



Energy • Environment • Sustainability



WATER FILTRATION

Cooling Tower Water
Treatment

An Initiative of
ENSAVIOR

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AQUAIRE

Innovate • Restore • Engineer

In this age of globalization, the smarter and healthier buildings require high-performance engineering solutions.

Today, is the need for businesses to make a switch to best engineering practices & promote environmentally responsible products and services.



WHO WE ARE

Ensuring Quality, Retaining Trust

AQUAIRE is inception with a vision to provide solutions related to world's most precious resource water. We at Aquaire; Innovate, Restore and Engineer the water through its cycle, specially in the area of Filtration, Purification, Deaeration, Pressurisation, Make-up, and Thermal Storage for number of industries including construction, environmental, food and beverage, government, industrial, public utilities, residential and commercial building services.

We design, build and install the products and systems using cutting edge technologies based on scientific breakthroughs not only for improving energy efficiency and optimizing production but also promote sustainability and contribute to a green future.

Product Range

- ❖ Electrolytic Scale Removal System for Dissolved Salts
- ❖ Water Filtration System for Suspended Solids
- ❖ Pressure Maintaining System

- ❖ Deaeration System
- ❖ Water Make-up System
- ❖ Thermal Storage Systems
- ❖ Condenser Cleaning System (Automatic On-line Rubber Ball Cleaning)

We engage in the project right from the conceptualization stage and help in right selection, optimum design and implementation of most energy-efficient products. Besides that, we ensure on-site job training to project managers, facility managers and operators so that the systems are operated in most efficient and simplest manner. Based on the needs of the project, we also undertake the operation and maintenance of the system for which we have back up of spare parts and trained manpower.

Every project for us is a golden opportunity for continuous improvement and swift growth. This results in maximum cost effectiveness, efficiency, and productivity for our customers.

TECHNOLOGY PARTNER



What is in Your Cooling Tower Water?

Whether you are using cooling tower water for industrial/process applications or comfort cooling, there will be a requirement for a filtration system for suspended solids and a chemical or non-chemical based scale preventing/removal system. A cooling tower water treatment system is necessary in ensuring an efficient process and long equipment service life for your connecting components (heat exchangers, chiller tubes, evaporative condensers, cooling tower basin, piping system and more) and also downstream equipment.

Water in cooling towers attracts and absorbs large volumes of airborne contaminants on a continuous basis - acting as an air scrubber filtering the surrounding air. With time, these fine particles can build up and settle within the system, adversely affecting cooling performance while lowering the life of sub-components. Typically, 85% of suspended solids in cooling water and hot water loops are smaller than 5 microns in size.

Predominantly, the contaminants in the system are sand, silt, scale and rust. These contribute to the excessive creation of deposits (scale, corrosion, bio-fouling and biological activity), negatively impacting heat transfer efficiency. Solids accumulation in Cooling Towers and Condensers cause increased bacteria growth (legionella bacteria and other health risks).

Such concerns then lead to:

- ❖ Reduction in heat transfer efficiencies and an increase in energy consumption,
- ❖ More blow down, resulting in more makeup water and chemical usage,
- ❖ Higher down time and system operating & maintenance costs.

The Negative Impact of Suspended Solids



Legionella Bacteria

Legionella (the cause of legionnaires disease) is a type of bacteria found in freshwater environments. Once legionella finds its way into an enclosed environment, such as a building's cooling tower system, it can quickly multiply and spread throughout the building's water system. Looking to control the growth of legionella in your facility?



Scale

Hard water contains dissolved compounds of calcium, magnesium and other elements. Over time these elements deposit on various surfaces and form a hardened layer referred to as scale. The layer of scale grows in thickness and reduces the effective transmittance of heat from the heat exchangers, ultimately reducing your HVAC systems efficiency. The concern for surface scaling is not limited to cooling tower & HVAC environments, scale can also become a concern in RO and other industrial applications, requiring a pre-treatment filtration system.



Fouling

Fouling is a general term referring to the deposit and accumulation of scale, algae, suspended solids and insoluble salts on a surface (commonly found on heat exchangers and process equipment). Like scale, fouling will also cause rapid declines in heat exchanger efficiency levels, reducing your HVAC systems performance. The concern of fouling is not limited to cooling tower & HVAC environments, fouling can also become a concern in RO and other industrial applications, requiring a pre-treatment filtration system.

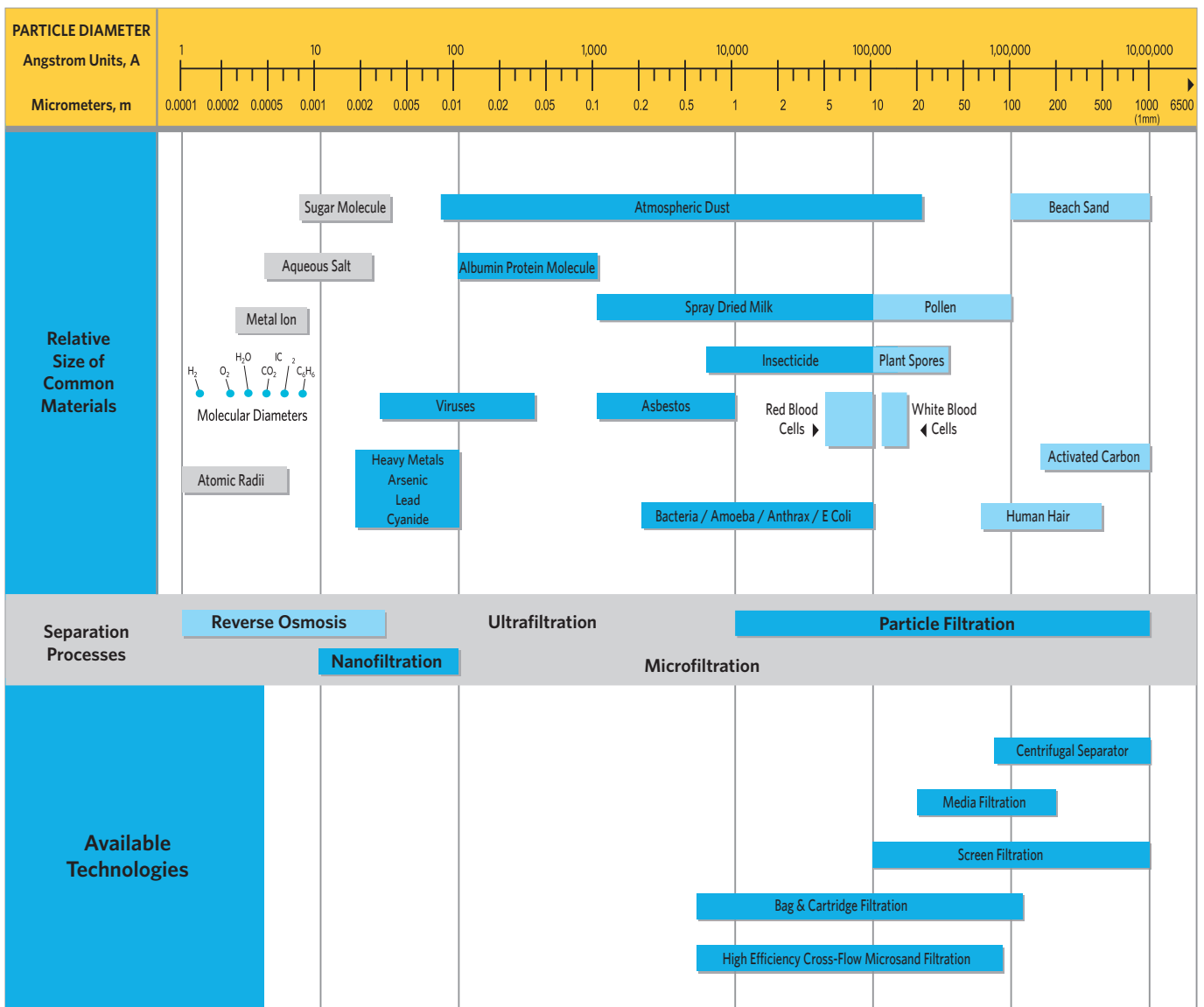
Choosing the Right Technology

Separators, automatic screen filters, traditional media filters, micro-filters (cartridge & bag) and high efficiency media filtration systems, all offer an effective means of removing particulate from the circulating water of cooling towers. Each of these technologies offer differing benefits. Depending on the quality of your feed water, one technology (or a combination of) may be better suited to meet your objectives. Understanding your application and the available technologies is necessary in choosing the right cooling tower filtration system.

Selecting the right technology will depend on:

- ❖ The quality of the make-up water being added to the system
- ❖ The type of contaminants getting into the system, being regenerated within the system and already in the system
- ❖ Filtration performance & particle removal rate for maximum process or cooling efficiency
- ❖ The cycles of concentration at which the system is operating
- ❖ The current chemical treatment program
- ❖ The location of the cooling tower
- ❖ The maintenance and operating requirements
- ❖ Budget and footprint constraints.

Particle Size Matrix



Centrifugal Separators

Centrifugal separators (or hydro-cyclones) are primarily selected due to the technology being the least expensive in terms of equipment costs. The separator utilizes centrifugal forces, spinning the water to separate the heavier particulate from the water.

These separators are effective in removing suspended particles from the stream of water when the specific gravity (density) of the particles is heavier than the fluid it is in. The more significant the difference in density between water and the particle, greater the efficiency of removal process.

Traditional Sand Filters

Traditional sand (or media) filters direct the flow of cooling water onto the surface of the media bed. As the cooling water passes through the media, particles are captured within the layers of the media bed. The water then moves downward, passing into a drain at the bottom of the filter tank and discharging. Such filters have the capacity to remove organic particulate ≥ 10 microns. The system's performance in removing fine particles highly depends in the type of media(s) being used within the filter bed.

There is a loss of media during the backwashing cycle to remove heavy particles (such as dirt, sand or calcium carbonate). Periodic replacement of the media is one of the maintenance requirements of these filtration systems. These units require a large footprint, making it a challenging solution for retrofit projects where space may be a constraint. These filters also have a second concern, water usage.

Automatic Screen Filters

The screen-filtering element acts as a barrier, removing all particulate (both organic and inorganic) down to 10 microns. Automatic self-cleaning screen filters are becoming the filter technology of choice for cooling tower filtration applications requiring removal of particles 10 microns and larger. During the self-cleaning process, this technology yields the least flushing

discharge. Screen filters also provide uninterrupted filtration during the cleaning process, thereby requiring only a single filter for continuous 24/7 filtration.

Cartridges & Bag Filters

Where specialized fine filtration is required, micro filtration systems are available. These systems can achieve removal of both organic and inorganic particles down to 0.1 microns without requiring a backwash cycle. They are the most flexible side stream solutions, adjusting the level of micron filtration as needed. However, these consumables can become costly with time. The cartridges and bags require monitoring and manual replacement. When frequent replacement is necessary, such systems require a pre-filter to be placed in front of the bag/cartridge. Doing so will aid in removing the larger particulate, reducing the total suspended solids, ultimately maximizing the life of the micro filtration system.

High Efficiency Media Filters

High efficiency media filters are similar to traditional sand filters, however, the size, shape and weight of the microsand used in these systems allow for improved filtration efficiencies. The injectors generate cross-flow patterns that sweep the surface of the media. This sweeping motion causes a portion of the water to flow parallel to the top layer of the media, allowing for high efficiency sub-micron filtration performance while preventing media fouling at the surface and water channeling through the media.

Contaminants trapped upon and within the microsand media (depth filtration) are removed using an automatic backwash cycle. The system's backwash cycle requires less flow and a shorter duration than traditional sand or multi-media filters. The result is a technology that removes particles down to sub-micron levels at 4 to 5 times the hydraulic flow rate of traditional media filters, while requiring up to 50% less water for backwash. The nature of the microsand and cross-flow technology has aided in the creation of a system that occupies and weighs up to 80% less than traditional media filters. Horizontally stacked vessels are now available, doubling the filtration capacity within the same footprint.

Filtration Technology	Particle Removal	Applications	Maintenance and Operational Costs	Backwash Costs	Energy Costs
Centrifugal Separators	Nominal 70 microns	Removal of large, heavy particles. Lowest purchasing cost. Small footprint.	Purge or backwash components require routine inspection. Must be online 24 hrs/day.	Minimal	High. Requires a high pressure to operate correctly 24 hrs/day.
Traditional Sand Filters	Nominal 10 microns	Used in removal of particles ≥ 10 microns (low density particles).	Media replacement along with part replacements.	High	High
Automatic Screen Filters	Down to 10 microns	Used in removal of particles ≥ 10 microns (both low and high density). Budget friendly.	Contains moving parts that may require maintenance and replacement.	Low	Low
Micro Filtration	Down to 0.1 microns	Used in extremely fine filtration (at times used as a temporary solution).	Consumable type products can be costly over time.	None	Low
High Efficiency Media Filters	Nominal 0.5 microns (submicron performance)	Used in removal of fine particles ≥ 0.5 microns. Requiring a small footprint (in comparison to traditional sand filters).	Media replacement (every 5-7 years).	Medium	Low

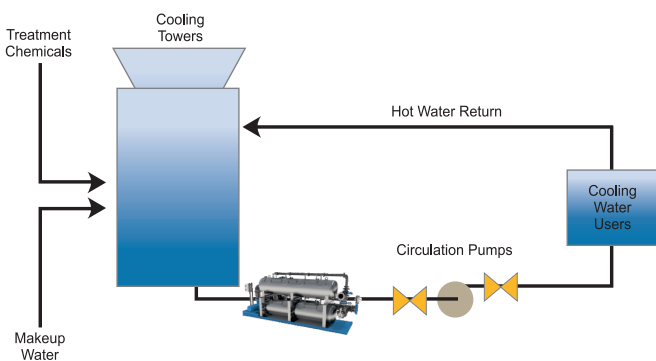
Most Common Configurations

Full Flow Filtration

Full flow filtration is used to filter 100 percent of the systems circulating water. It utilizes a filtration system installed after the cooling tower on the discharge side of the pump. This filter continuously filters the entire system flow, meaning that the filter must be sized to handle the system's design flow rate. Full flow filtration reduces heat exchanger and chiller maintenance significantly and improves the operating cycles of the equipment as well. Full flow filtration is the preferred method of filtration but is not cost effective for systems with high flow rates. Also, for a system this large, decreases in flow rates may not be detected easily. This decrease could result in an increase in pressure on the pump discharge and not allow fluid to flow to the heat exchanger properly, leading to a decrease in heat transfer. Furthermore, full flow systems cannot run and be cleaned at the same time, which means that maintenance results in some planned downtime. Although full flow filtration reduces the overall solids concentration in the water pumped to the heat exchangers and chillers, this method does not address the problem of solids accumulation in the tower basin or remote sump.

Side Stream Filtration

Side stream filtration is used to filter a portion of the systems circulating water, removing debris and particles that are adversely affecting the cooling loop and its components (heat exchangers, chillers and more). Over time, filtering 10% - 20% of the cooling loop flow results in the filtration of the total volume of water every 12 - 72 hours. The filtration rate will highly depend on the application and filtration technology at hand. Side stream filtration technology generally falls into the following categories: screen filters, centrifugal filters, bag & cartridge filters, sand/media filters and high efficiency media filters. Such filter technology are evaluated based on their performance in filtering fine particulate (ranging from 1 - 50 microns). Choosing the right filtration side stream filtration system can yield significant savings.



Full Flow Filtration

When Your Cooling Tower Requires A Side Stream Filtration

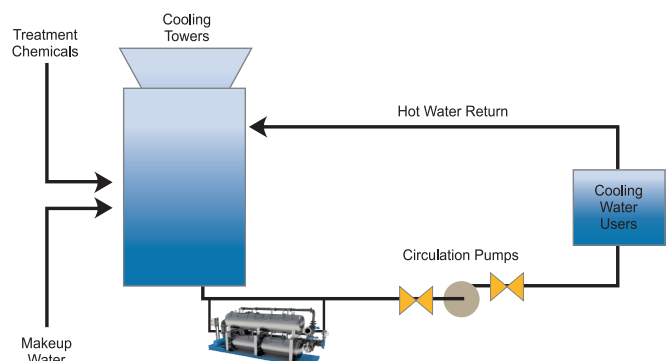
Consider the following signs, when your facility requires a side stream filtration system.

- ❖ Make-up water source is high in suspended solids, iron, biological and organic activity.
- ❖ There is a concern for biological growth, even though a strong biocide treatment is in effect.
- ❖ Frequent cleaning of heat exchangers and chillers (regular cleaning should occur approximately every 12 - 16 months).
- ❖ Signs of excessive rates of corrosion within the water loop and its components.
- ❖ Loss of heat transfer and efficiency in the overall cooling system.
- ❖ High build-up of solids within the sump and/or fill of the cooling tower.

Benefits of Using a Side Stream Filtration System

Below are listed the common benefits that yield a high ROI for facility and maintenance managers implementing a side stream filtration system. It is important to understand your water and the suspended solids that are adversely influencing the overall system, before committing to improved efficiencies and reduced operating/maintenance costs.

- ❖ Reduction in water consumption:
 - ★ Demand for makeup water in cooling towers is decreased with an increase in the system's cycles of concentration. Essentially, higher cycles of concentration mean that water is being recirculated through the system longer before blow-down is required. Less blow-down reduces the amount of makeup water required in the system, resulting in water savings.
- ❖ Reduction in chemical use:
 - ★ A side stream filtration system can remove suspended particles, reducing the need for additional chemical treatment such as dispersants and biocides.

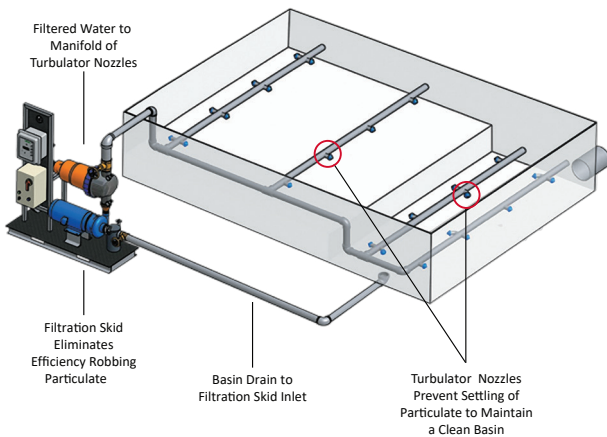


Side Stream Filtration

- ❖ Reduction in energy consumption:
 - ★ Side stream filtration reduces the likelihood of scale and fouling on the heat exchangers. Even the smallest layer of scale or fouling on heat exchange surfaces can reduce the rate of heat exchange, forcing the system to work harder to achieve the required cooling.
- ❖ Lower maintenance cost:
 - ★ Traditionally, cooling towers are cleaned by draining the tower and having the sediment removed mechanically or manually from the basin or sump. Cooling systems that are cleaned via side stream filtration routinely provide longer periods of continuous operation before being taken offline for required maintenance.
- ❖ Improvement in productivity and reduction in downtime:
 - ★ When a cooling system is fouled or has scale build-up, production may be slowed due to inefficient heat exchange equipment. In some cases, the cooling system and heat exchange equipment may need to be taken offline for repairs, decreasing production.
- ❖ Control of biological growth:
 - ★ Biological growth control and reduction can mitigate potential health problems, such as those caused by Legionella. ASHRAE Guideline 12-2000 has basic treatment recommendations for control and prevention, stating that the key to success is system cleanliness.

Basin Sweeping

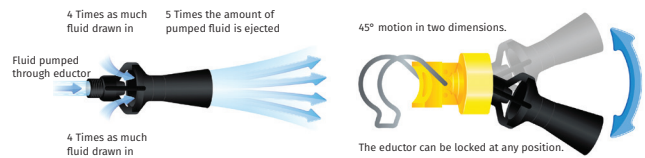
Basin Sweeping is used to filter a portion of the systems circulating water, removing debris and particles and returning the filtered water to the cold water basin of the cooling tower through turbulator eductor nozzles placed in the basin. The filtered water returned to the basin is used to “sweep” the dirt towards the filtration system inlet thus keeping the solids from ever entering the cooling system. While the application of full flow or side stream filtration depends on the application, most applications will benefit from a basin sweeping system from both an efficiency, and an economic standpoint. Basin sweeping systems can work as stand-alone or paired with full flow and side stream filtration.



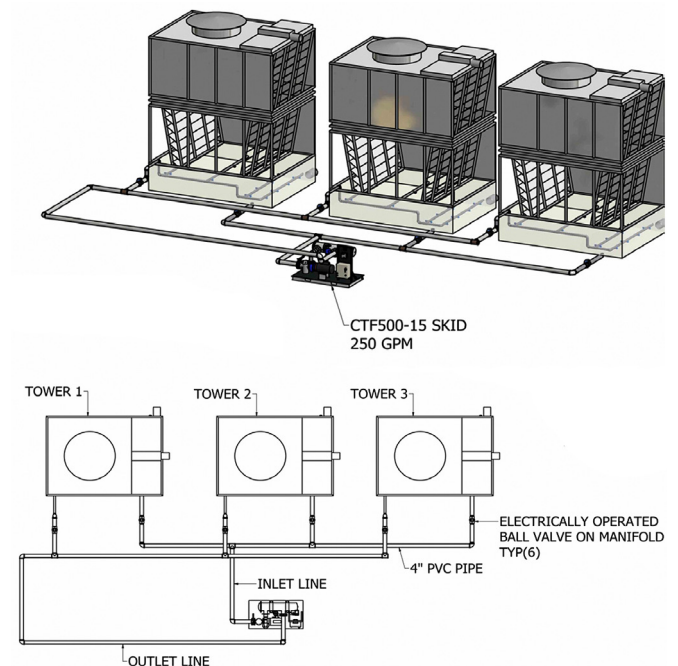
Turbulator Basin Agitation Systems

When used in conjunction with filter skids that include a pump, Turbulator agitation nozzles will...

- ❖ Remove suspended solids at the source
- ❖ Keep solids suspended at the source to prevent settling
- ❖ Provide cleaner water to chiller
- ❖ Significantly reduce...
 - ★ Cooling Tower blow-down cycles
 - ★ Water wastage
 - ★ Equipment maintenance
 - ★ Chemical use.



Typical Installation



Cooling Tower Water Filtration and Basin Sweeping Systems

LCF and CTF cooling tower filtration systems are designed for highly efficient cleaning of cooling tower water systems and basins with simplicity and low cost.

LCFX and CTFX filtration systems are revolutionary in their low energy design while maintaining clean cooling tower water systems and basins. By incorporating zone control technology with unique low cost VFD/PLC pump controls, multiple cooling tower systems can be kept clean with a single X™ filtration system at a low pressure and flow rate.

LCF Series

The LCF-Series automatic self cleaning filter skids provide a low cost solution for full stream, side stream and basin sweeping for separation of solids from water. These filter skids are designed for small or larger cooling tower filtration systems. They have a compact footprint and are available in various flow rates from 11 m³/hr (50 gpm) to virtually any flow rate specified.



LCF Series - Single Basin

Designed for highly efficient cleaning of cooling tower systems with simplicity and low cost

CTF-Series

CTF filtration systems have a compact footprint that can be customized to fit constrained areas. Flow rates are available from 34 m³/hr (150 gpm) to any flow rate by using multiple filters.



CTF Series - Single Basin

Designed for highly efficient cleaning of cooling tower systems with simplicity and low cost

LCFX-Series

The LCFX-Series has unsurpassed efficiencies, providing both basin agitation and water cleaning. By combining V-Series filters and the zone control system, maintains a pressurised main line that has zone control valves placed at each defined zone.



LCFX-Series - Multi-Basin

LCFX multiple basin filtration systems are available in flow rates from 11 to 34 m³/hr (50 to 150 gpm).

CTFX-Series

These filter skids are designed to significantly reduce maintenance costs, energy costs, and chemical usage with the energy-efficient, water saving X™ system for cooling towers! These packages are designed for single or multiple basins up to 16 zones. One filter skid can control multiple cooling towers or a single basin containing hundreds of thousands of gallons. Available in various flow rates from 11 m³/hr (50 gpm) to virtually any flow rate specified.



CTFX-Series - Multi-Basin

Incorporates zone control technology so multiple basins can be kept clean with a single filtration system while maintaining low energy usage

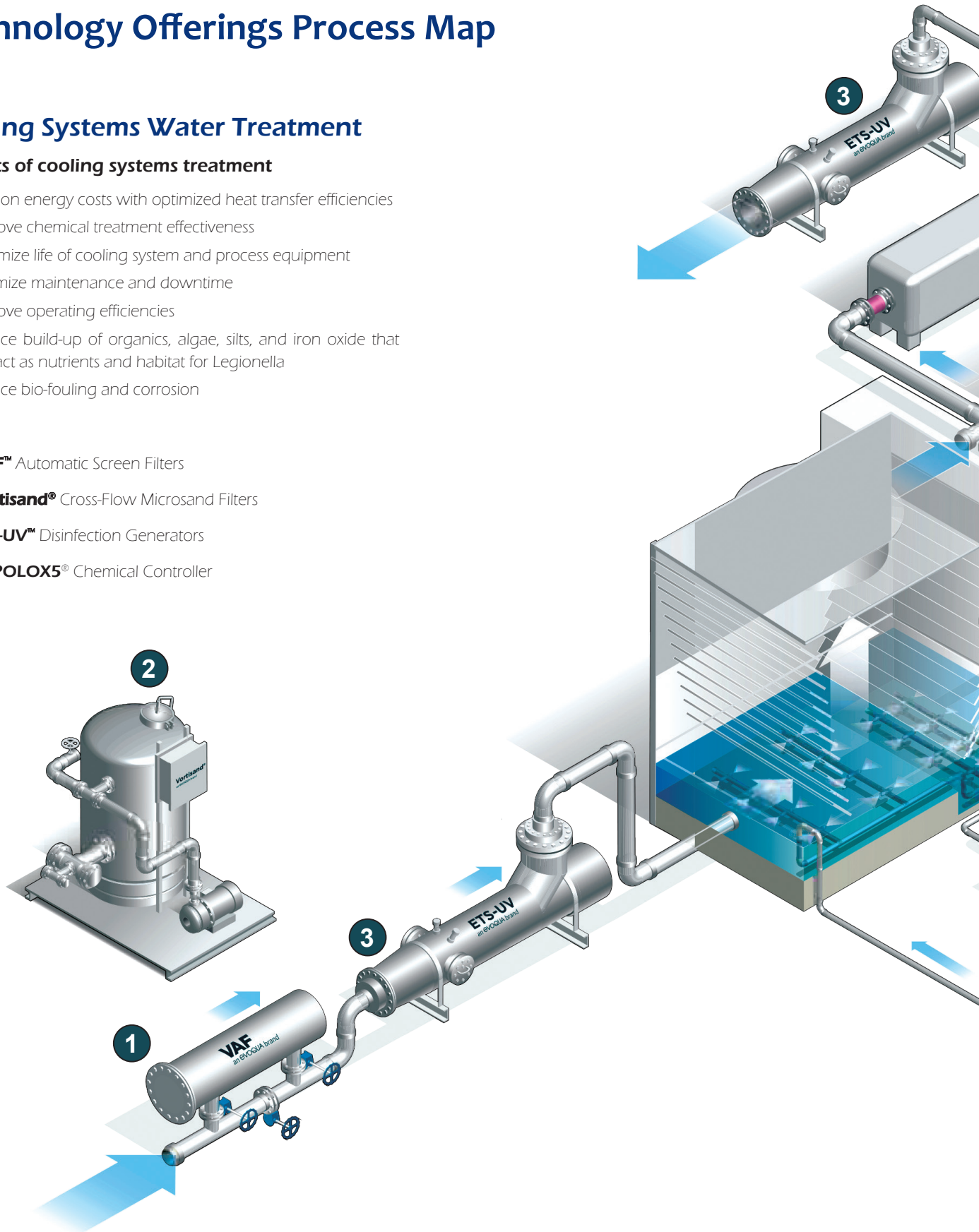
Technology Offerings Process Map

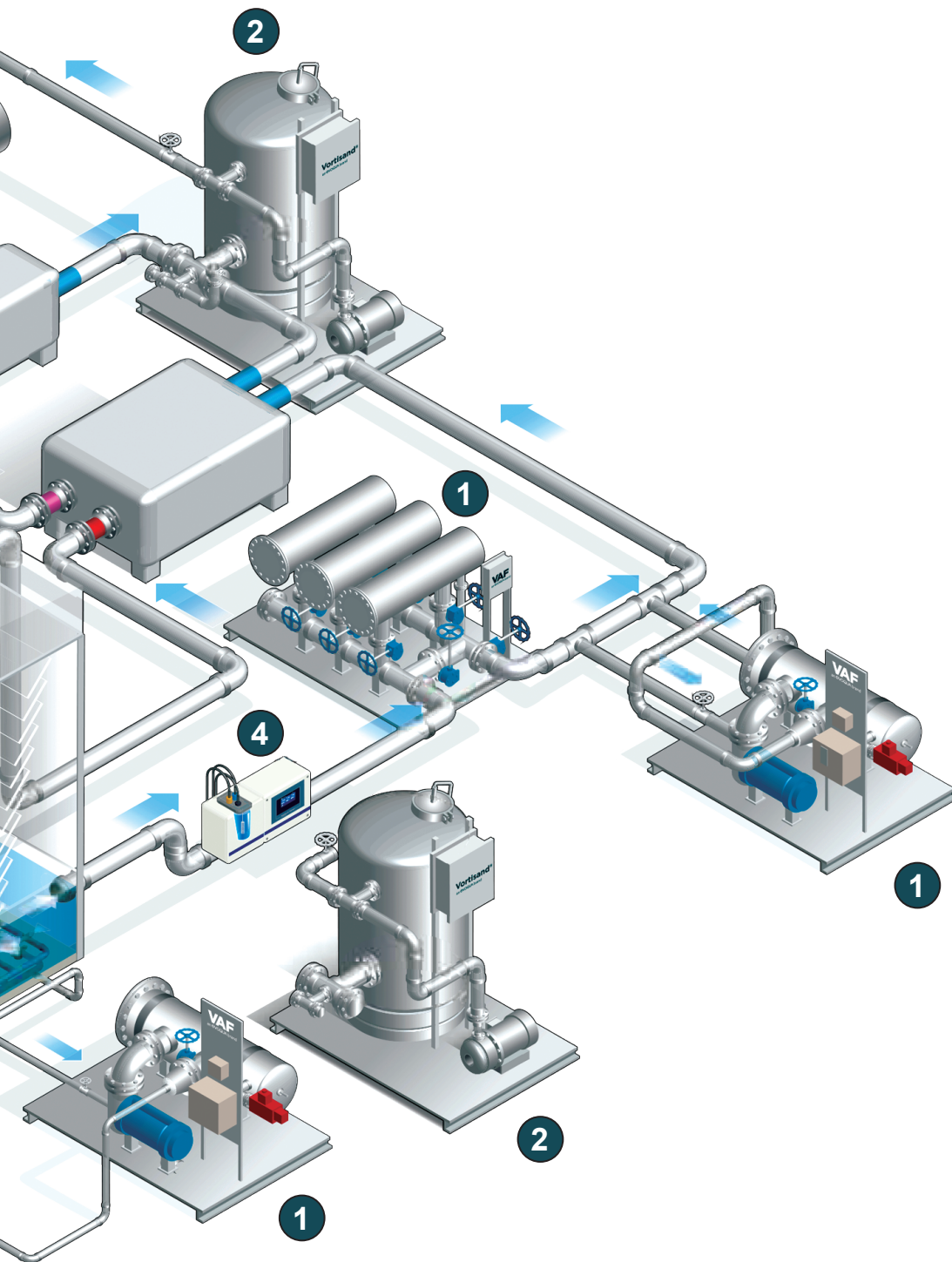
Cooling Systems Water Treatment

Benefits of cooling systems treatment

- ❖ Save on energy costs with optimized heat transfer efficiencies
- ❖ Improve chemical treatment effectiveness
- ❖ Maximize life of cooling system and process equipment
- ❖ Minimize maintenance and downtime
- ❖ Improve operating efficiencies
- ❖ Reduce build-up of organics, algae, silts, and iron oxide that can act as nutrients and habitat for Legionella
- ❖ Reduce bio-fouling and corrosion

- 1 **VAF™** Automatic Screen Filters
- 2 **Vortisand®** Cross-Flow Microsand Filters
- 3 **ETS-UV™** Disinfection Generators
- 4 **DEPOLOX5®** Chemical Controller





APPLICATIONS

- Agriculture
- Aquaculture
- Aviation
- Ballast Water
- Car Industry
- Car Wash
- Chemical Industry
- Cooling Water
- Drinking Water
- Electronics
- Food & Beverage
- Food Industry
- Golf & Turf
- Greenhouses & Nursery
- High Rise Building
- HVAC
- Injection Molding
- Metal Processing
- Mining
- Oil & Gas
- Petrochemical
- Pharmaceutical
- Plastic Industry
- Potable Water
- Power Generation
- Pulp & Paper
- Pump Seals
- Re-Injection
- Pre-RO Filtration
- Seawater Filtration
- Spray Nozzle Protection
- Steel Industry
- Textile Industry
- Wastewater

*The selection of an appropriate solution should be made in conjunction with a specialist.
Please contact our team of water experts for additional assistance.*

Automatic Self-cleaning Screen Filter Systems

Automatic self-cleaning screen filters are developed for the removal of suspended solids from pressurized water streams. Woven-wire technology has provided screens with maximum open areas and filtration degrees down to 10 microns. By providing a two-dimensional discrete opening, particles are positively removed based on size alone and not other characteristics such as specific gravity, shape or particle plasticity.

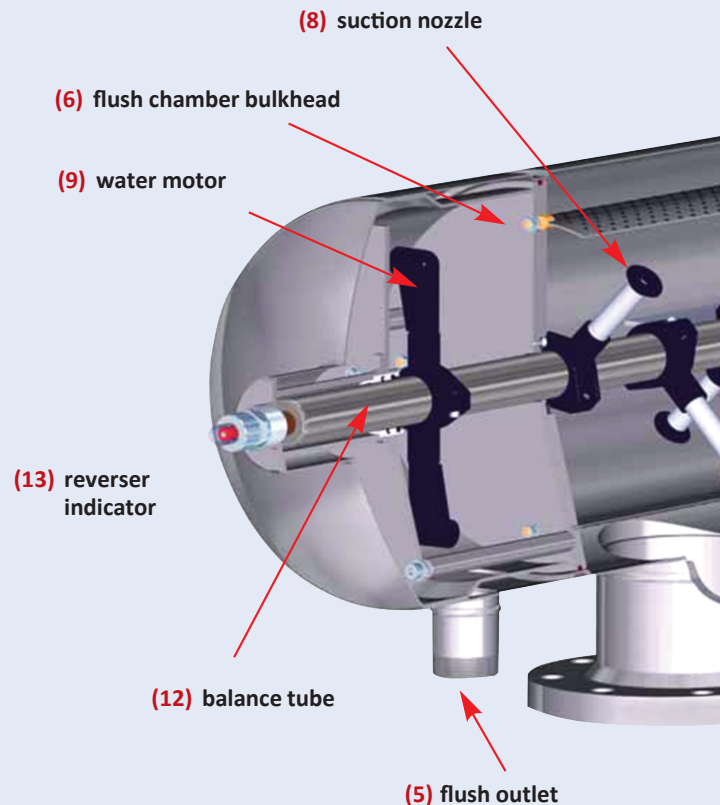
Automatic self-cleaning screen filters remove organic and inorganic particles with equal efficiency. The removal efficiency is not dependent upon a probability function but is positive in nature. When the pressure drop across the filter reaches the maximum set limit of 0.5 bars (7 psi) across the screen, the automatic cleaning cycle is initiated. The filter remains online and filtering during the entire cleaning cycle which takes less than 30 seconds to complete. Automatic screen filters are unique in that the self-cleaning cycle does not require the entire system flow to stop and reverse. Therefore, unlike many other types of filters, the self-cleaning cycle of these filters does not interrupt system flow during the rinse cycle. In addition, the total volume of water used for cleaning is quite small. This volume acts as supplemental blow down for the system to keep dissolved solids within acceptable limits.

The V-Series™ automatic self-cleaning screen filters are used where removal of suspended solids is required. Individual filters and pre-assembled systems are used in applications for cooling towers, industrial water reuse, groundwater re-injection, well water, surface water, irrigation, seawater, intake water, wastewater and many more. V-Series filters are also used for pre-filtration to membrane or other micro-filtration technologies to reduce fouling and pre-filtration for UV systems to reduce “shadow effects.”

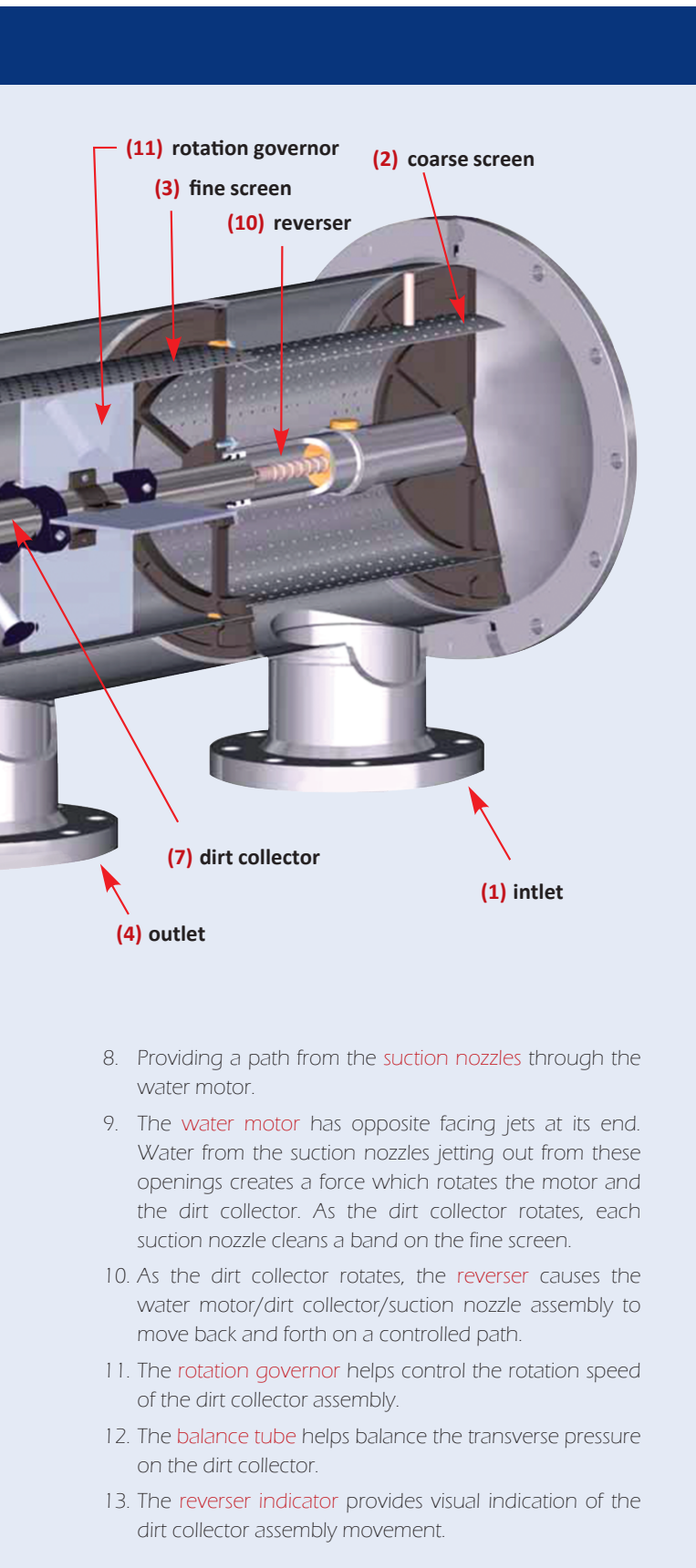
Typical Applications Include:

- ❖ Pre-filtration to RO, UV, arsenic removal, bags, cartridges, and other technologies requiring suspended solids removal/reduction
- ❖ Cooling Towers
 - ★ Side Stream Systems, Plug-n-Filter Skids
- ❖ Industry Process Water
- ❖ Well Water
- ❖ River Intake Water
- ❖ Seawater
- ❖ Petro/Shale Water Re-injection
- ❖ Spray Nozzle Protection
- ❖ Process Water
- ❖ Pump Seal Protection
- ❖ Paper Mill White Water
- ❖ Mine Leach Field Filtration
- ❖ Micro Irrigation

How it Works



1. Dirty water enters from the **inlet** of the filter.
2. Passes through the **coarse screen** from outside in.
3. Water flows from inside of the coarse screen to the inside of **the fine screen**. Dirt is collected on the inside of the fine screen.
4. Clean filtered water exits through the filter **outlet**.
5. As the dirt builds up, pressure drop across the fine screen increases. When the pressure drop reaches a pre-set level of 0.5 bar (7 psi), the filter controller starts the flushing cycle by opening a flush valve on the **flush outlet**.
6. A **bulk head** is provided to separate the filtration chamber from the flush chamber.
7. The **dirt collector** (a hollow pipe with suction nozzles) extends through the partition.



8. Providing a path from the suction nozzles through the water motor.
9. The water motor has opposite facing jets at its end. Water from the suction nozzles jetting out from these openings creates a force which rotates the motor and the dirt collector. As the dirt collector rotates, each suction nozzle cleans a band on the fine screen.
10. As the dirt collector rotates, the reverser causes the water motor/dirt collector/suction nozzle assembly to move back and forth on a controlled path.
11. The rotation governor helps control the rotation speed of the dirt collector assembly.
12. The balance tube helps balance the transverse pressure on the dirt collector.
13. The reverser indicator provides visual indication of the dirt collector assembly movement.

The filter bodies are manufactured in 316L stainless steel. It can remove suspended solids from 1500 to 10 micron rating. The complexity and cleaning efficiency of any self-cleaning screen filter is in the mechanical system that drives the cleaning process. There are two variables in sizing weave-wire screens:

1. **Screen micron rating** is generally based on what size particulate needs to be removed from the water. The size of the particulate removed is based on the micron rating of the screen and all the particles larger than that rating. The ratio of flow to micron rating uses maximum allowed flux or velocity (gpm/sq in) through the screen such that the finer the micron the lower the maximum flux allowed, which also keeps the pressure loss across the screen at less than 0.25psi for any size filter used.
2. **Screen area** is determined for a given application by making sure the maximum allowed flux is not exceeded for the desired micron filtration. As flow rate increases, the screen area is required to increase in direct proportion.

The V-Series patented Bi-directional Hydrodynamic Drive (BHD) mechanism **DOES NOT** require electric motors, limit switches, gearboxes, or hydraulic pistons, thereby eliminating external shafts and seals. It is the simplest and most efficient in design resulting in:

- ❖ fewer moving parts (no limit switches or pistons reversing the cleaning mechanism),
- ❖ simpler controls,
- ❖ lowest flush flow available,
- ❖ greater cleaning efficiency, and
- ❖ lower maintenance requirements.

The patented BHD Drive improves screen cleaning efficiencies resulting in:

- ❖ 100% screen cleaning with controlled suction nozzle rotation
- ❖ Flush waste is less than 1% of system flow
- ❖ 70% fewer moving parts
- ❖ Individual flow rates from 7 to 2,274 m³/hr (30 to 10,000 gpm)
- ❖ Pre-assembled filtration systems to meet any flow demand
- ❖ Filtration 10 to 1500 micron



V-Series Automatic Screen Filtration

The V-200 Series features the most advanced and cost-effective self-cleaning screen filtration technology. Ideal for flow rates from 7m³/hr to 50m³/hr (30 gpm to 220 gpm), the V-200 Series offers a cost-effective solution for automatic filtration down to 10 micron rating. The patented Bi-directional Hydrodynamic Drive (BHD) mechanism used in the V-200 is the most efficient and simplistic design available.

Constructed of glass reinforced acetal, glass reinforced nylon and/or 316L stainless steel, the inherently corrosion resistant materials of the V-200 Series ensure a long service life under a wide range of water quality conditions.

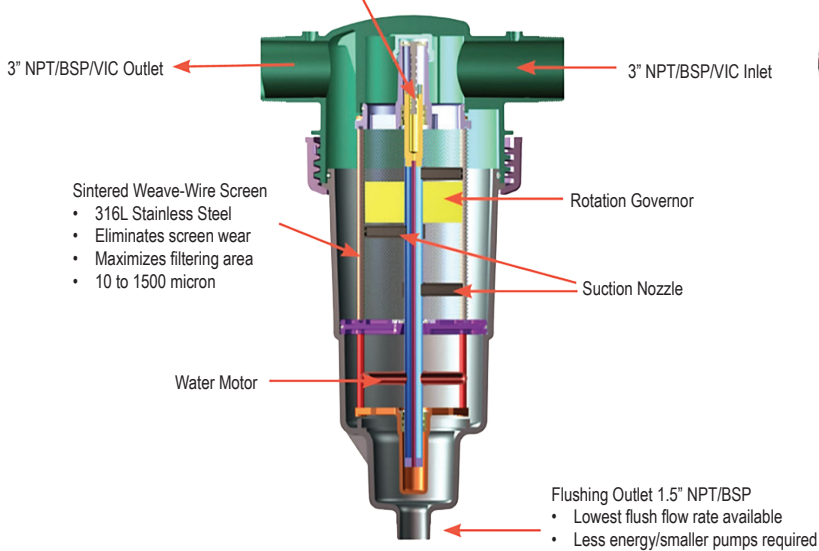
The 10 to 15 second flush cycle is automatically initiated when a pressure differential across the screen increases to a maximum of 0.5 bar (7 psi). The filter remains on-line during the cleaning process. The flush discharge is the lowest available resulting in minimal waste.

When installed with a battery-operated controller and valve, the filtration system operates completely with line pressure without

requiring any electricity. The ideal solution for remote filtration applications. (Solar option is available).

GENERAL SPECIFICATIONS		
Materials Filter body	V-200P	• 3" NPT/BSP inlet/outlet • 3" Grooved inlet/outlet • Glass reinforced nylon
	V-200ST	• 3" Flange inlet/outlet • 316L SS
	Screens	• 316L SS sintered
Filtration Range		• 10 to 1500 micron
Filtering Area		• 1129 cm ² (175 in ²)
Flow Range per filter		• 7 to 50 m ³ /hr (30 to 220 gpm)
Max Pressure	V-200P	• 8 bar (120 psi)
	V-200ST	• 10 bar (150 psi)
Min Pressure		• 2 bar (30 psi)
Max Temp	V-200P	• 40° C (104° F)
	V-200ST	• 80° C (176° F)
Flush Cycle		• 10 to 15 seconds
Control Options		• MicroFlush™ control system

- Patented +Bi-directional Drive
- Controls nozzle rotation for 100% screen cleaning
 - Eliminates electric motors, gear boxes, limit switches and pistons



The V-Series filters are available ASME certified and are manufactured in an ASME certified facility. The filters come in a broad range of materials, pressure and temperature ratings. Custom manufactured filters and skids to simplify installation and meet specific requirements.



MATERIAL OF CONSTRUCTION	
Description	Material
Filter Body	316L Stainless Steel
Coarse Screen	316L Stainless Steel (Perforated)
Fine Screen	316L Stainless Steel (Weave-Wire)
Inlet/outlet	316 Stainless Steel
Flush outlet	316 Stainless Steel
Flush Chamber Upper Bulkhead	316 Stainless Steel
Main Chamber Upper Bulkhead	Glass Reinforced Acetal
Dirt Collector Tube assembly	316 Stainless Steel
Suction Nozzles	CPVC
Water Motor	Glass Reinforced Nylon and Acetal
Reverser	Acetal
Rotation Governor	Glass Reinforced Nylon and Acetal
Reverser Indicator	Glass Reinforced Nylon Nut and Acetal Dome
Flange Gasket	Nitrile
O-Rings	EPDM
Seals	EPDM

Models															
Model Number	Screen Area		Nominal Flow										Flush Line	Flush Volume 15 Seconds	
			25 micron		50 micron		100 micron		150 micron		200 micron				
	in ²	cm ²	gpm	m ³ /hr	gpm	m ³ /hr	gpm	m ³ /hr	gpm	m ³ /hr	gpm	m ³ /hr	in	gal	liters
V-250	224	1445	134	30	181	41	276	63	320	73	360	82	1.5 NPT	8	30
V-500	448	2890	269	61	363	82	551	125	640	148	720	164	1.5 NPT	15	57
V-1000	867	5594	520	118	702	159	1066	242	1220	277	1410	320	2 NPT	15	57
V-1500	1300	8387	780	177	1053	239	1599	363	1850	420	2120	482	2 NPT	23	87
V-2000H	1696	10942	1018	231	1374	312	2086	474	2420	553	2780	632	2 NPT	33	125
V-3 VERT	1696	10942	1018	231	1374	312	2086	474	2420	553	2780	632	3 flange	33	125
V-3500	3060	19742	1836	417	2479	563	3764	855	3990	906	5010	1139	3 flange	44	167
V-8000	6784	43768	4072	924	5496	1248	8344	1896	9680	2212	11120	2528	3 flange (x4)	132	500



High Efficiency Submicron Filtration

Vortisand® is a High Efficiency Microsand Filtration System. It is a high capacity media filter that combines cross-flow dynamics with microsand media to achieve sub-micron filtration performance. This technology allows the unit to operate at filtration rates of up to 5 times greater than those of traditional media filters, while filtering 10-50 times finer.

Technology Benefits

High Efficiency Submicron Filtration

The system's high efficiency lies in the unique use of microsand and cross-flow filtration. Vortisand® systems deliver sub-micron filtration performance.

Higher Flow

The cross-flow technology has enabled the optimization of the media bed depth, improving filtration capacity.

Automated Operation

Vortisand systems provide a fully automated experience, along with maintenance reminders and a user friendly interface to make operating and maintaining the system an easy task.

Smaller Footprint

The effective use of the media bed ultimately results in requiring less media, allowing for high levels of efficiency with a smaller footprint (up to 80% smaller and lighter than traditional filters).

Lower Cost of Operation

An important consideration for facility managers utilizing any filtration system is the overall operating cost. The Vortisand® system helps reduce operating costs in several ways:

Reduced Water Consumption: Requires up to 50% less water during backwash when compared to traditional multi-media filtration (MMF) systems.

Energy Savings: High levels of TSS made up of fine particles contribute towards the growth of fouling and bio-film. Removing the fine particles ensures your cooling system operates efficiently, 24/7.

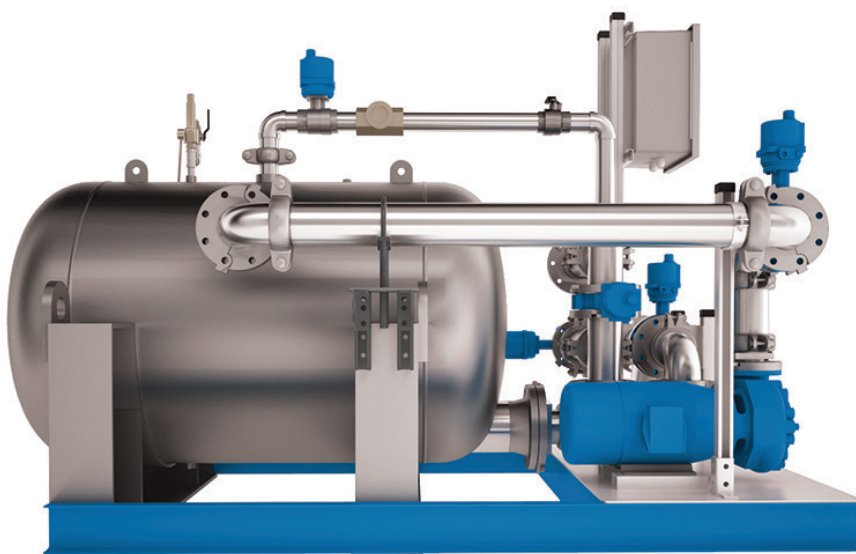
Reduced Chemical Costs: Significantly improves effectiveness of the chemical treatment program by reducing TSS.

Low Maintenance Costs: Requires little to no human intervention, with minimal maintenance and operational tasks.

Reduced Cleaning Costs: Significantly reducing the potential for growth of bio-film and fouling yields reduced labor costs; as the requirement of manually cleaning the tower basin, chillers, heat exchangers and loops will be reduced. Such savings in cleaning also ensures reduced process downtime.

Reduced Potential for Legionella Growth: Filtering the fine particles that can act as a source of food/nutrients for Legionella.

This unique lightweight and compact design provides both shipping and on-site infrastructure savings.



Vortisand H2F® System

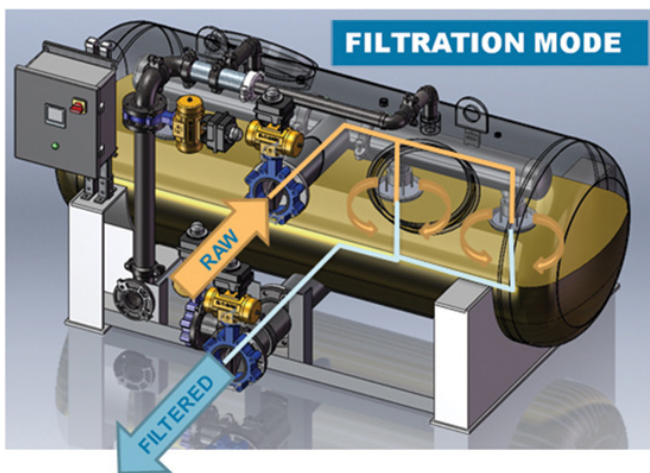
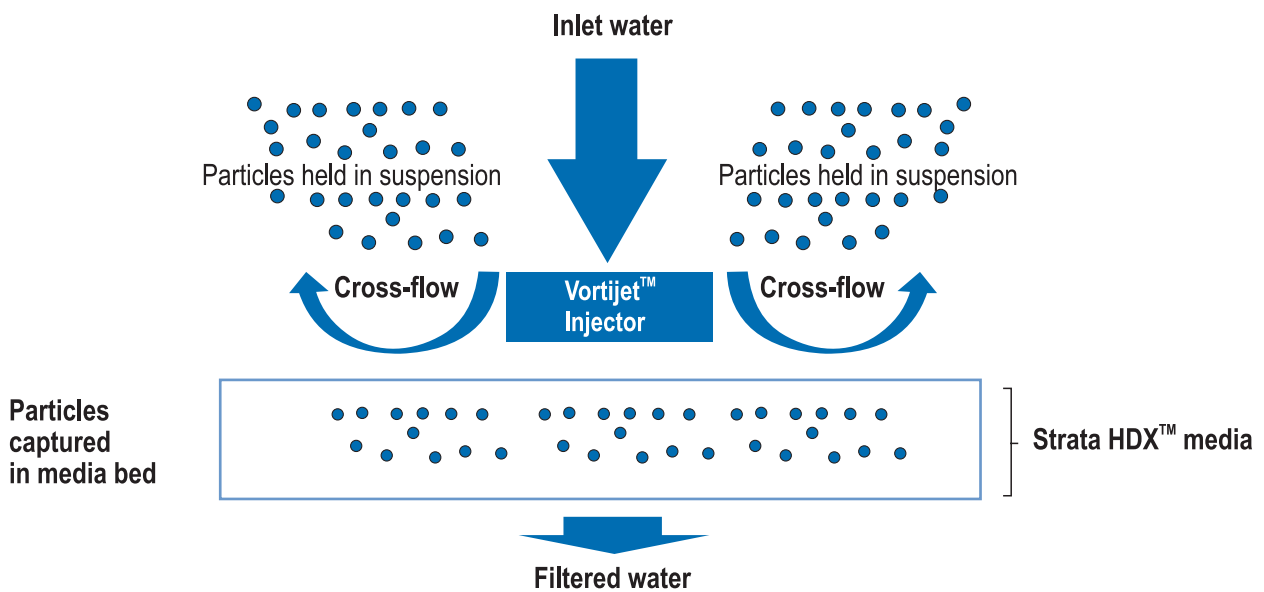
How It Works

Vortisand® filtration systems use exclusive Vortijet™ diffusers to generate cross-flow patterns that sweep the surface of the media.

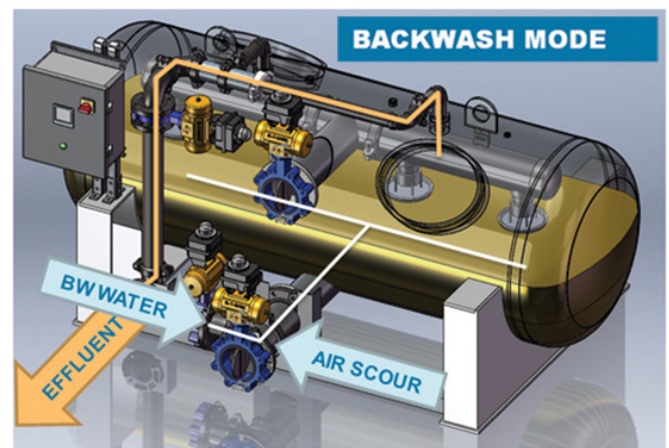
This sweeping motion causes a portion of the water to flow parallel to the top media layer, allowing for high filtration rates while preventing fouling and channeling. Contaminants trapped

in suspension and within the microsand media (depth filtration) are easily removed using an automatic backwash cycle. The system's backwash cycle requires less flow and a shorter duration than traditional sand or multi-media filters.

The result is a technology that removes particles down to sub micron levels at 4 to 5 times the hydraulic flow rate of other media filters, while requiring up to 50% less water for backwash.



The filter is put into service with an initial head loss through the clean media, between 5 and 8 psi (depending on the filtration rate). As dirty water is being filtered, the head loss through the media will increase. When the head loss reaches the high differential pressure set point (between 12 and 18 psi), the inlet and outlet valves are closed. The air scouring phase begins (1-2 minutes), followed by the backwash phase (5-12 minutes). The cycle is paused (1 minute), followed by an optional rinse phase (2-5 minutes). The cycle is paused again (1 minute) before normal filtration is resumed.



In many applications, an air scouring phase precedes the backwash phase. Simultaneous air and water backwashing is not used. The duration of the air scouring phase is set by the operator (typically from 1 to 2 minutes). The purpose of the air scouring phase is to provide a high-energy scrubbing action that removes biofilm or other sticky material from the media. The frequency of backwash depends on the raw water quality (concentration, size, and nature of particles). The duration of the phase is set by the operator (typically from 5 to 12 minutes).

● EVOQUA

Evoqua Water Technologies delivers products, solutions and services to ensure water quality and consistency for municipalities, industrial water users and recreational facilities. With more than a 100-year heritage of industry-leading brands and products, technical expertise, and unmatched customer service, They are the partner of choice for millions of water users across the globe.

Have more than 100-year heritage of innovation and industry firsts, market-leading expertise and unmatched customer service. Cost-effective and reliable treatment systems and services ensure uninterrupted quantity and quality of water, enable regulatory and environmental compliance, increase efficiency through water reuse, and prepare customers for next-generation demands.

Evoqua's unparalleled portfolio of proven brands, advanced technologies, mobile and emergency water supply solutions and service helps cities across the world provide and discharge clean water, and enable leisure and commercial industry to maximize productivity and profitability.

Every day, millions of people and thousands of companies rely on Evoqua Water Technologies to help them meet their needs for clean water.

They are a recognized leader in developing the technologies that has steered the industry over the past 100 years and for developing the technologies that will fuel the industry for decades to come.

Key patented technologies include:

- ❖ Hollow Fiber Membrane & Cleaning
- ❖ Desalination
- ❖ Electro - De-ionization
- ❖ Membrane Systems for Water and Wastewater
- ❖ Chemical Feed & Disinfection
- ❖ Biological Wastewater Treatment
- ❖ Magnetic Wastewater Treatment
- ❖ Wastewater Treatment Odor Control
- ❖ Wastewater Metals Recovery
- ❖ High Purity Water & Advanced Oxidation



Ensavior Technologies Pvt. Ltd



+91- 9658 373 373
+91- 11- 47350382



Plot No. 17A, Block A, Sector 19, Dwarka,
New Delhi-110075, INDIA



info@ensavior.com
www.ensavior.com

Branch Offices: Bengaluru | Kolkata | Mumbai | Singapore

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