Water is the essence of life

System technology and components for biological treatment of industrial and municipal waste water

GVA

**"Water …
you are life itself."**

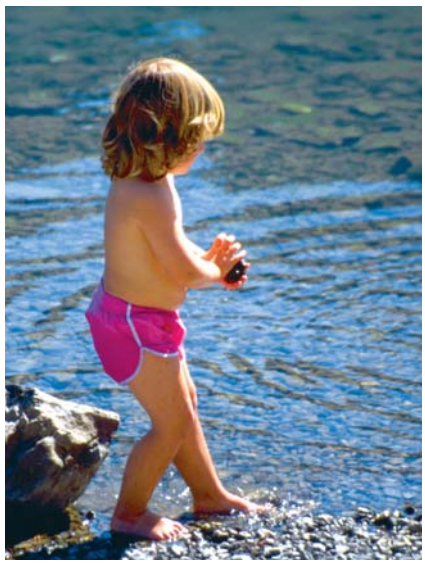
Wind, sand and stars;
Antoine de Saint-Exupéry (1900 – 1944)

GVA – system specialists for biological waste water treatment

GVA develops and supplies perfectly co-ordinated processes and technology for biological treatment of industrial and municipal waste water. We have been working closely with our customers on a global level for more than 20 years, our objective being to ensure that clean water remains a resource that future generations can rely on.


TÜV CERT
ZERTIFIKAT
Die TÜV CERT-Zertifizierungsstelle der TÜV Industrie Service GmbH TÜV Rheinland Group
bescheinigt gemäß TÜV CERT-Verfahren, dass das Unternehmen
GVA Gesellschaft für Verfahren der Abwassertechnik mbH & Co. KG
DIN EN ISO 9001:2000
TÜV

We give the same careful consideration to the latest findings in environmental protection and research and international norms and standards during development, combining these with our extensive experience and know-how gathered through the supply of many systems.



The sewage treatment plant in Brandenburg was also equipped by GVA. Turbo compressors, WEEDLESS-V vertical agitators and WEEDLESS-T submersion agitators, the GVA pressurised aeration system with approx. 3,200 m ELASTOX®-R type 750 and the pipeline construction were supplied.

WEEDLESS-T submersion agitators can be equipped with two or three-bladed propellers.

ELASTOX®-T patented disc air diffusers from GVA have set new standards in aeration.

Innovative technology inspired by nature

Comprehensive know-how in process and system engineering

Customers all over the world appreciate the competent consulting service we provide during the design and realisation of all types of biological waste water treatment systems. In addition to patented aeration and circulation components, GVA's scope of services also encompasses process and system engineering, particularly in relation to the further development and optimising of treatment techniques by our R&D department.

The GVA scope of services

Process, planning and service

- New system concepts
- Modernisation and optimising
- TRICYCLE process biological treatment stages
- Service technology and pipeline construction

System engineering and components

- ELASTOX® energy-saving pressurised aeration systems
- WEEDLESS energy-saving circulation components
- GVA decanting equipment for clarified water discharge in SBR systems
- GVA monitoring systems
- GVA environmental sample database service system for aeration modules

Approx. 28,000 m of GVA ELASTOX®-R membrane tube air diffusers are in use in the aeration tanks at the municipal waste water treatment plant in Hanover.

ELASTOX® aeration systems – the optimum solution for every application

Efficient aeration of waste water treatment tanks demands powerful aeration systems that can be optimally adapted to suit the respective tank geometry and varied technical requirements.

A further requirement is the durability of materials and the reduction of operating costs. Continuous further development of membrane quality means that system operators receive state-of-the-art technology. ELASTOX® rubber membrane air diffusers from GVA were specially developed to provide system operators with tailored solutions for fine-bubble aeration applications, regardless of whether surface, oblique or spiral flow aeration is involved.

ELASTOX® aeration systems are distinguished by the excellent intermittent operating mode option they provide. This is a prerequisite for the application of modern process engineering.

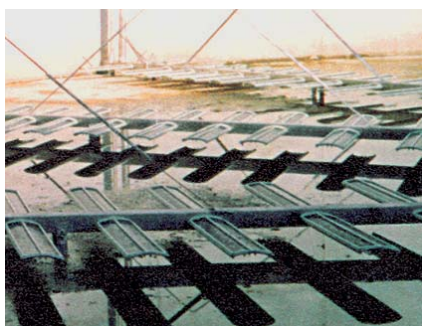
Further advantages are a particularly high oxygen utilisation, thanks to the fine-bubble aeration characteristics inherent in these systems, and a broad air flow range.

ELASTOX® rubber membrane air diffusers are available in three system versions:

- ELASTOX®-R tube air diffuser,
- ELASTOX®-T disc air diffuser with its patented central lift limitation and spring-loaded check valve,
- ELASTOX®-P plate air diffuser, the latest addition to the ELASTOX® product range.

ELASTOX® aeration systems are used for a variety of applications, including fresh water aeration in buffer tanks, oxygen input in aeration tanks and sludge stabilisation, or aeration of rivers, lakes and fishponds.

ELASTOX® aeration systems are designed specially to address different operating requirements.



ELASTOX®-T disc air diffuser membranes are manufactured from special rubber (EPDM) or special silicone that has proven its effectiveness in a multitude of systems.

ELASTOX®-P plate air diffusers are generally fitted in pairs to the aeration mesh.

ELASTOX®-R tube air diffusers – the revolution in pressurised aeration technology

GVA developed the ELASTOX®-R rubber membrane aerator in 1983 and ushered in the principle of the floodable support tube. The low-buoyancy hose aerator has since established itself on an international level and is subject to continuous optimisation and further development. The ELASTOX®-R support tube thus now consists of a single injection moulded component with an integrated air supply. All the materials used are highly resistant to known chemical and biochemical influences encountered in the biological waste water treatment process.

The aerator can be easily and speedily fitted to the aeration grids by a single person without the need for special tools.

ELASTOX®-T disc air diffusers – proven performance in millions of practical applications

The ELASTOX®-T disc air diffuser was presented at the IFAT in 1984 and represented one of the first air diffusers of its kind. Its patented central lift limitation set a high standard of quality and soon took the lead among rubber membrane aeration systems. Central lift limitation ensures that aeration is uniform over the entire aeration surface. It is ideal for intermittent operation and also reduces the volume of air that emerges when damage occurs, thanks to the integrated spring-loaded check valve.

ELASTOX®-T disc air diffusers are mainly used for so-called full floor aeration, where air diffusers are uniformly distributed across the tank floor. Surface aeration does not depend on the shape of the tank, meaning that existing systems can also be simply retrofitted and modernised.

ELASTOX®-P plate air diffusers – specialists for major challenges

GVA revealed the ELASTOX®-P plate air diffuser in 1996, launching a low-buoyancy air diffuser on the market that, although based on the concept of the tube air diffuser, also incorporated the qualitative advantages of the disc air diffuser. Its design was selected to generally enable its replacement with tube diffusers.

The ELASTOX®-P plate air diffuser combines the advantages of both these technologies in a maintenance and user-friendly aeration concept distinguished by reduced investment and operating costs. An example of the advantages is the possibility of realising removable aeration systems without draining the tank, thanks to the low buoyancy of the unit.

The low-buoyancy ELASTOX®-R tube air diffuser design is based on the floodable support tube principle.

WEEDLESS agitators – keep your cleansing process moving

Although in themselves a simple component, agitators are of elementary importance for the continuity and success of the process in waste water treatment systems.

They ensure constant circulation and mixing and must be designed with precision with regards to their performance to meet the technical requirements of the process.

WEEDLESS agitators were developed specially for waste water engineering and the resulting stress. Their large-formatted, slowly operating propellers are designed for maximum flow characteristics and are available in horizontal or vertical versions. The angle of the propeller blades can be varied, thus ensuring optimum adaptation to flow speed.

WEEDLESS agitators are used for mixing applications in anaerobic and anoxic zones, biological phosphate elimination and denitrification, mixing and compensating reservoirs and aeration with separate circulation.

Only the best possible combination of aeration and circulation (achieved here with WEEDLESS-V vertical agitators) ensures the optimum result.

WEEDLESS-T submersible agitators – three-bladed version

WEEDLESS-S agitators are ideal for use in buffer tanks.

WEEDLESS-T
– the submersible agitator with the patented suspension

Submersible agitators are the ideal circulation technology for tanks, enabling hermetic horizontal flow movement in circular and ring-shaped systems, troughs and circulation tanks. The WEEDLESS-T propeller and submersible gear motor are secured together on a sliding carriage with a patented suspension. The entire construction is lowered into the water with a twin guide, resting there on a special shock absorber system.

The submerged gear motor of the WEEDLESS-T submersible agitator is constantly monitored for leaks. This ensures that the bearings and gear wheels are not subject to damage.

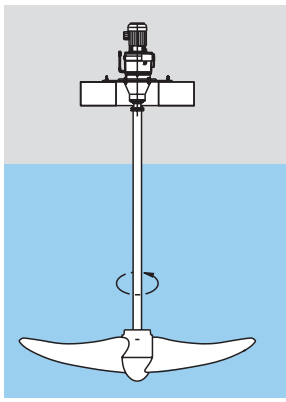
WEEDLESS-V
– the vertical agitator for mixing and circulation

WEEDLESS-V vertical agitators are mainly used in square or rectangular tanks. A flow direction from the floor to the surface of the water is usually selected here, thus generating a rolling flow current. The water on the surface thus flows to the edge of the tank where it is directed towards the floor of the tank.

Drive is provided by a dry-mounted gear motor connected to the agitator shaft that points vertically downwards. The gear motor is fitted on a bridge portal construction above the surface of the water. This means that there are no maintenance areas below the water surface. The entire construction is stable and minimises vibration and is designed for continuous operation.

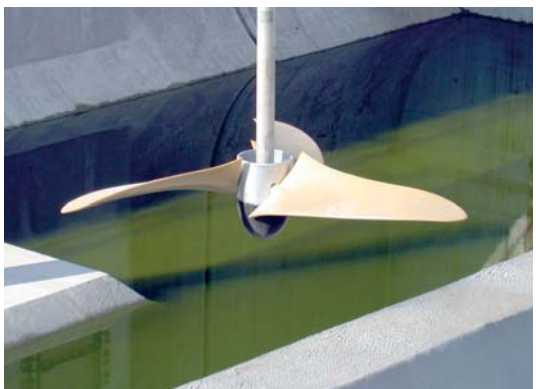
WEEDLESS-S
– the floating vertical agitator

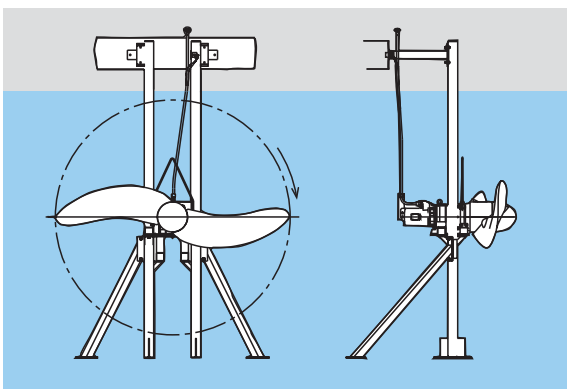
Our new floating WEEDLESS-S agitator enables the realisation of a uniformly-stable predetermined submersion depth of the propeller unit for the first time, even where the water level is subject to change. This advantage makes the new floating agitator the ideal option for applications in buffer tanks or SBR systems. WEEDLESS-S agitators are based on the vertical agitator design. However, in contrast to the WEEDLESS-V, they are secured to a float-like construction on which the gear motor is also mounted.



Both WEEDLESS agitator versions are designed for applications involving differing flow currents or tank shapes.

WEEDLESS-V vertical agitators are simply suspended from above in the tank.





System know-how and process engineering – take advantage of our specialised knowledge

GVA has been facing the continuously growing challenges of biological waste water treatment for over 20 years. Our know-how and practically experience has kept apace with this. GVA competence in process engineering concentrates on aeration processes that draw their inspiration from nature. Our research and development specialists have carried out pioneering work in this respect and continually advanced this technology.
Our industrial and municipal authority customers benefit from the extensive know-how and expertise embodied in our consulting service, a strategy that enables us to provide the optimum system design and ideal components to suit each respective requirement.

SBR systems – with GVA system technology and components

SBR aeration systems (employing sequencing batch reactor processes) are recognised as the state-of-the-art today and utilised with increasing frequency. All biological treatment steps are realised in a consecutive cycle in this process in a single reactor. Varying process versions are employed during this that vary with regard to the manner of waste water charging and cyclic procedures. We supply our GVA components for all SBR versions for aeration, circulation and decanting, along with suitable GVA system technology that has already proven its effectiveness under practical conditions in a multitude of systems all around the world.

HUMANA-Milchunion industrial plant, Everswinkel: SBR aeration system with GVA WEEDLESS-T submersible agitator, ELASTOX®-T disc air diffusers and decanting components

The patented TRICYCLE process utilises a triple tank system and enables the optimum disintegration of nutrients.

GVA decanting equipment – a decisive process step

The clarified water discharge phase is of decisive importance for the quality of cleansed waste water, particularly where SBR systems are involved. Specially-developed GVA decanting units ensure effective phase separation here and prevent scum from collecting in the drain. Decanting unit dimensions are always realised to suit drainage requirements in this respect.

The decanting unit lowering procedure is subject to positive control, and lowering speed can be adapted to suit prevailing requirements. The decanting unit is immediately raised to its uppermost position on completion of decanting to prevent penetration by sludge mixture during subsequent operating phases.

TRICYCLE – the patented GVA process for nutrient disintegration

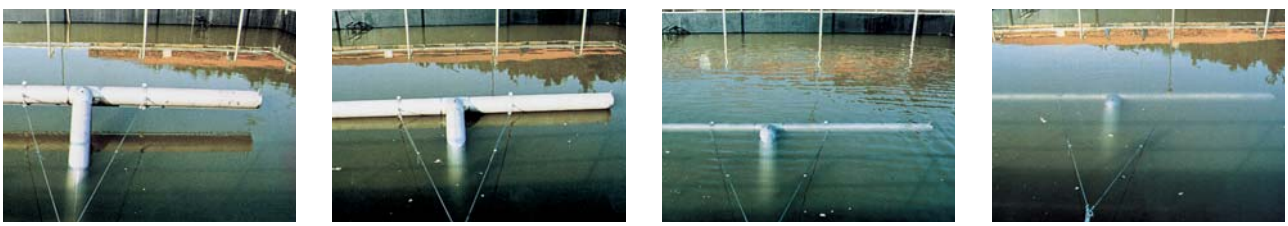
We developed the TRICYCLE process, a technology for biological waste water treatment, at the end of the 1980's. Our intention was to achieve the greatest possible elimination of nutrients through a high degree of stability during nitrification, denitrification and bio-P elimination. The solution was a patented process that employs a triple tank system, with each of the identical tanks being fitted with aeration and circulation units that can be deactivated.

The various denitrification and nitrification process stages are realised consecutively in the three tanks, with the through-flow sequence changing in the next cycle and the entire process commencing anew after the third cyclic change.

The advantage in comparisons with other biological processes:

- 100 % substrate and nitrate availability for nitrification
- High process stability
- Low overall nitrogen concentration in sequence
- Excellent controllability of the denitrification process
- Periodic cyclic change reduces energy costs

Position of GVA decanting unit in the Wesenberg treatment plant during different clarified water discharge phases



Take full advantage of our competence: complete technology concepts from a single supplier

Plant construction by experienced GVA specialists ensures safe and rapid commissioning.

GVA provides logical and project-related projection and plants construction of complete waste water treatment systems for public institutions and industrial customers from a single source – with all the advantages of the extensive know-how embodied in our new system design, modernising and optimising, system technology and components, plant monitoring, services and research and development.

GVA technologies are successfully employed in several hundred plants and systems

Our customers profit from process engineering know-how and the in part patented process technology we supply during planning and construction of waste water treatment systems. Whether pipeline construction or the installation of components such as aeration and circulation systems is involved, all system components are perfectly co-ordinated and ensure a high efficiency during daily operation.

The GVA maintenance system enables direct access to aeration modules.

We are also a reliable and competent partner when it comes to service. Our after-sales service package encompasses:

- Consultation on plant optimisation for greater efficiency
- Plant inspections involving supportive measurement and examination
- Plant monitoring systems
- Maintenance and refurbishment of plant and components
- Provision of original spare parts and components subject to wear

We provide monitoring systems for our high-performance rubber membrane aeration systems (e.g. employing differential pressure measurement to monitor perfect operation of aeration equipment). The measurement procedure functions independently of fluctuations in water level and can be interchangeably employed at several control points using a measuring head.

State-of-the-art technology at all times

Our R&D specialists also take the demands set by falling operating costs and growing quality requirements into consideration during continuous further development of our tried and trusted system technology and components.

Some of our answers to these challenges include:

- Further development of silicone and microbe-resistant EPDM membrane quality for serial production
- The new floating WEEDLESS-S vertical agitator with uniformly-maintained submersion depth, even where water levels fluctuate
- The revised WEEDLESS-T submersible agitator design

In addition to this, we also work on the development of new process technology for waste water treatment (e.g. membrane technology and other innovative solutions). This means that our customers can continue to face future challenges posed by waste water treatment and the demands of legislation with confidence.

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