

Technical specifications

The raw wastewater enters to raw wastewater inlet tank which is equipped with basket screen. The basket screen type is provided to remove any large solids from the incoming raw wastewater with bar space 20 mm. Screening unit is required in order to protect process equipments in the following. The screen is cleaned daily and manually when it is necessary.

The next step after screening unit is pretreatment unit. All the components are integrated in the tank which specially shaped for optimal flow. Tank is used for sand and sediments trap. Tank also contains automatically fine screen. This consists of circular bar screens. Its construction assures easy and effective Cleaning. Cleaning system is equipped with easily changeable brushes. Screenings are conveyed together with sand as well as the sediments into the one container. Fine screen are equipped with the washing of screenings and can also be equipped with dewatering of screenings. Multifunctional pre-treatment unit is equipped with cover against smell and with its own emergency bypass. Pre-treatment unit is installed at top of equalization tank and effluent from it is directed to equalization tank by gravity. This tank is equipped with one submersible mixer and two submersible pumps for transferring wastewater to the biological unit. Flow equalization is a method used to overcome the operational problems caused by flow rate variations, to improve the performance of the downstream processes, and to reduce the size and cost of downstream treatment facilities.

The selected biological process is a MBBR method that allows continuous inflow of wastewater into the treatment tanks. For this wastewater treatment plant, a prefabricated package treatment plant is designed to reduce BOD, TSS, and nitrogen. Phosphorus in the influent wastewater is not removed by biological process, so chemical (alum) used for Phosphorus removal. This package is made of carbon steel and complete ready to be placed on a prepared reinforced concrete foundation slab. One anoxic tank, two MBBR reactors, one intermediate tank, one lamella clarifier tank and treated wastewater storage tank are considered in this package in order to meet the standard for discharging the treated wastewater to surface water and irrigation.

Wastewater is directed to anoxic tank by equalization pumps. The anoxic tank is designed to remove nitrate which is produced through nitrification process in the MBBR tank. This tank is equipped with one vertical mixer. A portion of wastewater in MBBR tank is transported to the anoxic tank as a recycle flow .Two submersible pumps are considered for this purpose.

In a MBBR system the biomass is grown as a thin layer on small plastic carrier elements which move around in the reactor by aeration through produced air by blowers and forms a large quantity of biomass. MBBR process is able to provide similar BOD and nitrogen removal treatment performance as activated sludge process. To keep the media from flowing out of the tank, one screen is placed on the discharge outlet pipe and treated wastewater is directed to intermediate tank.

Wastewater from intermediate tank is led to sedimentation unit to separate the biomass and the solids from the wastewater. No sludge recycle is required for this process after start-up period. Most of the sludge settles at the bottom of the tank, while the residual flock is separated in the lamella plates. In the hopper, the sludge is thickened prior to discharge through the sludge outlet. During start-up, some part of produced sludge is returned to anoxic tank inlet. After that sludge is transferred to sludge storage tank which is aerated through considered blowers and fine bubble diffusers by gravity. The V-notch weirs at the top of the plate assembly are designed to create a pressure drop across the collection channels, ensuring that the flow is distributed uniformly between the plates and that the full area is utilized. The clarified liquid leaves the plate through openings at the top and is discharged into treated wastewater storage tank. Calcium hypochlorite is injected to this tank by hypochlorite diaphragm dosing pump as disinfectant agent.