

Necessity of Solar Still for Domestic Usage

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Water is a fundamental human need. Freshwater sources are viewed as waterways, lakes and underground supplies. Numerous human illnesses are brought about by dirty water. These days, every nation is challenging an extreme water lack because of contamination brought about by human deeds. Under these conditions, the quest for different sources must to be. A framework is required to give clean water without the utilization of condition to household reason. Water sanitation utilizing sunlight based vitality has become exceptionally famous in light of the fact that it is eco-accommodating and over the top expensive. The change of salts into unadulterated water by the utilization of sunlight based desalination and the gadgets used to cause sun oriented to desalt are known as sun powered stills. The equipment is based on solar power is mainly we can use in water purification for domestic needs for fulfillment of one family containing four to five members for drinking purpose .

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1 INTRODUCTION

Rain, a good illustration of a solar planetary system, altogether the water streams that flows into the lake, warmed by the sun's beams, is changed into a water system and driven by the wind breezes. When the mixture is broiled, it goes straight to the water droplets and then backs up as rain. To a lesser extent the same cycle is repeated in the unit of solar radiation. Now a days world, energy demands increasing considerably [1],[2] Population development and worldwide pollution, restricted flow of drinkable water are still another major problem. Solar is still one of the simplest and easiest ways to prevent water shortages rural as well as developed portions of the world. Low solar energy is used process of purification where the water at the center is allowed evaporation takes place and condensate occurs then allowed for condensed on glass cover,

what remains yield is known as distillate. The process eliminates salt and other bacteria, contaminants through the water that can be filtered and allows only the purity of pure water to be collected as a yield.[3]

Water is a significant source of several human consumptions. It is vital to the growth of agriculture and industry, as well as to support the growing demand for safe drinking water supply. The earth is almost covered with 97% salt water, 2% coated in the form of ice and polar ice and only 1% of water in order to usage of our survival. The remaining in rivers as well as in lakes, also basements. The rising demand for saline water for industrial development, as well as the increasing global requirement for safe and pure drinking water does not fulfill by natural means [4]

1.2 BASIC CYCLE OF WATER PURIFICATION OF EVAPORATION

It is based on two major principles one transmission and incineration. First, the water essential to be cleaned is put into a enclosure with a black color to bottom side The sun is still allowed to stay and which permits the energy to absorb the maximum sun's energy as soon as energy is absorbed it starts to increases water temperature, as soon as the water temperature increase water is converted to steam and evaporates to the glass roof, exit remains water

1.3 BASIC CYCLE OF WATER PURIFICATION OF CONDENSATION

The second scientific goal in which the sun is still active is compensation. After the water begins to flow and impact roof of glass movement of water turns into slowly through the glass, resulting in fresh and clean droplets will get. After glass is tilted from the bottom of the second sink, the water droplets will collected into the clean trough. The water condensate, that will store in the second solution are just cleaned, and are available water get its will become safe, pure to drink and cooking purpose without including, bacteria, Minerals ,germs or any other substances.

1.4 WATER CYCLE:

Let's understand the concept of understanding of water cycle it shows the nonstop development of water inside the Earth and environment. During the rainy season we see that rain water is collected on the roof and at street corners. Water vaporizes into water vapor, condenses to form clouds, and reasons back to ground in the form of rain and ice. Water in different stage's flows through the atmosphere (moving). Liquid water flows across land (overflow), into the ground and over the ground (groundwater). But after a few days, it disappears. Water is heated with the help of sunlight. Water vaporizes into the air through vaporization. After a while, water vapor in the air cools and is converted to water droplets, such as

clouds. This process is known as the conduction of water vapor. Where the air cannot hold the amount of water i.e. the clouds heavy, the water falls to the earth like the rain. The rainwater cycle is a continuous cycle.

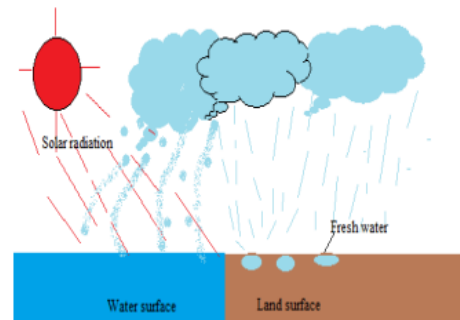


Figure 1: Schematic diagram of Earth's hydrological process [5]

1.5 PRINCIPLES OF SOLAR STILL

Watersupplyin the works is simple, yet practical, as the filling of the signs provides a way for the environment to produce rain. The sun's power warms the water until it becomes swollen. As the water begins to evaporate, water vapor rises, reducing the temperature of glass collecting the drops at inner side of glass this method removes contaminations, not only salts but also heavy metals, and removes bacteria in the water this outcome is more water cleanliness as compared to pure rainwater.

Solar is still one of the ways that can use inaccessible water to produce new water. The basic principles of solar still vary in evaporation, recovery and difference in the low temperature of the material. Figure 1.2 indicates the terms of the solar system still. Water that is inaccessible to the base is heated by the installation of hot sun rays. Because of this, current air convection is a result of temperature and salinity variations across the board [6]

Rising temperatures increase evaporation and current air and humidity improves flexibility to unseen tops The droplets (condensate) run through the visible surface of the collecting

station, which is made of glass (to prevent corrosion and corrosion) and is connected to a measuring trough . [7]

2 SOLAR STILL

Solar still is a basic method used to purification only. It mechanism on the hydrological cycle originate in nature Solar still is a renewable energy type device that depends on the solar energy to became into fresh water. The solar system uses sunlight in its place in other sources such as coal to obtain the energy needed for cleaning. It is able to provide clean drinking water and cooking water, even in areas where there are no other sources of energy, while till creating an environment

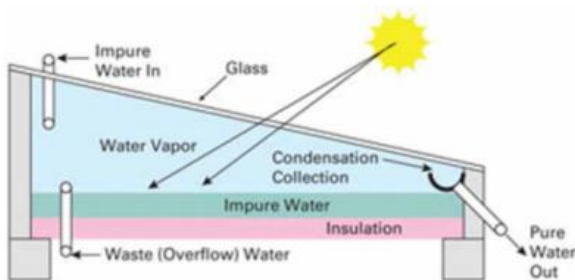


Figure 2: Solar still

2.1 CLASSIFICATION

It consists of two still one is active and another is passive solar stills

Sunlight enters through glass covers and evaporate the is called as passive solar stills. They do not depend on any external devices and works on the Zeroth law of thermodynamics. [9]

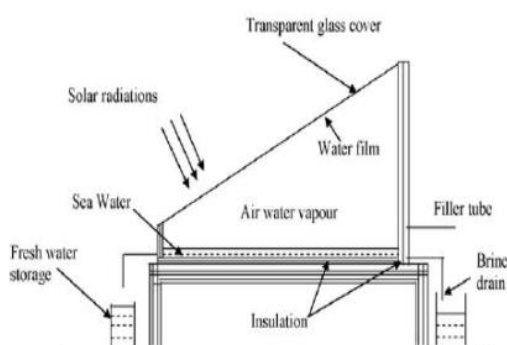


Figure 3: Passive solar still [9]

Active solar still includes some added system is used to augment the heat transfer to speed up

evaporation. It can be achieved through some modification in design, combination of an additional device or the combination of changes in geometry or design and improve techniques of heat enhancement

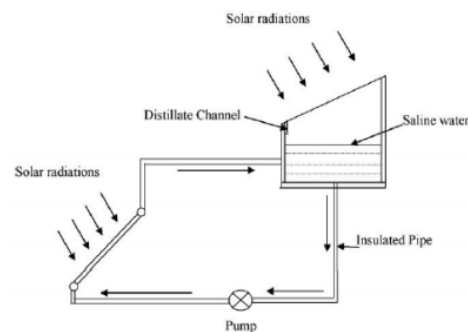


Figure 4: Active solar still [9]

2.2 EFFECT OF PARAMETERS ON SOLAR STILL

Solar still yield is depending on the temperature difference between solar still water or basin and inside temperature of glass cover. Solar still yield is proportional to the temperature difference solar still water and inside glass cover.[10]

- depth of water in the basin, of the basin material
- wind speed, solar energy,
- Angle of Inclination glass cover and atmospheric temperature.

2.3 TECHNIQUES

- Desalination Techniques having different desalination techniques as shown in Figure 5
- Some desalination method use solar power for its phase change process, and some use solar electricity produced by Photovoltaic panel for powered the membrane process.
- Desalination having the membrane is prepared in Reverse Osmosis (RO) and electro dialysis (ED). Desalination having PCM includes multi-flash, multieffect boiling techniques

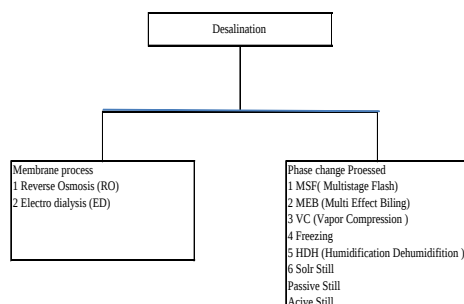


Figure5: classification of solar desalination system

2.4 SELECTION OF MATERIAL AND ITS PROPERTIES

Solar still consist of following parts and its material

- a) Collector/Glazing (Transparent) : Glass
- b) Basin (Absorber) : Aluminum
- c) Solar Reflector : Aluminum
- d) Cover (Casing) : Plywood
- e) Insulator Fiber : Glass
- f) Sealant : (i) Araldite (ii) Putty
- g) Drain Pipe : PVC
- h) Support Structure must be Hard
- i) Collection troughs: Stainless Steel

2.5 CONSTRUCTION AND FABRICATION

The solar still being prepared by two vessels of water and a glass piece flowing over the water containers. Dirty water is put into one of the vessel or trough, and the other remains empty. The glass is located from corner to corner the top at an angle, directly into the empty trough The base of a trough containing dirty water is often coated with dark paint to help absorb energy from the sun.

2.6 GENERAL PROCEDURE OF SOLAR STILL FABRICATION

It consist of existing boxes are made of hard plywood and araldite minutes were used to fix the gaps. The plywood boards are glued together to minimize heat loss in the system. Aluminum sheets are also used for absorber / duct due to their high flow rate (229 W / m²).

The bowl was painted black to enhance the adsorption of heat with water.

The basement area is also painted black to absorb maximum sunlight. In addition, the joint was well placed in plywood boxes before being covered with 4mm collectable rust. This is fitted together with a glossy glass cover at an angle of 11 ° 1-inch-diameter cylindrical collecting tray made of 1 mm stainless steel sheets. It was thus placed on the edge of the glass slope. The purpose has been to collect and drain the distillate by using a flexible hose in the final plastic container without strain. [11]

2.7 WORKING

Solar still consist of glass placed at the top of basin and it covers the basin and a channel is used for to collect yield. Solar radiation which enters through glass cover and salty water in basin is heated and due to temperature difference between glass temperature and temperature of water this is main reason to get pure water from impure water and water is gathered in the trough.

3 BENENEFITS OF SOLAR DISTILLATION

Solar transmission allows for residential in mostly populated areas, thus reducing the pressure on people in urban areas. Solar stills, which work in the sea or on landfills, can guarantee the supply of water during scarcity.

- a) Daily workouts and daily repairs are easy.
- b) No skilled labor is required.
- c) Ability to use local materials.
- d) There is no cost for energy.
- e) No interruption in fuel supply is limited.

4 SUMMERY:

- a) Normal utilization of water was 10 to 20 liters for each individual every day
- b) Hydrocarbon based fuel innovations that produce drinking water are costly, upsetting and negatively affect the earth.
- c) Solar is probably the most ideal choice as its day by day activity and maintenance process is not so costly and simple

- d) Availability of solar power arrangement is the one of best answer for remote zones
- e) It likewise keep up Percentage of hydrogen level (PH level)

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