Edited Aug 2015

Lyom purifier

One of the world's most efficient mobile treatment plants.

TECHNICAL SOLUTION

The facility fills a chamber of polluted water where also the mixing of the polymers occurs. All contaminated material will be settled in this chamber. As the pollution is pumped into the chamber it is analyzed for controlling the dosing and mixing of polymers.

Where the mixing of polymers is done, the water passes through a working chamber. What exactly occurs there is a patented process that is sealed where only our authorized personnel have access. This is also essential for the production safety.

The flocculated water is settled in the chamber and in the bottom of the chamber are electrical pumps that dosing the sediment output from the unit. The dry content in the sludge from the process is dependent on the input water composition and can varies between 8- 25 percent. The purified, processed water is discharged through an outflow from the top of the unit.

One of the essential benefits, except that the purification plant produces a very high purification results, is that it is capable of treating a large number of water pollutants. It also has the capacity of purifying uneven flows.

If pollutants fluctuates in the process, the measuring points that collects data will adjust treatment according to the degree of pollution in the supply of water. The simple and robust mechanical machinery prevents brake down and malfunctions.

All units and facilities are built according to each customer's specific need and problems and required specification. Service documents and drawings established when the plant is built. Spare parts recommendation and service manuals for maintenance is essential to. This particular world wide patented technology is designed for larger volumes of water. We are have designed from 10 to 400 m³ / h. The units can be stationary, and scaled up or down in terms of capacity.

Our technology is a cutting edge tech way the computer dosing and mixing of polymers. The mixture allows the flocks that quickly settles also gives a settling time for optimal outcomes approximately 5-8 minutes. The entire process can be monitored and if necessary and controlled in real time on-line from our service team in factory.

COAGULATION AND FLOCCULATION PROCESS FUNDAMENTALS

All waters, especially surface waters, contain both dissolved and suspended particles. Coagulation and flocculation processes are used to separate the suspended solids portion from the water.

The suspended particles vary considerably in source, composition charge, particle size, shape, and density. Correct application of coagulation and flocculation processes and selection of the coagulants depend upon understanding the interaction between these factors. The small particles are stabilized (kept in suspension) by the action of physical forces on the particles themselves. One of the forces playing a dominant role in stabilization results from the surface charge present on the particles. Most solids suspended in water possess a negative charge and, since they have the same type of surface charge, repel each other when they come close together. Therefore, they will remain in suspension rather than clump together and settle out of the water.

Coagulation and flocculation occur in successive steps intended to overcome the forces stabilizing the suspended particles, allowing particle collision and growth of flock. If step one is incomplete, the following step will be unsuccessful.

Coagulation is the first step that destabilizes the particle’s charges. Coagulants with charges opposite those of the suspended solids are added to the water to neutralize the negative charges on dispersed non-settle-able solids such as clay and colour-producing organic substances. Once the charge is neutralized, the small suspended particles are capable of sticking together. The slightly larger particles, formed through this process and called micro-flocks are not visible to the naked eye. The water surrounding the newly formed micro-flocks should be clear. If it is not, all the particles’ charges have not been neutralized, and coagulation has not been carried to completion. More coagulant may need to be added. A high-energy, rapid-mix to properly disperse the coagulant and promote particle collisions is needed to achieve good coagulation. Coagulants added where sufficient mixing will occur. Proper contact time in the rapid-mix chamber is typically 1 to 3 minutes.

Following the first step of coagulation, a second process called flocculation occurs. Flocculation, a gentle mixing stage, increases the particle size from submicroscopic micro-flocks to visible suspended particles. The micro-flocks are brought into contact with each other through the process of slow mixing. Collisions of the micro-flock particles cause them to bond to produce larger, visible flocks called pinflocs. The flock size continues to build through additional collisions and interaction with inorganic polymers formed by the coagulant or with polymers added. Macro-flocks are formed. High molecular weight polymers, called coagulant aids, may be added during this step to help bridge, bind, and strengthen the flock add weight, and increase settling rate. Once the flock has reached it optimum size and strength, the water is ready for the sedimentation process.

Flocculation requires careful attention to the mixing velocity and amount of mix energy.

Common coagulant chemicals used are alum, ferric sulfate, ferric chloride, ferrous sulfate, and sodium aluminate. The first four will lower the alkalinity and pH of the solution while the sodium aluminate will add alkalinity and raise the pH. The reactions of each are as follows:

Alum:

$Al_2(SO_4)_3 + 3Ca(HCO_3)_2 \rightarrow 2Al(OH)_3 + 3CaSO_4 + 6CO_2$, with calcium carbonate presents in the water to be treated

Ferric sulfate:

$Fe_2(SO_4)_3 + 3Ca(HCO_3)_2 \rightarrow 2Fe(OH)_3 + 3CaSO_4 + 6CO_2$,with calcium bicarbonate presents in the water to be treated

Ferric chloride:

$2FeCl_3 + 3Ca(HCO_3)_2 \rightarrow 2Fe(OH)_3 + 3CaCl_2 + 6CO_2$,with calcium bicarbonate presents in the water to be treated

Ferro sulfate:

$FeSO_4 + 3Ca(HCO_3)_2 \rightarrow Fe(OH)_2 + CaSO_4 + 2CO_2$,with calcium bicarbonate presents in the water to be treated

Sodium aluminate:

2Na2Al2O4 +Ca(HCO3)2–> 8Al(OH)3 + 3Na2CO3 + 6H2O, with calcium bicarbonate presents in the water to be treated

Na2Al2O4 + CO2–> 2Al(OH)3 + Na2CO3, with carbon dioxide presents in the water to be treated

Na2Al2O4 + MgCO3 –> gAl2O4 + Na2CO3, with magnesium carbonate presents in the water to be treated

Polymers are becoming used, especially as coagulant aids together with the regular inorganic coagulants.