
Water Purification By Effective Membrane: A Project Report

One of the greatest challenge facing in now days is providing sustainable supplies of clean water, with affordable cost. For it develop a effective membrane which reduce impurities like TDS Heavy metals and suspended impurities with good efficiency a membrane should have higher flux, more selective, andless prone to various type of fouling.

Introduction

Membrane technology is a visionary procedure that uses semi-permeable spiral wound membranes to separate and remove dissolved solids, organic, pyrogens, submicron colloidal matter, color, nitrate and bacteria from water. Feed water is sent under pressure through the semi-permeable membrane, where water permeates the minute pores of the membrane and is delivered as purified water called permeate water. The property of these membranes is that membranes are semi-permeable and reject the salt ions while letting the water molecules pass. The membranes used for membranes are made of cellulose acetate, polyamides and other polymers. The membranes are of hollowfibre spiral wound used for treatment, depend on the feed water composition and the operation parameters of the plant. This is a membrane based process technology for desalination and effluent water treatment. It is visionary that membrane-based sea water desalination and wastewater reuse are widely considered as possible and feasible solutions to augment water supply and prevent water scarcity. The most common membrane processes used is the membrane purification used for brackish water desalination and effluent water treatment.

Types of membranes

Water treatment processes employ several types of membranes. They include microfiltration (MF), ultrafiltration (UF), reverse osmosis (RO), and Nano filtration (NF) membranes. Membranes have the largest pore size and typically reject large particles and various microorganisms. UF membranes have smaller pores than MF membranes and, therefore, in addition to large particles and microorganisms, they can reject bacteria and soluble macromolecules such as proteins. RO membranes are effectively non-porous and, therefore, exclude particles and even many low molar mass species such as salt ions, organics, and etc. NF membranes are relatively new and are sometimes called "loose" RO membranes. They are porous membranes, but since the pores are on the order of ten angstroms or less, they exhibit performance between that of RO and UF membranes.

Methodology

There are so many methods for water purification like sedimentation, chlorination, membrane filtration, etc. we try to joint all this process in one process so this became easier and chipper then separate methods.

AEIOU summary

Environment: Work environment in which we have carried out our project work.

1. School
2. Villages
3. Public places.

Interactions: Interactions with whom, we have interacted while carrying out project related activities.

1. With guides
2. With faculties
3. With classmate
4. With filter repairer.

Objects: Objectives involved in our project work

1. Cellulose paper
2. Activated carbon
3. Outer body.

Activities: Activities that were carried out by us during this semester.

1. Research papers
2. Patents of membrane
3. About material
4. Find components.

Users: Ensured product functions that customer will experience.

- Filter repairer
- Domestic use
- Peoples
- Lab workers.

Empathy summary

A user empathy map is used to help in the discussion about the needs a user has using it allows you to focus on what was observed, and what can be inferred about your different user groups' beliefs and emotions.

Developing a better understanding of the person for whom you are designing your product with empathy map helps you synthesize observations and draw out unexpected insight. These are the first step of the project or problem. In this canvas, you have to find out what is user to your problems? What is a stakeholder? What are activities? And what are broad stories of their activities?

Activity

We visited a village where we saw villagers using raw water in domestic use, where we found that numbers of peoples were suffering from diseases caused by water therefor we suggested them to use water purifier with effective membrane and after using treated water their problem is solved. We visited a village, where we saw that students were drinking untreated water that untreated water contained high TDS. Then there we applied water purification plant with effective membrane that reduce TDS and make water drinkable.

We visited village, where we seen a problem. Influent water containing high percentage of chlorine can damage the membrane so that it can clogged and drastic reduction is performed. We visit village, where we seen that they used membrane to treat raw water to make it drinkable, but in that membrane output flow rate is low because of pressure drop, that's why the process of making raw water for making it drinkable becomes time consumptive.

Expected outcomes

From the study of various article on water purification with effective membrane we saw that the water purification with membrane is the one of the effective technique. This is advanced and fast growing method for treatment of water and wastewater. This method have large number of application because by this method variety of pollutants can be treated. Various parameters like PH, time of treatment, pressure drop, TDS, bacteria. The maximum removal obtained for PH, colour, and chlorine. This method is low cost treatment method so anyone can use it for domestic use. Water purification with membrane is very effective and useful method.