

# AguaClara Foam Filtration Challenges

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## Abstract

The Foam Filtration team is currently designing an emergency response water treatment system that utilized polyurethane foam as a filter medium. The goal for this semester is to finalize the design of the emergency treatment system, evaluate the effectiveness of the cleaning mechanism, build a working prototype of the system for presentation in DC at the National Sustainable Design Expo, and begin collecting data on the overall performance of the system.

- Skills: Fluids, Plumbing Design, Fabrication, Process Controller

## 1 Introduction

The foam filtration system has great potential for emergency response systems and possibly for use at schools or community centers. The emergency system proposed will be a multistage filtration system, using a foam roughing and finishing filter to clean turbid water. The system will also be designed to function as a small scale water treatment facility; including its own input reservoir, linear flow orifice meter (LFOM), chemical dose controller (CDC), filtration system, and disinfection tank. The system will be small enough so that individual filter units can easily be carried by one person.

## 2 Testing

Using the prototype, begin testing the performance of the filter. The key performance parameters are solids loading capacity ( $\frac{kg}{m^3}$  where the volume is the bed volume) and pC\*. Measure the raw water turbidity, effluent of the roughing filter, and effluent of the polishing filter.

### 2.1 Overall Filter Performance

Using the prototype filtration system, determine the overall performance and run time of the complete filtration system.

## **2.2 Cleaning System Performance**

Evaluate the effectiveness of the plunger cleaning method. The cleaning method is a key element that will likely determine the success or failure of the foam system. Develop cleaning methods that result in rapid recover to high  $pC^*$  values after cleaning. The cleaning methods must also be easy to implement.