FLOW SHEET

TREATMENT FLOW SHEET

The typical units required for UASB type wastewater treatment plant are as follows:

1. Screening,
2. Grit removal,
3. Skimming Tank,
4. Pumping,
5. UASB reactor,
6. Gas collection system (optional),
7. Post-treatment such as aerobic processes or settling tank, depending on the disposal mode of effluent,
8. Sludge drying beds.

The provision of screens and grit chamber is necessary for the treatment of municipal wastewater as required in conventional wastewater treatment plants. For certain industrial wastewaters provision of screens and grit chamber may not be necessary, but provision of grit chamber may be beneficial when floor-washing waste from industry is expected to be treated in UASB reactor. The grit chamber should be provided in such cases to remove heavy inorganic particles from the wastewater, which may otherwise increase the inorganic Suspended Solids (SS) concentration in sludge bed of the reactor.

When the wastewater contains floating matter such as, oil, grease, soap, pieces of cork and wood, vegetable debris and fruit skins, it is advantageous to have a skimming tank to remove this. The presence of oil and grease, if gets adsorbed on the sludge surface, can hinder transport of metabolites and mass transfer, ultimately causing reduction in process efficiency. This may be accomplished in a separate tank or can be combined with primary sedimentation when wastewater also has high suspended solids of inorganic origin.

After the primary treatment, it is required to provide pumping unit to pump the wastewater in upward direction in UASB reactor. Where the topography of the site suits for utilization of gravity head, choosing appropriate site for UASB reactor may not require this unit. The separate gas collection system can be provided if the gas produced is desired to use for combustion or power generation. Generally, the production of gas in UASB reactor is in the range of 0.25 to 0.5 m^3CH_4/kg COD removed. The utilization of biogas for power generation is economical for larger treatment plants.

After UASB reactor, some form of post treatment is generally desirable depending upon source of effluent discharge. UASB process can hardly remove any nitrogen from the wastewater. Hence, effluent from UASB reactor is suitable for irrigation purposes. UASB reactor when followed by post treatment such as aeration and/or sedimentation could conveniently achieve irrigation standards. The aeration can be obtained to the effluent flowing through a channel to an irrigation area. Where, the

treatment efficiency is adequate to meet the discharge standards, further treatment such as, aeration is only necessary to destroy anaerobicity. In such cases simple cascade type aerator can serve the purpose. In some cases where treatment efficiency is meeting the discharge standards but the effluent is high in suspended solids, the use of secondary settling tank becomes essential.

When stricter effluent standards have to be met (as for river discharge) some better form of post-treatment may become necessary. The use of aerobic biological treatment is generally preferred for this polishing treatment. The aerobic process such as, trickling filter, conventional activated sludge process, or extended aeration can be employed as a second stage treatment. Where the effluent from UASB reactor is expected to be high in nutrient such as nitrogen and phosphorous, the post treatment need to be designed for removal of these nutrients to meet discharge standards for surface water.