

Sub function Summary

The solar water pasteurizer can be broken down into seven separate sub functions that all play an integral role in the performance of the pasteurizer. Below is a list of the seven major sub functions and their brief description.

1. Feedwater System

In order to supply the pasteurizer with water that is to be treated, a feedwater supply system must be in place. This system ensures that the pasteurizer is continuously supplied with the correct quantity of untreated water during its operation. The feedwater system is a sub function that will have input from the operator, which is supply of untreated water.

2. Conversion of Solar Energy into Heat

A solar water pasteurizer will utilize sun's energy to cleanse the water of impurities. This sub function will capture the solar energy from the sun and convert it into a usable form, heat, which will be transferred to the water. This sub function will have no input from the operator and instead will be a stand alone system. Its main function will be to maximize the heat that can be recovered from the solar energy.

3. Heat Exchanger

In order to maximize efficiency of the pasteurizer an integrated heat exchanger will be present. The function of the heat exchanger will be to exchange heat between the outgoing treated water and the incoming untreated water. The heat exchanger will utilize the heat from the treated water that would otherwise be wasted, as well as ensuring that the out coming water is at a safe temperature. This sub function will not have any input by the operator.

4. Flow/Temperature Regulation

In order to properly treat the water for bacteria and pathogens, the water must reach a specific temperature (approx. 65°C), as well as remaining at that temperature for a specific amount of time. The flow and temperature regulation will ensure that the outgoing water has reached a desired temperature, as well as being held at that temperature for a determined amount of time, by carefully controlling the flow of the water. This sub function will not have any input by the operator.

5. Minimizing Heat Loss

In order to maximize the thermal efficiency, it is essential that heat loss to the surroundings is controlled. This sub function will consist of minimizing the heat loss to the surroundings, and therefore increasing the efficiency. This sub function will not have any input by the operator.

6. Release of Trapped Air

During the heating of the water inside the pasteurizer, it is expected that oxygen will be released from the water. This release of oxygen can have a negative effect on the performance of the pasteurizer, by blocking flow of the water. This sub function will ensure that all trapped air inside the pasteurizer is released to the atmosphere and that blockage of flow does not occur. Depending upon the design of the sub function, operator input may or may not be present.

7. Sediment Control

Although external to the pasteurizer, controlling the levels of sediment that may be present in the water supply is essential to the performance and reliability of the pasteurizer. Lack of sediment control would likely result in clogging of the passages inside the system. Sediment control will ensure that incoming water is cleansed of sediment that may cause performance losses of the pasteurizer. Sediment control will be a sub function that may or may not need operator input, depending upon the design.