AQUA AURA
Leading Technologies

Cleartec® System

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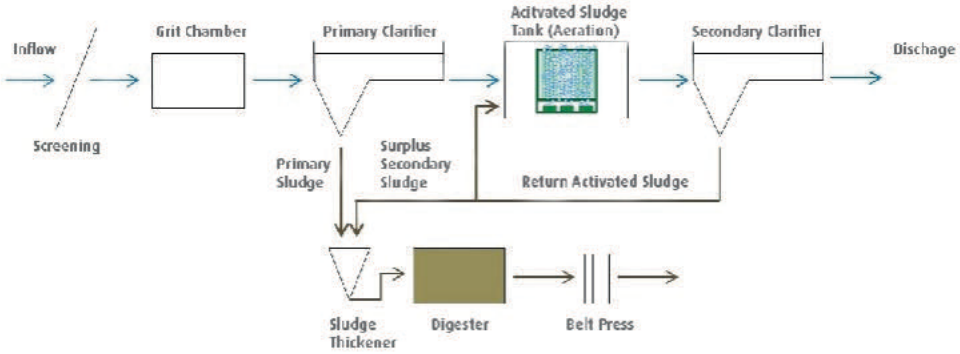
1. IFAS Process

IFAS (Integrated fixed film activated sludge) is a treatment process, combining suspended and sessile biomass. Equivalent to a conventional activated sludge process, necessary microorganisms for the biological treatment exist in sludge flakes that are suspended in the waste water. In addition a media is placed into the treatment tank in order to attach a part of the biomass (sessile biomass). With the attached growth more biomass is available in the system. More biomass simply means more microorganism and more micros are able to tackle more or higher polluted waste water.



2. Cleartec®

Cleartec® offers an attached growth media in the shape of a synthetic textile which is waste water resistant. The material is either Polypropylen (PP) or a combination of PP and Saran (PVdC). To keep the media in the system, the textile is fixed to a e.g. Stainless Steel module. Nevertheless the media is able to move due to the textile nature.

The attached growth system reduces the scouring or simply the discharge of biomass from the treatment plant while flexibility prevents clogging.

2.1 Cleartec® Biotextil

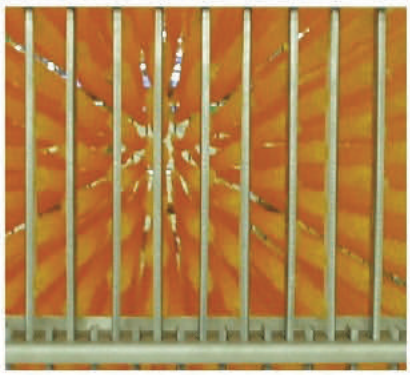
Cleartec® Biotextil is completely made of PP. The standard width is 0.96 m, the length depends on the water depth in the aeration tank.

One standard sheet has 16 growth stripes which on both sides has specially inserted loops. Due to the quantity of the loops, a high specific area is achieved which offers micros optimal space to attach. The growth stripes are alternate with a more loosed area. These zones allow free flow of waste water and oxygen between the textiles.

Cleartec® Biotextil is installed in a module where each sheet is placed successively (14-19 textile sheets per m module length is possible). Therefore the resulting space between the sheets depends on the design and is between 5.3 cm and 7.1 cm. The minimum distance ensures that the textile sheets does not merge due the growth of biomass.

Each textile sheet has sewed retaining straps at each ends where a rod or pipe can be inserted to fix the textile on the module.

2.2 Cleartec® BioCurlz



Cleartec® BioCurlz is a combination of materials. The core filament is made of PP; it is stitch-bonded and curled up. During the stitch-bonding process the loops are inserted. Loop material is Polyvinyldenchloride (PVdC). PVdC is an inherently stable yarn with a fairly large diameter achieved by only a few filaments. Therefore the loops stick out quite well. Due to the rope structure and the stability of the loops BioCurlz is perceived as 3-dimensional.

A standard unit has 6 strings connected in a holding bar. The strings are molded into a PP bar which is again enforced by a stainless steel frame.

In contrast to Biotextil, BioCurlz holding bars are successively placed but staggered in reversed order. This placement method allows a dense packing of Curlz (25-29 holding-bars per m module length is possible). The specific area per volume module is significantly elevated which makes Cleartec® BioCurlz a high-capacity media.

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3. Application and Criteria

Cleartec® attached growth textile is used to enlarge existing domestic WWTP which has limited area availability. The installation of a textile fixed-bed is equal to expanding the tank volume (aeration tank and clarifier). The required concentration of microorganism for the biological treatment is able to increased and so as well the general performance of the biological process of the treatment plant. As of now Cleartec® textile fixed-bed is applied in the aerobic zone (carbon elimination and Nitrification). Also the placement in the Denitrification zone is thinkable as long as the agitation of the activated sludge is realized by the integrated diffuser below the fixed-bed modules. The waste water inflow should undergo the mechanical pretreatment before entering the aeration tank. A fine bar screen with 6mm bar space is recommended. Furthermore a sand and grease trap as well as a pre settlement tank shall be existing. The final settlement tank can usually be used without any modification.

4. Modular Construction and Installation

Cleartec® textile media is at best built in a non-corroding frame construction which optionally can be equipped with diffusers. These modules are liftable during plant operation via crane and so the drainage of the tank is no longer necessary. The optionally integrated diffusers could at the same time be inspected and maintained as needed. The aeration of the textile provides optimal oxygen transfer to cover the demand of the biomass. Furthermore an excellent flow is created which ensures the quasi movement of the textile and the scouring of the biomass.

In order to warranty the functionality of the Cleartec® System, the compliance of various parameters is necessary:

Space between textile sheets	Specified by design and growth material
Space between modules	Optimal 50cm, ensuring spiral flow, variation possible
Distance to tank wall	Optimal 50cm, ensuring spiral flow, variation possible
Distance to water level	Optimal 50cm, ensuring spiral flow, variation possible
Distance to diffusers	Optimal 50cm, ensuring free stream, variation possible
Placement of Biotextil	parallel to flow direction

5. Advantages in a Glance

Increase of Performance

Even without additional tank volume the biomass concentration is augmented. More micros are able to tackle more or higher polluted waste water. A new plant is designed to be smaller from the start as long as the minimum hydraulic retention time during peak load is met (depending on treatment target).

High Sludge Age

A higher sludge age is achievable in the sessile biomass than in the suspended one. Therefore the slowly growing Nitrificants are able to survive and maintain in the system. The Ammonia (NH4-N) consent is improved significantly.

Low Sludge Volume (ISV)

The increase of biomass in the aeration tank does not pose added load to the clarifier. Sessile biomass which is scoured from the textile by diffused air finally merges with the suspended biomass. Therefore suspended floc is intensified by added micros. This interaction also improves the settling character of the sludge in the clarifier. The sludge volume index is consequently reduced and the capacity of the clarifier even tends to rise so that at the end the biomass concentration is able to increase.

Self-regulating and low Maintenance System

The diffused aeration enables through scouring the regulation of the sessile biomass growth. Thus the blocking and clogging within the fixed bed is prevented. The scrubbing and maintenance is consequently not essential as the system cleans itself.

Energy Saving

Cleartec® textile fixed bed does not require additional means to clean or additional energy to keep its movement in water. Air is induced to solely provide micros with enough oxygen. The air-filled bubbles are enough to keep the system “alive”. Cleartec® is foremost the only IFAS system with the combination of textile media and state of the art ultrafine strip diffuser.

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