

Basic Knowledge Wastewater Treatment Plant



Environmental protection through wastewater treatment

If untreated wastewater is discharged into a body of water, microorganisms destroy the organic matter contained in the water through high oxygen consumption. This leads to a lack of oxygen in the water, which in turn destroys the ecological balance. To prevent this from happening, wastewater must be treated in wastewater treatment plants beforehand. The most important component of a wastewater treatment plant is the biological purification by microorganisms. The natural degradation processes are thus shifted from the body of water into an industrial plant, where they take place in controlled and optimised conditions.

Mechanical treatment

First the wastewater is treated mechanically. The aim is to remove solids from the water. A bar screen first removes coarse solids such as textiles, paper and plastic bags from the wastewater. Then mineral solids such as entrained sand are separated in grit chambers by sedimentation. Organic solids, such as food scraps, are also separated by sedimentation in the primary clarification.



Biological treatment

After the mechanical treatment, the wastewater contains almost exclusively dissolved substances. These dissolved substances are biodegraded by microorganisms in the biological treatment. The most commonly used method here is the aerobic activated sludge process. In this treatment stage, the wastewater is aerated in order to supply the microorganisms (activated sludge) with oxygen. Since the activated sludge is suspended in the aeration tank, activated sludge is also continuously discharged along with the wastewater flow. In the secondary clarifier the activated sludge is discharged mechanically separated (usually by sedimentation) from the treated water. A portion of the separated activated sludge is fed back into the aeration tank as return sludge. Without return sludge, it would not be possible to achieve stable operation of the biological treatment. Although the secondary clarifier is actually a mechanical process, it is still therefore classed as a biological treatment.

Sludge treatment

The non-recycled portion of the sludge separated in the secondary clarifier is referred to as surplus sludge or secondary sludge. Surplus sludge and sludge from the primary clarification (primary sludge) mainly contain organic ingredients and are a by-product of wastewater treatment. Therefore, a separate treatment is required for this sludge (sewage sludge). This is usually implemented in digestion towers, where the sewage sludge is digested under anaerobic conditions. Digested sludge can then be used as fertiliser in agriculture, for example.

