

## Novel Oxidation, Coagulation and Flocculation System

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The novel oxidation, coagulation and flocculation system is applicable to water and wastewater chemical treatment in which oxidation, coagulation and flocculation processes are followed by a direct filtration.

The system can be used for treatment of surface and ground waters and wastewaters for removal of organic and inorganic contaminants.

The oxidation process can be provided by several oxidizing chemicals such as ozone, hydrogen peroxide, potassium permanganate, chlorine and the coagulation process can be accomplished with several coagulants such as aluminum sulphate, ferric chloride, ferric sulphate.

Our preferred option is oxidation with ozone and hydrogen peroxide and coagulation with aluminum or ferric salts.

Selection of the chemicals depends on the quality of the water or wastewater to be treated and the treated water quality required, and it covers a wide range of the impurities to be removed and specifically difficult to oxidize hydrocarbons and chlorinated organics, and iron, manganese, uranium, arsenic, cyanide, hydrogen sulphide and naturally occurring organics.

Low levels of organic contaminants can be oxidized to carbon dioxide without involving filtration.

However, high levels of organic contaminants and inorganic contaminants may require oxidation followed by filtration. Filtration can be provided as a one-stage or two-stage filtration in a single vessel.

The filtration media can include single or multimedia of sand and anthracite or granular activated carbon or other proprietary media.

The two-stage filtration system can provide sand or sand/anthracite filtration in the first stage and granular activated carbon or other proprietary media in the second stage. Both one and two-stage filtration systems are assembled in a single vertical vessel, having a very small foot print.

The system has been applied to ground waters for removal of arsenic, uranium, iron, manganese and dissolved organics in a wide range of the water chemical composition.

The treatment process is flexible and it can be used for treatment of a wide range of difficult to remove contaminants without a major modification.

The treatment system is economical and have a small installation footprint as several treatment processes take place in a single vessel.

The entire treatment package can be mounted in a trailer or on a skid and it can be mobile.

The flexible and compact technology is specifically applicable to groundwater remediation and groundwater supplies for industrial and municipal applications and difficult to treat industrial wastewater.

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Jan Korzeniowski has water engineering background and forty years of water and wastewater treatment system design and applied research of new technologies. He is Principle and Chief Engineer with J.K. Engineering Ltd. in Calgary,