

te-ionTM

Water and Wastewater Treatment



te-ion[™] Innovative Technology

Advanced oxidation technology for water and wastewater treatment.

The te-ion[™] technology is an advanced oxidation process including optional further treatment steps i.e. ultrafiltration.

te-ion[™] is based on the electrical glow discharge to form different species of reactive oxygen species (ROS) in a so-called non-thermic plasma (NTP). Due to the very high oxidation potential these radicals can oxidize most organic compounds (via proton transfer or hydrogen atom transfer) and inorganic compounds like arsenic salts from the oxidation state + III to + V. Oxygen radicals will be introduced into the water either by immersed turbine or by external blowers and a floor mounted diffuser system. For production of NTP just ambient air can be used without further pretreatement.

The te-mem[™] ultrafiltration process can be used as an optional pre- or post-treatment step to remove suspended solids and thereby increase the efficiency of the overall process. The characteristic of the te-mem[™] process is the use of immersed organic hollow fibre membranes for ultrafiltration. The membrane fibres are wound up in a carrier cartridge, which protects the hollow fibres, allows a very high packing density and results in a very efficient air-scour cleaning of the membranes inside. Through te-mem[™] all suspended solids, precipitations, coagulations, bacteria and viruses will be removed from the water and therefore the water will also be disinfected.

Applications

- · Removal of trace pollutants
- · Arsenic removal
- Suppression of bulking sludge (Microthrix Parvicella and / or Nocardia)
- · Borehole treatment (metaldehyde removal)
- · In-situ membrane cleaning
- · Colour removal (humic acids)
- Disinfection

Main Advantages

- Much lower energy demand than conventional ozone or advanced oxidation processes
- No inflow air treatment required
- Simple system, robust process, no fine mechanical parts
- Small footprint
- Easy installation, modularly expandable
- Start-up / stops of operation possible
- Long lifetime of equipment
- · Cheap and easy replacement
- No additional chemicals or consumables necessary





High Treatment Efficiency

Removal of Anthropogenic Trace Substances

Through human activities and human sewage anthropogenic trace substances enter the municipal wastewater systems and finally get into surface waters via wastewater treatment plant effluents. From the surface waters they can also pass into ground and drinking water resources.

Our solution to treat these persistent substances is the te-ion[™] technology. The overall process consists of two steps. The innovative te-mem[™] technology removes most suspended solids, turbidity and microorganisms. The following advanced oxidation process with non-thermic plasma (NTP) oxidizes most trace substances or splits them into subcomponents that are easily biologically degradable in the recipient. The modular system of the process is suitable for all construction sizes of existing and new wastewater treatment plants.

Suppression of Bulking Sludge

The te-ion[™] technology immersed in activated sludge bioreactors will lead to superior suppression of bulking sludge by selective destruction of Microthrix Parvicella and / or Nocardia. Additional floc-forming chemicals can be reduced. The production of several ROS followed by injection into the aeration basin leads to breaking up of filamentous microorganism on the sludge flocs which leads to an enhanced settling behaviour. The sludge flocs and thereof treatment capabilities will not be affected.



After Treatment



Arsenic Removal

Arsenic is a naturally occurring element in ground waters, especially near geothermic or mountainous environment.

In drinking water it constitutes a serious health risk and may lead to chronic diseases. With te-ionTM abstracted water will be treated with the most innovative way of water treatment – a combination of advanced oxidation with non-thermal plasma, iron coagulation (precipitation of arsenate) and te-memTM ultrafiltration membrane technology (complete separation of arsenate precipitations and bacteria /viruses > 0.02 µm). The combination of these technologies can achieve degradation in excess of 99%.



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