



Virginia Tech Mechanical Engineering Safi Pre-Filter Design Team



Caleb Steckmann, Betsy Wusk, Lauren Armstrong, Felipe Rodriguez, Ahmad Janudin

Problem Statement

In areas where the water is highly turbid the Safi filtering system can become easily clogged. When the filter becomes clogged it has to be clean reducing the life of the filter. Our design team is created a pre-filter to lower the turbidity of the water and prolong the life of the Safi filter.

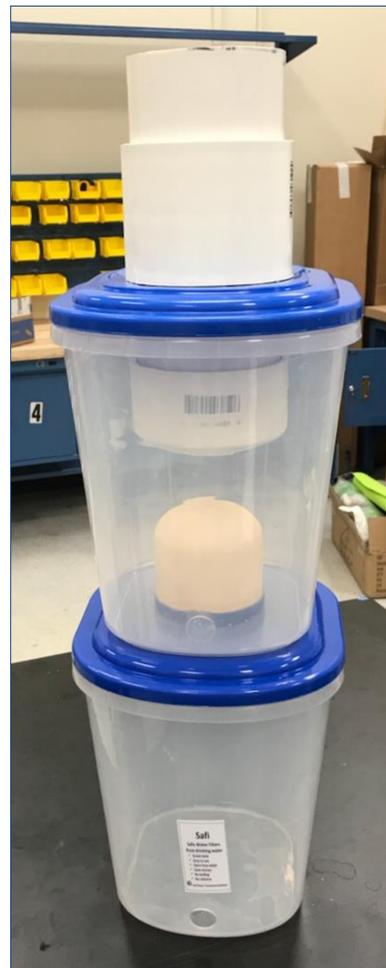
Design Proposal/Solution

Virginia Tech Mechanical Engineering students designed and fabricated a low cost and easy to assemble, pre-filter design. The design is composed of four locally available PVC components that are assembled by hand. The filter material is then placed inside.

For easier access to the filtering material, the team designed a cloth sock to be inserted into the PVC frame. This sock can be filled with more cloth, foam, or used alone.



T-20 pre-filter CAD model



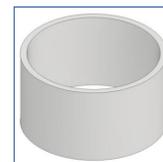
T-9 pre-filter

PVC Pre-Filter Components

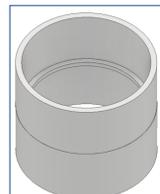
The PVC components in this design are available in Malawi for plumbing purposes. These parts are assembled by hand and kept together with an interference fit throughout use. The entire pre-filter is supported by the lid of the existing Safi system.



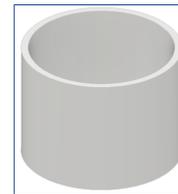
PVC Endcap
MK 1150



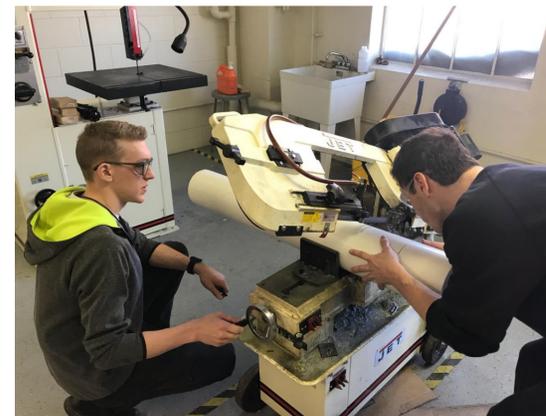
4" Long PVC Pipe
MK 845.62



PVC Coupling
MK 4201.00



6" Long PVC Pipe
MK 1268.43



The PVC frame has a simple construction process. This involves cutting a PVC pipe into 4" and 6" sections, and drilling holes into the PVC endcap for water to pass through.

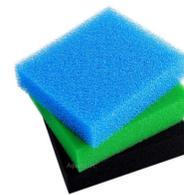
Material/Pre-Filter Testing

The team is currently conducting testing to determine the best material for filtration. While doing so, the team is considering turbidity reduction, flow rate, ease of cleaning, and time between cleaning.

Different Materials Being Considered For the Pre-Filter



Raw Cotton Filtering Sock



Food-Safe Reticulated Foam



Malawi Chitenge

Some Early Testing Done Using The Reticulated Foam and Cotton Sock



Water Before Pre-Filter



Water After Pre-Filter