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

Dear Water Warriors,

Ultrafiltration offer Sparke to beverages and beer that we consume. Additionally, they are a great product to have in your design to control bacteria & virus.

This addition also allows engineer to DRIVE the process a little fundamentals on electrical engineering & automation.

Please give me feedback to add more topics.

Enjoy reading !

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Editor



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Filtration & Automation!

That's variety for our readers. Most industries today realize having a nice STP or ETP is not enough. With little add-on, if the TDS permits, we can recycle wastewater using UF, that are automated and need no further attention. Just plug in and play.

Filtration also brings in clarity of many things that we consume, beer, Fruit Juices, soft drinks etc.

UF usually needs auto operation. From a simple off-the-shelf microprocessor-based automation to a sophisticated PLC & Touch screen equipped panel. So, we felt it appropriate to add some knowledge on MCC, Automation & Control.

For more, read on:

The Future of Water Treatment...Hold Automation and PLC for Greater Impact

We thank Maven Automation that contributed technical points on the Automation for this edition of Wignity. MAVEN Automation is a certified company for manufacturing of LT Electrical Control Panels.

They provide electrical design solutions based on various engineering software. They are committed to provide quality Electrical solution in a positive, closely Controlled, well-managed & professional manner. They are mainly into:

1. Power and Control Panel
2. Cable Harness Product
3. Solar Renewable Product
4. IOT Solution
5. IT Solution
6. Machinery

In Water and Wastewater Treatment plants, the Power and Control Panel plays a crucial role in the operation, monitoring, and automation of various treatment processes. Here's a certain details on it.

Low Tension Panel (LT Panel)

There are various uses of LT Control Panel as per the user requirement, the main being as Control Center or Feeder or Distribution Board.



LT Power Panel receives the main power supply Either from Generator or Transformer and distributes the same to various electrical devices

and distribution boards.

With the help of protective switch gears, they are used for controlling and monitoring the main power supply from a centralized location.

There is various applications of LT Control Panel. Some of them are listed as:

Medium to High-Capacity Manufacturing Industry

- Hospitals
- Educational Institutions
- Commercial Complexes
- Hotels

Power Control Center (PCC) Panel

PCC Panels are the most essential part of electrical system of an industry from where the power of the industry is controlled.



PCC Panel is a power distribution board to control the Electrical power supplied to HT Panels, MCC panels and transformers who play vital role in all electrical control system.

Power Control Centre is used for distribution and control of various power source used in industry. Normally Power Control Centers is installed near power source hence fault level is high.

GREEN CHEMISTRY CLEAN PLANET

World Class **MADE IN INDIA**
Products based on our magic
polymer PolyNorbit'



GRAFIL INDUSTRIAL UF MEMBRANE

- ♦ HCl & NaOH not required
- ♦ Prevents bio-fouling & algal development on the membrane surface
- ♦ Superior performance with low-energy



TECH-JAL PiYO

- ♦ Drinking Water free of bacteria or Virus
- ♦ Works on gravity & does not require electricity
- ♦ More efficient and cost-effective (2-4 paisa per litre)



GRAFIL MBR MEMBRANE

- ♦ High Temperature Tolerance upto 45deg °C
- ♦ High Tensile Strength & Low Fouling
- ♦ Excellent performance, durability & water permeability



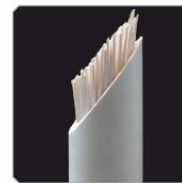
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SUPPORT LOCAL**



**WORLD CLASS
PRODUCT
MADE IN INDIA**



**BE OUR PARTNER
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Motor Control Center (MCC) Panel



The Motor Control Center are used in industrial and commercial applications for connecting the individual motors for manually, remotely or automatically starting, stopping selecting forward and reverse rotation, selecting and regulating

the speed, regulating and limiting the torque and protecting against overload, single phasing, phase imbalance, earth fault, under current, under / over voltage, lock rotor current, high winding temperature etc.

The motor control centers consist of following:

- One or more vertical metal cabinet sections with common power bus, motor control units with provision of individual connections and metering instruments.
- Circuit Breakers, Starters, Protection Devices, Controllers Etc.

PLC Control Panel

Programmable logic controller (PLC) control panels or also known as PLC Automation Panel are one of the most important and efficient kinds of control panels. Which are generally used in a variety of electronic and electrical circuit fittings.

PLC Control Panels we manufacture are highly capable of giving higher output at less power consumption.

Integrated with solid PLC logic and flawless PLC hardware programming.



Ease in modification of logic, reduced size, means of remote communications and advances in the technology have made PLC Automation Control Panels an edge over conventional relay-based systems. Our Engineers has provided PLC based Panels from Various PLC.

From small I/O application to the complex I/O systems are provided by the Maven Engineers. Maven Engineers have developed communication software's for remote communication of the PLC Panels in various different protocols.

With PLC based Panels HMI/MMI are provided to provide the operator various messages and controls of the process plants touch screen MMI are provided. To effective control of the system.

What to do if you wish automation.

Simple,

- A. Give a load list with working and Standby drive
- B. Give Power V, Phase and Hz
- C. Give list of instruments – digital & Analogue
- D. Specify any other need e.g. welding point or power need for illumination etc.

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Filtration...The Cornerstone of Effective Water Treatment

We thank MANN+HUMMEL that contributed technical points on the Filtration for this edition of Wignity. Their core competency, filtration, is the basis of their business and their responsibility.

They are convinced that filtration makes the difference, and MANN+HUMMEL provides key technologies helping to enable a cleaner planet. By separating the useful from the harmful, they are contributing to common goals.

Despite this complexity, obtaining a consistent effluent quality is not always possible. Membrane technology, on the other hand, utilizes a physical separation process to produce a consistent, high quality permeate in an environmentally friendly manner.

AQUADYN Hollow Fiber Ultra Filtration

AQUADYN modules are encased ultrafiltration hollow fiber membrane modules that effectively reduce micro-organisms and suspended solids from water.

The AQUADYN series offers a comprehensive range of filtration modules for a wide spectrum of applications. Available with modified Poly Acrylonitrile (PAN), we offer a variety of module sizes.



Due to the optimized design efficient flow distribution, enhanced cleaning, minimal pressure drop, and high packing density can be achieved. For applications requiring higher pressure and large capacities, extra-large modules are available (10" x 60").

Moreover, the AQUADYN UA (PAN) materials are superior in their hydrophilic property compared to most other polymeric materials. The enhanced hydrophilic property improves the wettability and reduces operating pressure. Additionally, it makes the membrane more resistant to fouling; resulting in less cleaning cycles and reduced chemical usage.

The double asymmetric hollow fiber membranes offer another advantage over single asymmetric membranes. Bacteria, solids, and turbidity can be rejected effectively due to a filtration layer inside and outside the hollow fiber. Therefore, problems such as pore clogging during backflush do not occur.

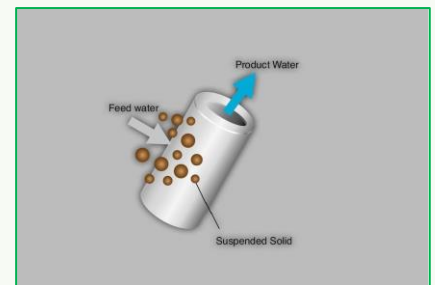
Advantages

- High flow rates (high hydrophilicity)
- High & stable permeate performance
- Most reliable process (double asymmetric hollow fiber membranes)
- Effective retention of particles and bacteria
- Easy pretreatment
- Compact installation
- High productivity
- Flexible flushing modes
- Low chemical demand

Module Operating Process

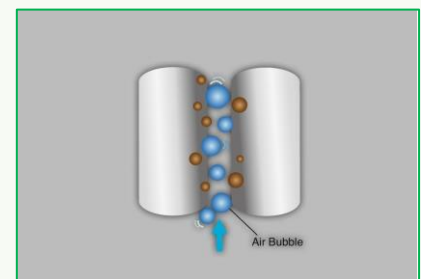
Filtration Process

Filtration process is an outside-in flow configuration where feed water is in contact with the exterior of the fibers and the filtrate (product water) is drawn from the inside of the hollow fibers (lumen). This configuration has the distinctive advantage of a larger membrane surface area which translates into higher flows.



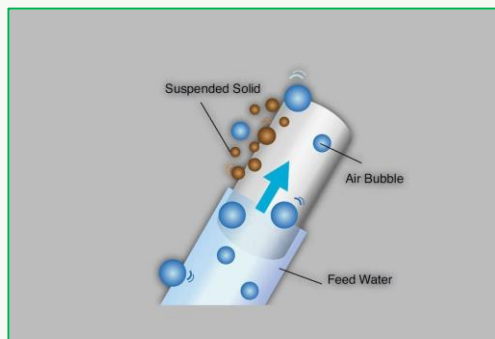
Air Scouring

During the backflush process, air is injected into the module to loosen suspended solids on the fiber surface. This enables suspended solids in the module to be flushed out effectively and prevents solid build-up.



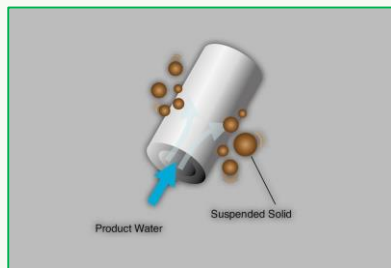
Forward Flush

Feed water flushes the exterior surface of the fiber and dilutes the retentate. Air scouring is incorporated along with this process to ensure the suspended solids are dislodged before backflushing. This reduces the use of permeate.

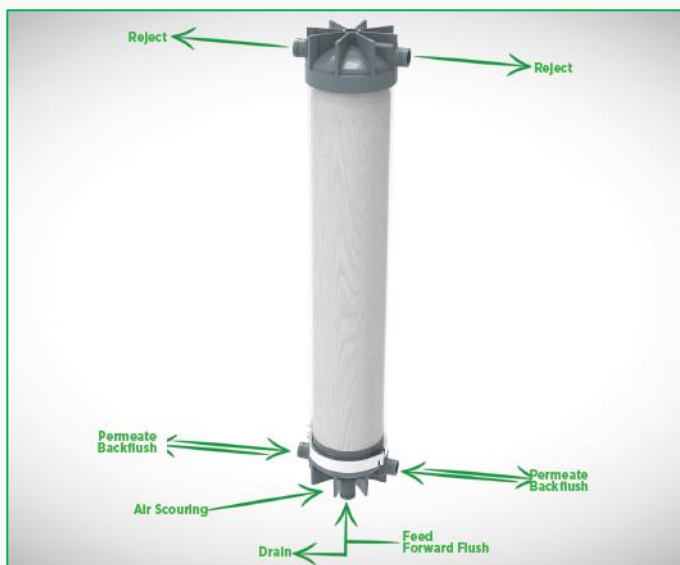


Back Flush

Either at pre-set intervals or when reaching a predetermined transmembrane pressure (TMP), the membrane module undergoes a backflush cleaning sequence where filtrate is used to backflush from the inside of the hollow fibers, hence dislodging the solids attached to the feed surface of the fiber.



Flushing Modes



Applications

1. Oily Water and Wastewater Treatment
2. Storm Water Treatment
3. RO Pretreatment
4. Ground Water Treatment
5. Mine Tailing Pond Treatment

Module Specification and Operating Data

AQUADYN Hollow Fiber UF Modules

Parameter	UA860-HP	UA1060-HP
Structure	Hollow Fiber	Hollow Fiber
Membrane Surface (m ²)	45	65
Pore Size (µm)	0.025	0.025
Housing Material	uPVC	uPVC
Potting	Epoxy	Epoxy
Flow Type	Out / In	Out / In
Type of Filtration	Dead-End	Dead-End
Regeneration	Backflush, Air Scouring	Backflush, Forward Flush, Air Scouring
Max Feed Pressure at 20° C (bar)	5	5
pH Range	2-10	2-10
Max Feed TSS (mg/l)	≤ 150	≤ 150

iSEP Ultra Filtration Modules

iSEP 500 ultrafiltration (UF) modules feature a vacuum-driven, back washable, spiral-wound membrane design to handle high fouling water and wastewater streams. With open feed channels and an integrated tank design, iSEP modules can handle significantly higher solids than many standard polymeric UF designs on the market today.

As the latest evolution of the SpiraSep product line, iSEP modules consistently deliver high-quality permeate regardless of feed conditions with the additional benefits of reduced footprint, higher membrane area, integrated aeration, and the ability to quickly drain solids from the modules between backwashes.

Extensive pre-treatment for UF systems, such as clarifiers, adds significant and unnecessary cost, footprint, and complexity. With the ability to directly treat some of the most difficult water and wastewater streams, iSEP is able to drastically reduce capital and operational costs while simplifying the overall treatment process.

Product Features

Integrated Tank Design

Membrane elements and tank have been integrated into a single, encapsulated module eliminating the need for a large process tank.



Frequent Draining

High tank intensity design allows for frequent draining, effectively purging solids from the membrane module resulting in lower fouling.

Membrane Aeration

The open flow channels enable aggressive air scouring where bubbles “scrub” the membrane surface clean.

High Effluent Quality

The strong, durable design of the iSEP element eliminates mechanical failures, ensuring high quality effluent throughout the life of the membrane system.

Low-fouling Chemistry

MANN+HUMMEL Water & Membrane Solutions engineers developed a specially formulated, low-fouling membrane chemistry that increases permeability, reduces fouling, and lowers energy consumption due to a hydrophilic 0.03-micron chemistry.

Membrane Backwash

Periodic backwash purges particulate matter from the membrane surface.

Maximum Feed Limits

TSS	1000 mg/l
BOD	150 mg/l
OIL & GREASE	100 mg/l

Typical iSEP Filtrate Quality

TSS	< 1.0 mg/l
Turbidity	≤ 0.1 NTU
SDI	≤ 3

iSEP 500 Application Experience

The low fouling design of iSEP membranes enable it to operate on some of the most challenging water and wastewater streams:

- Produced Water
- River Water
- Power Plant Wastewater
- Secondary & Tertiary Wastewater
- Food & Dairy Wastewater
- Industrial Wastewater

TurboClean Beverage Elements

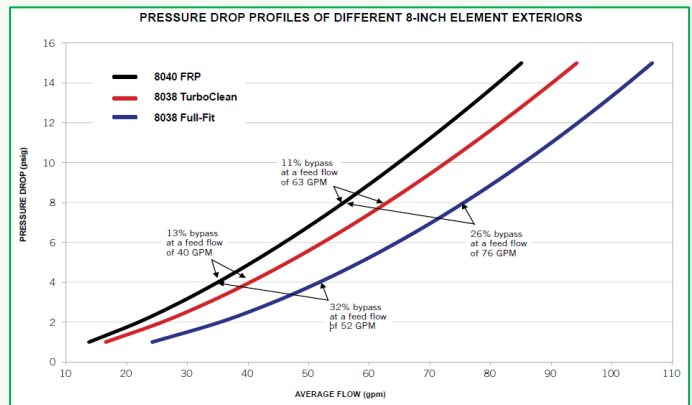
When it comes to sanitary membrane elements, there is a stronger choice for processors of soft drinks, juice, beer and wine, drinking water, and many other process streams.



TurboClean elements feature a rugged polypropylene shell that results in a stronger, more rigid, and durable element better suited for the most challenging process applications.

TurboClean elements are available with all membrane types (RO, NF, UF and MF), including cellulose acetate and thin-film varieties, and are manufactured to a precise diameter that reduces bypass flow by 60% or more when compared against conventional full-fit, net-wrapped or caged membrane elements.

Less Bypass for Better Performance



As shown in the chart above, TurboClean elements allow less flow to bypass the element, resulting in higher crossflow velocity at the membrane surface. TurboClean elements typically exhibit about 12% bypass flow—60% less than the 30% bypass flow from competitive full-fit elements.

Applications

TurboClean elements are used in a wide variety of beverage and water purification applications, including:

1. Beverage Water Make-Up
2. Juice Processing
3. Soft Drink Production
4. Beer and Wine Processing
5. Drinking Water
6. Dialysis and Pharmaceutical
7. And many more...

SpiraSep 960 Ultrafiltration Modules

MICRODYN SpiraSep 960 Ultrafiltration (UF) modules are immersed, and vacuum-operated spiral-wound membranes complete with backwashing and aeration capabilities. SpiraSep modules are spiral-wound membrane elements with a fouling-resistant polyvinylidene fluoride (PVDF) barrier layer. Suspended solids, turbidity, viruses, bacteria and some organic compounds are removed by the SpiraSep process.

Main Features

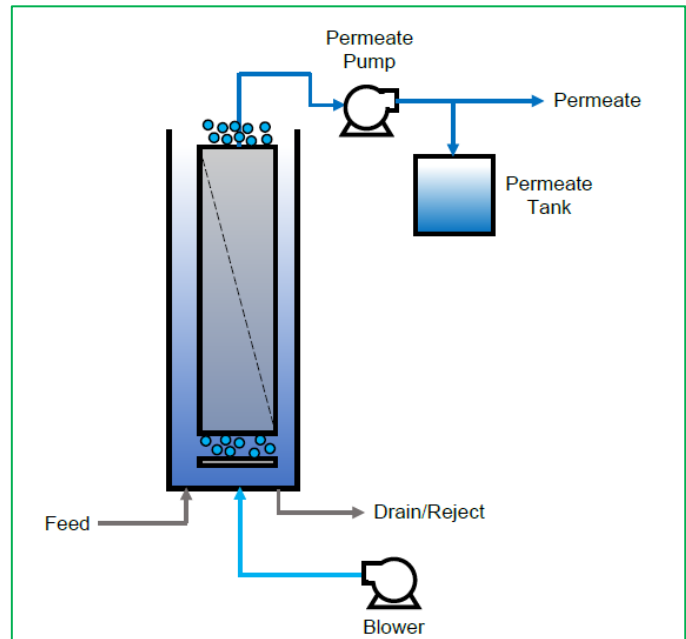
- Spiral-Wound
- High Solids Tolerance
- Nominal 0.03 Micron Pore Size
- PVDF & PES Membranes Available
- Integrated Aeration

Operational Sequence

Permeate Production

In a system using MICRODYN SpiraSep 960 UF modules, an array of membrane manifold assemblies is submerged in a common process tank. Each membrane manifold assembly is connected to a main header which is connected to the permeate pump. Feed is delivered to the membrane tank, submerging the membrane elements.

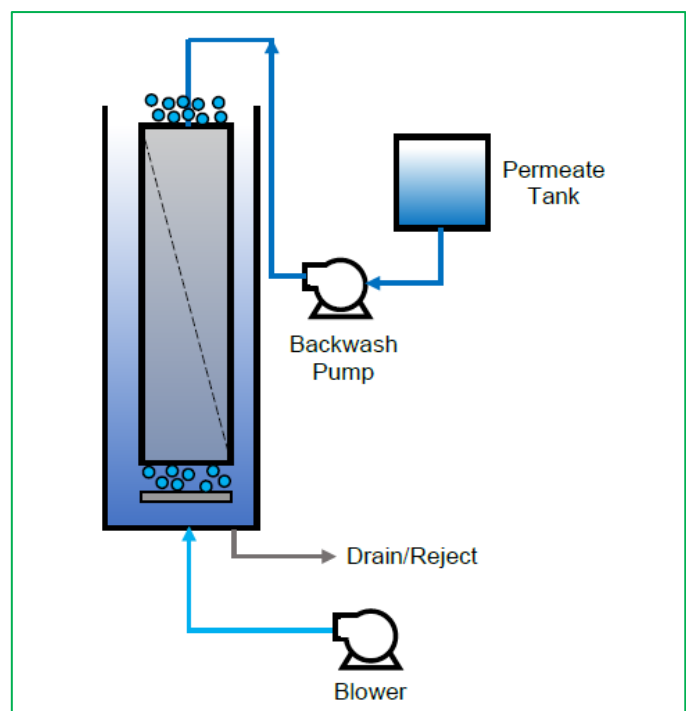
A vacuum is generated by the suction of a self-priming centrifugal pump, creating the necessary net drive pressure to “pull” water through the SpiraSep membranes. Air is bubbled up through each membrane element via bubble diffusers, creating tremendous shear forces on the membrane surface that remove suspended solids from the membrane surface.



Backwash Operation

Periodically (on a timed basis), permeate water is reversed through the membrane, or backwashed, to further remove accumulated suspended solids.

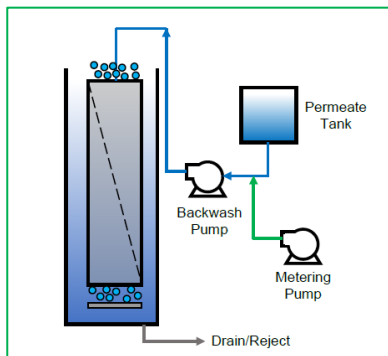
This process also introduces a small amount of disinfectant (when required) to help control microbial activity on the membrane surface. Concentrate is removed from the process tank, via a reject pump or gravity-driven drain line, and is typically less than 10% of the influent rate.



Chemically Enhanced Backwash (CEB)

A chemically enhanced backwash (CEB) is performed to remove particulate matter and microbial growth from the membrane surface, which will prolong run times between membrane cleanings.

A chlorine CEB is typically performed daily while an acid CEB is generally performed once every three days (these CEB's may occur more or less frequently depending on the organics load and salt/mineral concentrations of the feed stream). During a CEB, the membrane tank is first drained.



Permeated water, along with either sodium hypochlorite or acid, is then backwashed through the system until the water level fully submerges the membrane elements.

The membranes are then allowed to soak in the CEB cleaning solution for a period of 15 – 30 minutes. Following the static soak the membranes are briefly backwashed to dislodge any additional particulate matter.

Before resuming permeate production, the membrane tank is completely drained. The CEB chemical solution is delivered to an appropriate collection system for neutralization prior to disposal.

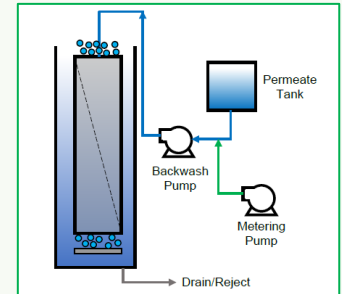
A CEB can also be performed in situ, where the membrane tank is not drained. For this type of procedure, the sequence of events are essentially the same, where the chemical is backwashed through the membranes followed by a soak period and additional backwashing.

Recovery Clean (CIP)

Eventually a full-scale clean-in-place (CIP) is performed when the maximum TMP of the ultrafiltration system is reached. As a general rule, the maximum TMP of submerged membrane system is 0.7 bar (10.0 psi).

A CIP process consists of an extensive chemical soak using either chlorine* or acid. After the feedwater is removed from the membrane tank, UF permeate containing cleaning chemical is backwashed through the system until the membrane elements are fully submerged.

The membranes are allowed to soak in the cleaning solution for a period of at least two (2) hours. Additional backwashing is performed after the static soak to remove additional solids and particulate matter. The cleaning solution is then drained and delivered to an appropriate neutralization process prior to disposal.



Operating Data

It is critical in the operation of a SpiraSep system to properly monitor performance and water quality. All operating data should be normalized so that performance trends can be determined and analyzed. This will play a crucial role in determining when to clean the membranes. The following data should be recorded for all SpiraSep systems:

- Permeate, feed and concentrate flow rates
- Transmembrane pressure (TMP)
- Feed and permeate turbidity
- Temperature
- Feed and permeate pH
- Aeration rate
- Backwash frequency and duration
- Backwash flow rate
- Backwash pressure

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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!

