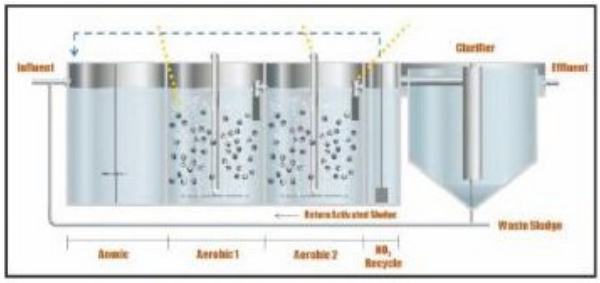
Technologies

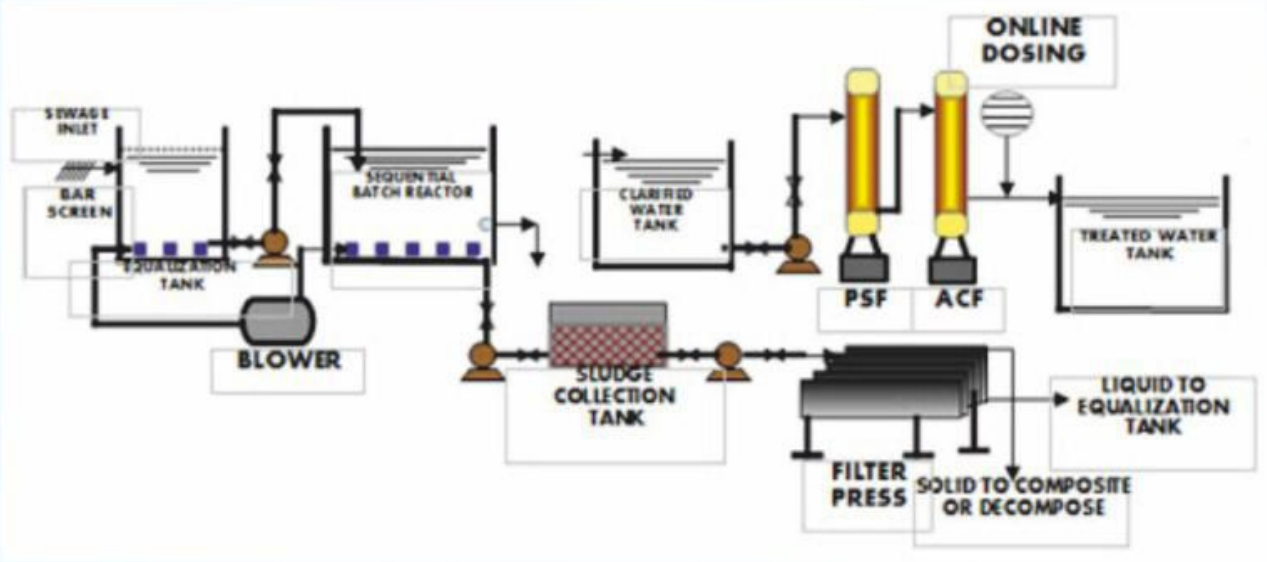
MBBR Technology is a better alternative to conventional wastewater treatment plants that are large-sized, power intensive and require a lot of monitoring. MBBR offers an effective option to the conventional systems made unviable due to scarcity of open space.



Advantages

- Odorless operations, with a self – regulating system
- High bio-film surface area, compact plants with high loading rates
- Reduced power consumption
- Simple to operate, low maintenance requirements
- Non-clogging design, better oxygen transfer efficiency
- Attached growth process, No recycling of sludge high MLSS maintained.
- Easy to monitor
- Removes E-coil (coil form)
- Capacity – 15 m3/day and above
- prefabricated Units available
- Civil Units
- Recycling for gardening, flushing, car wash and cooling towers
- Sludge handling – filter press, centrifuge, sludge drying bed and sludge holding tank

SBR Technology



The Sequencing Batch Reactor (SBR) is a fill-and draw activated sludge system for wastewater treatment. In this system, wastewater is added to a single "batch" reactor, treated to remove undesirable components, and then discharged. Equalization, aeration, and clarification can all be achieved using a single batch reactor. To optimize the performance of the system, two or more batch reactors are used in a predetermined sequence of operations.

SBR systems have been successfully used to treat both municipal and industrial wastewater. They are uniquely suited for wastewater treatment applications characterized by low or intermittent flow conditions. wastewater treatment plant using an SBR. Influent wastewater generally passes through screens and grit removal prior to the SBR. The wastewater then enters a partially filled reactor, containing biomass, which is acclimated to the wastewater constituents during preceding cycles. Once the reactor is full, it behaves like a conventional activated sludge system, but without a continuous influent or effluent flow. The aeration and mixing is discontinued after the biological reactions are complete, the biomass settles, and the treated supernatant is removed. Excess biomass is wasted at any time during the cycle. Frequent wasting results in holding the mass ratio of influent substrate to biomass nearly constant from cycle to cycle. Continuous flow systems hold the mass ratio of influent substrate to biomass constant by adjusting return activated sludge flow rates continually as influent flow rates, characteristics, and settling tank underflow concentrations vary.

View of SBR-STP Internals

The operation of an SBR is based on the fill-and draw principle, which consists of the following five basic steps: Idle, Fill, React, Settle, and Draw. More than one operating strategy is possible during most of these steps. For industrial wastewater applications, treatability studies are typically required to determine the optimum operating sequence. For most municipal wastewater treatment plants, treatability studies are not required to determine the operating sequence because municipal wastewater flow rates and characteristic variations are usually predictable and most municipal designers will follow conservative design approaches. The Idle step occurs between the Draw and the Fill steps, during which treated effluent is removed and influent wastewater is added. The length of the Idle step varies depending on the influent flow rate and the operating strategy. Equalization is achieved during this step if variable idle times are used. Mixing to condition the biomass and sludge wasting can also be performed during the Idle step, depending on the operating strategy. Influent wastewater is added to the reactor during the Fill step.

The following three variations are used for the Fill step and any or all of them may be used depending on the operating strategy: static fill, mixed fill and aerated fill.

During static fill, influent wastewater is added to the biomass already present in the SBR. Static fill is characterized by no mixing or aeration, meaning that there will be a high substrate (food) concentration when mixing begins. A high food to microorganisms (F:M) ratio creates an environment favourable to floc forming organisms versus filamentous organisms, which provides good settling characteristics for the sludge. Additionally, static fill conditions favour organisms that produce internal storage products during high substrate conditions, a requirement for biological

phosphorus removal. Static fill may be compared to using "selector" compartments in a conventional activated sludge system to control the F:M ratio. Mixed fill is classified by mixing influent organics with the biomass, which initiates biological reactions.

During mixed fill, bacteria biologically degrade the organics and use residual oxygen or alternative electron acceptors, such as nitrate nitrogen. In this environment, denitrification may occur under these anoxic conditions. Denitrification is the biological conversion of nitrate-nitrogen to nitrogen gas. An anoxic condition is defined as an environment in which oxygen is not present and nitrate-nitrogen is used by the microorganisms as the electron acceptor. In a conventional biological nutrient removal (BNR) activated sludge system, mixed fill is comparable to the anoxic zone which is used for denitrification. Anaerobic conditions can also be achieved during the mixed fill phase. After the microorganisms use the nitrate-nitrogen, sulphate becomes the electron acceptor. characterized by the lack of oxygen . In some cases, gentle mixing during the initial stages of settling may result in a clearer effluent and a more concentrated settled sludge. In an SBR, there are no influent or effluent currents to interfere with the settling process as in a conventional activated sludge system. The Draw step uses a decanter to remove the treated effluent, which is the primary distinguishing factor between different SBR manufacturers. In general, there are floating decanters and fixed decanters. Floating decanters offer several advantages over fixed decanters as described in the Tank and Equipment.

Advantages of SBR

- Equalization, primary clarification, biological treatment and secondary clarification can be achieved in single reactor vessel.
- SBR requires samll space.
- SBR has controllable react time and quiescent settling.
- Minimal footprint.
- High nutrient removal capabilities.
- The BOD removal efficiency is generally 85 to 90%.
- Filamentous growth elimination.