

Contact Chamber (CC)

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Spring 2016

The Rapid Mix Contact Chamber team worked to build a contact chamber that allowed for the rapid mixing of raw water and coagulant, improving upon the existing Rapid Mix Tube by providing a larger volume for mixing to take place. The goal of the team was to determine the shape of the contact chamber that would result in the least coagulant loss and to determine the residence time needed to maximize mixing but minimize coagulant loss. The team used mass balance to determine the loss of coagulant to the flocculator walls and used pigging to clean the flocculator in between trials. Mass balance did not end up working for the team. The end up using a tube settler and its performance as a measure for coagulant loss. The results they found were that contact chambers lessen coagulant loss. They found that residence time has the largest effect and surface area to volume ratio has a smaller effect on coagulant loss.

Fall 2016

For the fall semester, the Rapid Mix Contact Chamber team worked on assessing the utility of the contact chamber performance in the rapid mixing of raw water and coagulant. The team determined this performing the tests with and without the contact chamber using the coagulant properties which were found. The team ran different tests with a straight flocculator to find the relationship between head loss and nano cluster buildup and to measure the difference in the head loss values when the tests were run with and without the contact chamber. The team found that there was no significant effect on adding a contact chamber for the flocculator studied.

Spring 2017

Fall 2016's team tested differences in head loss when coagulant was added to the system with and without clay, to analyse whether higher turbidities decreased head loss. From replicating these experiments, the current team decided to build a coiled flocculator with 50 cm of headloss and a residence time of 1 minute, more like what is actually used in an AguaClara plant. However, the focus was later on moved back to the original flocculator. One important conclusion was a confirmation that the microbore tubing flocculator can be used as a tool to measure free coagulant by means of measuring headloss. In addition the team built a contact chamber with a design parameter of the ratio of total surface area of clay to surface area of the chamber. Experiments with this contact chamber and the microbore flocculator suggest that the former does help reduce coagulant loss in the flocculator. However, the dynamics of the coagulant within the contact chamber warrant further research .

Fall 2017

Fall 2017 team aims to design a contact chamber that minimizes contact of incoming fluid with the chamber walls. The length of the contact chamber is set to be approximately 10D. The team varied the residence time in the contact chamber by varying D while keeping L/D constant.

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Documents

	Challenges	Tasks	Symposium	Final Presentation	Final Report
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Spring 2016					
Fall 2016					 
Spring 2017					
Fall 2017			