

PRODUCT

WATER TREATMENT & RECYCLING SYSTEMS

ELECTROFLOCCULATION

PURPOSE

Clearmake's innovative electroflocculation system, Clearmake Electropure™ simply and cost effectively removes a wide range of contaminants from water allowing it to be safely reused or discharged to the environment or storm water system. This unique technology is the most efficient and effective water treatment technology available.

APPLICATIONS

The technology has been proven in more than 80 water treatment and recycling installations, including:

- Truck and car wash facilities
- Printing/ink processes
- Textile dye plants
- Paint manufacturing and use
- Removal of heavy metals
- Grey (bath, shower, hand basin and laundry) water
- River, stream and lake water containing clay, micro-organisms, agricultural and industrial chemicals, and other pollutants
- Leachates and toxic metals in ground water
- Storm water and waste water on building sites
- Nursery irrigation water
- Fat, grease and oil trap water
- Food processing
- Artificial wetland management
- Sewage treatment plant effluent



THE PROCESS

The process is based on the electrolytic addition of coagulating metal ions directly from electrodes in the reaction chamber. These ions coagulate pollutants in the water, in a similar manner to the addition of traditional coagulating chemicals such as alum and ferric chloride, and allow for easier removal of the pollutants.

The water is filtered and the pollutants are removed by fine bubbles which are generated at the electrodes during the process, and rise within the chamber capturing the coagulated pollutants and floating them to the surface (similar to a dissolved air flotation process). The pollutants are then removed from the surface of the water leaving clean water in the reaction chamber ready for safe reuse or discharge.

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BENEFITS

The electrolytic addition of the ions (coagulant) has a number of advantages over their addition chemically:

- There is no addition of anions meaning no increase to in salinity of the treated water
- The system produces half to one third of the waste sludge of traditional systems
- Greater ion activity means less metal ions required and a wider range of pollutants can be removed

The process uses no chemicals (other than correction of the raw water to a neutral pH, if required) therefore:

- The process does not add to the salinity of the water
- No need for regular checks of chemical levels in storage drums
- Significantly reducing the operating costs of the system (operating costs as low as 20c per kL)
- Eliminating the need to procure and store hazardous materials on site

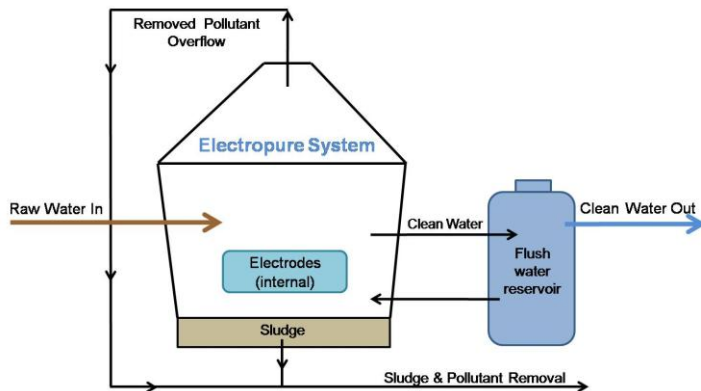
The process can be entirely automated:

- This keeps operating costs low and increases system efficiency

Lower energy consumption means the system can be adapted to operate using solar power which enables systems to be easily operated in remote locations.

The system can remove a wider range of contaminants than any other single process including oils and chemicals that filters are unable to remove.

Low capital and operating cost (payback period less than 6 months in some cases).



BENEFITS COMPARED WITH OTHER TECHNOLOGIES

Filters	Clearmake Electropure™
Clogs easily with sticky substances e.g. glues, emulsified oils etc.	Does not clog with sticky substances e.g. glues, emulsified oils etc.
High electricity consumption to force water through the filters	Low electricity consumption
Needs progressive filters for each stage - each stage produces back wash water that cannot be used again	One step process to reach nano-filtration level - can process filter back wash water
Requires nano filtration to remove colour	Adds dissolved oxygen and removes colour
Filter media or membranes can fracture under pressure	Does not output water unless treated

DAF	Clearmake Electropure™
Adds to the salinity of the water – presents challenges in reuse applications	Does not add to the salinity of the water, adds oxygen - very suitable for reuse
Uses multiple chemicals - need to store hazardous chemicals	Does not use chemicals (except pH adjustment if needed)
Large volume of waste produced	Minimal waste volume
Does not kill pathogens	Kills and removes pathogens
Mainly suitable for large volumes with full time operator	Automated operation suitable for small & large scale treatment plants
Labour intensive	Very little operator input

Bio Reactors	Clearmake Electropure™
Removes BOD by digesting it	Separates BOD, still requires disposal
Cannot always handle oils or other materials that kill bio life	Not hindered by most pollutant materials that kill bio life
High residual bacteria level	Low residual bacteria
Needs large volumes and takes several days to process	Needs only small volume and process in ≈ 2 hours
Specific to one water type	Can handle a wide array of different water types
Must operate continuously	Can be turned on and off as required