

# A STUDY ON “DESALINATION OF SEA WATER AND MAKING IT FIT TO USE FOR HOTEL PURPOSES”

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## **INTRODUCTION**

On Earth, water accounts for 72-74% of surface area whereas land accounts for just 26-28%. There, also, water can be divided into two categories:-

- a) Salt Water: accounting for 95%; unfit for human usage.
- b) Fresh Water: accounting for 4.7%; fit for human use, but majorly, in the form of ICE. Only 0.3% is directly available to us. This 0.3% of fresh water source is also depleting at an alarming rate.

Desalination is the removal of dissolved salts in the waterbodies present on the Earth. It specifically aims at purifying the water of large waterbodies such as Oceans, Seas, Salt Water Lakes, etc. so that this water can be made fit for use, for humans.

Desalination came to India through Israel. Israel Desalination Enterprises (IDE) is the company at the center of this creation since 1960s when they established their first desalination plant in Eilat.

**AIM:** A study on “*Desalination of Sea water and making it fit to use for Hotel Purposes*”

## **OBJECTIVES:**

1. To understand what is Desalination?
2. To study the need of desalination of sea water.
3. To explore various types of Desalination processes.
4. To analyze the cost of machinery required for Desalination.

## REVIEW OF LITERATURE

### **Various types of Desalination processes.**

Water desalination processes separate dissolved salts and other minerals from water. Feed water sources may include brackish, seawater, wells, surface (rivers and streams), wastewater, and industrial feed and process waters. Membrane separation requires driving forces including pressure (applied and vapor), electric potential, and concentration to overcome natural osmotic pressures and effectively force water through membrane processes. As such, the technology is energy intensive and research is continually evolving to improve efficiency and reduce energy consumption.

Seawater desalination has the potential to reliably produce enough potable water to support large populations located near the coast.

Numerous membrane filtration seawater desalination plants are currently under construction or in the planning stages up and down California's parched coast, with the 50 million gallons per day (mgd) Carlsbad Desalination plant scheduled to be operational by 2016. Reverse osmosis (RO) and Nano filtration (NF) are the leading pressure driven membrane processes. Membrane configurations include spiral wound, hollow fiber, and sheet with spiral being the most widely used. Contemporary membranes are primarily polymeric materials with cellulose acetate still used to a much lesser degree. Operating pressures for RO and NF are in the range of 50 to 1,000 psig (3.4 to 68 bar, 345 to 6896 kPa). Electro-dialysis (ED) and Electro-Dialysis Reversal (EDR) processes are driven by direct current (DC) in which ions (as opposed to water in pressure driven processes) flow through ion selective membranes to electrodes of opposite charge.

In EDR systems, the polarity of the electrodes is reversed periodically. Ion-transfer (perm-selective) anion and cation membranes separate the ions in the feed water. These systems are used primarily in waters with low total dissolved solids (TDS).

Forward osmosis (FO) is a relatively new commercial desalting process in which a salt concentration gradient (osmotic pressure) is the driving force through a synthetic membrane. The feed (such as seawater) is on one side of the semi permeable membrane and a higher osmotic pressure "draw" solution is on the other side. Without applying any external pressure, the water from the feed solution will naturally migrate through the membrane to the draw solution. The diluted solution is then processed to separate the product from the reusable draw solution.

Membrane Distillation (MD) is a water desalination membrane process currently in limited commercial use. MD is a hybrid process of RO and distillation in which a hydrophobic synthetic membrane is used to permit the flow of water vapor through the membrane pores, but not the solution itself. The driving force for MD is the difference in vapor pressure of the liquid across the membrane.

The clean solvent we obtain after that process is Pure Drinkable Water.

COST of a Regular Desalination Machine



Rs. 25,000 /- Per unit

Compact Desalination Machine

Used for providing drinking water

Output = 500-550 cubic meter per hour.

Voltage = 220V



Cost: - Rs. 1.5 Lakh onwards

Industrial type of Desalination plant for sea water treatment.

Capacity: - 500 LPD

Automatic Machine

## CONCLUSION

**The Desalination Machine** is very helpful for The Hotels as:

- It would lower their inland water usage
- It would help in CSR activities
- It will provide fresh water for Hotel's personal services
- No need for external water supplies from other services

**It (Desalination Plant/ Machine)** will also act as a savior of flora and fauna in drought stricken areas:-

- Providing water through pipes and canal systems.
- The water shortage of the country can be avoided.
- The depleted inland resources of water can be refilled.
- Forest cover can be increased as water is readily available.

## RECOMMENDATION & SUGGESTIONS

- Desalination Machines should be installed by every Hotel & Resort, located on the coastal regions of India.
- This should be done and seen as a humanitarian act, rather than acting for profit.
- Because saving water means saving lives.
- The Desalination Plants should be set up by the government too. And see that the ecological balance is maintained.
- The best way to do so is dividing The Coastal Plants into two teams and making the work for a brief period of 6 months each. So that the marine life is not harmed in any way by the concentrated salt water solution (Brine).