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SFC Umwelttechnik

clean water for the world

**ADVANCED OXIDATION
TECHNOLOGY
FOR WATER AND
WASTEWATER TREATMENT**

C-ION



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ADVANCED OXIDATION TECHNOLOGY FOR WATER AND WASTEWATER TREATMENT

SFC is a specialized company for process technologies in the field of water and wastewater treatment.

Typical clients are municipalities, industry (biomass heating plants, paper, food, beverage, chemical) and general contractors. Main business activities are consulting and design and supply of process technology, equipment, EPC and turn-key contracting.

APPLICATIONS

- ❑ Removal of anthropogenic trace substances (fourth treatment step)
- ❑ Arsenic removal
- ❑ Suppression of bulking sludge (*Microthrix Parvicella* and / or *Nocardia*)
- ❑ Borehole treatment (metaldehyde removal)
- ❑ In-situ membrane cleaning
- ❑ Colour removal (humic acids)

The **C-ION** technology is an advanced oxidation process including optional further treatment steps i.e. ultrafiltration. **C-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 pretreatment.

The **C-MEM™** ultrafiltration process will 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 **C-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 **C-MEM™** all suspended solids, precipitations, coagulations, bacteria and viruses will be removed from the water and therefore the water will also be disinfected.

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



TREATMENT OF VARIOUS RAW WATER SOURCES

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 **C-ION** technology. The overall process consists of two steps. The innovative C-MEM™ technology removes most suspended solids, turbidity and microorganisms. The following advanced oxidation process with non-thermal 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.

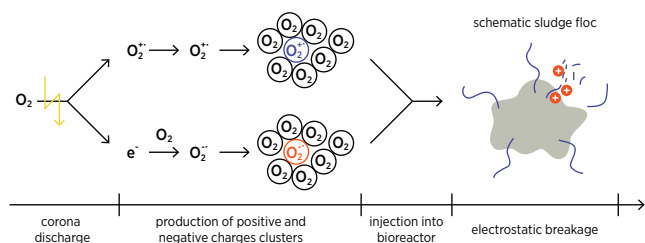


Before

After one week with **C-ION**

SUPPRESSION OF BULKING SLUDGE

The **C-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.



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 **C-ION** well 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 C-MEM™ ultrafiltration membrane technology (complete separation of arsenate precipitations and bacteria/viruses > 0.02 µm). With the latter combination a degradation of 99% and more can be reached.



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