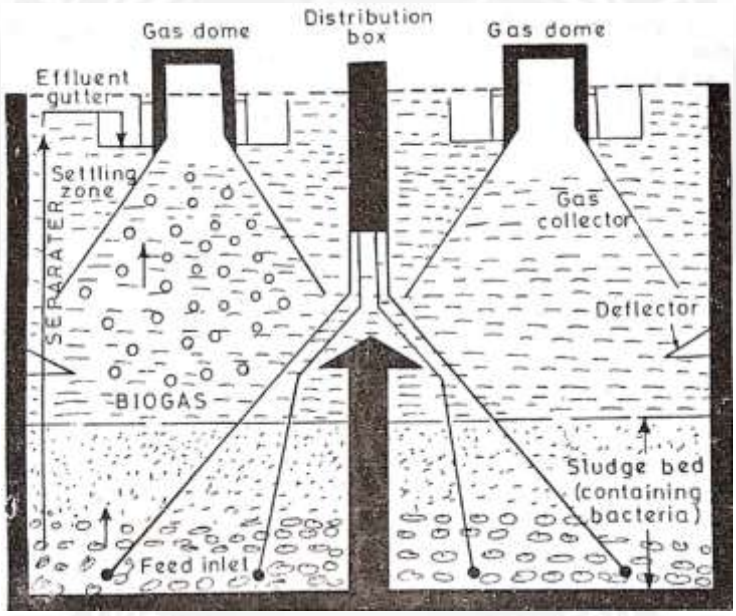
UASB (Upflow Anaerobic Sludge Blanket) Reactor:

The UASB reactor maintains a high concentration of biomass through the formation of highly settle able microbial sludge aggregate. The waste water flows upwards through a layer of very active sludge to cause anaerobic digestion of organics of the waste water at the top of the reactor, these phase separation between gas-solid-liquid takes place any biomass leaving the reaction zone is directly recirculated from the settling g zone. The process is suitable for both soluble waste waters as well as waste water containing particulate matter.

The large scale adoption of this technique for treating municipal waste waters is comparatively of recent origin .This reactor consists of an Up flowing treatment tank, provided with a feed inlet distribution system at the tank bottom. A gas solid-liquid separator (GSS) device is provided at the top to help provide a quiescent zone at the top of the reactor.



The wastewaters enter the tank from the bottom and flows upward through the sludge bed. The sludge bed develops micro-organisms capable of Flourishing in an oxygen deficient environment. The sludge bed (blanket) traps the suspended organics of the up moving wastewater. The suspended solids trapped in the sludge bed are degraded by the producing methane and CO 2(ie, biogas, which is a mixture of 65-70% methane, and 30-35% CO2.The biogas produce of during the anaerobic decomposition reducing the BOD and suspended solids of the wastewater. The methane or biogas is collected at the top of the tank in a gas collector from Where it can be withdraw n for use as a by-product, while the water sludge mixture is made to enter a setting tank where the sludge mixture is made to enter a setting tank where the sludge settles down and f lows back in to the bottom of the reactor.

The sludge will show good settling properties after an initial start up period, followed by granulation forming a sludge blanket or sludge bed in the lower part of the reactor. Retention of the bacteria contacting sludge in the reactor is one of the most important features of the UASB process. The bacteria in the sludge continue to perform their function of treating the incoming effluent. The continuous bacterial presence and activity enables retention time in the reactor to be reduced to about 6-8 hours, as compared to at least 30 hrs that is required in conventional sewage treatment systems. The treated effluent is collected in gutters, and discharged out of the reactor. The sludge is periodically shifted in to the drying beds to be used as a soil enriches, The methane generated can be used as a gas for domestic or industrial use it may also be used for generation of electricity for running the plant, after the approximated hydration and cleaning. This process can be reactivated even after the plant remains shut down for days or months, or after power breakdowns and interruptions in wastewater supply Like other high rate anaerobic systems.

The various advantages offered by UASB systems are

The space requirement of the system is quite comparable to that of an Activated sludge ie, about 0.5 acres per MLD, as compared to 2.5 acres per MLD required for oxidation ponds, and 1.5 acres for Aerated lagoons.

The capital cost investment of such a plan it s about Rs.20 lakh/MLD as compared oabout Rs.35 lakh/MLD for an Activated sludge plant, Rs.75 lakh/MLD for oxidation ponds and Rs.15lakh/MLD f or Aerated lagoons.

The system requires lesser and simpler electromagnetic parts as compared to the ones required in an Activated sludge plant, leading to lower operation and Maintenance cost.

Electricity consumption in this system , like all anaerobic systems is quite low, and the system is quite capable of withstanding long power failures.

The sludge Production system is low, and the produced sludge is having quick dewatering characteristics.

The system enables quicker sludge digestion, as compared to the conventional digestors.

Biogas is produced in the system as a by-product, which can be used to produce electricity to run the system.