**Overview of Wash Process**

Looking at the wash process discussed in 1: Defining the Problem, and knowing the hardware outlined in 2: General Method Justification, how is the wash process actually carried out? In this document, the perceived method for how clothing is acted upon for each phase of the wash cycle:

**Hydration Phase:** Where clothing is soaked with clean water

**Soaking:** An intermediary phase, clothing is left to soak as water disperses throughout the clothing item. Can occur before and/or after the agitation process.

**Agitation Phase:** Clothing-water mixture has mechanical energy applied to it to dislodge and evacuate contaminants, with water being a medium that

**Drying Phase:** Where wash water is removed from clothing item to be purified and reused

**Disinfecting Phase:** Through any number of means, bacteria is sterilized on the clothing item to prevent the cultivation and spread of pathogens.

**Hydration Phase**

In this phase, the clothing is first placed into the machine, and the wash cycle is initiated. To start the process, air needs to be evacuated from the chamber and vented from the system. This is done by compressing the clothing, displacing the air in the wash chamber with a clothing item. Once the clothing is compressed fully, the valves in the system close the connection between the wash chamber and reservoir, and open the air valve, and clean the water intake. Then the piston retracts, and simultaneously, water is drawn into the wash chamber, and air is expelled from the reservoir. This leaves a wet clothing item and removes the air from the system.

**Soaking**

This phase is just time allowed for water to permeate through the clothing item. It can be used as an intermediary step between the Hydration and Agitation phases, or can be used as a part of the Agitation phase depending on the needs of the wash process.

**Agitation Phase**

In this phase of the wash process, the intake and output valves of the system, air, clean water in, and dirty water out are all closed, and the separation valve is open to allow free flow of water from the wash chamber to the reservoir and back. From this point, water is displaced back and forth from the wash chamber to the reservoir and back through cycles of compression and decompression. Flow of water through the clothing item, flow of water out from the pipes into the wash chamber, the physical movement of the clothing by compression and decompression, and the movement of clothing by the flow of water should all serve to agitate the clothing item and help to evacuate various types of contaminants ranging from liquids and solids, and water soluble to insoluble materials.

**Drying Phase**

This phase of the wash process starts with the acting piston fully retracted, and all of the water in the system being located inside the wash chamber with the clothing item. The isolation valve is closed, and the air intake and dirty water out valves are then opened. At this point the acting piston compresses the clothing simultaneously, taking water into the reservoir above the acting piston, and expelling the dirty water to be recollected. The more force that is applied by the piston, the more water can be displaced from the clothing item. Once the water is removed, all valves are closed, and the isolation valve is opened, and the acting piston retracts to fill the wash chamber with air. At this point, the clothing item is ready to be removed by the user through the access hatch.

**Disinfection**

This is a process not covered in the design of the prototype, since the scope of this design is outlining a physical process to carry out the phases of the wash process. Disinfection can be accomplished by treating the wash water or using other various means that can be easily implemented into this, and other washing machine designs.