

# Municipal wastewater treatment

Reliable containerized solutions  
from PPU Umwelttechnik GmbH

[clearfox.com](https://clearfox.com)





# PPU Umwelttechnik GmbH

Your trusted partner for  
municipal wastewater treatment



PPU Umwelttechnik GmbH and aquaplast GmbH are family-owned businesses operating for over 20 years. Together, they are recognized worldwide as experts in designing compact wastewater treatment systems for industrial and municipal applications.

Under the ClearFox® brand, these innovative systems are distributed worldwide through a steadily growing network of partners.

With the experience of nearly 600 successfully completed large-scale projects and over 12,000 delivered standard treatment plants, we offer extensive expertise and outstanding market knowledge. Our powerful team of seasoned specialists supports our customers every step of the way – from project planning and implementation to ongoing service.

At our headquarters in Bayreuth, we bring together production, engineering, and research under one roof. This close collaboration allows us to work efficiently and develop customized solutions for complex wastewater treatment projects.

Striving for constant improvement and system optimization, we have become one of the leading manufacturers of modular treatment plants worldwide.

Our belief: Environmental protection is truly sustainable only when it remains economically viable. That's why we continuously work to combine ecological responsibility with economic efficiency – for clean water, a healthy environment, and a future-proofed infrastructure worldwide.

↗ **50 Experienced employees**

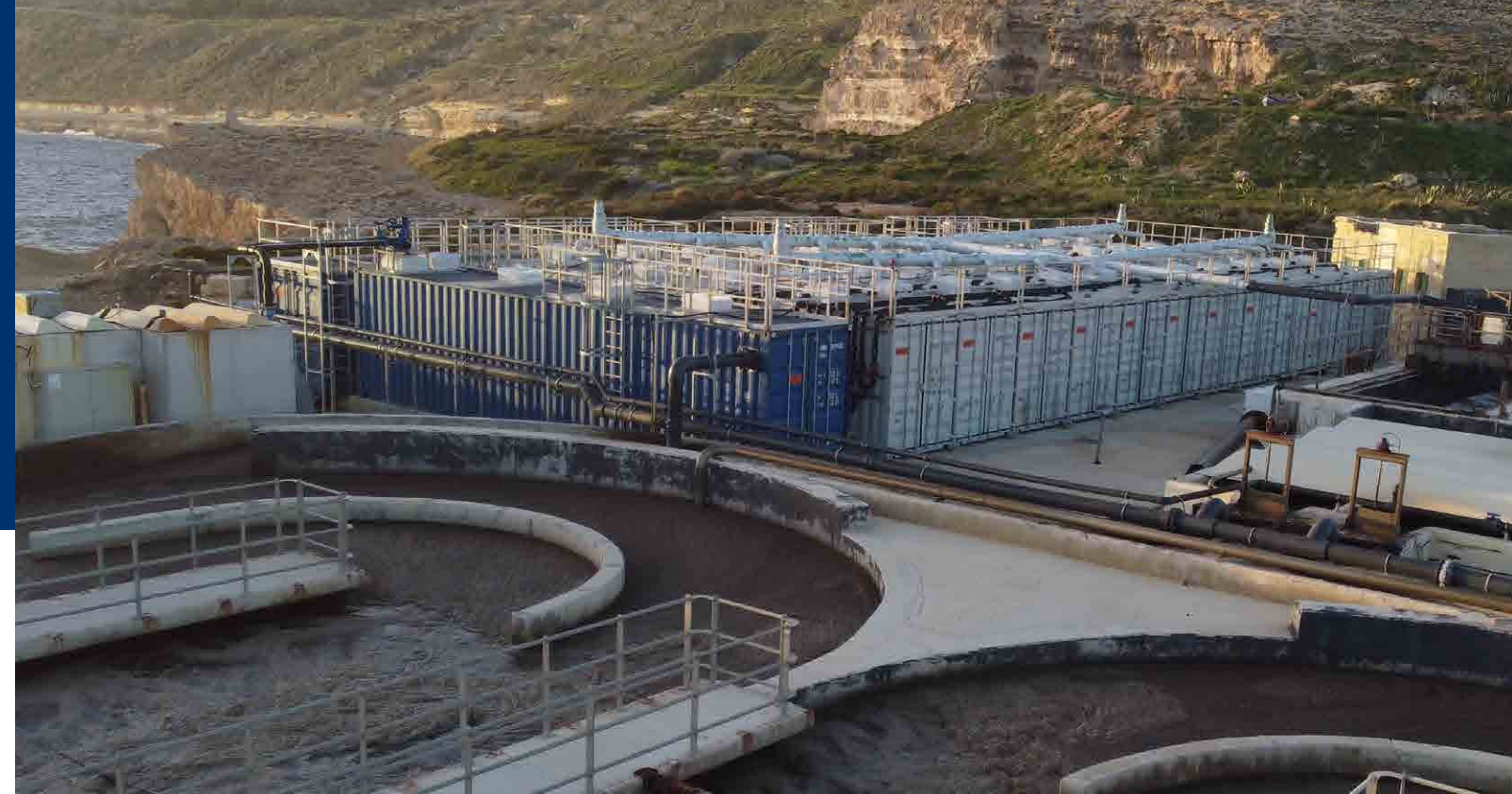
💡 **20+ Years of experience**

🏠 **600+ Large scale systems**

⚙️ **12.000+ Standard units**

💧 **50.000 m<sup>3</sup> Wastewater/day**

↕️ **20.000 PE Max project size**



**PPU Umwelttechnik GmbH is a member of  
numerous associations**





# PPU for local authorities, general contractors and engineers

Proper wastewater disposal is a constant challenge for municipalities. Treatment plants become outdated, need repairs, or must meet stricter regulations. At the same time, any CAPEX and OPEX costs must be justifiable. We provide customized solutions that combine high quality with cost efficiency.

## Turnkey complete solutions

We offer tailored turnkey solutions from a single source. From planning and implementation to maintenance, we support you throughout every project. With our modular system, we develop solutions that are precisely customized to your needs.

Whether it's a complete solution or just specific treatment stages, we are your main contact for all wastewater treatment needs. Municipalities and operators rely on us to manage and implement all steps.

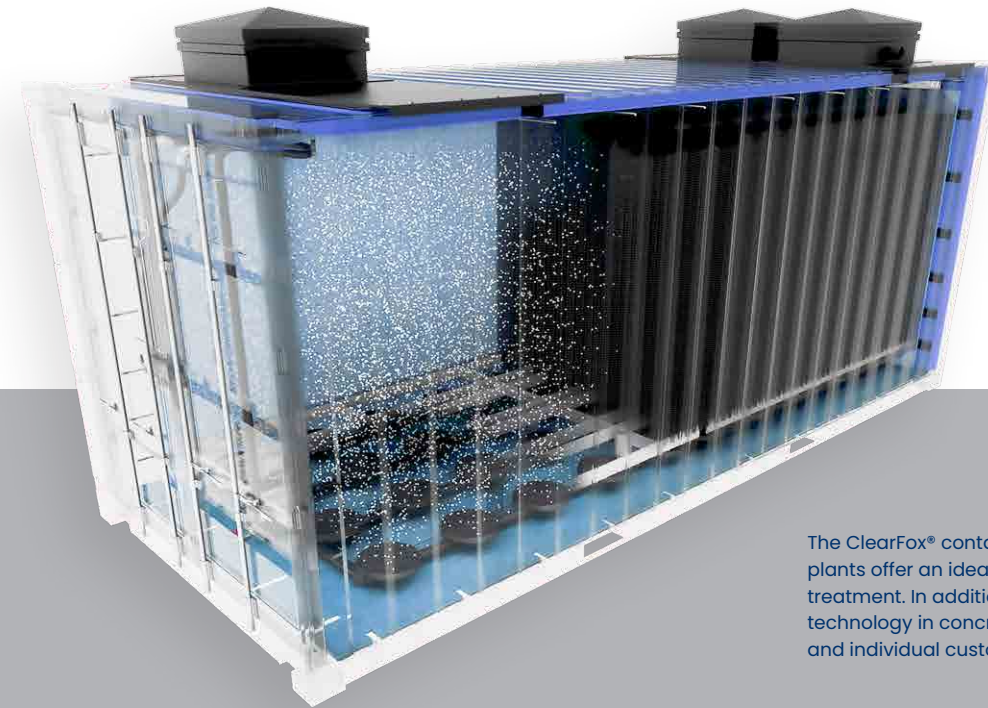
## Flexible partnership opportunities with planning and engineering offices

As a general contractor, you create tailored and cost-effective solutions for complex projects. Success relies on strong interdisciplinary collaboration.

We are your experienced partner in wastewater technology – offering flexible cooperation models and expert planning through our well coordinated engineering team.

This is how projects are implemented reliably, quickly, and smoothly.

## Our products Compact and flexible. Just clever.



The ClearFox® containerized wastewater treatment plants offer an ideal solution for municipal wastewater treatment. In addition, we also supply our wastewater technology in concrete tanks – for maximum flexibility and individual customization options.



## Container modules

Our container modules are ideal for applications that require a quick, modular, and durable solution. They are particularly well-suited for decentralized wastewater treatment.

### The advantages

- Modularity: Customizable and easily expandable.
- Long durability: DEKRA-certified with a lifespan of 20+ years, often even longer thanks to the use of durable Corten steel. Additionally, only robust components and materials are used.
- Efficient space utilization: Compact design with integrated, space-saving technology.
- Fast implementation: Short manufacturing times, ideal for time-sensitive projects.

## Concrete plants

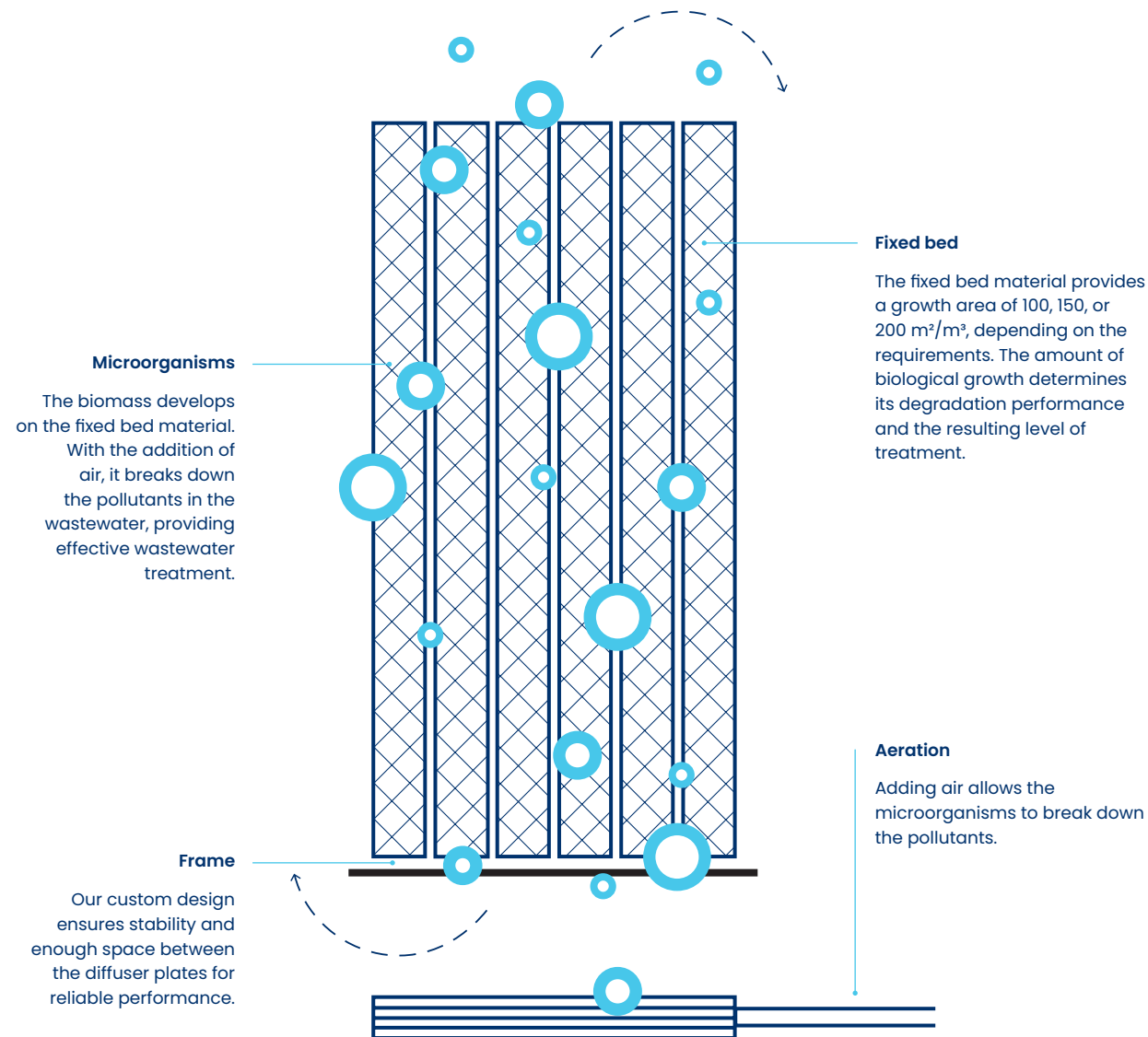
Concrete plants – the traditional construction method – particularly suited for large-volume applications and underground construction.

### The advantages

- Compact design. The above-ground space remains available for buildings, parking, or green areas.
- Visually unobtrusive. Discreetly integrated into the landscape.
- Suitable for retrofitting projects using existing tanks or for flexible tank geometries.

# ClearFox® FBBR

## The most efficient solution for biological wastewater treatment.

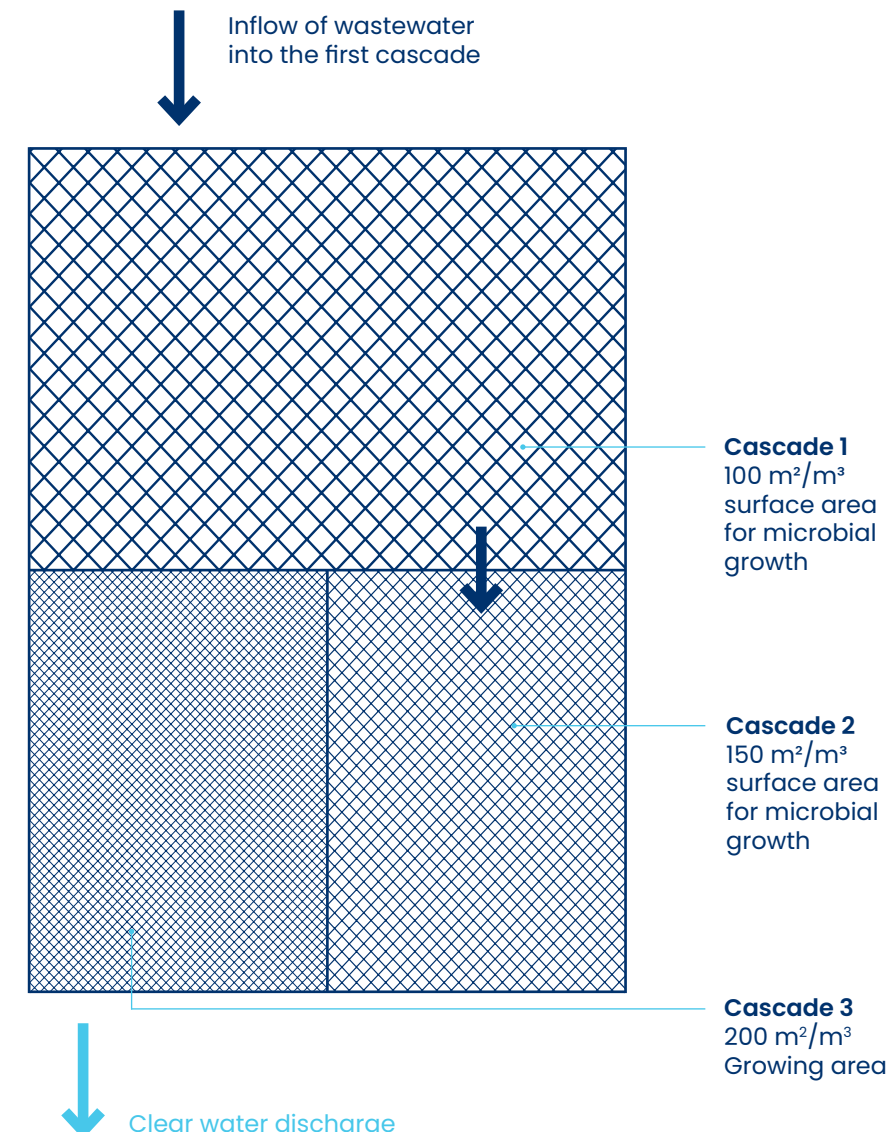


The ClearFox® FBBR is one of the most efficient and robust processes for biological wastewater treatment on the international market. It is a modification of the well-known fixed-bed process used worldwide. Through the use of special cascades and aeration sequences, the ClearFox® fixed bed reactor can biologically treat municipal and industrial wastewater. This method is far more stable than typical activated sludge processes and produces less sludge than conventional biological wastewater treatment methods.

In container wastewater treatment systems, all wastewater treatment components are installed in rotationally molded containers. These tanks are made without any welds or weak points, ensuring maximum operational safety and reliability.

## FBBR specifications

The ClearFox® fixed-bed reactor is the biological treatment module and is the only one in its size class to have proven its high efficiency in a 50-week test in accordance with EN 12566-3. This test was carried out by a certified wastewater institute and confirms a purification performance of 100 kg COD per 20 foot container per day.



The submerged fixed-bed method is particularly efficient and robust against load fluctuations and variable pollutant concentrations due to its high specific surface area per unit volume. It is considered 'especially suitable for wastewater treatment in decentralised areas' as confirmed by the ATV report in 1996.

PPU Umwelttechnik GmbH specializes in this process and consistently relies on cascaded systems for municipal wastewater, which can cover a wide range of loads.

The cascading process allows the specialized microorganisms to settle on the fixed bed material, which break down the contamination in the best possible way.



# The applications of the ClearFox® systems

## Limitless possibilities

### Modernisation

Upgrading of existing ponds, rotating discs, trickling filters, or other treatment systems.

#### More treatment capacity

Integrating our systems into existing systems allows for smart capacity adjustments.

#### This is possible at every treatment stage

- Additional buffer volume (for rainwater or press water from mobile sludge presses)
- Higher biological treatment performance
- Expansion/reduction of the secondary clarification
- Renewal of the primary clarification

#### Adding treatment stages

Modular Integration for

- Nitrogen degradation (nitrification and denitrification)
- P-Elimination
- Disinfection/Filtration
- 4th treatment stage

### New construction

- New complete solutions
- Standardized and customized, making it cost-effective and efficient
- Infrastructure development for residential and industrial zones

### Rental fleet

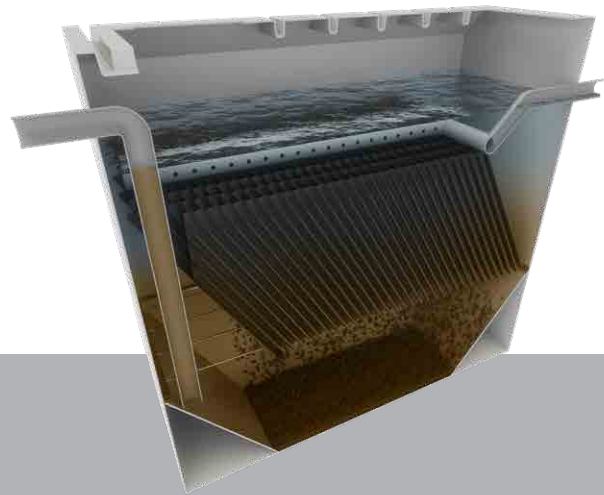
- Flexible financing options
- Accessible fleet of compact systems
- Perfect solution for temporary wastewater treatment
- Reliable sewage treatment systems during construction and renovation work
- Compliance with legal regulations
- Rental duration can be tailored to your needs
- Risk reduction through a trial phase and rent-to-buy option





# Our additional modules

## The ideal partners for your wastewater treatment



### ClearFox® lamella clarifier

Compact and powerful secondary or primary clarification. The ClearFox® lamella clarifier is the solution for reliable solids removal. It guarantees reliable sedimentation and increases the efficiency of the entire wastewater treatment process.



### ClearFox® DAF

ClearFox® DAF dissolved air flotation is a physical-chemical process for separating suspended solids from wastewater. The specially developed flotation reactor enables the efficient separation of pollutants with low energy consumption.

### ClearFox® DiOx

The ClearFox® DiOx is an innovative oxidation module for the treatment of wastewater with a high organic load. The central element of the system are special electrodes coated with a thin layer of boron-doped diamond. The boron doping converts the nonconductive diamond into an effective electrode material.

A module consists of an anode and a cathode. When voltage is applied, reactive hydroxyl radicals are created at the anode from water molecules, effectively breaking down contaminants in the water.

Hydroxyl radicals react with many organic pollutants, breaking them down or turning them into harmless components. This lets the DiOx module remove a wide range of contaminants efficiently.

### ClearFox® SBR-Equipment

SBR systems are a simple and flexible technology for biological wastewater treatment. They stand out for their ease of use and reliability. Whether for retrofitting, integration into existing tanks, or as a completely new system – our SBR systems are customized and tailored to meet specific needs. The compact kits offer a simple solution for a wide range of applications.

### Mechanical cleaning

ClearFox® modules offer you reliable solutions for mechanical pre-treatment. From individual modules like screens, sand traps, and grease separators to compact complete systems – our modules ensure effective solid separation and enhance the efficiency of subsequent processes.

### Sludge press

The sludge presses with modern ring disc technology are an efficient way to remove water from sludge. They reach a dry substance content of over 30%. They require very little maintenance, keeping operating costs low. They are also ideal for small municipalities.

### UV disinfection

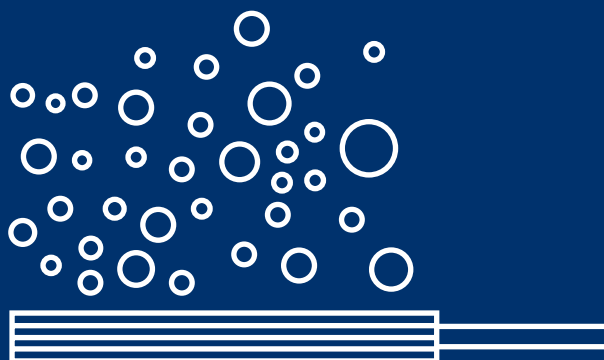
The UV disinfection module uses ultraviolet light to kill microorganisms. It disinfects your wastewater efficiently, without chemicals, and in real-time. It's easy to integrate, low maintenance, and provides great health protection.

### Phosphorous-Elimination

The phosphorus removal module provides a reliable solution and can easily be added to existing treatment plants – either on its own or with the lamella clarifier. This helps you meet future water quality standards.

### Filtration

Our filter modules provide various options for efficient wastewater treatment. From low-maintenance glass bead filters to powerful ultrafiltration systems, we have the right solution for removing suspended solids.



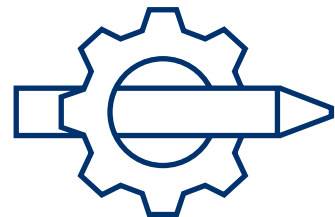
# From the first request to the finished project and beyond

PPU Umwelttechnik GmbH supports you until your wastewater treatment plant is up and running.



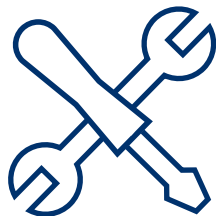
## Comprehensive wastewater analyses

If needed, we analyze your wastewater to offer the best solution. We can also help with analyses after the project to document the achieved effluent values.



## Custom Engineering

The design of your system will be tailored to the size and complexity of your project. We provide in-house sizing and will keep you updated regularly.



## Production by one company

PPU Umwelttechnik GmbH produces all plants at its main factory in Bayreuth. You receive your customised system fully assembled and tested from a single company.



## Smooth tendering process

With experience and sustainable technologies, we are a reliable partner for public tenders. Our efficient solutions offer low lifecycle costs and meet both technical and environmental requirements.



## Flexible financing options

You can either purchase or lease our systems. The lease period is individually tailored to your needs. After the lease, a purchase option is available, allowing you to test the system before buying.

## Purchase? Of course

With the purchase of a ClearFox® wastewater treatment system, you are guaranteed process reliability in the treatment of your wastewater.

PPU Umwelttechnik GmbH tests all systems before they leave the production plant.

Upon purchasing, a thorough customer service is provided to maintain the smooth operation of the wastewater treatment plant.

**We will gladly advise you!**

## Rental? No problem

All containerized wastewater treatment plants are available for rent, rent-to-buy or purchase. The rental period can be individually chosen, ranging from a few months to several years.

These rental treatment plants are used to cover wastewater needs during construction, renovation, or on-site operations.

A purchase option is available at the end of the rental period.

**We will gladly advise you!**







# Municipal wastewater treatment in Pfalzpaint using FBBR container system

## Overview of the project

The wastewater treatment plant in Pfalzpaint treats wastewater from 10 municipalities with a capacity of 800 PE (population equivalents). Due to outdated technology (disk immersion bodies, pump sump, aerated secondary clarifier), the cleaning performance was no longer sufficient for direct discharge into the Altmühl River.

The wastewater association needed to expand the plant without having to dismantle it. What was required was a robust, low-maintenance system with the possibility of a trial phase and subsequent evaluation of the cleaning performance.

PPU Umwelttechnik GmbH provided a containerized wastewater treatment plant with an immersed fixed-bed, available for lease with a purchase option. It works in three stages, with the surface area increasing from 100 m²/m³ to 150 m²/m³, and then to 200 m²/m³. The staff checked the system at the factory, so it could be installed in just one day. The biological process stabilized after a few weeks.

The test phase showed reliable performance and minimal maintenance, leading the consortium to purchase the plant after five months. Since then, minimal adjustments have been needed.

### Inlet

COD 1190 mg/l  
BOD<sub>5</sub> 450 mg/l  
NH<sub>4</sub>N 64 mg/l  
P<sub>tot</sub> 19,1 mg/l

### Outlet

COD 58 mg/l  
BOD<sub>5</sub> 25 mg/l  
NH<sub>4</sub>N 24,4 mg/l  
P<sub>tot</sub> 9,8 mg/l

## Variant comparison according to LAWA

	Pumping station	New construction	ClearFox®
Acquisition costs	3,182,600 €	3,457,250 €	656,583 €
Reinvestment costs after 12.5 years	47,293 €	282,608 €	64,895 €
Reinvestment costs after 25 years	51,720 €	412,342 €	358,439 €
Reinvestment costs after 37.5 years	22,588 €	134,977 €	30,995 €
Annual operating costs	172,080 €	106,455 €	97,500 €
Total investment after 50 years	8,734,151 €	7,646,186 €	3,635,134 €

Based on the German Working Group on water issues (LAWA) and a population equivalent of around 1,700  
All prices are net values.



### Project

Modernization of the wastewater treatment plant in Pfalzpaint.

### Sector

Municipal wastewater treatment

### Size

800 PE

### Applications

ClearFox® containerized wastewater treatment plant

### Module

ClearFox® FBBR

### Location

Germany

### Completed

2020



**Do you have any questions?  
We will gladly advise you!**  
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**info@clearfox.com**



Further information on  
municipal wastewater  
treatment can be found here



#### **Innovation made in Germany**

PPU Umwelttechnik GmbH focuses on wastewater treatment in the residential, municipal, industrial and decentralized sectors. Under the brand name ClearFox®, the company sells wastewater treatment plants produced in Bayreuth all over the world. The focus is on biological and chemical-physical processes for wastewater treatment. PPU Umwelttechnik GmbH offers selected processes in ISO sea containers. This makes them compact, mobile, modular and ready for use anywhere in the world within a very short time. Each containerized wastewater treatment plant is tailored to individual requirements, making each project unique.

PPU Umwelttechnik GmbH manages the entire project planning – from wastewater analysis to approval. As the general contractor, PPU handles the planning, production, and commissioning of each treatment plant. Customers can count on reliable collaboration with PPU Umwelttechnik GmbH.

#### **PPU Umwelttechnik GmbH**

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