

C&S Brand Activated Carbons for Wastewater Treatment

With ever tightening environmental regulations, Activated Carbon is becoming more widely used in industry for wastewater treatment, to remove undesirable or unacceptable toxic or hazardous organic compounds down to levels acceptable to government authorities for disposal into the sewerage system, or into water courses. Industries currently utilising Activated Carbon for wastewater treatment include manufacturers of agricultural chemicals (including pesticides and herbicides), the steel industry (coke plant effluent), munitions factories, petroleum refineries and storage installations, manufacturers of organic pigments and dyes, mineral processing plants, and remediators of contaminated sites.

Powdered Activated Carbons (PACs) may be utilised in conjunction with biological treatment processes (e.g. the Zimpro "PACT" Process). Carbon dosage rates and mixing times are dependent on the nature and concentrations of the organics to be removed. High activity, high purity Activated Carbons, with good settling characteristics, are the carbons of choice for these applications.

Because of their versatility, and their ability to handle influent wastewaters of varying nature, Granular Activated Carbons (GACs) are more widely used than PACs for wastewater treatment. They can be utilised as a stand-alone unit process, after physical/chemical treatment (e.g. coagulation/clarification, filtration, dissolved air flotation), prior to biological treatment (to remove compounds which might be toxic to the biological system) or subsequent to biological treatment (to remove undesirable organics not broken down in the biological process). Empty Bed Contact Times (E.B.C.Ts.) utilised can vary from as low as 30 minutes up to 150 minutes or more, depending on the nature and concentrations of the contaminants to be removed, the effects of other organic species present in the influent, and the required effluent level(s) of the contaminant(s). The carbon usage rate is dependent on the above criteria, on the efficiency of the treatment system utilised, and on the choice of Activated Carbon.

Granular Activated Carbon is utilised in wastewater treatment in a number of different configurations. These include:

- Single Vessel Adsorption System - Upflow
- Single Vessel Adsorption System - Downflow
- Two or more Vessels in Series - Upflow
- Two or more Vessels in Series - Downflow
- Two or more Vessels in Parallel - Upflow
- Two or more Vessels in Parallel - Downflow
- Pulse Beds - Upflow

And variations of the above, e.g. 2 vessels in series x 2 in parallel, upflow expanded beds, etc; Since each configuration has its advantages and disadvantages, dependent on the specific application, James Cumming & Sons Pty Ltd will be pleased to assist with advice on the selection of the system most suited for your requirements, including pretreatment or post-treatment as applicable.

Because of the uncertain nature of typical wastewaters, it is strongly advised that testwork be carried out prior to system design to determine the feasibility of Activated Carbon adsorption for the particular treatment objective, to develop operational parameters, and to allow the estimation of capital and operating costs. Initial testwork is usually in the form of isotherm testing, followed by dynamic column testwork. Again, James Cumming & Sons Pty Ltd will be pleased to assist with advice.

their broad range of adsorption pore size distribution, and thus their ability to adsorb a wide range of organic chemicals, of varying molecular size, coal based Activated Carbons are regarded as the carbons of choice for industrial wastewater treatment.