

# Wastewater Treatment with the TFR Technology



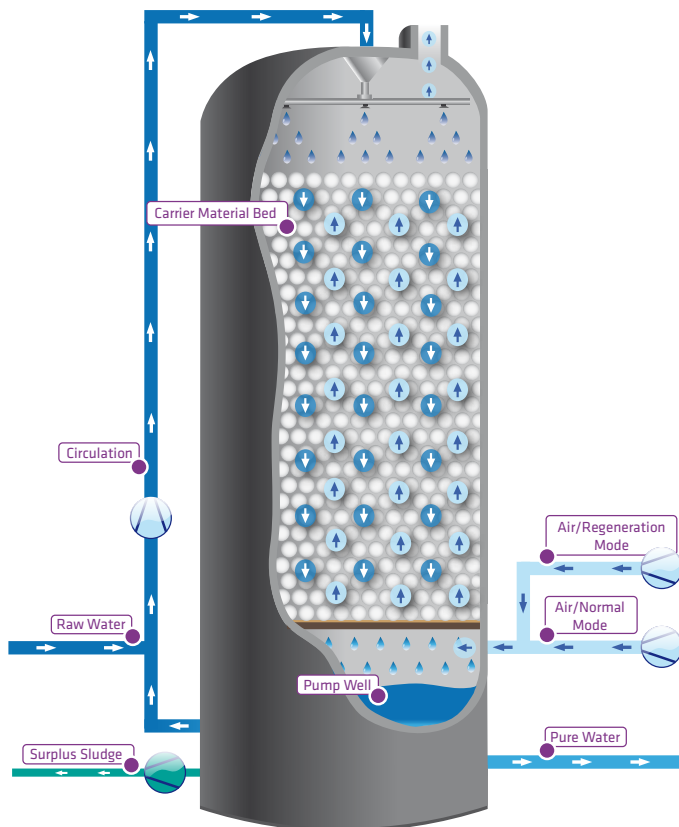
This code takes you to more information.

## Biological Wastewater Treatment Technology

Many companies are facing the task of having to pretreat or completely clean process effluents in their own factory to avoid discharge fees or to lower the raw water consumption by water reuse. The majority of organic compounds are converted into carbon dioxide and water by aerobic microorganisms and can quite easily and economically be removed.

The oxygen demand of industrial wastewater is high, often between 1,000 and 10,000 milligrams of oxygen per litre, in contrast to the low solubility of oxygen in water of only a few milligrams per litre. Therefore, the high biomass concentration, generated by modern technologies, needs to be aerated against the pressure of the water column. Anaerobic processes work without aeration, however, require a high expenditure for the commissioning and ensuring a stable operation.

## Technical Principle of the TFR Technology



## TFR Technology

The TFR Bioreactor works with a small light-weight carrier material which is contained within a reactor. The microorganisms grow on the surface of the carrier material and adapt and optimise themselves according to the properties of the waste water. The carrier material is not immersed within the waste water and so it is easy to supply the microorganisms with enough oxygen. This is achieved by trickling waste water down through the carrier material and blowing air up through the carrier material with a simple ventilator.

The carrier material is stable and does not need to be replaced. The renewable growth of biomass is regularly removed from the system by fully automatic regeneration. The high density of microorganisms as well as ideal conditions for the mass transfer between biomass, water pollutants and surplus oxygen are the basis for a high and stable biodegradation performance.

Environmental Expert.

**DAS**

# Biological Wastewater Treatment with the TFR Technology



This code takes you to more information.



Wastewater Treatment with TFR *industrial* in the Energy Sector

## Fields of Application

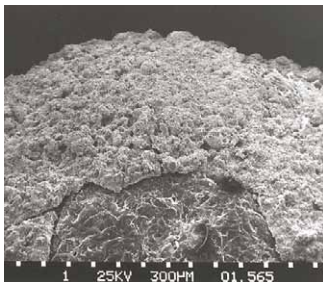
- Brewery and beverage industry
- Chemical, pharmaceutical and cosmetics industry
- Textile industry
- Food and delicatessen industry
- Agriculture and meat processing
- Energy and waste disposal management

## Advantages

- Very efficient performance and optimal adaption at low investment costs
- Minimal maintenance with low operating costs
- No corrosion protection needed due to PE-material
- Modular design allows easy system extension with minimum space requirements

## Examples of Application

- All industrial, disposal management and municipal wastewater
- Reduction of the organic load (COD/BOD<sub>5</sub>), solid load (settleable and filterable solids) and nitrogen load (NH<sub>4</sub><sup>+</sup>/NO<sub>3</sub><sup>-</sup>)
- Treatment prior to indirect discharge, direct discharge or recirculation



Carrier Material with Biofilm



Carrier Material Bed

## Various Applications Examples

| Challenge                                                                        | Wastewater Characteristic                                                            | Target                                        |
|----------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|-----------------------------------------------|
| <b>Indirect Discharge</b><br>Pre treatment before discharge into sewage system   | Industrial wastewater readily biodegradable to slightly biodegradable                | COD < 600 mg/l<br>BOD <sub>5</sub> < 400 mg/l |
| <b>Direct Discharge</b><br>Treatment prior direct discharge into bodies of water | Industrial- and municipal wastewater readily biodegradable to slightly biodegradable | COD < 100 mg/l<br>BOD <sub>5</sub> < 25 mg/l  |
| <b>Water Reuse</b><br>Irrigation (e.g. in arid areas)                            | low-concentrated wastewater                                                          | COD < 100 mg/l<br>BOD <sub>5</sub> < 10 mg/l  |
| Process water                                                                    | Industrial wastewater                                                                |                                               |
| <b>Nitrogen Removal</b>                                                          | Industrial wastewater heavy polluted with ammonium                                   | NH <sub>4</sub> -N < 2 mg/l                   |