

March 2024
Vol 1, Edi 4

Wignity, adj. - to add dignity to the world of water management



Dear Water Warriors,

Filtration means blocking pores and the UF revolves around avoiding cleaning or cleaning it for the next cycle. But what if you have fibers that tend to knot on screens and are difficult to clean – give vibrations and avoid choking.

One day Vibration & Shear would redefine Filtration

Nidhi Jain
Editor



Technical Editor
Mr Sanjeev Srivastava
srivastava@aktionindiaa.com
+91 95128 55227



Occlusion Filtration as very importance since and encourage many technologies companies to develop products for waste water treatment as well as drinking water.

While Ultra Filtration (Typically 0.01 – 0.02 micron pore size) encourage many applications in drinking water (bacteria, virus removal) also was used extensively lately to control the same to protect RO as SDI post UF treatment is < 3.

Fibers In waste as well as fine metallic impurities in Effluent and sewage is another challenge in WWTP design and with development of Vibro Screens that do not clog by knotting or sedimentation, the designers can be more confident in their design.

For more, read on:

Waughter Vol 1 Edi 8 & Vol 2 Edi 7.... ReCap

In above publication we have already discussed about the use of Ultra-Filtration with key words like

- Cross Flow Vs Dead End
- Target UF Impurities: Particulates, Bacteria, Virus
- Hydrophilicity
- Choice of Membrane Material
- Operation & Control Philosophy
- Role of Backwash & CEB

Waughter Readers, please download above from <https://bit.ly/waughter-app> and move further for designing a UF system.

Also please download the Software UF design in XLS and if there is any difficulty, please write to us to provide the software to you.

Ultrafiltration membranes can separate larger materials such as colloids, particulates, fats, bacteria, and proteins, while allowing low molecular weight molecules to pass through the membrane. Ultrafiltration membrane pore sizes fall between that of nanofiltration and microfiltration. Suspended solids and solutes of high molecular weight are retained, while water and low molecular weight solutes pass through the membrane.

We thank Pure Water Enterprises Pvt. Ltd. that has contributed technical points on the Ultrafiltration Membrane of SUEZ for this edition of Wignity.

About ZeeWeed 1500 Ultrafiltration Membrane

The ZeeWeed 1500 product is an ultrafiltration membrane module which is used in water treatment for the specific removal of particulate matter.

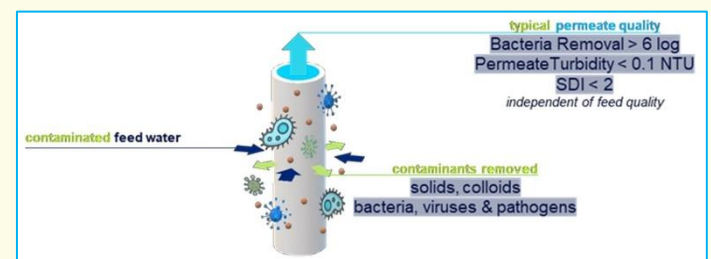
It is a hollow fibre, single bore, pressurized, outside-in product optimized for variable quality, medium solids (respective to ZeeWeed family of membranes) applications where membrane integrity and plant robustness are a key requirement.

It provides the Designer with the flexibility to combine a wide feed quality operating range with resilient performance with or without pre-treatment to ensure high quality product water.



A Module is a tubular vessel containing thousands of membrane fibres arranged vertically. The Module is the basic building block and the smallest replaceable membrane part of a ZeeWeed 1500 system.

At the core of the Module is the SUEZ proprietary ZeeWeed 1500 ultrafiltration fibre. The wall of the fibre is smooth, consisting of millions of ultrasonic pores. It is the consistent structure of these pores which ensures particulate matter, bacteria, viruses, and other micro-contaminants are rejected. Below is the Water Treatment Schematic in Fibre.





Veolia Ultrafiltration Membranes

ZeeWeed Pressurised Filtration technology

Veolia's Ultrafiltration Membranes are world class membranes known for Excellent chemical resistance, mechanical strength & durability.

The Veolia ZeeWeed 1500-600 Ultrafiltration (UF) hollow-fiber PVDF membranes are designed with a robust life expectancy, giving promising performance in your water treatment system operation and helping to achieve regulatory requirements.

Our UF Membranes are utilized for drinking water (NSF Approved), wastewater, tertiary and water reuse applications, as well as industrial feedwater and RO pretreatment.



Veolia ZeeWeed - 1500-600 UF Membrane

FEATURES - OF VEOLIA UF MEMBRANES



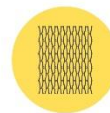
MADE OF PVDF - EXTREMELY STRONG & DURABLE



ABILITY TO TAKE HIGH TSS & TURBIDITY LOAD



OUTSIDE-IN FILTRATION CONFIGURATION



0.02 MICRON NOMINAL PORE DIAMETER



SIGNIFICANTLY LOWER CLEANING FREQUENCY



PURE WATER ENTERPRISES PVT. LTD.

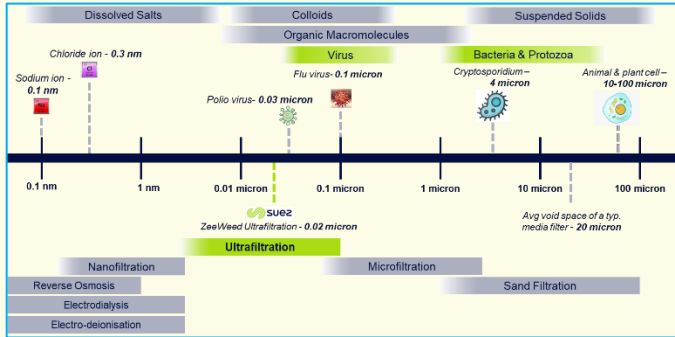
308, Matharu Arcade, Subhash Road, Vile Parle East, Mumbai - 400056.

www.purewaterent.net

+91 7506795491

info@purewaterent.net

The ZeeWeed fibre is an ultrafiltration membrane which sits within the general membrane separation spectrum. The purpose of the ZeeWeed fibre is to act as a barrier to suspended solids, bacteria, viruses, and other micro-contaminants.



A different water quality is expected on each side of the fibre.

- The permeate side (inside) of the fibre is cleaned water that is free of suspended solids and other particulate contaminants.
- The feed side (outside) of the fibre is contaminated water that is increasingly concentrated as the filtration effect progresses.
- The reject side (outside) of the fibre is an extension of the feed side enabling various mechanisms for optimizing ZeeWeed performance as the feed water becomes increasingly concentrated during filtration.

Working Philosophy or operating principle

Basic operations to create a sustainable operation of the ZeeWeed fibre.

1. Filtration
2. Back pulse
3. Feed Flush
4. Scour Aeration
5. Chemical Cleaning

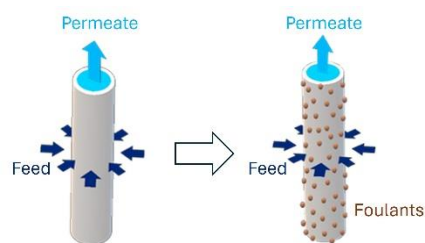
Filtration

In Filtration feed water is directed to the outside of the fibre lumen and based on a pressure gradient the water is encouraged to cross into the inside of the fibre lumen leaving particulate matter on the outside.

As filtration continues solids and foulants in the water are allowed to concentrate. The solids and foulants will generally concentrate around the ZeeWeed fibre.

This is typically seen as pressure difference across the fibre changes, known as the Transmembrane Pressure (TMP).

Within the module the fibre is one of many all operating under similar conditions. The number of ZeeWeed fibres within the module is optimized to provide a compromise for solids tolerance within a broad range of applications.



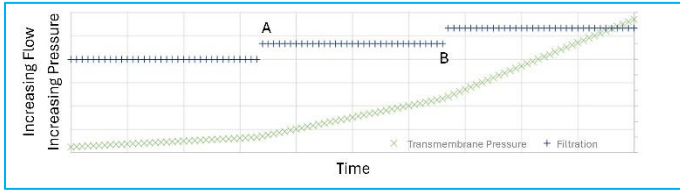
ability to remove design perspective.

The typical operational approach is to operate in Dead-End whereby no reject is discharged from the module during filtration.

Within the module it is expected that solids will gather around the fibres and within groups of fibres. Depending on the type of foulant the Designer can understand which method of solids removal will be most effective.



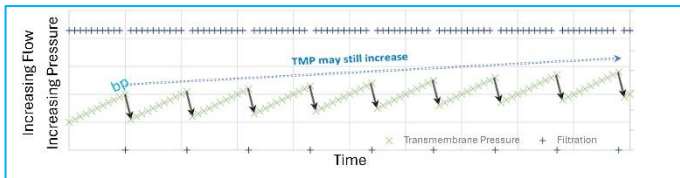
Operating with a continuous bleed to reject (crossflow) is not a standard design and the Designer is encouraged to discuss with their SUEZ representative if this is a design requirement.



The above Figure shows a general expectation that at constant flow TMP increases with time, primarily due to solids concentration increasing within the Module as clean water is separated from the feed.

The figure also shows step changes at A and B highlighting a general expectation that as filtration flow increases the rate of rise in TMP also increases.

If this trend continues then the ZeeWeed fibre would become blocked with solids and filtration could not be possible. This would not be a sustainable operation, and strategies to mitigate solids and other foulant build-up in, on and around the membrane surface are necessary.

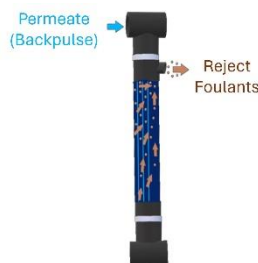


The train can call upon sequences to minimize the TMP increase without introducing cleaning chemicals.

These sequences are known as Back pulse, Feed Flush and Scour Aeration. The above figure shows a general expectation that Back pulse at regular intervals can reduce the TMP (represented by bp) and extend the operation of the Module.

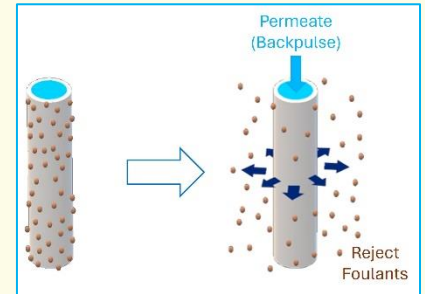
Backpulse

In Backpulse filtered water is directed to the inside of the fibre lumen and based on a pressure gradient the water is encouraged to cross to the outside of the fibre lumen pushing any captured fouling layers away from the fibre surface.



Within the module the fibre is one of many all operating under similar conditions. During backpulse the filtered water from many fibres passes from the permeate to the feed side and exits the module via the reject connection.

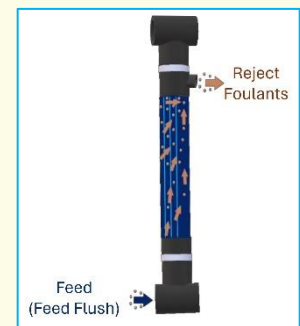
The reject connection is located at the top of the module indicating that there will be a directional flow through the module. The backpulse frequency, flow and duration settings can be adjusted to ensure backpulse sequence is optimized.



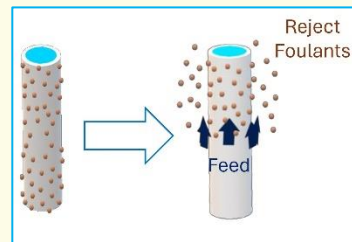
Feed Flush

In Feed Flush Feed Water is encouraged to scour, release and capture particulates on the outside of the fibre lumen and take them away from the fibre.

The feed flush can be adapted to be a continuous feed and bleed and be used to enable recirculation options.



Within the module the fibre is one of many all operating under similar conditions. During feed flush the feed water enters from the feed connection and exits the module via the reject connection and this ensures a feed flush provides a full deconcentration of the module.



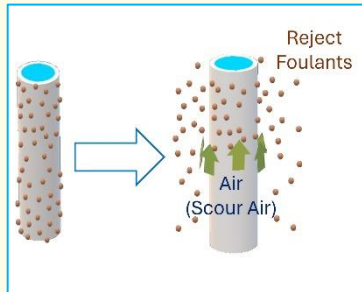
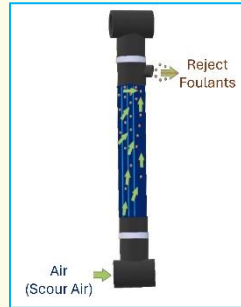
The reject connection is located at the top of the module indicating that there will be a directional flow through the module. The feed flush frequency, flow and duration settings can be adjusted to ensure feed flush sequence is optimized.

Scour Aeration

In Scour Aeration low pressure, oil free, coarse air bubbles are introduced to scour and release particulates on the outside of the fibre lumen. The effect is to re-suspend the particulates.

Within the module the fibre is one of many all operating under similar conditions. During scour aeration the air enters from the feed connection and exits the module via the reject connection.

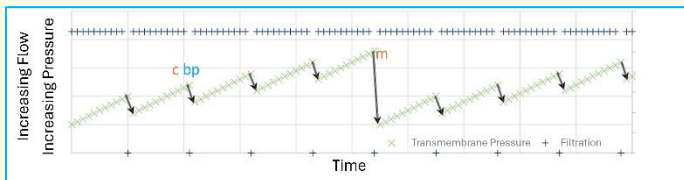
As the air passes through the module, it will displace some water through the reject connection.



The scour aeration frequency, flow and duration settings can be adjusted to ensure scour aeration sequence is optimized.

Chemical Cleaning

Foulants that cannot be removed by Backpulse, Feed Flush and/or Scour Aeration sequences may require chemical addition and soak to remove. Below Figure shows increasing TMP restored during a chemical clean (mc).



In Chemical Cleaning the fibre is contacted with a chemical solution. It is possible to contact the chemical on the feed or permeate side of the fibre or to pass the chemical through the fibre. Various cleaning chemicals are allowed, and the decision should be a judgement on the main foulant type. The Recovery Clean is the final method to clean the ZeeWeed fibre and the combination of the above basic operations can be optimized to extend the time between Recovery Clean to accomplish the plant design requirement.

For further details:

Ms. Krishna Panchal
+91 7506001071

krishna@purewaterent.net, www.purewaterent.net

Advantages

Customers around the globe depend on ZeeWeed 1500 for their drinking water treatment, tertiary filtration, and pre-treatment for brackish and seawater desalination. A versatile product, the ZeeWeed 1500 will consistently provide the highest quality treated water, proven to consistently outperform conventional filtration technology while meeting or exceeding regulatory requirements.

The ZeeWeed 1500 product encompasses,

- Hydrophilic PVDF chemistry for high permeability and low operating pressures.
- Outside-In flow path including ability to scour air demonstrating versatility and performance on a variety of water sources.
- Hollow fibre membrane providing high solids tolerance able to handle spikes in feed water quality.
- Pressurized configuration with fibres orientated vertically.
- Single bore fibre with proven track record on membrane life
- Rack less Module System utilizing modern integrated header approach.
- SUEZ has extensive knowledge on fibre research, development and real global project experience in designing, building, operating, and servicing.
- Excellent Product Water Quality that is reliable and consistent.

Key data required for selection of the right product

Below major data are required to select the membrane.

1. COD , BOD , TSS, Turbidity, O&G
2. Capacity
3. Source of water, Application

Know About Vibro & Magnetic Equipment

Delite Industries is Well known Company in India and it's Established in 1996 At Ahmedabad, Guj. (INDIA), They are into Vibro Separation Equipment and Magnetic Equipment which is use in: Powder Separation, Solid Liquid Separation, Magnetic Separation in various industries like Pharma, Paper, Food, Nutraceuticals, Pigments, Foundry, Ice-cream, Dairy, Dyes, Plastic, Metal & Mineral, Ceramic, Chemical Powder, ETP, Caustic Recovery, back water Recovery and many more areas.

Vibro and Magnetic equipment play important roles in water and wastewater treatment processes, aiding in the removal of contaminants and improving the overall efficiency of treatment operations.

Key products are in Vibro Equipment's:

1. Vibro Sifter
2. Center Discharge Vibro Screen
3. Vibrating Screen

Key products are in Magnetic Equipment's:

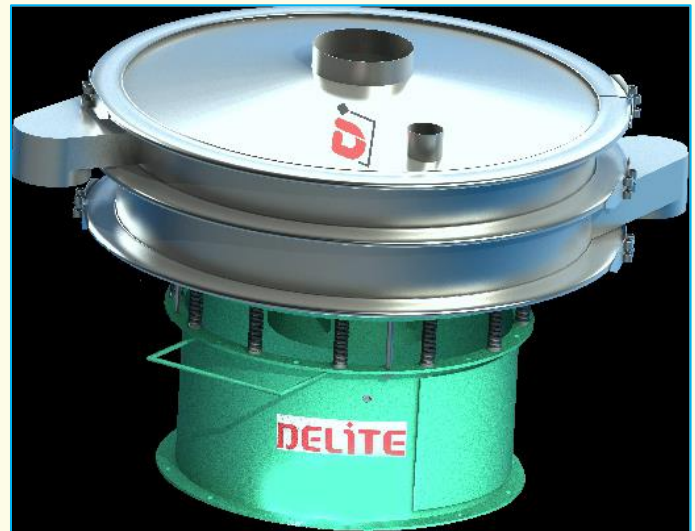
1. Pipeline Magnetic Trap
2. Magnetic Drawer
3. Magnetic Plate
4. Magnetic rod
5. Magnetic Drum Separator

Specific to ETP these screen can be very handy in some applications such as:

1. Textile : Here the removal of microfibers results in better performance of Primary Clarifications and savings in Chemicals used for color removal.
2. Fruit Juice and Vegetable processing, Fisheries and Aquaculture Industry : Removes VSS and thus drastic reduction in COD and therefore reduced aeration tank size and Reduced power consumption

Working philosophy or operating principle of the Vibro Equipment

The working principle of a rotary sifter involves the use of centrifugal force to separate particles based on their size and shape.



The material to be sifted is fed into the sifter from the top and is then distributed evenly on the cylindrical screen. As the screen rotates, the material is subjected to centrifugal force, causing the smaller particles to pass through the screen's mesh openings, while the larger particles are retained on the screen.

Using vertical vibration motor as the excitation source, the eccentric hammer at the upper and lower ends of the vibration motor will rotary motion is transformed into horizontal, vertical, and inclined three-dimensional motion, and is transmitted to the screen surface of the Vibro Sifter.

According to different screening requirements, the material passes through 1-5 layers of screens with different mesh numbers. The cleaning device under the screen keeps hitting the screen, so that the material can be sieved smoothly and effectively avoid the problem of material blockage or filter.



Key Data required for the selection of the product

- Flow Rate in kg/h
- Type of product Powder/Liquid /granules /Slurry
- No. of Sieve / or number of deck
- Material of Contact
- Material of non-contact
- Mesh Size
- Under Size over size %
- Inlet Parameters:
 - Input Material
 - Bulk Density
 - Viscosity
 - Particle Size
 - Natural of product
 - Moisture Contact

Working philosophy or operating principle of Magnetic Equipment



Magnetic separation is a process used to separate materials based on their magnetic properties. Essentially, magnetic materials can be separated from non-magnetic materials by

using a magnetic field.

The application of a magnetic field in the separation process is initiated by using a Permanent magnet or electromagnet, which produces a magnetic field in the desired separation region.

Within this field, materials possessing magnetic properties are drawn towards the magnet's source.



This attraction is often due to the material's inherent domains, where the magnetic orientations of its atoms synchronize with the external magnetic field.

Conversely, non-magnetic materials remain unaffected by the magnet and Continue on their trajectory, allowing for their easy separation as they don't adhere to the magnet.

Key Data required for the selection of the product

- Material To Separation
- Percentage of Iron Contamination
- Type of product Powder/Liquid /granules /Slurry
- Flow rate in Kg/h
- Material of Contact

This is the key data required for us to suggest which model and size would be the optimal for the application, however they do suggest certain inputs for the best efficiency and economic feasibility to save on cost, hence they are able to efficiently help their clients determine the optimal product for their use.

For further details:

Mr. Himanshu Patil - Director
+91 9978618779

Sales@deliteindustries.in
www.deliteIndustries.in

STRONGER
Together

Strength in Unity

Collaborative Excellence in Water Treatment



Join us in embracing the "Stronger Together"
This initiative aims to unite us all in our efforts, emphasizing collaboration, support, and synergy within our community.

Let's join hands and make a difference together!

