

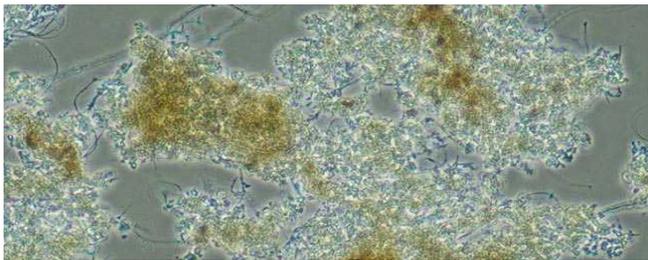
Aerobic biological water treatment processes



- Decomposition by micro-organisms
- High yield through deep knowledge
- Active sludge separation
- High and low loaded systems

Aerobic biological water treatment processes

After the waste water has been purified of coarse particles, greases and emulsions in an earlier stage, it may, for various reasons, be desirable to apply biological treatment. The purification yield can be increased considerably through biological water purification processes as they decompose dissolved organic substances as well. Furthermore, it is a first step towards the (partial) reuse of waste water.



Aeration basin with biological purification

Decomposition by micro-organisms

Organic substances are decomposed by micro-organisms, which can be categorised in two groups:

- Aerobic types of bacteria, whereby the decomposition reaction takes place in the presence of oxygen or oxygen donors
- Anaerobic bacteria, which obtain their energy from a reducing metabolism

Advantages

Marel Watertreatment is highly experienced in applying aerobic purification, especially in the food and textile industries where water purification by aerobic microorganisms provides the greatest advantages, namely:

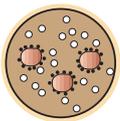
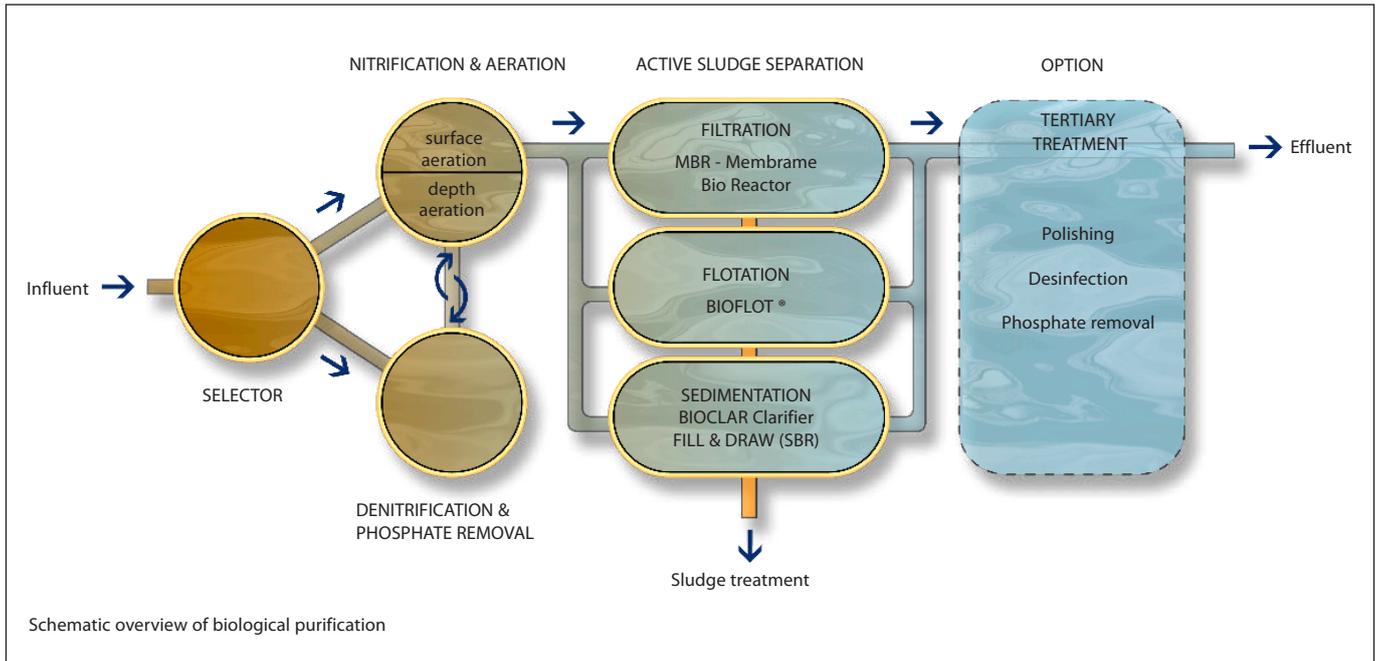
- Better purification results
- Odour formation is limited to a minimum
- Better results in the field of phosphate and nitrogen removal
- Low maintenance

High yield through deep knowledge

Aerobic micro-organisms are actively present in the “active-sludge system” as well as on the carrier material. The purification yield is highly dependent on the level of competition between the micro-organisms. The relation between the nature of the contamination, the number of micro-organisms and the oxygen required play a decisive role. Marel’s understanding of the most effective interrelations is the result of many years of experience.

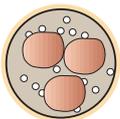
Solution ▼	Problem ►	Gross particles	Greases	Emulsions	Dissolved contamination
Screening					
Flotation					
CFF					
Biological treatment					

Every waste stream is different and demands its own approach



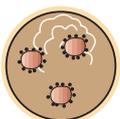
Selector

The biological decomposition process in the aeration basin benefits from the presence of the right population of microorganisms. The creation of optimum circumstances in a separate small reactor – the ‘selector’ – stimulates the growth of this population. As most of the contamination can only be digested as food by the flocculent bacteria under the right circumstances, Marel makes a customer-specific design for each project.



Nitrification and aeration

The bacteria degrade the contamination in the aeration basin. An aeration system supplies the oxygen that the bacteria consume. To this end, water can be sprayed into the air – known as surface aeration – or air can be injected into water – known as depth aeration. Marel provides perfected aeration systems for both kinds of aeration.



Denitrification and phosphate removal

In aerobic systems, some bacteria can also degrade contamination in low-oxygen situations if nitrate is available. During this denitrification process nitrate is converted into harmless nitrogen gas and is thus removed from the water. Phosphate is consumed by bacteria for storing energy. This phenomenon can be used to biologically remove phosphate from water, possibly aided by the addition of certain substances to the water.



Surface aeration with Marel's Bio-art System

Active sludge separation

To be able to discharge the purified water, the bacteria must first be separated from the water.

Marel has three separation processes:

- BIOBRANE: Marel's *BIOBRANE MBR* system
- Filtration: Marel's *MBR* system
- Flotation: Marel's *BIOFLOT®* system
- Sedimentation:
 - Marel's *BIOCLAR* system for a continuous process
 - Marel's *SBR* system for a discontinuous process (fill & draw) and *Bio-Art*

Optional

Depending on the requirements for the effluent to be discharged, supplementary techniques can be applied, such as:

- Fine filtration
- Disinfection
- Phosphate removal



A clear vision on water treatment

We are specialised in the industrial treatment of process waste water and sludge and have extensive and advanced knowledge of industrial production processes.

We can therefore provide our clients with tailored solutions for all phases of a production process, in the form of sub-trajectories or as integral end-of-pipe projects. The following objectives are pivotal for all processes, from process water preparation through to purposeful treatment of waste water and collecting and processing separated sludge:

- Reduction of operation costs
- Water re-use
- Waste to energy



Marel is the leading global provider of advanced equipment and systems for the fish, meat and poultry industries.

Marel Water Treatment B.V. is specialized in the industrial treatment of waste water and sludge for the food and food related industry.

With offices and subsidiaries in over 30 countries and a vast global network of agents and distributors our expertise in local markets and requirements helps us deliver superior service and support to our customers.