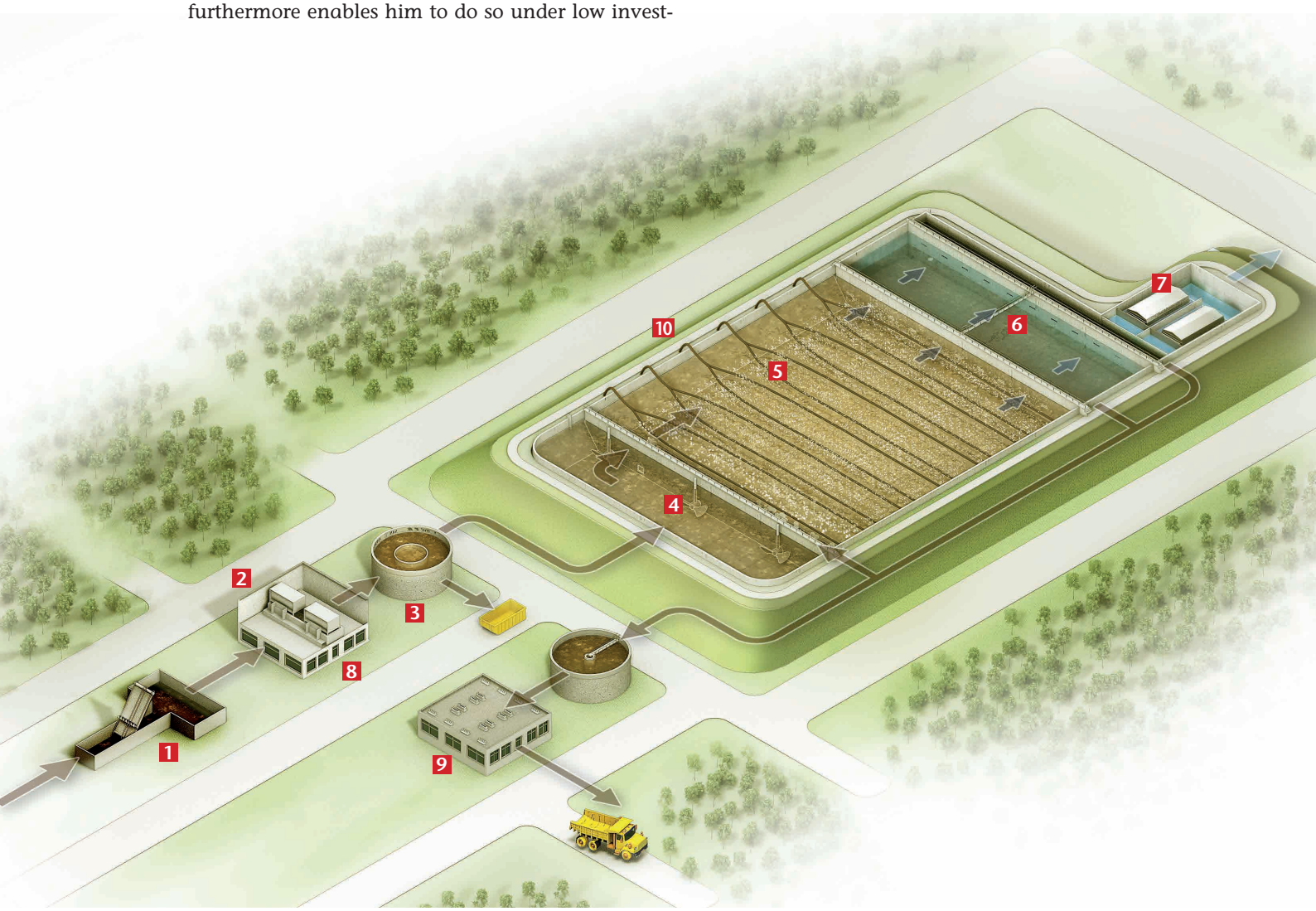
THE BIOWORKS® PROCESS

BIOWORKS®

... the clear solution

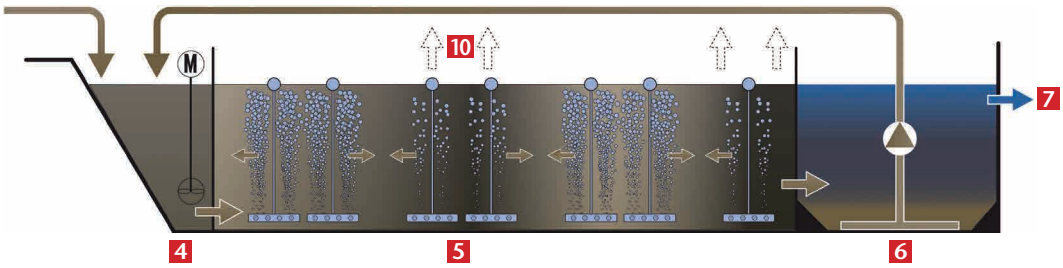
Efficient and economic wastewater treatment

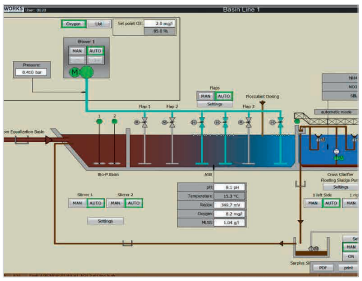
With worldwide rising awareness for the protection of our environment, requirements for wastewater treatment are increasing, carbon-, nitrogen, and phosporous compounds have to be eliminated to the greatest possible degree. The BIOWORKS® process not only guarantees our client that this target is achieved, it furthermore enables him to do so under low investment and O&M costs. As technological designer for the entire process, we can guarantee that effluent values are fully complying with any legal requirements – our clients benefit from this high level of security. Efficiency is achieved by innovative solutions in every single step of the process.



Typical single process steps of a BIOWORKS®-treatment plant:

1 Coarse screen/pump station. 2 Fine screening with high level of separation. 3 Sand and grease removal. 4 Anaerobic Bio P-zone for enhanced P-removal. 5 Activated sludge basin with aeration system OXIWORKS® for improved nutrient removal and low O&M costs. 6 Integrated clarifier: Turbulence free geometry and optimal sludge settling. Highly effective sludge removal and recycle system. 7 Effluent and tertiary treatment if required. 8 Central control: simple, reliable and fully automated operation – low personnel demand. 9 Sludge dewatering and further treatment. 10 Automated denitrification.





Full process control with PLC and SCADA

The biological stage within the BIOWORKS® process

Waste water contains many nutrients in the form of carbon and nitrogen compounds, phosphates, proteins and other components.

After mechanical pre-treatment 2 + 3 the biological process starts with the Bio-P zone 4. Robust and low maintenance submerged stirrers are mixing the inlet with return sludge. In this selector basin organic acids are created under an anaerobic ambient, this enables the bacteria in a later aerobic stage to absorb more phosphates than usual. Effluent values of total P < 1 mg/l without chemical dosage are possible under the condition of favourable nutrient composition.

Bio-P zone, activated sludge basin and clarifier

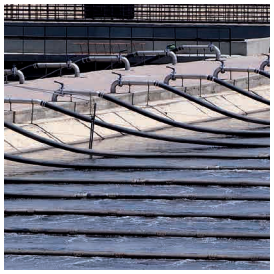
The water-sludge mixture flows through the separation wall into the aerobic reactor.

The most important process step is conducted in the activated sludge basin 5. Carbon- and nitrogen compounds in the waste water are aerobically digested by the various kinds of bacteria living in this basin. The aeration system OXIWORKS® enables the bacteria to work as efficient as possible, while the whole basin is mixed properly and efficiently by the fine bubbling suspended aeration system.

Within the so-called denitrification phase lays another important task for the biomass in the activated sludge basin. Smart control of the air flow 10 allows to create anoxic zones within the activated sludge basin. Oxygen which is bound to nitrate is split off and utilized by certain specialized bacteria in order to oxidize carbon compounds, the nitrogen is released to the atmosphere. In the clarifier section 6 the biomass is separated from the clear water by settling. The valuable biomass is withdrawn from the basin bottom of the clarifier and is recycled to the inlet of the basin. Clear product water is streaming from the effluent of the settling zone 7.

Blower station for air supply of the biological process

In cases of strict requirements for effluent quality a tertiary filter stage can follow (optional). Due to it´s generous design and the high sludge retention time (SRT), the BIOWORKS® process is inherently robust and forgiving. The waste sludge is aerobically digested (extended aeration) and the storage and handling of disposed sludge isn't complicated.



Single air connection of aerator chain

BIOWORKS® – THE CLEAR SOLUTION

→ **Highly effective technology**
→ **Cost effective operation**
→ **Safety and reliability**

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