



De-watering Waste Water Disposal System

Center for Entrepreneurship

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PROJECT OVERVIEW

The purpose of this project is to work along side the Peltier Desalination System to purify contaminated well water. The Dewatering Waste Water Disposal system provides an efficient and reliable method of disposing of the contaminated waste water solution.

The constraints of the project include:

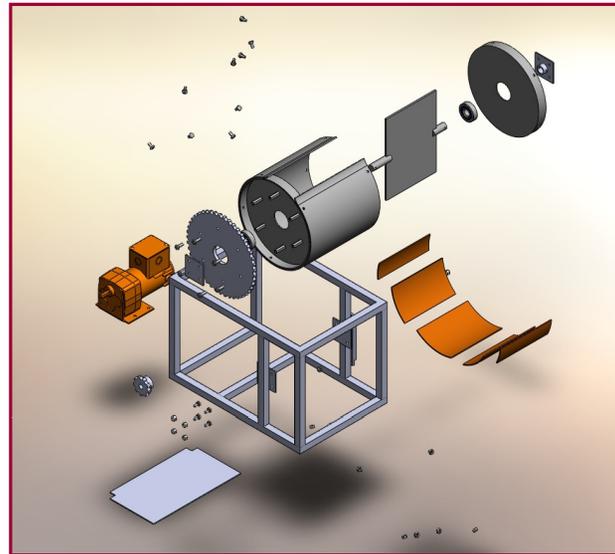
- Design must handle 10 gallons of contaminated solution per day
- The moisture content of the solid waste is less than 1%
- Scale model is contained within a footprint of 12x18x12 inches
- The overall system is powered by a standard 15 Amp household outlet

The objectives of the project include:

- Providing a system to rid the Peltier Desalination System of its waste water
- Venting the steam away from the excess water
- Scraping the solid waste from the system

HOW IT WORKS

The De-watering Waste Water Disposal System consists of the frame, cylindrical tank, scraper, motor, and flexible silicone heaters. The waste water from the Peltier Desalination System enters through the slot at the top of the cylinder. The water is boiled using the silicone heaters attached to the lower half of the cylinder. The steam is allowed to vent through the slot in the top. Once the water is evaporated from the system, a motor rotates the cylinder around the fixed scraper. The solid waste is pushed by the scraper out of the slot that has now rotated to be at the bottom of the cylinder.



ADVANTAGES OVER STANDARD WELL FILTERS

Currently, most purification methods utilize reverse osmosis (RO) filters. These filters are costly and must be replaced periodically. Water distillation is a viable alternative for purification of well water. The current design's components do not need to be replaced, making the system more environment-friendly. The Peltier Desalination System purifies water by using the thermoelectric effect to evaporate the liquid and condense steam. The process leaves contaminants such as salt behind. The Dewatering Waste Water Disposal System reduces the contaminants to solid matter and expels them out of the system for convenient disposal.

Rotating Cylinder Design

The Dewatering Waste Water Disposal System contains a free-to-rotate cylindrical tank and a fixed scraper blade inside of the tank. The rotation occurs once the water is evaporated from the system and is responsible for expelling the solid contaminants. The scraper is attached to the frame, while the tank is rotated on bearings around an axis by a motor. There is a minimal clearance between the inner tank surface and the blade to insure adequate contact with all solid contaminants.

The 1/17 hp motor and a gearing ratio of 5:1 provides enough power and torque to turn the tank, while overcoming the friction due to adhering contaminants on the inner tank surface. To expel the contaminants, the tank rotates 180° clockwise, 360° counter-clockwise, and then returns to its starting position.

PROJECT OUTLOOK

The design at hand will supplement the Peltier Desalination System by autonomously reducing the contaminated leftover solution to solid waste and forcing the waste out of the system. Together the two systems will function to provide households a cheaper, and more environment-friendly method of purifying contaminated well water.