

REVIVE

Water treatment system

REVIVE™ - MODULAR PROCESS FOR REGENERATION AND REUSE OF WATER.

This system offers enhanced onsite biological treatment of any sewage or heavily contaminated water, including landfill leachates. The regenerated and purified water is revitalized and can be reused in many ways, for direct reuse or recharging local aquifers, land crop irrigation to hand-washing and bathing in water deprived regions.

REVIVE can provide pathogen and parasite free water, thus creating a local fresh water resource and hence enhanced water security. The solution is completely sludge-free as it is based on a complete natural food chain, from bacteria to protozoa to insects, and also including plants. It builds on multidisciplinary knowledge of the structures and processes which occur in natural aquatic ecosystems. It addresses the needs of water deprived people in any climatic conditions by offering a robust, maintenance-free and simple system for recovering fresh water from their own waste water.

REVIVE is a tool for onsite management of sewage and water resources. It is an alternative to traditional centralized sewerage systems which defy all criteria for sustainability, and to solutions often labeled eco-friendly, but which are not based on the principles of natural life cycles.

The complete REVIVE system consists of two cylindrical tanks of the same dimensions. The tanks are made of a light-weight material approved for use in drinking water systems. The waste water flows gravimetrically into the dynamic anaerobic pretreatment tank, which is normally situated underground. Processes within the tank are designed to ensure efficient initial biodegradation and sedimentation of inorganic material and oxidation of hydrogen sulfide. Advanced reduction of nitrates is achieved through optimized recirculation of a specific volume of the purified effluent from the second aerobic tank. This is carried out by bio-stimulated immobilized denitrifying bacteria.

The pretreated water is then transferred by a dosing pump to the second tank, which contains highly aerobic microbial and biochemical processes. The efficiency of biodegradation is governed by specific liquid circulation and vortex dynamics. Continuous release of organic carbon (exudates) by carefully selected aquatic plants sustains the growth and function of microbial and protozoan communities in the root zone (rhizosphere), and hence enhances water treatment.

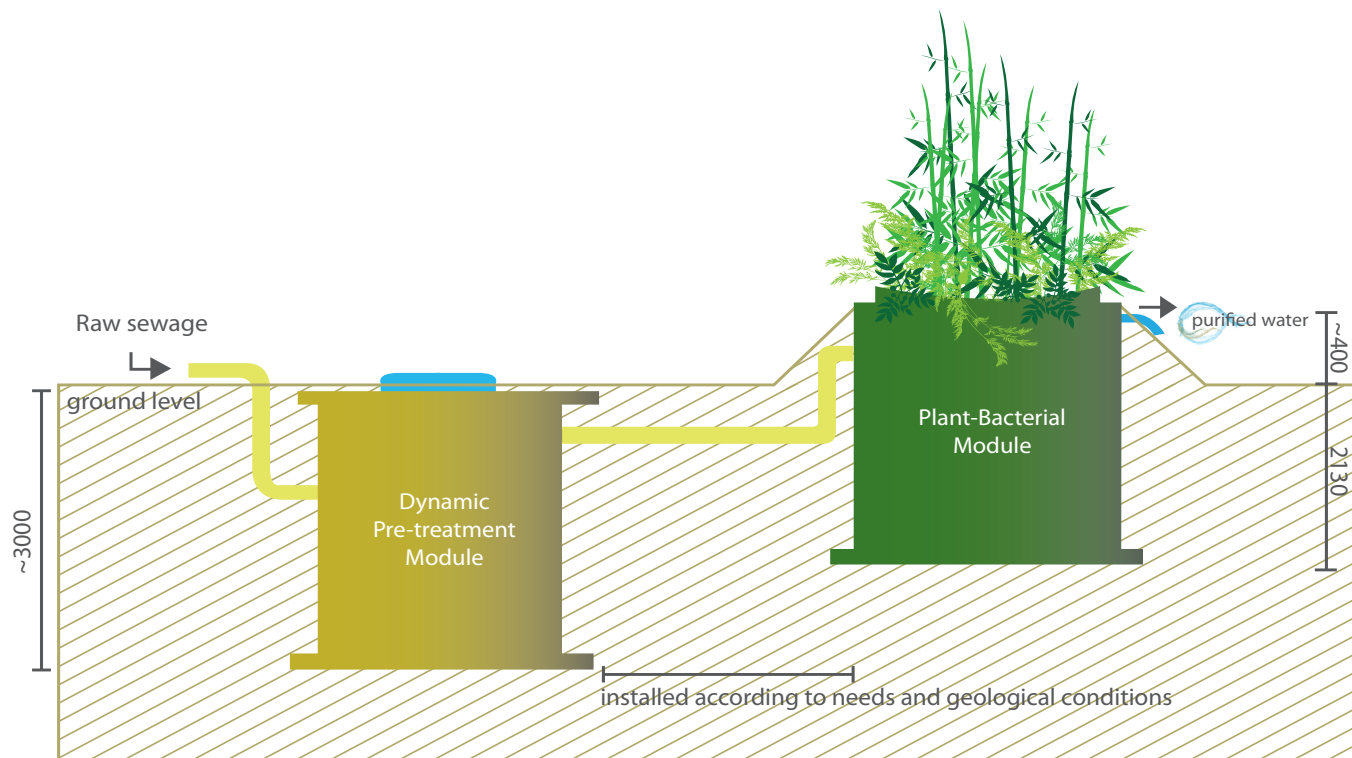
Highly aerobic biodegradation is correlated with efficient particle flotation. Nutrients are accumulated by bacteria from the breakdown of pollutants. In turn protozoans graze on the bacteria, and are then predated by insects. In this chain nutrients present in the waste water are eventually returned to the surrounding environment via intimate plant-bacteria-insect interactions. The regenerated and revitalized water leaves the system gravimetrically and is ready to be reused.

In areas with high sensitivity to phosphorus influx, we apply an additional absorption mechanism based on phosphorus enriching bacteria immobilized on organic fibrous material.

The quality of the purified water complies with the highest national and WHO quality standards for A-class water. The micro-fauna thriving in the water purified by REVIVE is indicative of water quality in unspoiled high quality natural lakes.

The REVIVE system can serve a single household as well as an entire community with a population below 2000 inhabitants. Examples of application include public gardens and visitors' centers, motorway service stations, small industrial sites, remote mountain settlements etc. The system can regenerate freshwater from waste waters resulting from intensive horticulture, aquaculture and farming. The intention is that all of the treated water should be reused onsite, for landscaping and gardening, irrigation and recharging small natural and man-made retention and groundwater aquifers. In this sense, we are offering the closed-loop and zero-discharge solution.

Some added values: the solution facilitates green architecture and development of green urban and recreational areas. It facilitates new housing development and brings timeless aesthetics. It improves the local microclimate and increases biodiversity. It can promote gardening and cultivation of plants with additional economic and health benefits. It creates new incentives for local business development. It offers living educational tools for schools.



QUICK TECHNICAL FACTS

Powerful system for water and wastewater treatment

- Capacity / flow of the basic REVIVE module: 1 – 12 m³ day⁻¹ can be scaled up using parallel installations or clusters of systems in series.
- Capacity / flow in the multi-channel dynamic modules: 30 to 100 (200) m³ day⁻¹ with pretreatment by mechanical self-cleaning screens.
- Retention time: 0.5 to 6 days.
- Energy consumption: 300 kWh year⁻¹ or less for a flow 6m³ day⁻¹.

Certification & Compliance

- Compliant with national and WHO water quality standards: Yes
- CE-certified construction: Yes
- CE-certification of the entire system: ongoing
- Treated water quality: WHO A-class water – equivalent to water in a high quality aquifer or a natural lake, and free from pathogens or parasites.

Freedom to forget after installation

- Maintenance: practically maintenance-free.
- System safety: there is no risk to the physical safety of children and animals as the system is enclosed. There is no potential for contact with contaminated water or sewage.
- Earthquake and flood proof? Yes

Construction specifications

- Construction: lightweight composite material or polyester rotational molding. Raw materials and construction certified for water and food purposes.
- Foot-print: 0.1 - 0.2 m² PE⁻¹ (PE = person equivalent, and in the EU PE = 200 L person⁻¹ day⁻¹).
- Dimensions: Two cylindrical tanks 210 cm high x 200 cm in diameter, each with an internal cylinder 200 cm high x 80 cm in diameter. Weight: cylindrical construction alone 160 kg or less.
- Weight: cylindrical tank alone 160 kg or less. Total weight of a complete system – two tanks: 400 kg or less.



Suitable for highly efficient year round treatment of any kind of residential sewage, industrial and agricultural wastewater, landfill leachates, restoration of heavily polluted surface waters.



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