



## Plasma technology in wastewater treatment

The elimination of poorly degradable substances in the effluent of wastewater treatment plants, but also between the individual treatment stages of a wastewater treatment plant itself, is a current and urgent challenge in both the industrial and municipal sectors. Many processes are being considered or investigated for this purpose. Depending on the specific requirements, TIA Technologien zur Industrie-Abwasser-Behandlung GmbH from Breitenfelde already utilises various processes.

As all processes offer advantages and disadvantages, TIA is investigating additional, new options. With the lowest possible operating costs - operation, maintenance, logistics, energy, operating materials, disposal - the same or even better results should also be achieved in the industrial sector than with known process steps.

TIA and the Leibniz Institute for **Plasma** Research and Technology e.V. (INP) in Greifswald are cooperating on the use of plasma technology in wastewater technology. In further cooperation with Hamburg Wasser, for example, a pilot plant is being used to investigate how **multi-resistant germs** and **drug residues** can be effectively removed from hospital wastewater.

This technology is also of interest for use in the treatment of **landfill leachate** and poorly biodegradable substances in **industrial wastewater**, and its technical application is being investigated.

The plasma process requires no operating resources other than electrical energy and its output can be easily controlled. It is therefore also interesting for applications in which continuous system maintenance is not possible. AI can be used to react automatically to fluctuations in contamination using appropriate algorithms and optimise the processes.

Thanks to its wide range of possible applications, plasma technology can be an alternative to several technologies that would otherwise have to be installed one after the other.

In addition to the numerous plants for pure industrial wastewater treatment in Europe, Asia and Africa, TIA is increasingly realising economical treatment processes for the **re-use of wastewater in industrial processes**. Of course, the cost of fresh water and, in many cases, its subsidisation played a role here. Overall, however, the direction towards the multiple utilisation of water is predetermined - and TIA is prepared for this. Here too, TIA provides customised solutions for the technically and economically successful treatment of wastewater.

In many plants for cleaning and treating wastewater, however, the biological stage - anaerobic and/or aerobic - is still a centrepiece of the process chain for reasons of



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efficiency. Here, TIA has new developments in the areas of power density, efficiency and controllability. The CCB - **Capacity Controlled Bioreactor** - from TIA has now been realised in many plants. The ability to control bioreactors via the biomass content is also of great importance for the further digitalisation of plant operation.

In the municipal sector, TIA is sticking with the COMPACT systems, which are built in a standardised way with partners abroad. Small plants are built in-house according to the IKEA principle and can therefore be realised extremely cost-effectively. Here too, the plasma process can be used to sterilise the effluent, thus enabling the water to be reused.

Image: Controllable bio-reactor in a food processing plant in Egypt

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