

## **The Sirofloc Process for Water Treatment.**

Unique Magnetite Process used to produce high quality drinking water without the addition of potentially harmful coagulant chemicals and resultant sludges.

- Well suited for removal of colour, iron, aluminium compounds and turbidity from raw water. It has low capital and operating cost with a compact layout.
- Has a rapid start/stop capability, with residence time of less than 30 minutes.
- Removed colour and turbidity can be returned to the water source resulting in near zero sludge production.

### **Description**

The Sirofloc process is a unique, commercially proven technology offering an alternative to conventional methods for producing potable water. The process avoids the addition of potentially harmful coagulant chemical and resultant sludges by using finely divided magnetite, a naturally occurring iron oxide. Three characteristics of this inert mineral which are used in the Sirofloc process are its density, its magnetic properties and its controllable surface charge. Under acidic conditions the particles carry a positive charge thus attracting negatively charged materials. When the pH level is raised the particles become negatively charged and attached materials are repelled. The reversible surface charge is used to remove colour, iron compounds, aluminium compounds and turbidity from raw water and then to shed these unwanted contaminants as a concentrated effluent, allowing the magnetite to be continually reused.

Raw water first passes through a series of contact tanks where it is mixed with the magnetite. Acid is added and the impurities are adsorbed onto the magnetite, assisted if necessary by the addition of a polyelectrolyte. The loaded magnetite then passes between the poles of a permanent magnet before entering a clarifier. The magnetic field causes the magnetite particles to flocculate and this, together with their high density, results in rapid separation of the loaded magnetite in the clarifier. The supernatant from the clarifier, now free from colour, iron, aluminium and suspended matter, flows to a filtration stage where, by increasing the pH and addition of chlorine, any manganese present in the water is removed. The supernatant is returned to the head of the works. The loaded magnetite slurry in the clarifier underflow is pumped to a regeneration section. Here caustic soda is added to reverse the surface charge on the magnetite and the contaminants disengage, with the assistance of high shear stirrers, in the reactivation and re pulp tanks. Down stream of these, the clean magnetite is recovered from the liquid effluent using proprietary magnetic drum separators and is recycled. The liquid effluent can then be discharged from the plant directly or treated on site using conventional techniques to produce a sludge.

The key benefits of Sirofloc as a water treatment process include:-

- Full automatic control for unmanned sites.
- Meets all EEC quality standards
- Superior performance on colored waters
- Minimum sludge production –sludge treatment plant usually not required

### **Advantages**

- Attractive capital and operating costs.

- Very compact layout
- High quality of clarified water reduces filtration requirements.
- Avoids use of potentially harmful iron and aluminium based coagulants.
- Insensitive to contact pH
- Rapid stop/start capability, with total plant residence time of less than 30 minutes.
- Instantaneous reaction to changes in raw water quality and flow rate.

