

42.- Oxycon®, aerated activated carbon filtration for wastewater applications

Title and name of product or technology
OXYCON® aerated activated carbon filtration for wastewater applications
Abstract
Aerated activated carbon filtration for waste-water applications
Description including main features/advantages
<p>Activated carbon is used in the food, pharmaceutical and (petro-) chemical industry, air and gas treatment, in gas masks, air-conditioning, cigarette filters, waste, drink and process water treatment and groundwater remediation.</p> <p>In the wastewater purification systems, activated carbon is often used in the tertiary purification phase, together with membrane filtration, ultra filtration, reverse osmosis, ozonisation, peroxidation, evaporation, ion exchange, sand filtration, etc.</p> <p>Activated carbon is frequently used to remove recalcitrant, non-biodegradable compounds from wastewater. The adsorption capacity of activated carbon, with respect to certain molecules like phenol, increases when the treated water contains high concentrations of oxygen. This is due mainly to a chemical oxidation of the adsorbed molecules by the dissolved oxygen with activated carbon acting as a catalyst.</p> <p>Activated carbon is also an excellent support material for bacteria to grow and to form a biofilm (layer). The growth of bacteria on activated carbon can cause negative effects: an activated carbon filter can blind by an excessive growth or where anaerobic bacteria form sulphides, can cause an undesired odour and colour. But if the COD parameters are known the system can be designed and controlled to produce positive results.</p> <p>Bacteria can reduce the impurities from the wastewater, dissolved in the water and adsorbed on the activated carbon. The normally biologically difficult to degrade molecules are adsorbed on the carbon so that a slower biodegradation occurs.</p> <p>Adding powder activated carbon to a classic aerobic biological water purification plant, known as the PACT-process, is a comparable application.</p> <p>The OXYCON®-system stimulates a synergy of different reactions, adsorption, filtration, biological purification and oxidation.</p> <p>The Oxycon-system offers the following benefits:</p> <ul style="list-style-type: none"> • Extended/Permanent activated carbon bed life. • A rapid stabilisation of the system biology within the carbon bed that is able to cope with toxic shocks. • Recalcitrant non-biodegradable molecules in the wastewater are metabolised as well as the easily biodegradable organics. • Nitrification (only at very low loads).
Innovative aspects
Specific for wastewater treatment applications the OXYCON®-technology has been developed to add an accurate and efficient amount oxygen (from air) to a classic activated carbon contactor (even if already in use). As well as adsorption and filtration, the activated carbon acts as a catalyst for chemical oxidation processes. By addition of oxygen aerobic bacteria are encouraged to grow and metabolise difficult biodegradable molecules (bio-regeneration in-situ).
Current and potential industrial users/domains of application
References and applications: landfills/tips, textile industry, waste treatment industry, wood industry, chemical and food industry, ground remediation, truck and tank

cleaning, etc...
Current state of development
Pilot + some full scale installations

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