

Monthly Magazine
June 2009 Edition



MD's Desk

Dear All,

It was indeed a proud moment to see our O&M Team in SRF, Manali site been awarded as the Best Kaizen Contributor for effective RO Recycling Plant and its maintenance for this year. I would like to see our O&M Team in other sites emulating the same and bring more laurels to the Organization. I am also happy that our policy to maintain Customer Satisfaction is being realized through these incidents.

I was glad to see the level of enthusiasm and interest shown by our Staff in participating in the sports events. More such events have to be conducted often to pep up the person. It not only acts as a stress reliever but also bring about a positive interaction between the associates. There are enough facilities available in the office to indulge in these activities which alleviates the stress before leaving home. I want all Staff to utilize the same.

As you all are aware of, next month is our Annual Day and the HR Team is gearing up with some entertaining events. With the King of Pop and Dance hogging the news everywhere, there seems to be a renewed interest in dance. I hear a lot of music and dance practices by our Staff who are preparing for the D-day. I appreciate their interest and fervor to participate in the events and also eagerly looking forward to all the action.

Regards,


S. Suthakar
Managing Director



MEMBRANE & ELEMENTS

Membrane and Element Construction

The two primary membrane module configurations used for reverse osmosis applications are hollow fiber and spiral wound.

Hollow Fine Fiber (HFF) Membranes

This configuration uses membrane in the form of hollow fibers that have been extruded from cellulosic or polymeric material. The fiber is asymmetrical in structure and is as fine as a human hair. It typically measures about 42 micron (0.0016 inch) ID (inner Diameter) and 85 micron (0.0033 inch) OD (Outer Diameter). Millions of these fibers are formed into a bundle and folded in half to a length of approximately 120 cm (4 ft). A perforated plastic tube serving as a feedwater distributor is inserted in the center and extends the full length of the bundle. The bundle is wrapped, and both ends are epoxy sealed to form a sheet-like permeate tube end and a terminal end that prevents the feed stream from bypassing to the brine outlet. The hollow fiber membrane bundle, 10 cm to 20 cm (4 to 8 inches) in diameter, is contained in a cylindrical housing or shell that is approximately 137 cm (54 inches) long and 15 - 30 cm (6 - 12 inches) in diameter. The assembly is called a permeator. The pressurized feedwater enters the permeator feed end through the center distributor tube, passes through the tube wall, and flows radially around the fiber bundle toward the outer permeator pressure shell. Water permeates the outside wall of the fibers into the hollow core or fiber bore, through the bore to the tube sheet or product end of the fiber bundle, and exits through the product connection on the feed end of the permeator.

Concentration polarization is the ratio of the salt concentration in the membrane boundary layer to the salt concentration in the bulk stream. The most common and serious problem resulting from concentration polarization is the increasing tendency for precipitation of sparingly soluble salts and the deposition of particulate matter on the membrane surface.

Concentration polarization is worse under conditions of laminar flow. Laminar flow occurs when the velocity is so low that there is no turbulence in the water - the flow moves in "layers" with little or no mixing between layers. Turbulence helps to mix the concentrated fluid at the membrane surface with the (relatively) dilute fluid in the bulk of the solution. An absence of turbulence allows the concentrated fluid at the membrane surface to become even more concentrated with respect to the bulk stream, causing concentration polarization.

In a hollow fiber module, the permeate water flow per unit area of membrane is relatively low (because of the very high surface area of fibers) and may be laminar; therefore, concentration polarization is high at the membrane surface. Care must be taken to ensure that scaling and fouling of the membrane surface do not occur. The hollow fiber unit allows a large membrane area per unit volume of permeator, which results in compact systems. Hollow fiber permeators are available for brackish and sea water applications. Brackish water contains dissolved solids below about 15,000 parts per million. Hollow fine membranes are made of cellulose acetate blends and aramid (a proprietary polyamide type material in an anisotropic form). Hollow fiber membranes require feedwater with a lower concentration of suspended solids compared to the requirements of the spiral wound membranes. This is because of the very close packed fibers and tortuous feed flow inside the hollow fiber membranes. This is one of the reasons that hollow fiber modules are not as popular as spiral wound modules in the water treatment field.

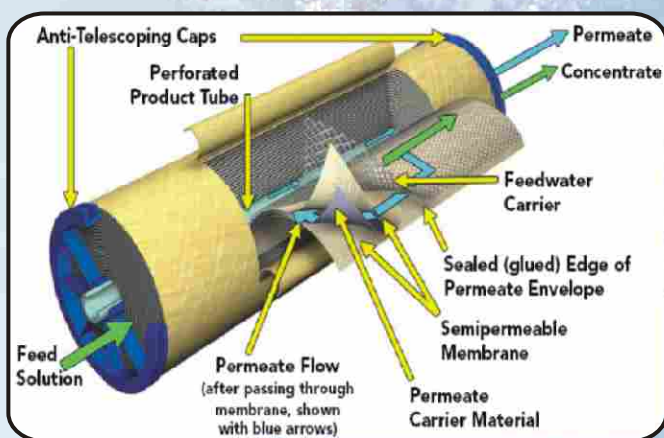
SPIRAL WOUND MEMBRANES

In a spiral wound configuration, two flat sheets of membrane are separated with a permeate collector to form a leaf. This assembly is sealed on three sides, with the fourth side left open for permeate to exit. A feed/brine spacer material sheet is added to the leaf assembly. A number of these assemblies, or leaves, are wound around a central plastic permeate tube. This tube is perforated to collect the permeate from the multiple leaf assemblies. The typical industrial spiral wound membrane element is approximately 100 or 150 cm (40 or 60 inches) long and 20 cm (8 inches) in

pressure tube to waste or to feed another tube. Permeate from each element enters the permeate collector tube and exits the tube as a common permeate stream. A single pressure tube with six membrane elements connected in series can be operated at up to 50-percent recovery under normal design conditions. Each membrane element has a brine (or chevron) seal around the outside of the element at the feed end. The shape of the brine seal is designed to expand when the feedwater pressure pushes against it. When installed correctly, the brine seal prevents the feed/brine stream from bypassing the element.

The below figure is a simplified representation of a cut-out view of a spiral wound membrane. Shown is the membrane, feedwater carrier, and permeate carrier before they are wrapped around the central permeate or product tube. Feedwater flows into each element between membrane envelopes, along the feedwater carrier. The feedwater carrier has two main purposes:

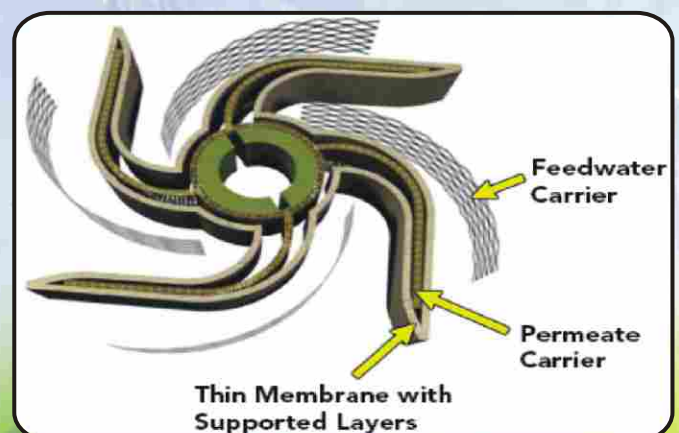
1. To separate membrane envelope layers for adequate flow rates.
2. To provide a tortuous path for flow this, in turn, causes turbulence for cleaning along the



diameter.

The feed/brine flow through the element is a straight axial path from the feed end to the opposite brine end, running parallel to the membrane surface. The feed channel spacer induces turbulence and reduces concentration polarization. Manufacturers specify brine flow requirements to control concentration polarization by limiting recovery (or conversion) per element.

Recovery is a function of the feed-brine path length. In order to operate at acceptable recoveries, spiral systems are usually staged with three to seven membrane elements connected in series in a pressure tube (or housing). The brine stream from the first element becomes the feed to the following element, and so on for each element within the pressure tube. The brine stream from the last element exits the



DANCE AS STRESS RELIEF : SYNCHRONIZE WITH THE MUSIC

Dance as stress relief is a wonderful choice for people all ages and health state. The amazing effects of dance as stress relief can be immediately felt as the simultaneous practice of both the body and the mind. If we should mention the benefits of dance as stress relief technique, the truth is that they are various and different from one person to another. There is one common benefit for all dance passionate: they experience a positive dimension in what concerns the mental state and the physical health, a new outlook on life.

It is known that each of our five senses have the role of sending signals to our brain through the nervous system. Therefore, we feel like jumping for joy when we are happy or we crash in the bed when we are upset. Stress can determine the body to block the signals meant to reach our brains, especially if we are trying to hide our emotional frustrations or physical exhaustion and we end up crashing mentally.

Dance as stress relief can help you reveal your inner problems and anxiety. It is considered that through dance sessions you can overcome the stress accumulated in your body. All the hostility, anger and depression are released through the dance movements on music. Dance can reconnect you with your true personality, which can be greatly affected by stress.

Dance requires you to use all your senses;

you will learn how to relax and regain the inner balance through various movements related to different dynamics, rhythms and tempos. If we would present the benefits of dance as stress relief in few words, those would refer to the following: the dance can balance your mind and body, improve the muscular tones and help you maintain your health. The most important benefits of dance besides the stress relief are:

HEALTH - Dance sessions are beneficial for the circulatory system. In addition, the weight control will not be a problem any more as the dance movement burns lots of calories.

CREATIVITY - You can express your creativity through dance, and this is a great way to release some of the stress. Use dance as stress relief for all your feelings through body movement.

BUILD CONFIDENCE - We all know stress can break your confidence into thousands of pieces. Dance as stress relief can help you rebuild your confidence, by giving you a new sense of creativity, energy and motivation. Choosing dance as stress relief will help you build back the trust in yourself and also a positive attitude towards life. It's like getting back to your inner life rhythm, your mental balance.

HAVE SOME FUN - Even if dance requires you to focus, be committed and spend some time exercising, it is always fun, finally turning into a pleasurable, rewarding and stress-free experience.

You can release some of your stress through dance. Don't worry; you don't necessarily have to take professional dance classes. It is enough for you to dance even at home, as much as you feel good.

EVENTS OF THE MONTH

Our “Aqua Designs” OPERATION & MAINTENANCE team in SRF Manali has been awarded as “The Best Kaizen Contributor” for Effective RO recycling plant & its Operation & Maintenance for the year 2008 - 09.

SPORTS DAY EVENTS

For the first time, Sports Day was conducted in Aqua Designs. The final matches of Volley Ball, Table Tennis and Shuttle were the highlight of the day. Earlier, the finals for Carrom both for men and women were conducted and winners announced.



Best Kaizen Contributor



SRF LIMITED
Manali

To
Hr.K. Teeravandana Aqua Design

SRF Manali Team appreciates and recognizes the exemplary performance demonstrated by you in your area of operation.

SRF Manali Team is glad to recognize you as “The Best Kaizen Contributor” for Effective recycling in RO during 08-09

We look forward to your continuous support and wish you to achieve higher goals in future.

V. Sekar
V. Sekar
Vice President (Operations)

NEWCOMERS IN AQUA DESIGNS



Mrs. Mythily

woods joined our team as Manager - HR and has rich experience as Merchandiser in various Textile trading Companies and in handling international organizations in her career.



Mr. Suresh

has joined our team as Manager - Chemical Marketing and has around 7+ Years of Experience in the Field of Chemical Marketing.



Mr. P. Arun Kumar

has joined our team as Executive - Commercial and has around 2 Years of Experience in the Field of Commercial & Finance & Accounts.



Mr. G. Silambarasan

has joined the E&C team as Engineer - E&I and has around 3 Years of Experience in handling electrical control panels, PLC and other panels connected to water treatment plant.



Mrs. A. Rizwana

has joined our team as Manager - Proposal and has around 14 Years of Experience in project proposals.

NEW PROJECT

TAMILNADU WATER SUPPLY AND DRAINAGE BOARD,

Chinnamanur Municipality is a second grade Grade municipality in Theni district located about 520 KM south of Chennai. An Underground sewerage scheme has been formulated by the TWAD Board for the town and the Collection system works are in progress. A Sewage Treatment Plant has been proposed to treat the sewage of the town. Aqua Designs has bagged the order to carry out the works for a 3.99 MLD STP.

DIFFICULT QUESTIONS

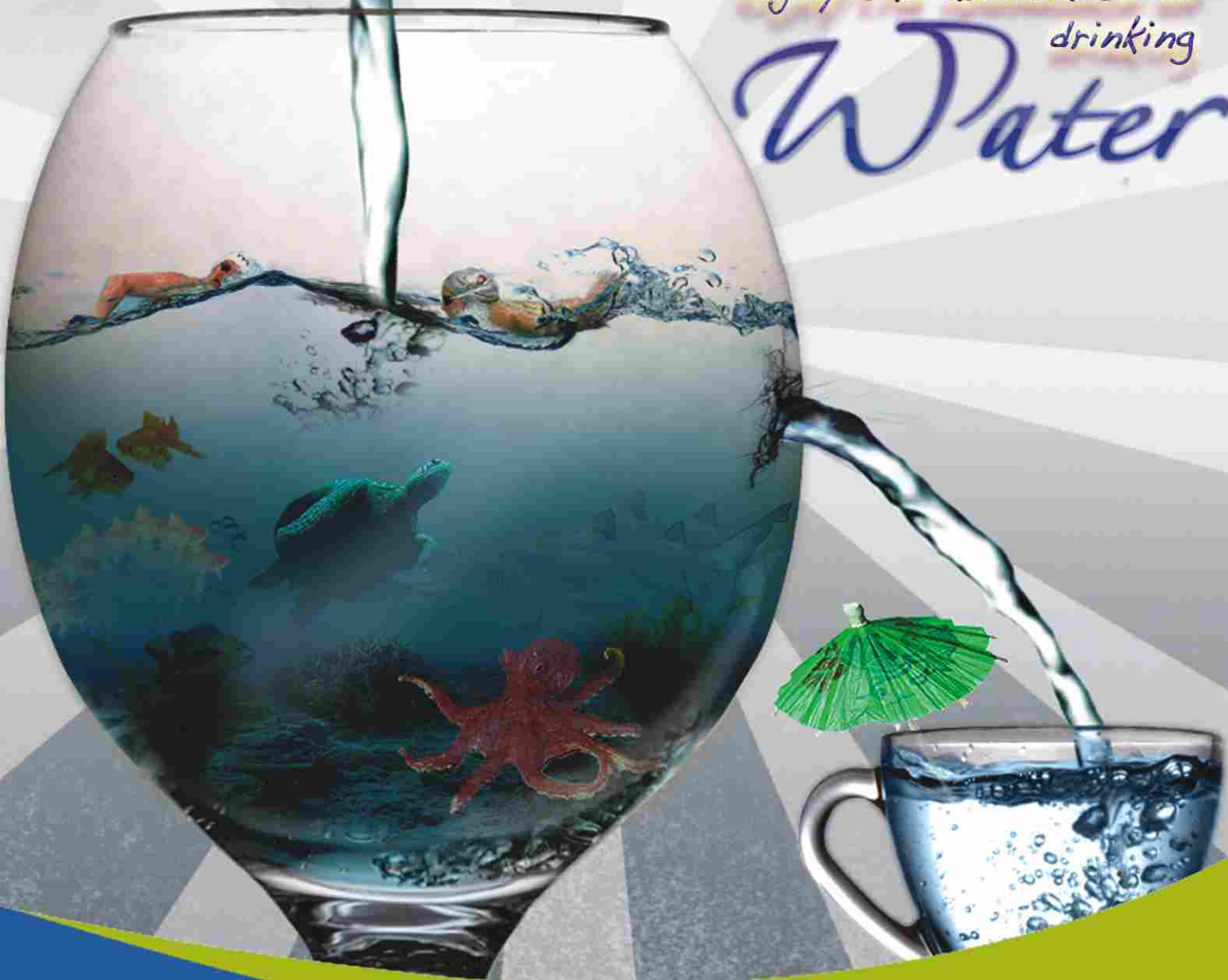
..... EASY ANSWERS

1. The more you take the more you leave behind.
2. Light as a feather, there is nothing in it; the strongest man can't hold it for much more than a minute.
3. You answer me, although I never ask you questions. What am I?
4. What goes up and down stairs without moving?
5. Give it food and it will live; give it water and it will die.
6. What can you catch but not throw?
7. I run, yet I have no legs. What am I?
8. Take one out and scratch my head, I am now black but once was red.
9. Remove the outside, cook the inside, eat the outside, throw away the inside.
10. What goes around the world and stays in a corner?

- ANSWERS**
1. Footsteps
 2. Breath
 3. Telephone
 4. Carpet
 5. Fire
 6. Cold
 7. Nose
 8. A match
 9. Corn
 10. Stamp



*Enjoy the abundance of
drinking*
Water



Contact Aqua Designs for more information on
desalination technology

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