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Water

www.biovistabd.com




WHO WE ARE

Biovista Bangladesh Ltd (BBL) was founded in 2009 by a group of enthusiastic young scientists or science graduates. For over 15 years we have designed and developed instrumentation and scientific methods that are being used by major pharmaceutical industries, diagnostic and hospitals, and food and beverage industries in Bangladesh.

We are a private biotechnology company with the main office in Dhaka, Bangladesh, along with overseas offices in the Netherlands, and Australia. Our multi-national team has diverse academic backgrounds, including analytical chemistry, clinical biochemistry, molecular biology, synthetic chemistry, biochemistry, immunology, bioinstrumentation, and nanotechnology, and is on a continuous hunt for new technologies for end users in Bangladesh.

We provide unique solutions for purifying water for industry, government building, hospital and household uses. To date, we have supplied and installed portable generation and water disinfection UV systems to the top pharmaceuticals, government building, hospital and private residences. We provide a successful and reliable growth platform for our customers, suppliers and team. Moreover, we ensure the best quality products complying WHO guidelines and give the best customer services throughout the country anytime our customers need assistance.

OUR TEAM MEMBERS

Rakib Ahmed
Chairman
Biovista Bangladesh Ltd.

Mr. Ahmed is one of our directors who has a huge 12 years of experience in pharmaceutical industry. He is a Dhaka University graduate and the major of his B. Sc and M. Sc was Biochemistry. He also has an MBA degree majoring in Marketing. Mr. Ahmed knows mostly about pharmaceutical industries, their problems and solutions. He also has practical experience with diagnostic tools- reagents and equipment. He has unique skills to supervise and train fresh university graduates who start their careers in health sectors like pharmaceutical companies or diagnostic centers.

Mr. Ahmed has enormous knowledge of the development and quality control of drugs. He serves in various professional organizations. He is currently a General Secretary of Bangladesh Society for Pharmaceutical professionals; Chairman of Liberty Foundation; President of Badhan Foundation (A blood donors organization); and Joint Secretary of Dhaka University Biochemistry and Molecular biology Alumni Association. He previously served as a General Secretary of Graduate Biochemists Association (5 terms) and Joint Secretary of Bangladesh Society for Biochemistry and Molecular Biologists.

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Md. Aktar Hossain
Managing Director
Biovista Bangladesh Ltd.

Mr. Hossain graduated (B. Sc and M.Sc.) from the Department of Biochemistry and Molecular Biology, University of Dhaka. He was awarded M. Phil degree from the same department. He has got certificate in research methodology with SPSS Literacy, professional key account management & strategic alliances, and "supply chain management". His main role in Biovista Bangladesh Limited is to promote products and customer services. He has been working in large private organizations for about 6 years in the field of marketing and distribution of diagnostic and hospital equipment's, reagents, etc. Besides his theoretical and academic background, Hossain has acquired practical knowledge in immunology, biochemistry, Microbiology and hematology while he has been working as a biochemist in Bangladesh medical college hospital and as a consultant in Noor Medical Services in Dhaka.
He has extended knowledge on Marketing & Application of equipment & reagents of Beckman Coulter, USA; BioMerieux, France and Instrumentation Laboratory, Italy while he was working as Manager in a renowned private organization. He also has gained working experience on equipment & reagents of Abbott Diagnostic, USA; DPC, USA; Roche Diagnostic, Germany. Sysmex, Japan, Olympus, Japan and Ortho Diagnostic, Germany etc.

Dr. M. Nahidul Hasan
Overseas Business Development Director
Biovista Bangladesh Ltd.

Dr. M. Nahidul Hasan, an expatriate living in the Netherlands, is running his own business in the name of Business Connection BV and Biovista BD Limited. Dr Hasan obtained his BSc degree (majoring in Biochemistry) from the Department of Biochemistry & Molecular Biology, University of Dhaka, Bangladesh and MSc degree (majoring in Medical Molecular Biology) from the University of Westminster in collaboration with University College London (University of London), UK.

Dr. Hasan obtained his PhD in Biotechnology from Delft University of Technology (TUDELFT). He is the first auther of a patent for bio-nano filtration of liquids. Dr. Hasan is responsible for the overseas business development of Biovista Bangladesh Ltd.

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BIOVISTA'S SKID MOUNTED FILTRATION SYSTEM WITH SPECIFICATION

Model/No.	Compositions of skid	Filtering Velocity Flow Rate
AFM®-640 mm	**Calplas Filter AFM®-640 mm,** Speck Badu 90 ECO VS 1.10 kW 230V Besgo DN50/d63 & Air compressor Filtration control panel APF® dosing pump Filtering Area: 0.3 m2 **Dimensions:** Lx W x H: 1500 x 780 x 1800 mm	5 to 15 m/hr: 1.5 to 4.5 m3/hr
AFM®-720 mm	**Calplas Filter AFM®-720 mm,** Speck Badu 90 ECO VS 1.10 kW 230V Besgo DN50/d63 & Air compressor Filtration control panel APF® dosing pump Filtering Area: 0.4 m2 **Dimensions:** Lx W x H: 1500 x 780 x 1800 mm	5 to 15 m/hr: 2.0 to 6.0 m3/hr
AFM®-960 mm	**Calplas Filter AFM®-960 mm,** Speck Badu ECO Motion 2.20 kW 230V Besgo DN65/d75 & Air compressor Filtration control panel APF® dosing pump Filtering Area: 0.7 m2 **Dimensions:** Lx W x H: 1850 x 1120 x 1800 mm	5 to 15 m/hr: 3.5 to 10.5 m3/hr

Skid mounted AFM® filter unit

Model/No.	Compositions of skid	Filtering Velocity Flow Rate
FRP AFM – 610 mm	FRP Vessel Filter AFM – 610 mm High efficiency VFD Pump 1.36 HP 1 KW 230v, Upvc Pipe Fittings & Solenoid valve, PLC based control panel APF® dosing pump Filtering Area: 0.29 m2 **Dimensions:** Lx W x H: 1380 x 915 x 2740 mm	**7- 15 m/hr:** **2 to 4 m3/hr**
FRP AFM – 760 mm	FRP Vessel Filter AFM – 760 mm High efficiency VFD Pump 1.36 HP 1 KW 230, Upvc Pipe Fittings & Solenoid valve, PLC based control panel APF® dosing pump Filtering Area: 0.45 m2 **Dimensions:** Lx W x H: 1380 x 915 x 2740 mm	**7- 15 m/hr:** **3 to 6 m3/hr**

Skid mounted AFM® filter unit

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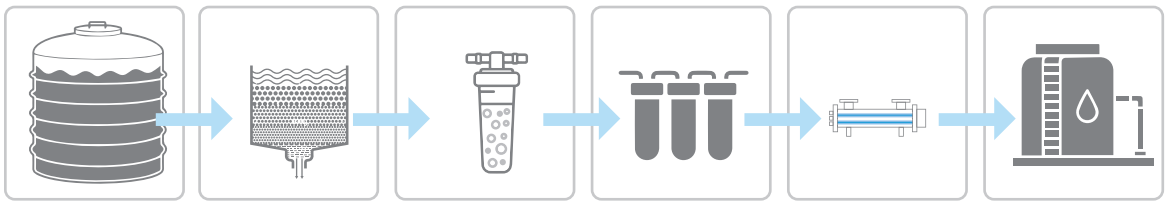
AFM BASED FILTRATION IS SUPERIOR
COMPARISON BETWEEN THE AFM BASED FILTRATION AND SAND BASED FITRATION SYSTEM

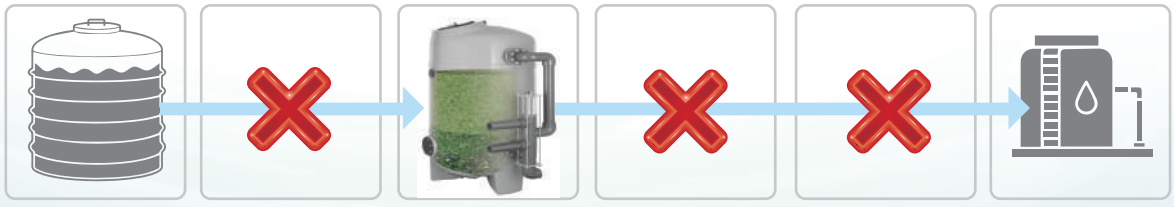
Multi Step of Sand Based Water Filtering System

Sand Based
Filtration System



One Step of AFM® Based Water Filtering System

AFM® Based
Filtration System



Items	Our system (AFM based)	Traditional system (Sand based)	Remarks
Process	One step	Multi step	AFM needs less maintenance and less operating cost
Solids removal	++	+	Performance in terms of solids removed, 25% to 50% better than sand.
Micro-organism elemination level	+++	+	AFM will remove 100% more bacteria from the water than sand
Iron removal	++++	+	AFM is very good at removing iron and manganese, due to surface —ve charge
Manganese removal	++++	+	
Arsenic	+	+	AFM is good at removing Arsenic
Particle size	5 um	10-15 um	AFM will remove most particles down to 5 micron, but also many sub-micron and dissolved components by surface adsorption
Bio infection	—	+	AFM does not become a biofilter, not subjected bio-me chanical coagulation and worm-hole channelling
Life Time	>20 years	2-3 years	More money save than sand
Monthly Cost	Less	More	About 50% less than Sand
Operation procedure	Automatic	Manual	More authentic
Space requirement	Compact in size	More space is required	Comparatively less space is required

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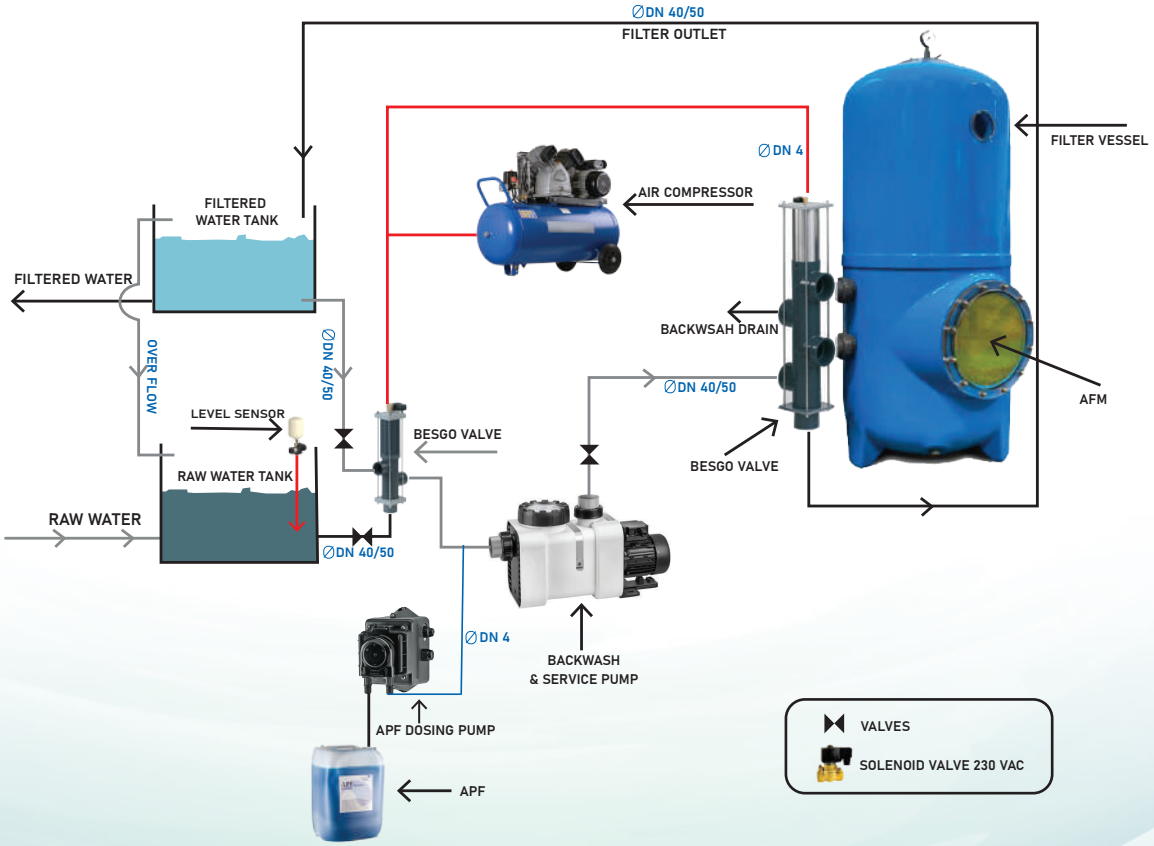
SCHEMATIC DIAGRAM OF BIOVISTA WATER FILTRATION UNIT (BWFU)

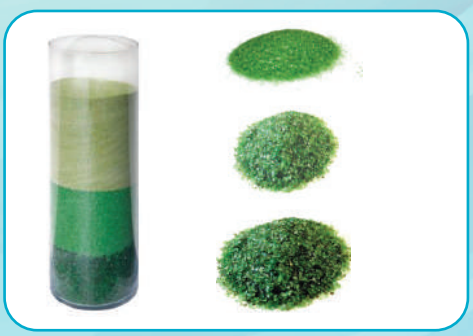


ACTIVATED FILTER MEDIA (AFM®)

Product Information

Name	Compositions	Usage	Unique Features
Activated Filter Media (AFM®)	Green & amber up-cycled glass. Optimized mechanical filtration performance with activated mesoporous surface	Replaces sand in all media filtration applications	Bio-resistant, self-sterilising, predictable performance, filtration down to 1 micron (Grade 0), 4 microns (Grade 1).

Arrangement of Different grade of AFM® in the filter unit (AFM®0, AFM®1, AFM®2, and AFM®3 from top)



RECOMMENDED APPLICATIONS FOR DRYDEN AQUA AFM®

Application Type

Drinking Water	Municipal Waste Water	Industrial Process Water	Industrial Waste water
To remove ron, Manganese, Arsenate, some priority chemicals and micro organisms	Phosphorous & Bacteria, BOD, COD & TOC	Organic pollutants & Oils, TSS & Particles< 1 micron	Colours and fine fibers, Residual mineral oils.

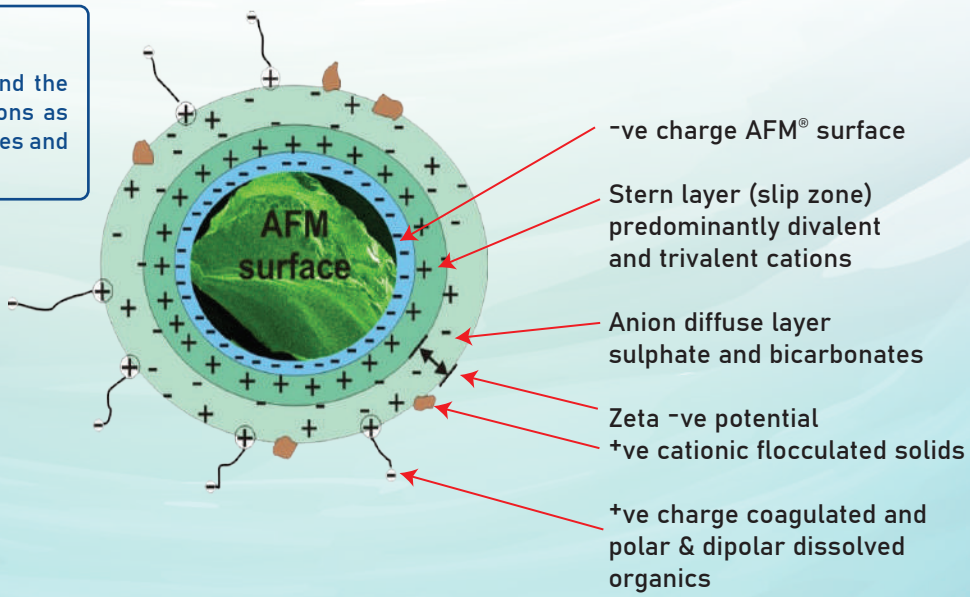
Activated Filter Media (AFM®) is at the heart of Biovista Water Filtration Unit (BWFU).
It is clasified into four grades (grade 0, grade 1, grade 2 & grade 3)

AFM® is an activated amorphous Aluminio Silicate with a high negative zeta potential and will therefore attract positively charged organics, the activated hydrophilic surface has cation bridging, hydrogen bonding and entropic interactions with organics in water.

HOW AFM® WORKS

Zeta Potential reactions

on the surface of AFM® and the behavior of $^{+}$ve and $^{-}$ve ions as well as sub-micron particles and dissolved organics



- The AFM® activation process creates a mesoporous structure with huge catalytic surface area. Activated AFM® has a surface area of over 1000000 m^2 per m^3 which is over 300 times greater surface area for adsorption and catalytic reactions.
- OH^{-}groups on the surface give AFM® a strong negative charge known as Zeta potential that attracts heavy metals and organic molecules.
- The surface has metal oxide catalysts. In the presence of O_2 or oxidizing agents the catalytic surface generates free redicals and thus high redox potential. Free redicals oxidize pollutants and disinfects the surface of AFM®. Therefore AFM® is self-disinfecting.

$$O_2 + H_2O \longrightarrow 3O^* + OH^*$$

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- AFM® prevents bacteria from settling to make it a unique, bio-resistant filter media. No bio-film is formed in filter bed.
- The activated surface of AFM® prevents bacteria mud-balling, coagulation and channeling of unfiltered water through the filter bed.
- Similar to activated carbon, the surface nano-structure adsorbs pollutants from the water. But unlike carbon AFM® is recharged by just back washing with water.

Key Features

- Electro-mechanical filtration media
- Does not bio-foul and is not subjected to worm-hole channeling.
- Certified for drinking water under UK, European and International regulations
- At least 50% better performance than sand, confirmed by nation government organizations
- Will help reduce THM precursors in drinking water systems.
- High performance removal of crypto oocysts, especially when combined with ZPM
- Should never need to be changed, will last for the life of the filter
- Lower running cost and better performance.

Advantages

- Crystal clear water
- No bacterial contamination of filter material => less inorganic chloramine
- No chlorine odor due to almost no presence of Trichloramine
- Healthy air due to minimized production of volatile chlorine disinfection by-products
- Low need for disinfectants.

Certifications

- AFM® is certified under Regulation 31 of the UK Drinking Water inspectorate, AFM® is compliance with European Water Directive (98/83/EC) & (80/778/EEC).
- International certification for drinking water under NSFS0 and NSF61 by the WQA Water Quality Association of the USA;
- Quality control systems ISO 9001-2008;
- HACCP food safety certification by TUV in Germany;
- IFTS independent product Environmental Technology Verification.

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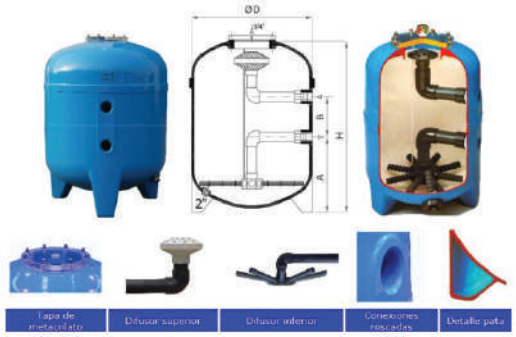
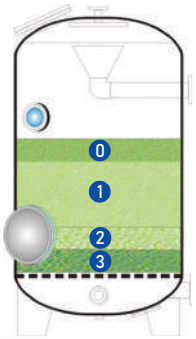
FILTER VESSEL WITH BOTTOM NOZZLE

Product Information

Name	Compositions	Usage
Calplas Filter	Fiber Glass, Polyester, Polypropylene, and Methacrylate	Vessels for AFM® and Sand media





This vesel is filled with AFM® as per following arrangements

Grade 0	:	20%
Grade 1	:	30%
Grade 2	:	15%
Grade 3	:	15%

Technical Description of Calplas Filter

Materials	
Body	Laminated polyester reinforced with fiber glass
Top Distribution	Acrylonitrile Butadiene Styrene (ABS)
Inlet/Outlet	Laminated polyester reinforced with fiberglass GAS threads
Bottom Distribution	Polypropylene
Top Lid	Methacrylate
Bottom Lid	According to model
Manufacturing & Design Code	
Laminated Polyester	Manually oriented fiber glass according to maximum strengths
Design Code	AD Merkblatter & British Standard

BESGO AUTOMATIC VALVES

Besgo Valve

Calplas filter is fitted with Besgo automatic valve for the automatic filtration and cleaning of the filter media by self triggered back wash. The filtration and cleaning of BWFU is controlled by this Besgo valve.

Besgo valves are available in 3-way or 5-way options with single solenoid controls, which make the filtration and cleaning of the filters system easy and less energy consuming. It can be operated by water or air pressure. With a higher backwash velocity and a lower pressure drop, the Besgo valve achieves a particularly good backwash result. It allows switch over without switching the pump off. It is simple to install and secure in operation.

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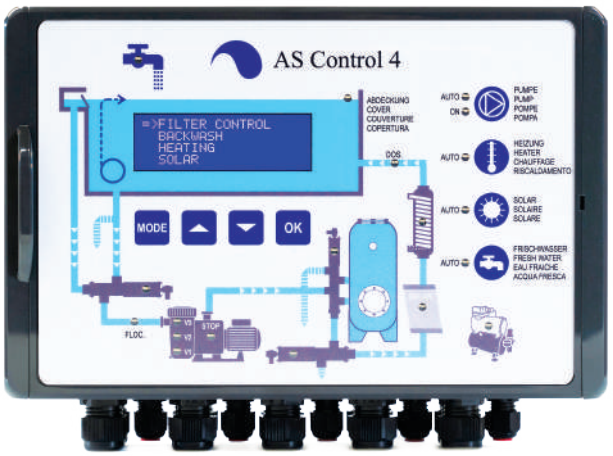
CONTROL PANEL



Control Panel

AS Control is an innovative, micro-processor operated switchbox which can efficiently control water generation, with ease of use and energy savings as focal points.

The AS Control has the functionality of ingeniously using 24 hour filtration, whereby various filter pump speeds can be programmed using the clock. The pump speed can also be automatically adjusted by activating and deactivating certain components which need a different pump speed at any given moment. In addition the controller can control all of the other components of the system.

Key Features

- Display of water & air temperature + various operating conditions
- Complete filtration management + electronic circuit breaker / protector
- Operation and Backwash controlled automatically by 2 & 3-way besgo valve and its in-built VFD with programming of this control unit
- Level control for buffer tank
- Heating control with frost protection, priority switching and delay timer
- Balance tank control (backwashes directly from the pool or the balance tank)
- Energy efficiency control: normal or economy mode with besgo 3-way valve
- Connection for pool cover
- Connection for external switch (main drain, buffer tank, auto)
- Connection for chemical measurement and dosing system (230v and potential-free).

SPECK BADU ECO TOUCH PUMP

Product Information

Name	Usage	Unique Features
Speck Badu Eco Touch	Service & Backwash pump	Self-priming, low energy consumption, low speed motor and variable frequency distribution

Speck Badu Eco Touch Pro self-priming circulation pump is a superb choice for low speed filtration system. It guarantees the most effective use and maximum energy saving in all performance ranges. Operation is intuitive.

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Service & Back Wash Pump

Key Features

- Corrosion-resistant due to the high-quality plastics used which is also 100% recyclable.
- Self-priming which gives a steady circulation and uncomplicated installation.
- Electrically safe, because of the total electrical separation between the water and the pump shaft.
- Temperature stability up to 60°C.
- German design mechanical seal using carbon to ceramic sealing surfaces.
- Stainless Steel shaft.

ZETA POTENTIAL MIXER

Product Information

Name	Materials	Usage	Unique Features
Zeta Potential Mixer (ZPM)	Stainless steel 316	Mechanical coagulation and oxidation reactions and as injection point for coagulants, flocculants, oxidising agents or gas (CO_2, 0_3, 0_2)	Aggressive mixing and cavitation of the water, can increase redox potential and drop Zeta Potential, stresses oocysts and parasites such as sporidians, rendering them more susceptible to oxidation.

ZPM is the fitted in pipeline before the filler unit to achieve maximum coagulation & flocculation with the help of minimum use of chemicals.

ZPM

- ZPM amplifies coagulation and flocculation reactions to make the suspended solids larger and easier to remove by the filters.
- ZPM amplifies coagulation and flocculation reactions for the conversion and precipitation of dissolved components into small particles larger.
- ZPM neutralize the electrical charges (Zeta Potential) on dissolved particles to make some positively and some negatively charged. The opposite charge attracts and causes coagulation & flocculation.
- Most particles in water including bacteria and dissolved organics have a negative charge. On passing through the ZPM some of the electrons giving the negative charge will be rubbed off and sent to ground via the earth. This reaction will cause coagulation and flocculation to occur without the use of chemicals and can greatly improve the performance of AFM®.

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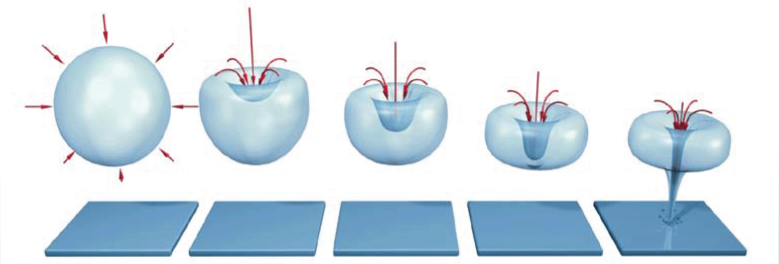
Mechanical Disinfection and Barrier Against Micro-organisms

On passes of water through ZPM, the water is made to cavitate and spin at high speed which helps to kill parasites. The Zeta potential (electrical potential) of the water is shifted into the lower zeta potential, this increases the redox potential and surface tension. As the electrical potential drops to neutral, the redox oxidation potential for the water increases by up to 100 mV which makes it difficult to effectively the water is beginning to disinfect itself without any chemical.

The nano-bubbles created by cavitation that are attracted to the surface of solid particles such as viruses, bacteria, fungal spores and protozoa or the surface of organic molecules. When the nano-bubbles collapses on an solid surface the energy release directly onto the cell membranes. The localized pressure is 2000 bar and temperatures up to 3000°c are generated which help disinfect the water without use of any chemical.

ZPM module also causes a controlled cavitation of the water that will shatter large organisms such as protozoa including giardia and cryptosporidium oocysts. The cavitation reactions can also provide a log2 reduction in bacterial levels.

Nano-bubble implosion process while dosing chemicals through 2PM



Main Benefits

- Increase oxidation potential by up to 100 mv, therefore initiating disinfection without chemical
- Improves coagulation/flocculation by at least 30%
- Flanges directly into the pipe work.

DOSING PUMP

Key Features

- Manually adjustable flow rate output
- Enclosed housing
- Self-priming, does not lose prime or vapor lock
- Pumps off-gassing solutions and can run dry
- 3-point roller design assists with anti-siphon
- Tube replacement without tools
- Output reproducibility
- Tube lubrication not required
- Continuous dosing for better performance.

Dosing Pump

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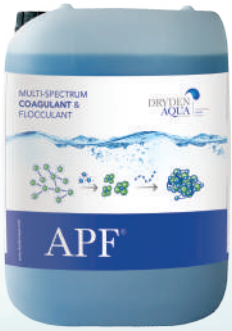
ALL POLY FLOC (APF)

Product Information

Name	Compositions	Usage	Unique Features
All Poly Floc (APF)	Poly Aluminium Chloride (PAC), 6 different electrolytes, poly electrolytes and NoPhos	Coagulation and flocculation reactions, phosphate reduction	APF is a multi-spectrum coagulant and flocculant that can remove pollutants from solution and flocculate fine suspended solids into large particles that are easily removed by AFM® .

Key Features

- Focused coagulation and flocculation
- APF® contains NoPhos and will actively prevent bacteria and algae from growing
- Remove cryptosporidium oocysts when combined with ZPM and AFM®
- Chlorine consumption and the production of unwanted chlorine by-products are reduced by up to 80%.
- Helps to prevent by-products such as Trichloramine & THM makes the water safer.



All Poly Floc (APF)

Dose : Minimum 1ml/m^3 of APF should be injected through ZPM located between the pump and AFM® fillers.

How Does APF Work

APF Focused coagulation and flocculation

- Coagulation: is the process of dragging chemicals out of solution to form a colloidal suspension of small particles. APF must be mixed instantly and aggressively with water through ZPM. If ZPM is not used, the coagulation stage is missed and APF jumps to flocculation.
- Flocculation: is the process of bringing the colloidal suspensions of small particles (skin cells, bacteria and parasites) together to form large particles or floc that can be easily removed by AFM®.

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DRYOX Optimize the Coagulation and Flocculation

Product Information

Name	Compositions	Usage	Unique Features
DryOx	Chlorine Dioxide (ClO_2)	Disinfection for filter media, pipe systems, channel systems, storage tanks and swimming pools. Elimination of biofilm from tanks and pools.	DryOx removes biofilm easily and economically.

DryOx Tablets

Each tablet of DryOx dissolved in water generates 2g of chlorine dioxide (ClO,). This soluble gas can penetrate the cell membrane of biofilm and kill the pathogens (bacteria, viruses). It works very well in less accessible areas such as **filter media, pipe systems, channel systems and overflow storage tanks** as it can penetrates biofilm to kill parasites, bacteria and fungus. DryOx is used primarily for filter disinfection and for elimination of biofilm. It is less oxidative than chlorine, but it is 100-times more effective in killing pathogens protected by biofilm.

Dosage:

For Deep Clean: Add 2 DryOx tablets per 10m^3 of water and backwash after 30 minutes. The concentration of chlorine dioxide cannot exceed 0.4 mg/l.

Disinfection of filter media: Fill the balance tank. Add 2 DryOx tablets per 10m^3 of water in the balance tank/feed reservoir. Dissolve the tablet and stop the pumps for 5 minutes. Turn the pumps on for 5 minutes and then turn off again for 1 hour.

Disease under Control with DryOx

Microorganisms	Diseases
Norovirus	Infection usually start 12 to 48 hours after exposure. The first symptom is a sudden onset of nausea followed by projectile vomiting and diarrhoea.
E. Coli	An indicator bacteria that there is faecal or sewage contamination of the water and insufficient chlorine. Check water supply balance tank overflow and back wash line. Can cause gastroenteritis and is sometime fatal
Legionella	Legionella disease is very serious and fatal in up to 15% of cases. There are around 75 different Legionella species, most just of them cause a nasty flu. Present in around 30% of all pools.
Pseudomonas	Can cause skin, ear and eye infections when present in large numbers. Probably in 100% of pools.
Staphylococcus	MRSA multi drug resistant Staphylococcus aureus, a common bacteria can cause minor skin infection through to life threatening and fatal disease. 30% of pools
Mycobacteria	Chronic skin disease, tuberculosis infection levels seems to be increasing rapidly
Vibrio	Can cause gastroenteritis and septicaemia, now being found in some pools. Cholera is a Vibrio bacteria species.
Cryptosporidium & Giradia	Very debilitating parasitic disease casing vomiting and diarrhoea. 3500 cases every year attributed to public pools in the UK fatality rate approx. 1 in 400. Found in approx. 10% of pools.
Algae	Any staining of a surface green, brown or even pink may be due to algae and bacteria, it is an indicator of serious biofouling and represents a Legionella and disease risk.

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FLOWVIS I FLOW METERS

Key Features

- Flowvis® allows you to set your pump's speeds correctly to optimise filtration performance, backwash water consumption and guarantee maximal energy savings
- Easy to read (clear, stable reading in m3/hr)
- Accurate, the most reliable flow measurement
- Innovative, unique patented design 2 in 1 : flowmeter+ non return valve.

FINE BUBBLE AIR DIFFUSERS FOR WATER AERATION, OXIDATION & MIXING

Key Features

- Semi-flexible, tubular construction
- Self ballasted
- Available in 9 lengths from 0.3 - 3 m.
- Air handling capacity from 1 - 10 m³/hr
- Less than 0.2 bar (3 psi) pressure differential
- Oxygen transfer efficiency up to 5 kg/kwhr
- Resistant to calcification
- Easy to clean and maintain
- Robust and long-lasting (typical lifespan in chemically aggressive Landfill leachate plants is more than 10 yrs)
- Simple, efficient and sustainable water treatment without chemicals.

PHARMACEUTICAL WATER

Potable Water Treatment:

Potable Water Treatment System delivers clean, safe, and refreshing drinking water through a reliable and advanced purification process. To meet international health and safety standards, the system effectively removes Iron, manganese, turbidity, TSS, chemicals, and harmful microorganisms from raw water. Using a combination of Activated filter media (AFM) filtration, activated carbon adsorption (Optional), softening (if need), micron filtration, andfinal disinfection, the system ensures consistent water quality.

Potable water quality standard:

Test parameter	Target concentration WHO standards
PH	6.5-8.5
Arsenic	0.01 ppm
Chloride	<250 ppm
Color	<15.0 ppm
Iron (Fe)	<0.3 ppm
Manganese	<0.1 ppm
Turbidity	<5.0 ppm
TSS	<5.0 ppm
Total dissolve solid (TDS)	<400.0 ppm
Zinc	3.0 ppm
Total coliform	0 (CFU/100 ml)
Fecal coliform	0 (CFU/100 ml)
Pseudomonas	0 (CFU/100 ml)

All the values mentioned in the table above are expected to achieve with the correct flow rate and the stated incoming water quality.

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Purified Water Generation Plant (PWG)

A purified water generation system uses multiple filtration and treatment stages to remove impurities, with a common configuration including pre-treatment filters (multi-media, activated carbon, softener), reverse osmosis (RO), and sometimes electro-deionization (EDI) for high-purity applications. Specifications include pre-filters to remove sediment, an RO system to remove dissolved minerals, and an EDI or UV system for final purification and sterilization. The final system is controlled by a PLC for automation, with components often made of 316L stainless steel for hygiene and durability.

Purified Water Quality Standard

Test parameters	Target Results (As per USP/BP)
pH	5-7
Conductivity at 25°C	<1.3 µS/cm at 25° C & <1.1 µS/cm at 20° C
Heavy Metals	NMT 0.1 ppm
Nitrate	NMT 0.2 ppm
TOC (Total Organic Carbon)	NMT 500 ppb
Total Microbial Count	NMT 100 CFU/ml
Total E-coliform	Absent/100 ml
Salmonella Spp	Absent/100 ml
Staphylococcus Aureus	Absent/100 ml
Pseudomonas Aeruginosa	Absent/100 ml

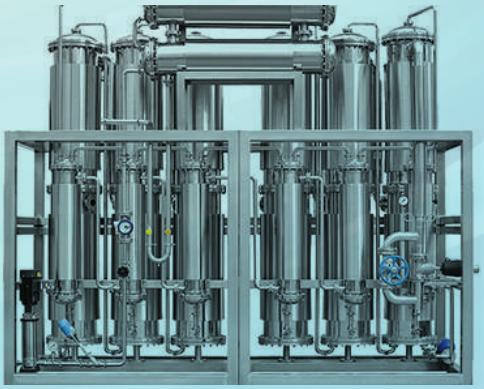
Purified Water Generation Plant

Water for Injection (WFI) Generator

Water for Injection (WFI) is sterile water used for the manufacturing of pharmaceutical products which are administered parenterally, ophthalmically, or inhaled. WFI also is used for cell culture growth media, washing, and rinsing bioreactors in fast-growing biologic therapies. WFI is manufactured by Multi-Effect distillation process.

Water for Injection Quality Standard

Test parameters	USP (US Pharmacopeia)	European Pharmacopoeia
Conductivity	< 1.3 µS/cm at 25°C*	< 1.1 µS/cm at 20°C
Bacteria	<10 cfu / 100 ml (Guideline action limit)	<10 cfu / 100 ml (Guideline action limit)
TOC	< 500 ppb	< 0.5 mg/l
Endotoxin	< 0.25 l. U./ml	< 0.25 l. U./ml



WFI Generation Plant

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Purified Steem Generator (PSG)

A purified steam generator is a device that uses purified water to produce high-purity steam by heating it above 100 C, separating it from liquid and gaseous impurities, and maintaining its quality during distribution. These systems are essential for industries like pharmaceuticals, food, and beverages, where steam is used for sterilization, disinfecting equipment, and for processes requiring high-purity steam that meets specific pharmacopeia standards.

Purified Steam Quality Standard

Test parameters	USP (US Pharmacopeia)	European Pharmacopoeia
Conductivity	< 1.3 µS/cm at 25°C*	< 1.1 µS/cm at 20°C
Bacteria	<10 cfu/100 ml (Guideline action limit)	<10 cfu/100 ml (Guideline action limit)
TOC	< 500 ppb	< 0.5 mg/l
Endotoxin	< 0.25 l. U./ml	< 0.25 l. U./ml

Purified Steam Generator Plant

Continuous Electro Deionization (CEDI)

The Ionpure industrial modules generate mixed bed deionized water through electro deionization and are specifically designed for industrial applications. Ionpure® modules consistently deliver maximum reliability and superior performance for power, HPI/CPI, general electronics, food and beverage and laboratory applications without regeneration downtime.

Product Water Quality

Test parameters	Standard Quality
Product Resistivity	>16 megohm-cm (see note below)
Silica (SiO2) Removal	90 – 99%, depending on feed conditions

CEDI

Softener

Softening filters are mainly used to remove hardness components from water, such as calcium ions (Ca^{2+}) and magnesium ions (Mg^{2+}), to prevent the formation of scale. The working principle of filters mainly relies on a process called ion exchange. Inside the softening filter, ion exchange resin is usually filled. This resin has a negative charge on its surface and can attract positive ions (such as calcium and magnesium) in water. When water containing hardness components flows through these resins, the sodium ions (Na^{+}) on the resin exchange with the calcium and magnesium ions in the water, thereby adsorbing the calcium and magnesium ions in the water onto the resin, while the sodium ions are released into the water, replacing the original calcium and magnesium ions.

Because sodium does not cause scale problems, the treated water becomes soft water. After a period of time, as more and more calcium and magnesium ions are adsorbed, the resin will gradually become saturated, and it is necessary to regenerate the resin. The regeneration process involves adding high concentration saline solution (sodium chloride solution) to the resin, allowing sodium ions to replace calcium and magnesium ions on the resin again, restoring the resin's exchange capacity for continued use.

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OUR COMPLETED PROJECTS

Installation of a Potable Water Plant and Softening Unit

- Capacity of WTP : 1,440 m3/day
- Capacity of Softening: 600 m3/day
- Type: AFM® Filtration with Coagulation, Flocculation, Softener and UV System.

Installation of a Potable Water Plant and Softening Unit

- Capacity of WTP : 1,440 m3/day
- Capacity of Softening: 360 m3/day
- Type: AFM® Filtration with Coagulation, Flocculation, Softener and UV System.

Installation of a Potable Water Plant and Softening Unit

- Capacity of WTP : 1,440 m3/day
- Capacity of Softening: 600 m3/day
- Type: AFM® Filtration with Coagulation, Flocculation, Softener and UV System.

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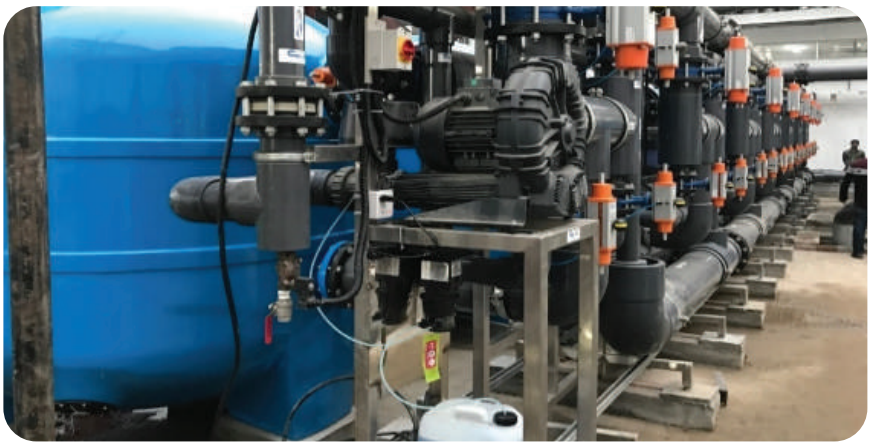
OUR COMPLETED PROJECTS

Installation of a Potable Water Plant and Softening Unit

Capacity of WTP : 7,200 m3/day

Capacity of Softening: 7,200 m3/day

Type: AFM® Filtration with Coagulation, Flocculation, Softener and UV System.



Installation of a Tertiary Wastewater Treatment Plant

Capacity of WTP : 6,240 m3/day

Type: AFM® Filtration with Coagulation, Flocculation.

Installation of a Potable Water Plant & Distribution Unit

Capacity of WTP : 3,840 m3/day

Type: AFM® Filtration with Coagulation, Flocculation, and UV System.

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Water

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