

DOSING SYSTEM:

Dosing of SEPT-X should take place as high upstream in the influent flow as possible. This allows for maximum contact time for the high speed enzymes to break down pollutant and nutrient molecules. It also allows maximum strength culture to be present in the aeration chamber. Simple two tank pre-activating dosing systems are the most effective in introducing the technology into the influent. This represents a very minimal capital requirements and deliver the most economical results to plant operation. For very low flow plants the technology is applied by simply hanging the SEPT-X in filter bag in influent.

In sewage operation, the optimal dosing point may be within collection network. Dosing at key rising mains or pumping stations throughout the collection system will result in substantially treated influent arriving at the treatment plant.

ODOUR REMOVAL:

This is a significant benefit when residential housing encroaches on treatment facilities. This improvement in odor emission can have a positive impact resulting in less complains from the community

RETURN ACTIVATED SLUDGE

A very common technology process for waste water treatment is the use of return activated sludge. This process of re-circulating a highly cultured, mature microbial biomass has been the mainstay of nutrient removal in waste water treatment for several decades. This process not only reduces waste it also consumes substantial energy for aeration and creates the high bio-solids output of traditional plants.

The SEPT-X™ high speed enzyme technology changes the role of the RAS technology in the plant process and operation. RAS is no longer required to re-circulate a high volume of biomass when SEPT-X™ is added into a plant as the plant no longer relies on the biomass to remove nutrients as this is done enzymatically. In-process measures of quality, through an activated sludge plant, typically shows a worsening of quality prior to improvement, due to the reintroduction of the concentrated activated sludge. This inherent inefficiency can be avoided if the raw influent can be treated without the addition of activated sludge however previous technologies have failed to achieve adequate nutrient removal.

When using SEPT-X™ - best results are achieved by allowing the high speed enzymes to operate as effectively as possible by not re-introducing nutrient, biomass or contaminants back into the waste stream. In process terms, this means wasting all accumulated sludge and biomass from the system shortly after the introduction of SEPT-X™. Thereafter the plant operates enzymatically. At this time the RAS system is employed to return approximately 5% of inflow volume to assist with enzymatic inoculation.

BIOLOGICAL NUTRIENT REMOVAL (BNR)

When SEPT-X is used in a plant there is less reliance on processes such as BNR or anaerobic or anoxic chambers. These stages are introduced to assist with nutrient uptake by bacterial biomass. As the SEPT-X treatment technology is not dependent on uptake by bacterial biomass, the role for these stages is reduced. Their presence in stream are not however detrimental to SEPT-X as it operates effectively as a facultative anaerobic and will continue the action through anaerobic and anoxic stages

NITROGEN MANAGEMENT

Nitrogen is typically removed from waste water through a combination of uptake into bacterial cellular material, microbial digestion and sedimentation. Removed from the plant as a component of sludge the majority of the nitrogen then completes its transformation through the nitrogen cycle external of the plant. SEPT-X™ has the ability to enzymatically accelerate the completion of the nitrogen cycle to remove a large portion of nitrogen in the form of nitrogen gas (N₂) within the confines of the plant. This process requires ammonification, Nitrification, Denitrification to ultimately break the nitrogenous compounds in influent into CO₂ (Carbon Dioxide), H₂O (Water) and N₂ (Nitrogen Gas). This action is evidenced by higher than normal in-process measures of ammonia, nitrites and nitrates demonstrating progressive break down of the nitrogenous waste at rates much faster than are otherwise possible. Despite these higher in-process measures, final effluent is typically lower in total nitrogen, ammonia and nitrate than traditional plant operations provides, due to the enhanced biological efficiency in the aeration chamber.

Sequencing Batch Reactors (SBR)/Biological reactors

Similar to RAS systems, a portion of activated sludge is retained in SBR tank. When SEPT-X is introduced to the plant it is recommended that 90-95% of tank volume is decanted in each batch. This retain a small quantity of low strength enzymatic inoculants sludge.

PHOSPHORUS MANAGEMENT

Unlike nitrogen compounds which can be broken down and off-gassed as nitrogen gas (N₂-See Nitrogen management), Phosphorus can not be converted into gaseous state for removal at temperatures in waste water environment. As a result, Phosphorus is most effectively treated in plants adopting SEPT-X technology through co-aggulation and Sedimentation. The Phosphorus then is removed from the plant as phosphate. In large scale plants, this is commonly achieved through Alum Dosing. Whilst there has been a trend to BNR (Biological Nutrient Removal) in recent years targeting uptake of phosphorus by phosphorus favoring bacteria strain. The benefits of this are far outweighed by overall plant efficiencies that enzymatic treatment with SEPT-X offers

LOWER SLUDGE VOLUME INDEX (SVI)

Due to the lower biomass in the process, SEPT-X will typically provide improved settings characteristics Lower Sludge Volume Index (SVI).

SLUDGE REMOVAL:

Sludge is removed from the operation as filter cake (industrial) or bio-solids (sewage). In certain industrial treatment plants, the biological activity is often low due to the type of contaminant being treated, and as a result of low residence times. Filter cake is a result of high coagulation and flocculation additives utilized to remove suspended solids and contaminants. The SEPT-X™ enzymes rapidly remove the contaminants at the molecular level including many suspended solids, hence the need for flocculation and coagulation is substantially reduced, resulting in reduced filter cake volume. In sewage treatment and some industrial processes, the majority of bio-solids produced are dead bacterial cells that were formed to remove the nutrients (carbon, nitrogen, phosphorus etc) from the sewage through microbial digestion for energy and in the creation of new bacterial cellular material. As a high speed enzyme technology,

ENERGY SAVINGS

Waste water treatment typically requires high levels of aeration to sustain sufficient oxygen levels to support high levels of biomass and oxidation of waste material. This high oxygen demand leads directly to high electricity consumption for aeration.

By removing the reliance on biomass to remove nutrients and contamination, oxygen demand is substantially and rapidly reduced. The key contributors to the reduced oxygen demand are reduced microbial respiration due to lower levels of biomass, rapid removal of organic waste hence lower oxidation demand, lower microbial cell formation. The result of this is a natural increase in dissolved oxygen (DO) levels. Where employed, auto DO monitoring equipment will manage aeration allowing for SEPT-X™ technology to deliver energy savings often in excess of 50%. Where such technology is not employed, manual monitoring and adjustment of aerator run time and speed are required to realize energy savings. This not only provides direct cost savings to the plant but may offer options to generate carbon credits or obtain other forms of incentive for the adoption of energy saving technologies.

