or NAS®).

Results

During targeted digestion of secondary sludge with a retention time of only 20 days more than 50% of the organic fraction is converted (~40% of the dry matter). In this step 750 liter biogas is produced per kg dry organic matter.

In case of combined thermophilic digestion of primary and secondary sludge the overall yield of COD removal increases and results in enhanced biogas production.

The residual sludge after digestion can be dewatered (several %) more effectively than conventional sludge. As a result of the higher digestion temperature more organic nitrogen is liberated as $NH4^+$. Its concentration in the water fraction may well increase to levels > 1.500 mg/L, which makes this stream receptive for selective N-removal using alternative methods.

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