Basics on Tube Floc

Unknown macro: {composition-setup}

cloak.toggle.exclusive=false

Basics on Tube Flocculator

(Fun) Facts about Tube Floc

What is a floc?

"Floc" is the name given to the colloidal aggregates formed during the process of coagulation and flocculation. Small, micron sized particles of dirt and other organic matter exist naturally in rivers and other surface water sources. When there is a high concentration of these suspended particles in the water (as is the case after a storm), the water will look very cloudy and unpleasant to drink. It takes a very very long time (really long if the fluid is not quiescent!) for these suspended particles to settle out. By mixing a coagulant like alum into the water, these suspended particles will begin to stick to one another upon collision. Flocculation is the process of bringing these ever growing aggregates together to form even bigger aggregates which we call flocs.

What is Tube Flocculator?

The tube flocculator consists of many segments of plastic tubing joined together into one long coiled unit that is capable to producing flocs. Velocity gradients established by flow in the tube facilitate particle collisions. The tube flocculator allows the team to study how various parameters affect flocculation in laminar flow. Using Process Controller, we can isolate all parameters of flocculator in order to understand how each parameter affects the process.

Checklist for the setup

- Make sure all connections are tight.
- Make sure that there is no clogging in the flocculator and pump tubes
- The cables connecting pump and the computer are easily unplugged, so check them out!

Checklist for Process Controller

The details on Process Controller can be viewed here. Before running an experiment, make sure:

- Check the source page
- Check the location of datalog path
- If a new set point has been added in the set point list (and not at the end of the list), check that all rules and states still are referencing the correct set point, and any variable set points are referencing the correct set point too.

Cleaning Protocol

After running many sets of experiments, the particles get attached and accumulate in the flocculator tubes, so it's harder to observe what's going on in the tubes and this might contribute to a false effluent turbidity reading. Additionally, if the setup sits too long without any action, particles can build up in horizontal pieces of tubing and any connections.

Flocculator Cleaning

The flocculator should be cleaned regularly. Since the tubing is clear, it is visually obvious when the tubes need to be cleaned. Ideally, cleaning can be done between each major experiment, as it is not hard and takes only moments.

1. Turn the Process Controller to the OFF state
2. Prepare a small piece of sponge (cleaning sponge) by the size of tube inner diameter by cutting the sponge with scissors
3. Insert the piece of sponge at the starting point of the tube flocculator (right at the beginning of the clear flocculator tube)
4. Turn the Process Controller ON (State 7 - Calibrate Influent Turbidity)
5. The piece of sponge will move through the flocculator tubing, cleaning the sides of the tubes of any flocs as it moves
6. Turn the Process Controller OFF when it almost reaches the end of tube
7. Clean out the sponge and repeat if the flocculator tubing is excessively dirty

Influent Turbidity Vial

The vial inside the influent turbidimeter accumulates dirty water and does not do adequate self-cleaning. The influent turbidimeter vial should be cleaned just as often as the flocculator, as it contributes to false influent turbidity readings.

1. Turn off the Turbidimeter
2. Twist in the plastic stoppers on the tubing before and after the turbidimeter to stop flow from coming into the turbidimeter
3. Follow the directions on the module to open the top
4. Carefully unscrew the vial

5. Leave the top of the turbidimeter vial in a careful place (facing up) while cleaning the vial
6. Rinse out the vial and fill it with clean water
7. Screw the vial back onto the top
8. Wipe the outside of the vial with a Kimwipe to remove all fingerprints and other blemishes
9. Place the top back into the module and into the lock position, unscrew the plastic stoppers on the tubing and turn the turbidimeter on

Remaking the Stock Buckets

The clay and alum stock solutions can get old after no experiments have been running for quite some time. Because of processes like evaporation that we can not control, we can never be sure that the concentrations in the stocks are the same as we made them. If an experiment is going to be started after a long time from the last experiment, then the stocks should be remade in order to make sure that all parameters are the same across all experiments.
Back to Tube Floc Home Page