

AFM[®]
ACTIVATED FILTER MEDIA



THE BEST **FILTRATION MEDIA** FOR WATER TREATMENT





OUR FACTORIES



Dryden Aqua Distribution
Büsserach, Switzerland



Dryden Aqua Technology
Bonnyrigg, Scotland

OUR OFFICES



Dryden Aqua Germany
Weimar, Germany



Dryden Aqua North America
Dallas, TX, U.S.A

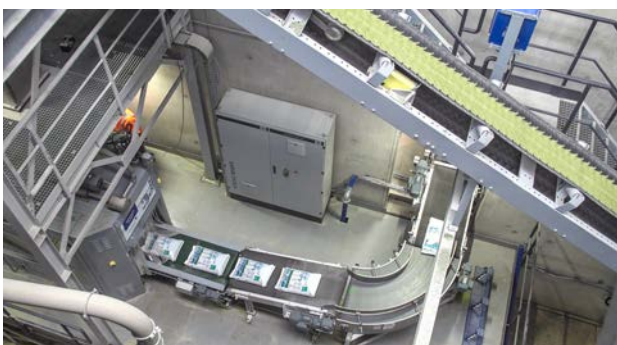


Dryden Aqua Asia
Shanghai, China

Dryden Aqua is one of the largest manufacturers of glass filtration media in the world, operating 2 most sophisticated & fully automated glass reprocessing facilities in the world; in Scotland and Switzerland. We are proud to provide innovative and cost-effective solutions for drinking water, food and beverage processing, industrial process water as well as municipal and industrial waste water worldwide.

OUR PRODUCT - AFM®

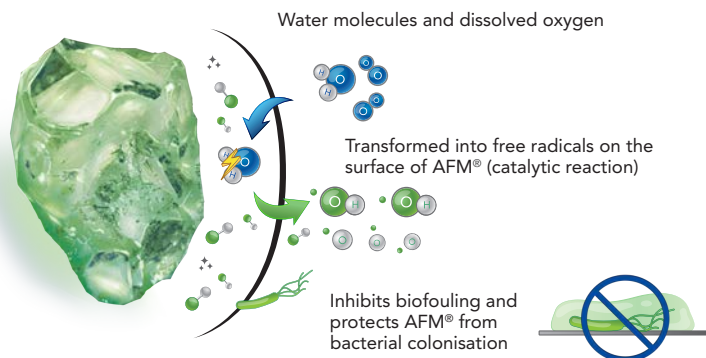
AFM® is an inert, amorphous aluminosilicate (glass) manufactured by up-cycling post-consumer green and brown glass bottles. Activated Filter Media AFM® is verified to at least double the performance of sand filters without the need for additional investments in infrastructure. AFM® is used in single or dual media filtration in both open (RGF) and closed (pressure) filters for treatment of various sources of water such as ground water, surface water, seawater and waste water.



Take a virtual tour of our newest factory and learn how AFM® is produced 

Two different types of AFM® are produced in our factories: AFM®s (standard) and AFM®ng (next generation). Both products are exposed to a unique 3-step activation process to become self-sterilising and to acquire superior filtration properties. During the activation, the structure and the chemistry of the glass is modified.

1 ► Self-sterilising surface

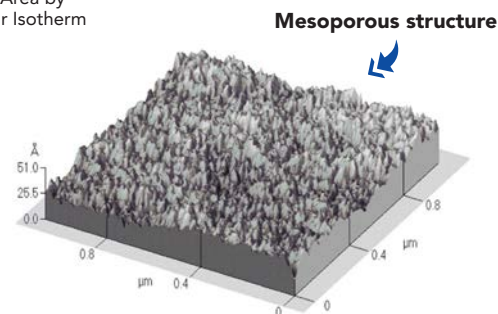


- ✓ Does not support bacterial growth, eliminates clumping, channeling and passage of unfiltered water.
- ✓ Reduces backwash water up to 50% providing a quick ROI, usually within 2 years.
- ✓ Improves and provides predictable, repeatable and consistent nominal filtration performance up to 98% and a life cycle >10 years.

2 ► Increased surface area

AFM® Grade 1 = 50.000 m² / 1'000 kg (245 ft² per lb) *
 Sand 0.4 - 0.8mm = 3.000 m² / 1'000 kg (15 ft² per lb)

* Surface Area by
 Langmuir Isotherm
 Method



- ✓ High surface area with superior mechanical filtration properties for adsorption of fine particles (see performance data on page 4).
- ✓ Precise, consistent particle size distribution, shape, sphericity and uniformity coefficient for outstanding hydraulic properties.
- ✓ High activated surface area amplifies catalytic reaction, generating free radicals to avoid biofouling on media surface.

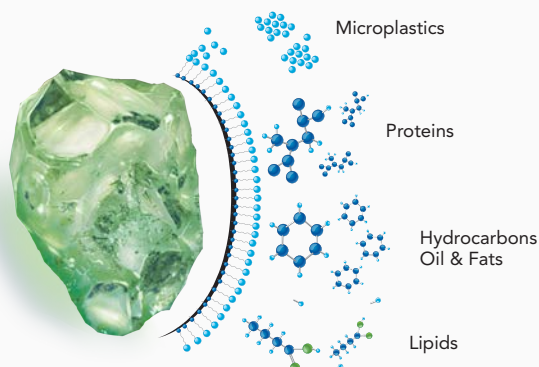
3 ► Advanced adsorption properties

AFM®ng : HYDROPHOBIC SURFACE

Hydrophobic, neutrally charged surface

Superior mechanical filtration performance, combined with efficient removal of hydrophobic contaminants such as hydrocarbons (oil & fats) organics and microplastics in both hard and soft water.

- ✓ **Best filtration performance & organics removal**

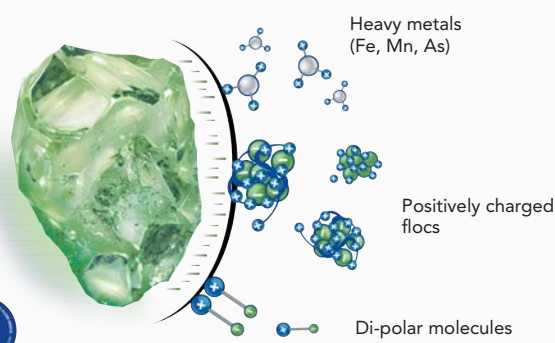


AFM®s: HIGH NEGATIVE SURFACE CHARGE

High negative surface charge

Robust and stable, high filtration performance media with a 20 year track record. Best suited for the removal of positively charged particles such as heavy metals (e.g. Iron, Manganese and Arsenic).

- ✓ **Best for heavy metals removal**





Grade	Type	Particle size	Function
0	AFM®-s	0.25 - 0.5 mm	Extra fine filtration grade
1	AFM®-s/-ng	0.4 - 0.8 mm	Main filtration grade
2	AFM®-s/-ng	0.7 - 2.0 mm	Support and Filtration (ng) grade
3	AFM®-s	2.0 - 4.0 mm	Support (layer) grade
DIN	AFM®-ng	0.7 - 1.2 mm	Special filter media for wastewater and highly polluted water



AFM® Grade 0 is an extra fine filtration grade providing a 98% particle removal efficiency down to 1µm without the use of coagulation and/or flocculation.



AFM® Grade 1 is our main filtration grade. AFM® ng removes 95% of all particles down to 1µm. Coagulation and flocculation may be used to further enhance filtration performance down to submicron.



AFM's Grade 2 is used as a support layer. AFM® ng Grade 2 acts as a support and filtration layer removing particles down to 5 µm.



AFM® Grade 3 is a support layer used to cover the laterals of a filter to ensure proper flow distribution during filtration and backwash of the filter.



AFM®-ng DIN is used as single filtration media or above Grade 3 in selected water and waste water treatment applications, removing 96% particles down to 4µm. It can be used as single media in DynaSand® filters.

Note: In case of TSS >30 ppm or a turbidity >10 NTU, the use of an Anthracite layer on top of the AFM® bed may be considered to extend the run phase between backwash.

AFM® is supplied in
25 kg (55 lbs) bags or
1000 kg (2200 lbs) big bags



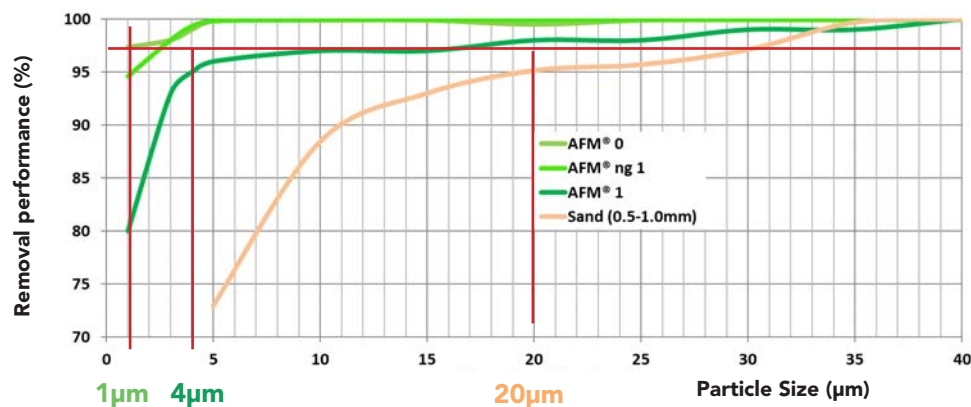
40 bags on CP1 pallet



24 pallets/truck or 20 pallets/20'FCL



Filtration performance of AFM® versus Sand at 20m/hr (8gpm/ft²) without flocculation



- AFM's Grade 0 removes 98% of particles >1µm
- AFM® ng Grade 1 removes 95% of particles >1µm

- AFM's Grade 1 removes 95% of particles >4µm
- High quality silica sand removes 95% of particles >20µm

Independently verified by



IFTS is a leading independent accredited laboratory in France specializing in water filtration
www.ifts-sls.com



Provides a stable & reliable filtration >1 micron without coagulation and/or flocculation

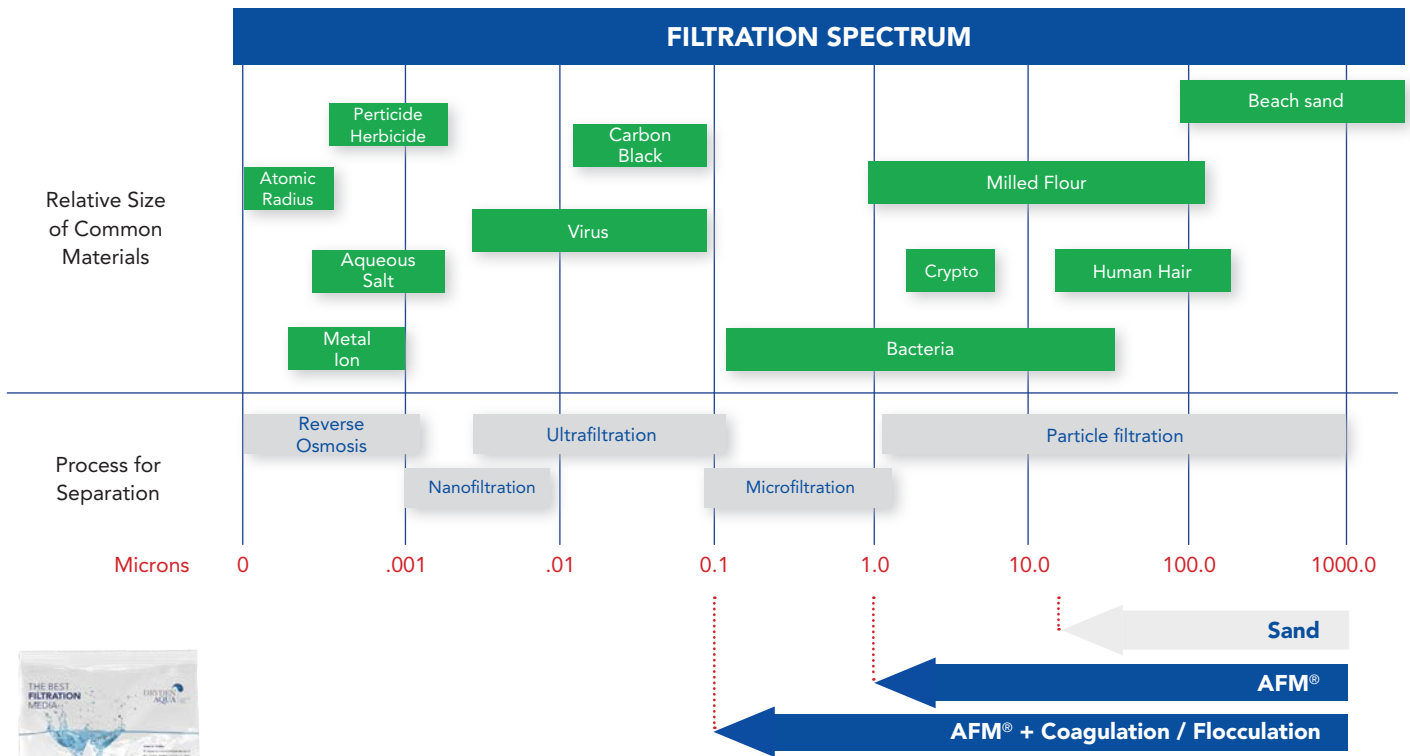


Substantially reduces turbidity and SDI



**Is fully resistant to biofouling and channeling
Lasts >10 years**

AFM® closes the gap between conventional media filtration and Ultrafiltration

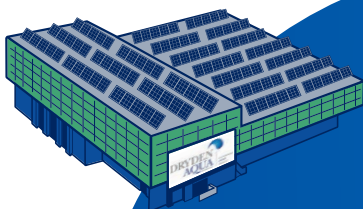


AFM®ng or AFM®s Grade 1 can be used with organic coagulants such as PAC (Poly-Aluminium Chloride), FeCl₃ (Ferric-Chloride) or polymeric cationic or anionic flocculants to further improve fine particles removal performance and to provide an effective Cryptosporidium oocysts barrier up to 20m/h (8 gpm/ft²).

AFM® is certified:

- ▶ ISO 9001:2015, ISO 14001:2015 and 45001:2018
- ▶ NSF/ANSI/CAN 61 & 372 certified by WQA for use in drinking water treatment
- ▶ DWI (UK) Regulation 31 certification for potable water use
- ▶ European Water Directive (98/83/EC) & (80/778/EEC) compliant
- ▶ HACCP certified for use in food & beverage production
- ▶ EN-12902 and EN-12904 compliant
- ▶ IFTS (Institute of Filtration and Techniques of Separation) independently tested and verified filtration performance

AFM® CERTIFICATIONS



Dryden Aqua Distribution AG
Industriering 68,
4227 Büsserach
Switzerland

Dryden Aqua Ltd.
Butlerfield Industrial Estate
Bonnyrigg, Edinburgh,
EH19 3JQ, Scotland, UK



WEBINAR
REVERSE OSMOSIS
PRE-TREATMENT



Benefits of AFM® vs Sand in RO pre-treatment

- ✓ Reduces SDI by up to 70%
- ✓ Significantly reduces RO membrane fouling through superior >1µm particle removal
- ✓ AFM® self-sterilising surface highly reduces RO membrane biofouling potential
- ✓ Reduces or eliminates RO pre-treatment chemicals dosing (coagulant, chlorine, SMBS)
- ✓ OPEX savings: reduced exchange of cartridge filters, no backwash air scouring
- ✓ Guarantees a stable RO membrane performance & increases membrane lifetime

AFM® FOR PRE-TREATMENT PRIOR TO REVERSE OSMOSIS

Pre-treatment in reverse osmosis (RO) systems is a critical process step where AFM® significantly improves the economics, sustainability and operation of an RO system.

In traditional filter media such as sand, biofilm and biomass formation cannot be avoided. This leads to clumping followed by channeling with consequent poor SDI and filtration performance.

AFM® removal performance of inorganic and organic suspended solids down to 1µm reduces RO membrane fouling potential. As a result, RO membrane bacterial growth (biofouling) is further reduced which increases RO system performance and availability.. Subsequently RO membrane lifetime is extended by reducing cleaning frequency (CIP's) and chemicals demand.



Benefits of AFM® in process and drinking water treatment

- ✓ Superior particle removal (TSS) and strong reduction of turbidity (NTU)
- ✓ No channeling and safe barrier against bacteria and viruses (Cryptosporidium, E.Coli, etc.)
- ✓ Exceptional removal of suspended heavy metals
- ✓ Reduces TOC, oxidation demand and consequent formation of harmful DBP's
- ✓ Offers substantial backwash water savings and outlasts all other filter media
- ✓ NSF-61, DWI (UK), HACCP certified for use in drinking water treatment and F&B production

AFM® FOR PROCESS AND DRINKING WATER TREATMENT

In ground and surface water treatment, AFM® significantly outperforms sand in terms of particle removal and - thanks to its unique adsorption properties - will also remove a much higher percentage of heavy metals, organics and microplastics from water. In addition AFM® strongly reduces the biological risk from bacteria, viruses and parasites.

Due to it's self sterilizing surface, AFM® reduces the disinfection chemical demand - such as chlorine - and therefore minimizes the formation of disinfection by-products (DBP) such as THM's.

Note: AFM® ng offers a significant performance advantage in soft water over sand and AFM® s, where media filtration performance is challenged in water with low TDS (<50mg/l), low Calcium hardness (<20mg/l) and low alkalinity (<50mg/l).



WEBINAR
DRINKING WATER
TREATMENT

AFM® FOR WASTEWATER TREATMENT

Municipal or industrial waste water can contain high organic and bacteria load which leads to biological growth in sand and other conventional filter media. This results in filter media clogging and channeling, requiring frequent backwash including air scouring. Over time, filtration performance cannot be restored using backwash, leading to a reduced availability and frequent filter media replacement.

AFM® replaces sand and other filter media in industrial and municipal wastewater treatment without the need for modifications. As no biofouling occurs on the unique self sterilizing surface of AFM®, a consistent high filtration performance can be achieved. Consequently AFM® offers a sustainable and superior alternative to sand and other filter media. Air scouring is not required during backwash of AFM®, generating additional savings in energy, time and backwash water.

Wastewater containing oil such as in O&G produced water, AFM® is used to retrofit nutshell filters, strongly improving oil removal to >90% with Oil droplet size down to >4µm.



WEBINAR
WASTEWATER
TREATMENT



Benefits of AFM® in wastewater treatment

- ✓ Removes 95% of >1µm particles. Reduces turbidity and TSS up to 90%
- ✓ No biofouling of AFM® strongly increases filtration performance versus sand filters
- ✓ Robust filter media for a predictable and consistent filtration
- ✓ Backwash restores AFM® performance achieving a lifetime >10 years
- ✓ AFM® efficiently removes hydrocarbons (oil & fat) and microplastics

Benefits of AFM® in cooling water treatment

- ✓ Removes organics and solids to control pathogenic bacteria such as Legionella
- ✓ AFM® self sterilizing surface reduces chemicals consumption by up to 50%
- ✓ No scaling on the AFM® surface provides for stable & consistent filtration performance
- ✓ Reduced OPEX by increased heat transfer & cooling water process performance



AFM® FOR COOLING TOWERS

As cooling tower circulates water via heat exchangers, some of the water continuously evaporates and some is "blown down" when water salinity reaches high TDS level. Make-up (fresh) water is added to compensate the loss of evaporation. Chemicals such as biocides, corrosion inhibitors and antiscalants are constantly added to reduce corrosion, biofouling and scaling potential.

Due to high nutrient load in the recirculated water, bacteria grow a biofilm in the sand filter which reduces its filtration performance. Organics and bacteria including pathogens such as Legionella, are released from the sand filter and in the cooling tower, resulting in increased treatment chemicals demand and cost as well as public health risks.

Due to its self-sterilizing surface and high filtration performance, AFM® is the perfect filter media for cooling water treatment. AFM® eliminates the disadvantages of sand for this application.



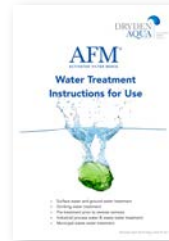
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CASE STUDIES



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ACTIVATED FILTER MEDIA



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filtration using AFM® in water treatment**

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