

Applications and Current Status of Ozone for Municipal and Industrial Wastewater Treatment - A Literature Review

CR108172

ABSTRACT

Ozone uses in treating municipal and industrial wastewaters are reviewed, although both applications are relatively new with respect to ozone treatment of drinking water. The use of ozone for pretreatment of sewage (by oxidation) preparatory to filtration and adsorption of organics by granular activated carbon has been shown to provide significant processing benefits, which include extension of the useful life of the GAC adsorbers before regeneration is required. A new process for treating primary sewage sludge with ozone and oxygen under pressure, called the "Oxyozosynthesis" process, has operated successfully for more than ten years, and a second plant has come on-stream. Primary sludge is converted in a batch process to a light, solid material which is odorless and has been approved for land treatment in place of ocean disposal. The cities of Denver, Colorado, El Paso, Texas, Tampa, Florida, and San Diego, California have started wastewater reuse programs, in which ozone plays an important role as a polishing and disinfecting agent. The city of Windhoek, Namibia, which already treats its sewage for potable reuse, is planning to substitute ozonation for chlorination prior to GAC adsorption.

Applications of ozone technologies to control pollution in full-scale industrial wastewater treatment plants are in the areas of recycling marine aquaria, electroplating wastes, electronic chip manufacture, textiles, and petroleum refineries. The rising acceptance of ozone as a replacement bleaching agent for paper pulp to eliminate the discharge of halogenated effluents from pulp bleaching plants also is traced. Newer applications for ozone in treating rubber additive wastewaters, landfill leachates, and detergents in municipal wastewaters are summarized briefly. The combination of ozone oxidation followed by biological treatment has been installed full-scale at a large German industrial chemical complex. Ozone coupled with ultraviolet radiation and/or hydrogen peroxide (advanced oxidation) is being utilized to destroy organic contaminants in groundwaters at munitions manufacturing plants and at Superfund sites (hazardous wastes). Ozone followed by activated carbon adsorption removes color and organics cost-effectively from North African phosphoric acid.