
Alternative Method for Desalination of Seawater

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ABSTRACT:-

A number of seawater desalination technologies have been developed so far in the past few decades to increase the water demand in the various regions of earth. Desalination of seawater is one of the best options for fulfilling the water demand for drinking purpose. Two of the most commercially important technologies developed are “Multi-Stage Flash” (MSF) distillation and the other is “Reverse Osmosis” (RO). Although these methods are capable enough for conversion of sea water to potable water but a significant amount of Research and Development (R&D) is being carried out for improving the technology and reduce the cost of desalination. This paper provides an alternative/additional method of desalination of seawater. Although MSF and RO desalination technologies are most successful processes but due to their high costing it is not feasible or can be used by all the countries. Hence to overcome this problem “desalination of seawater by evaporation method” could be used.

KEYWORDS:-

Evaporation Method, Multi-Stage Flash mixer (MSF) and Reverse Osmosis(RO), Semi permeable Membranes, Salt pits, Desalination

INTRODUCTION:-

Today most of the countries are suffering from water shortage. This is due to the enhanced living standards, rise in population, and expansion of agricultural and industrial activities. But the present fresh water resources are not capable of fulfilling these water demands. Hence there is need of finding other source of fresh water.

The oceans represent the earth’s major water reservoir. About 97% of the earth’s water is seawater while another 2% is fresh water in the form of glaciers and icecaps. Less than 0.5% of the fresh water is available of the earth’s total water supply. We know that seawater is not suitable for human consumption as well as for the industrial and agricultural work due to presence of salts in it. But what if we remove the salts from this seawater. By removing salt from the virtually unlimited supply of seawater, desalination has emerged as an important source of fresh water.

Today seawater desalination is a vital and dependable freshwater resource in countries such as Saudi Arabia, United Arab Emirates, and Kuwait. Overall, it is estimated that over 75 million people worldwide obtain fresh water by desalinating seawater. The Five World leading countries by desalination capacity are Saudi Arabia (17.4%), USA (16.2%), the United Arab Emirates (14.7%), Spain (6.4%), and Kuwait (5.8%). In 2001, seawater and brackish water accounted for about 60% and 40%, respectively, of all desalinated water sources in the world. There are various methods of desalination of seawater out of which following are 2 most commonly used methods worldwide.

REVERSE OSMOSIS:-

In this method the osmotic pressure is overcome by applying external pressure higher than the osmotic pressure on the seawater. Thus, water flows in the reverse direction to the natural flow across the membrane leaving the dissolved salts behind with an increase in salt concentration. The major energy required for desalting is for pressurizing the seawater feed. Due to this Reverse Osmosis process is very costly than any other process of desalting of seawater.

MULTI-STAGE FLASH EVAPORATION:-

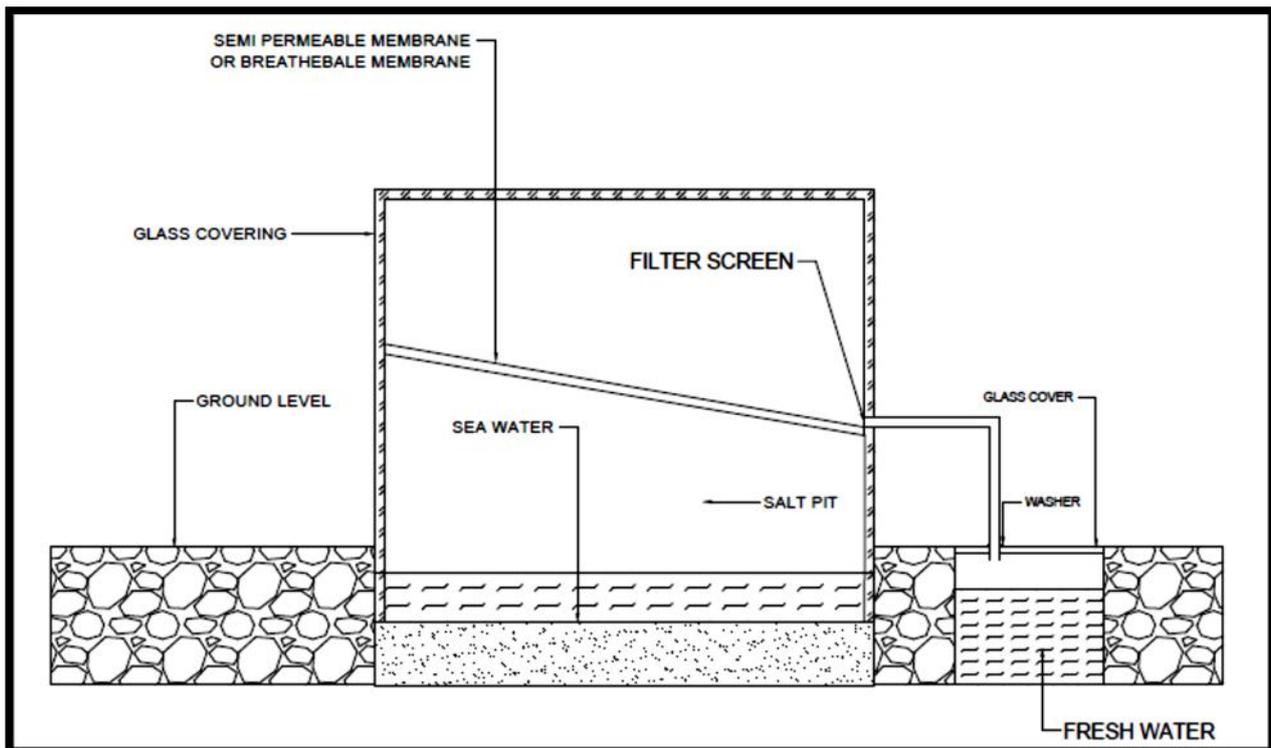
In this method there are number of chambers connected to one another, with each successive chamber operating at a progressively lower pressure. Source water/pre-treated water (i.e. feed water) first passes from back to front through a tubing system to the brine heater, where water is heated under a high pressure. The heated water then enters the first chamber at reduced pressure, causing it to boil rapidly with a portion evaporating into vapour. In each successive chamber which operates at a reducing pressure, the same process repeats the vapour generated by evaporation is converted into fresh water by condensation.

ALTERNATIVE PROCESS:-

These methods produce fresh water very effectively but for this, external energy is given to it. Due to this external energy the cost of these process increases.

The method which I think can be used as an alternative method for desalination of water is by evaporating the seawater by sun's heat. There are various salt pit in which sea water is collected and then that water is allowed to evaporate naturally due to sun's heat, and we get only raw form of salt. Hence in this process if we trap that evaporating water and then allow it to condensate then we could get fresh water out of it. When the water will evaporate then we will make it pass through a semi permeable membrane or a breathable membrane so that the condensed water will not again mix in the salt water. Due to this the water vapour which will condensate will settle as a water droplet on the film and due to the slope provided the water will flow under gravity to the collection tank. The working is shown in the fig. no. 1

Fig1. ACTUAL SETUP OF THE PROCESS

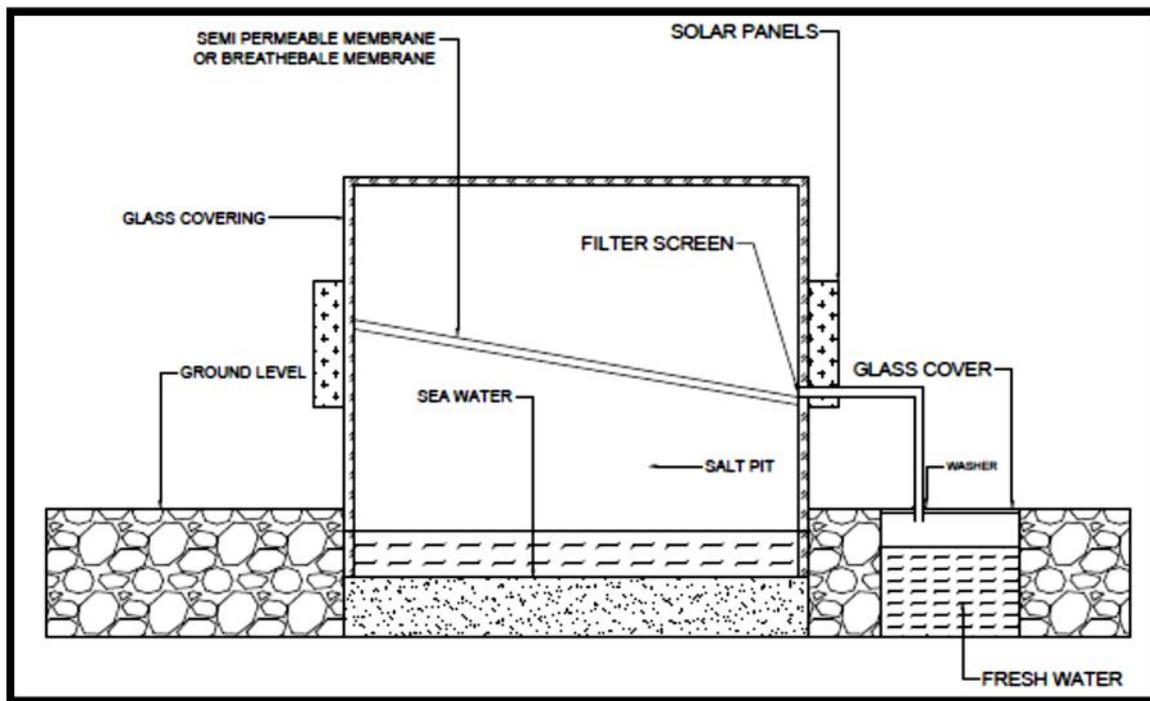


The biggest advantage of this process is that since the whole process is based on evaporation of water hence no energy is required to run the process just like RO and MSF.

Also there might be a possibility that due to presence of the semi permeable membrane the sunlight might not reach the seawater and the water will not evaporate. Hence to overcome this problem we can give some external energy i.e. heat to the seawater due to which the water will boil and water vapours will form and the further procedure will occur. But giving heat externally might affect the cost of the whole process hence to

overcome this we can provide solar cell panels at the surface of the glass case which is covering the salt pit. Due to this we will get the energy the whole day and the cost will also be reduced. This setup is shown in the fig. no. 2

**Fig2. MODIFICATION IN THE ACTUAL SETUP
[ADDITION OF SOLAR CELL PANELS]**



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