

Data Sheet DiOx Module

Description DiOx module:



The ClearFox DiOx module is an advanced oxidation process (AOP) to treat wastewater with a high load of pollutants. The main parts of the DiOx module are diamond electrodes manufactured in Bavaria, Germany. Metals such as niobium serve as a substrate for numerous diamond crystals that form a closed layer only few microns thick. A boron doping (BDD) during the coating process converts the diamond that is usually an electrical insulator to an electrode material. Diamond electrodes have the largest known overvoltage for oxygen generation and the largest overvoltage for hydrogen generation. This provides a high treatment efficiency and low levels of electric power are consumed. Moreover, OH radicals can be generated in water close to 100% efficiency only with diamond electrodes. As OH radicals are extremely strong oxidizing agents the diamond electrodes are promising in water purification applications. During the oxidation process, ozone and other antimicrobial substances are also produced which substantially increases the efficiency of water disinfection.



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Module ClearFox[®] DiOx 1.0

Specification:

Modules	
Electrode type	Boron-doped diamond electrode on niobium basis
Measures of Anode surface	500 mm x 150 mm
Maximum current density	100 mA/cm ²
Minimum Voltage	3 V DC
Maximum Voltage	25 V DC
Electrode gap	variable
Spacer material and insulation	Teflon
Contacting material in case of reversing polarity	Titanium
Maximum operating pressure	0.5 bar
Minimum flow / electrode gap	5 L/min
COD removal (100% current efficiency; example)	0.298 g / Ah
Heavy metal removal (due to composition of wastewater)	Highly efficient up to 99%

Production Range	DiOx 1.0	DiOx 2.0	DiOx 3.0
ClearFox [®] DiOx Modules	DiOx 1.0	DiOx 2.0	DiOx 3.0
Number of electrodes	5	10	15
Max. current	750 A	1500 A	2250 A
Surface	0.75 m ²	1.5 m ²	2.25 m ²
COD removal (100% efficiency)	223.5 g/h	447 g/h	670.5 g/h
Voltage (due to electr. conductivity)	20 V	20 V	20 V
Power	15 kW	30 kW	45 kW
Reversion of polarity	Yes	Yes	Yes
Inflow monitoring	Yes	Yes	Yes
Maximum operating electrolytic temperature	40°C	40°C	40°C

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Application:

- Landfill leachate
- Dyeing factories
- Fishponds
- Highly organically contaminated industrial wastewater
- Badly biodegradable organic molecules
- Produced water
- Wastewater from pharmaceutical industry,
- Aquaculture
- Due to the wastewater characteristics continuous flow or batch reactor and multiple flow
- BDD for the anode as well as the cathode due to the wastewater characteristics
- Heavy metal removal by using additionally a BDD cathode

Example for treated effluent from tobacco industry in Sweden after ClearFox[®] DiOx:

Cadmium Cd	Copper Co	Zink Zn
< 0.00005 mg/l	< 0.2 mg/l	< 0.02 mg/l

Benefits for Clearfox[®] DiOx modules:

- Fast startup, cost saving in installation, small footprint
- Modular system, adaptable at every application
- Very long lifespan
- High performance with high quality, Made in Germany
- Complex industrial wastewater
- Stable and very robust process technology
- no chemicals
- Wide potential window, ability for anode and cathode, chemical and mechanical stability, resistance to fouling