



ANWIN ENTERPRISES CO., LTD

FIBER FILTERING EQUIPMENT

High filtration rate

High filtration accuracy

High filtration capacity

Low backwash water

Substitute for conventional sand filtration equipment

Fiber Filtering Equipment

●—~ CONTENTS ~—●

1	Instruction of fiber filtering equipments	1
2	Filtration efficiency of fibers	2
3	Main distinguishing features of fiber filtering equipments	3
4	Fiber filtration vs. sand filtration	5
4.1	The pros and cons, fiber filtration vs. sand filtration	5
4.2	Cost analysis, fiber filtration vs. sand filtration	6
5	Operation principle and working procedures of fiber filtering equipments	7
6	Options offered by fiber filtering equipments	13
7	Applications of fiber filtering equipments	14
7.1	Reverse osmosis equipment pre-treatment	14
7.2	Ion-exchange resin pre-treatment	14
7.3	Wastewater discharge treatment	15
7.4	Wastewater recycling treatment	15
7.5	Oil removing treatment	15
7.6	Direct cooling water dead end filtration treatment	15
7.7	Side filter system of indirect cooling water	16
7.8	Substitute settling tanks	16
7.9	Filtration of groundwater	16
7.10	Pre-filtration for sea water desalination	17
8	Performance of fiber filtering equipments	19
8.1	Performance for Wastewater Treatment	19
8.2	Performance for Pure Water Equipment	20
8.3	Performance for Improving the Quality of Cooling Water	20
8.4	Performance for processing wastewater recycling	21
8.5	Performance for ground water filtration	21

1. Instructions of fiber filtering equipments

The Fiber filter is a kind of pressure-type filtering equipment with advanced configuration and superior performances. It adopts new cluster type soft wadding and specially-treated fiber bundles as filtering materials whose diameters can be as fine as tens or even several micrometers (μm). Therefore, it possesses advantages like large specific area and small filtration resistance. This kind of filtering material has successfully solved the limited filtration accuracy problem caused by the grain size restriction existing in the conventional granular filtering material.

The filtering material adopted by our fiber filters is made of long fiber PP, which can resist acid and alkali. The number of fiber bundles used, ranges from tens to more than one thousand, depends on the water treatment volume needed. These fibers have been treated by permanent bulking process, without which common fibers can not be applied in filtration process. By being pressurized or released, the density of these flexible fibers can be increased for filtering or reduced for washing procedures. As the fiber filter can use the hydraulic power of raw water or cleaning water to adjust its fiber density, so it can be seen as a density-adjustable filtering unit.

The diameter of the filter material is small, which increase the specific surface and surface free energy, increase the contact of impurity spectacle and filter material and the absorption ability of the filter, thereby improve the efficiency of filter and capacity of dirt cleansing.



Photo of fiber bundles

☪ Honor and Approval

Our products have won the rewards of Star of Invention/Innovation from U.N. and the “45th Eureka International Invention Exposition” golden prize in Brussels, and also obtain the associated patents issued by U.S., German, France, Finland, U.K., Italy, and Japan.



2. Filtration efficiency of fibers

Fiber filters possess the advantages of filtering rapidly, high filtration accuracy, and large filtration capacity. Without additional agents, they can effectively remove suspended solids, organic materials, colloid, iron, manganese, bacteria, virus and other pollutants in the water. For those iron and colloid which can not be removed by the conventional sand filtration, the fiber filters also have satisfactory screening effect on them.



Photo of fiber filters installation site

☪ Fiber Can Be Recovered

These fibers have strong absorbability for common oil. After saturation, they can be well recovered by washing with special oil dispersant.



The cleaning effect of oil stuck on fibers

3. Main distinguishing features of fiber filtering equipments

Excellent filtration efficiency —

The fiber filters can effectively remove suspended solids, organic materials, iron, manganese, and other pollutants in the water. For those iron and colloid which can not be removed by sand filtration, fiber filters also have satisfactory screening effect. For the well coagulation-treated raw water with suspended solids of 20mg/L, the suspended solids contained in the outlet water (filtered) can be reduced to 1mg/L and under.

High Filtration accuracy —

2 μ m-diameter suspended solids can be removed.

Rapid filtering —

The minimum filtration rate is 30m/hr, which is three times the speed of a conventional sand filter. However, the maximum filtration rate can reach 100m/hr, which is ten times the speed of a conventional filter.

High filtration capacity —

Normally, the filtration capacity is 5~120kg/m³ (filtering material), which is 2~10 times a conventional sand filter can achieve.

Small storage area —

Under the requirement for the same volume of outlet water (filtered), this equipment takes up only about 1/3~1/10 the space a conventional sand filter needs.

Light equipment weight —

With fibers as its filtering materials, the weight of the whole set is only 30~50% of a conventional sand filter.

Low cost per ton of outlet water (filtered) —

The cost for filtering the same volume of water is lower than what a conventional filter needs.

Low backwash water volume —

The volume of backwash water needed is only 1~3% of the outlet water (filtered) production. Normally, the raw water is allowed to be used as the backwash water.

Free of filtering materials replacement —

The filtering materials can be reused repeatedly without the declination of performance. Their service life can reach to ten years or more under normal operation.



No short fiber migration —

The bundle type filtering material is made from a single specially-treated long fiber, which is wound into shape. Therefore, there is no short fiber migration during operation and cleaning processes.

Easily-cleaned filtering material —

When the filtration does not function well, the filtering material can be washed by air-water cleaning procedure. Since the fibers are in a slack status, they can be easily cleaned to regenerate their filtration performance.

Compatible to agents —

While being heavily fouled, the filtering materials can be washed by acid, alkali, oxidant, and surfactant.

Excellent oil-removing effect —

These fibers have very strong absorbability for oil contained in water. After saturation, they can be washed with special oil dispersant.

Excellent iron-manganese removing effect —

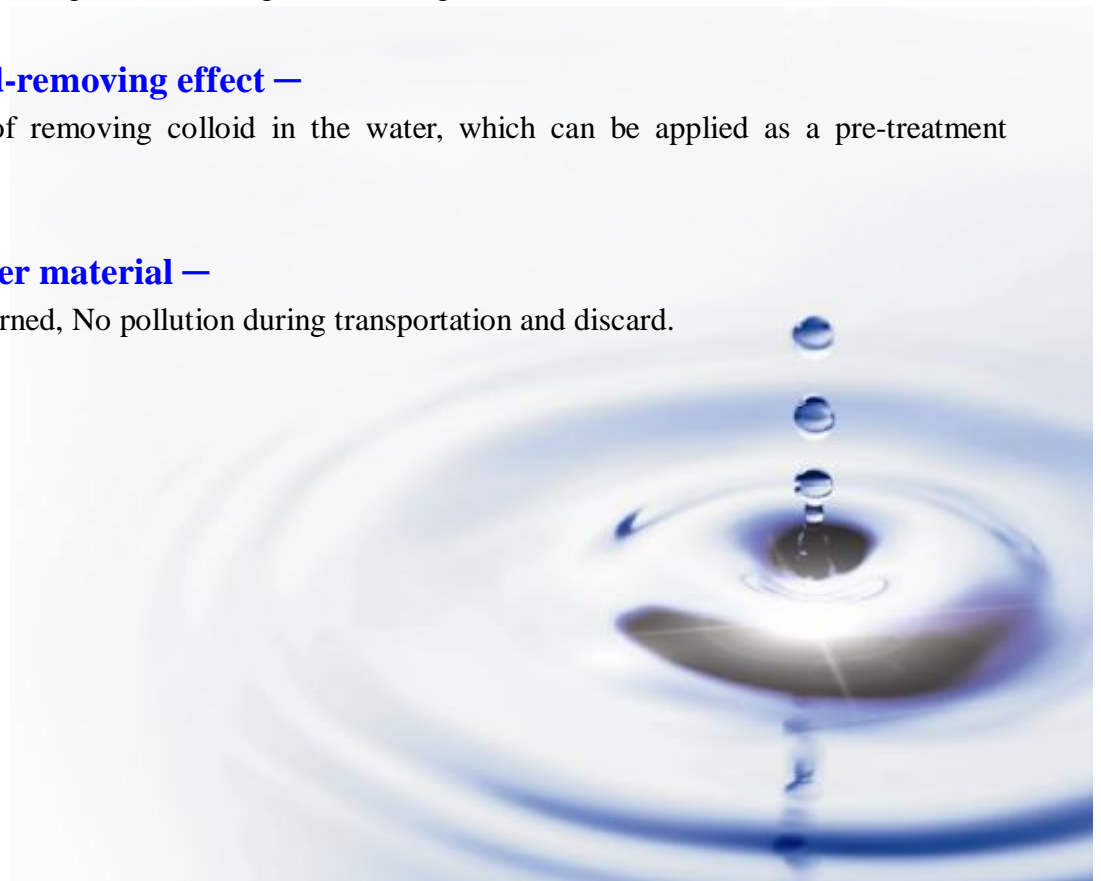
No need for settling tanks and agents, remove iron and manganese from water. Good performance for filtering iron and manganese in the groundwater.

Excellent colloid-removing effect —

Excellent effect of removing colloid in the water, which can be applied as a pre-treatment equipment.

No pollutant filter material —

PP fiber can be burned, No pollution during transportation and discard.



4. Fiber filtration vs. sand filtration

4.1 The pros and cons, fiber filtration vs. sand filtration (filtration volume: 100m³/hr)

Item	Type	Conventional sand filtration	Fiber filtration
Filtration rate (LV linear velocity)		10 m/hr	Normal filtration: 30m/hr High speed filtration: 60~100 m/hr
Filtering surface area		10 m ² large location area (LV=10)	Normal filtration: 3.3m ² (LV=30) High speed filtration: 1.25m ² (LV=80) small location area
Backwash time		20~30 minutes	15~30 minutes
Backwash water volume		2~3 times the standard outlet water volume. (LV=10) 100m ³ /hrx2x20min/cycle=100m ³ /cycle	0.36~0.48 m ³ /m ² /min Normal filtration: 0.36m ³ /m ² /minx3.3m ² x30min/cycle=36m ³ /cycle High speed filtration: 0.36m ³ /m ² /minx1.25m ² x30min/cycle=14m ³ /cycle
Total backwash water volume		If washed once a day, the total backwash water volume per year will reach 36500m ³ , which is a huge consumption.	If washed once a day, the total backwash water volume per year is 13140/5110m ³ , a much smaller consumption.
Filtration capacity		Shallow bed filtration, low capacity, and relatively high backwash frequency.	Deep bed filtration, high capacity, and relatively low backwash frequency.
Filtration accuracy		Only capable of removing suspended solids of 10μm diameter and above.	The removing rate of suspended solids: 100% for 10μm diameter ≥ 50% for 2μm diameter
Filtering material replacement		Once every 1 to 3 years, depending on fouling condition.	Last for more than 10 years under normal operation.
Treatment for colloid and iron		Not effective for colloid, iron, and manganese.	Capable of removing colloid, iron, and manganese.
S.S. removing rate		medium and low	High
Agglomeration		Microorganisms and pollutants will agglomerate on the filtering material to cause short circulating current during filtration.	No agglomeration impairing filtration effect.
Filtration for oil		The filtering material will be fouled by oil.	Capable of removing oil.
Power requirement		Much more backwash water volume (several times as much as raw water) and higher water head loss is needed, which requires larger power.	Less backwash water (lesser than outlet water (filtered) is required, which can be mixed with air to clean the fibers. Small power requirement.
Filtration water head loss		Initial pressure depends on the diameter of filtering material. Normally 0.5kg/cm ² Backwash if pressure difference is 0.5kg/cm ² .	Initial pressure is 0.2~0.4 kg/cm ² . Backwash if pressure difference is 0.5~1.0kg/cm ² .
Options for different applications	No.		High efficiency fiber filter. High speed fiber filter. High accuracy fiber filter. High capacity fiber filter. Oil-bearing wastewater fiber filter. Open type fiber filtering basin.
Wet weight		Heavy gross weight, 52000kg/set	Light gross weight, 16000kg/set

4.2 Cost analysis, fiber filtration vs. sand filtration (filtration volume: 100m³/hr)

Type		Conventional sand filtration	Fiber filtration
Item	Description		
Filtering operation	Electricity Cost for pump motor.	Motor power: 7.5KW Assumed power rate: 0.063US/KW · hr US0.47/hr x 20hr./day x 360days/year = US3,384 /year..... u	Motor power: 7.5KW Assumed power rate: 0.063US /KW · hr US0.47/hr x 20hr./day x 360days/year = US3,384 /year..... u
Backwash	Electricity cost for pump motor	200m ³ /hr 7.5KW x 2 x 1/3hr x US0.063/hr = US0.31/each time = US111.6 /year..... v	84m ³ /hr (6~8L/m ² · s) 5.62KW x 1/3hr x US0.063/hr = US0.12/each time = US43.2/year..... v
	Electricity cost for fan blower	0..... w	22KW x 1/3hr=7.3KW · hr 7.3KW · hr x US0.063/KW · hr = US0.46/cycle = US165.6/year..... w
	Cost of water	200m ³ /hr x 1/3hr x US0.34/m ³ = US22.67/cycle = US8,161.2/year..... x (Assumed tap water rate: US0.34/m ³)	84m ³ /hr x 1/3hr x US0.34/m ³ = US9.52/cycle = US3,427.2/year..... x (Assumed tap water rate: US0.34/m ³)
Cost of filtering material replacement		Replacement period is 1 to 3 years, depending on the fouling condition. If replaced every 3 years, and the cost each time is US4,477.61 then the average cost per year is US1,492.54/year. y	No need for replacement..... y
Operation cost per year		u+v+w+x+y = cost 3,384 + 111.6 + 0 + 8,161.2 + 1,492.54 = US13,149.34/year (Backwash once a day)	u+v+w+x+y = cost 3,384 + 43.2 + 165.6 + 3,427.2 + 0 = US7,020/year (Backwash once a day) = US3,510/year (Backwash once two day)
Note		(1) Shallow bed filtration, low filtration capacity, high backwash frequency. (2) The calculation above is based on the assumption of backwash once a day.	(1) Deep bed filtration, high filtration capacity, and low backwash frequency. (2) The calculation above is based on backwash once a day. (3) Normally can be backwashed by raw water.

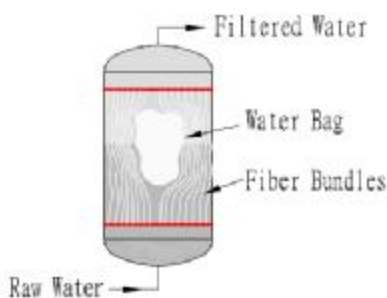
5. Operation principle and working procedures of fiber filtering equipments.

According to the internal configuration and filtering methods, fiber filters can be categorized into three types, whose operation principle is described as following:

TYPE 1 : Bag type filtration: One or several water bags are installed in the filter.

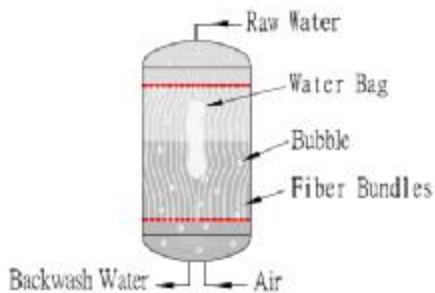
Operation principles

Filtering Operation



The water bags will be filled with water, pressurizing the surrounding fibers which density is hence increased to obtain good filtration effect and accuracy. The raw water enters the filter from the bottom and exits from the top of it.

Backwash



The water bags will be emptied to release the surrounding fibers, and then the cleaning water and air will be filled in to scour the accumulated solids out of the fibers. The raw water enters the filter from the top and exits from the bottom.

Water Rinse



When the water bags are still empty, the cleaning water will wash the filter in a reverse direction of backwashing.

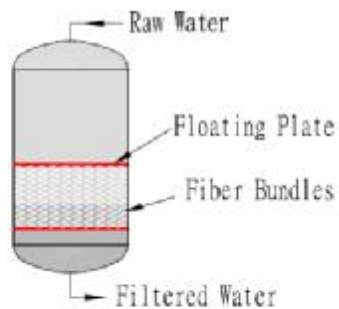
Advantages

The pressure of water bags can be adjusted for controlling the surrounding fibers' density so as to obtain the high accuracy of water quality.

TYPE 2 : Floating plate type: Floating plate installed on the top of fibers.

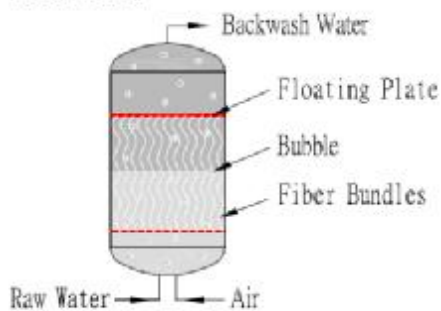
Operation principles

Filtering Operation



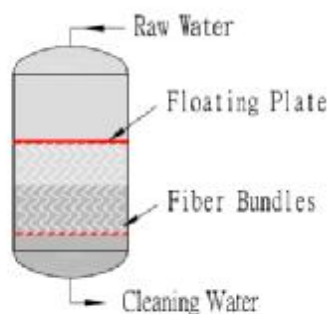
The floating plate is driven down by the hydraulic power of raw water, pressurizing the fibers to achieve the required filtration accuracy and effect.

Backwash



The water and air enters the filter from the bottom, driving the floating plate upward to release the fibers. The air coming in makes the fibers scrub with each other to scour the dirt out.

Water Rinse



Clean water flows from the top to the bottom, driving the floating plate down and taking the accumulated dirt out of the fibers.

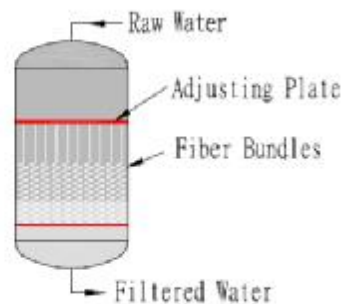
Advantages

Automatically driven up and down by the hydraulic power of raw water, the floating plate can increase or reduce the fibers' density. Therefore, the excellent filtration accuracy and capacity can be achieved through the appropriate fiber density adjusted by the pressure from the floating plate.

TYPE 3 : Adjusting plate type: Fiber adjusting plate can be adjusted to stay at an appropriate position.

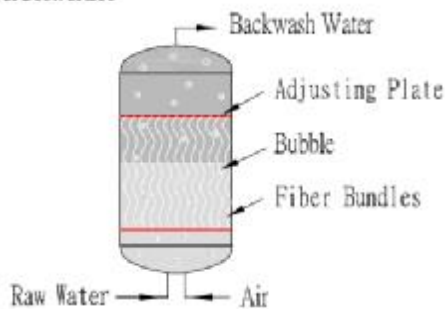
Operation principles

Filtering Operation



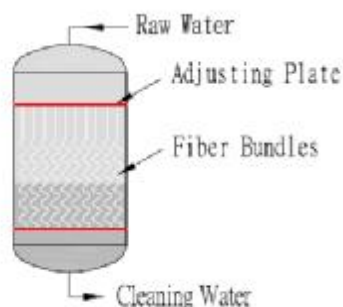
The Adjusting plate is driven down by the hydraulic power of raw water, pressing the fibers to achieve the required filtration effect. The most suitable filtration accuracy can be obtained by altering the height of the adjusting plate.

Backwash



The water and air enters the filter from the bottom, escalating and releasing the fibers. Air coming in makes the fibers scrub with each other to scour the dirt out.

Water Rinse



Clean water flows from the top to the bottom, pressurizing the fibers and taking the accumulated dirt out of them.

Advantages

From the fibers' own floating and sinking motion, the fiber bundles will be pressurized or released, appropriately catching the suspended solids in the water to generate high filtration capacity.

6.Options offered by fiber filtering equipments

The company has six types of fiber filter equipment, offering a variety of options to meet our clients' needs and various water quality requirements.

6.1 High efficiency filtering equipment

The filtering rate is 30m/hr. This type of fiber filters have advantages of high filtration accuracy, large filtration capacity, small space requirement and small backwash consumption, which are mainly used for common filtration application.

6.2 High speed fiber filtration equipment

The filtering rate is 60~100m/hr. This type of fiber filters have advantages of fast filtering, small space requirement and large treatment volume. This equipment is mainly used for circulating cooling water, condensation water and other applications, such as cooling water bypass filtering facility, where water treatment volume is large and inlet suspended solids are fewer.

6.3 High accuracy fiber filtering equipment

The filtering rate is 30m/hr. This fiber filter is generally used for applications, such as RO water feeding facility, where raw water quality is cleaner and outlet water (filtered) requirement is more rigorous.

6.4 High capacity fiber filtering equipment

The filtering rate is generally 30m/hr, and the filtration capacity is high, about 30~120kg/m³ (filtering material). Under the same water outlet quality requirement, this unit can save much installation space. It is mainly used for applications where raw water quality is bad, such as wastewater recycling or substitute for sedimentation tanks.

6.5 Oil-bearing wastewater fiber filtering equipment

The filtering rate is 30m/hr. This facility consists of oil-bearing wastewater filtering equipment and an associated cleaning system. This system is suitable for oil-bearing wastewater treatment, and its filtering materials can also be cleaned by special oil dispersants.

6.6 Open type fiber filtering basin

The filtering rate is 18~25m/hr. The main body of this unit is made of RC or steel structure with fibers installed inside. The unit, with advantages of small location space requirement and low installation cost, is used for tap-water plant and large sewage water treatment plant where the outlet water (filtered) volume requirement is above 10,000 tons per day.

7.Applications of fiber filtering equipment

Fiber filtering equipment has many special functions that the conventional sand filters and other type of filtering equipment can not achieve. Therefore, it can be applied to a wide range of industries such as electricity, petroleum, electronics, chemistry, metallurgy, textile, papermaking, food, beverage, tap water, swimming pool, municipal construction, household use, pure water pretreatment for RO and ion-exchange, wastewater recycling, cooling water bypass filtration, and the removing of iron and manganese from ground water, in which their superior filtration functions can be thoroughly brought out to escalate the subsequent water treatment efficiency.

Generally, the applications are as following:

7.1 Reverse osmosis equipment pre-treatment

- Advantages — **j** Effectively remove S.S. and colloids to prevent the clogging of RO membranes which result in the subsequent rising in pressure and decrease in production. It can also reduce the cleaning frequency of RO membranes.
- k** High filtration accuracy, which can reduce SDI value and provide good RO water feeding.
- l** Reduce the replacement frequency of filtering materials.
- m** Reduce the replacement frequency of filter cartridge.

Description — The excellent filtration effect of fiber filter can prolong the service life of RO membrane and reduce the chance of malfunction.

Filtering rate — 30~60m/hr

7.2 Ion-exchange resin pre-treatment

- Advantages — **j** Fiber filters can remove the S.S. and colloids which can not be screened out by the conventional sand filters, so as to prevent the S.S. from entering the resin bed and the subsequent fouling.
- k** With the filtration accuracy of up to 2 μ m and excellent absorbability, the fiber filter's capability of treating S.S. and COD has been largely escalated.

Description — **j** Compare to the conventional sand filter's incapability of removing colloids and particles of the S.S., our fiber filter equipment can provide a lot of benefits to ion-exchange pure water facility.

k The filtration accuracy is higher than the conventional sand filter; no replacement of filtering materials is required; the best choice for the pre-treatment of ion-exchange resin.

Filtering rate — 30~60m/hr

7.3 Wastewater discharge treatment

Advantages — Can be used in the filtration process before discharging wastewater; effectively reduce the content of S.S., COD and oil in wastewater.

Description — Improve the water quality to meet the discharging requirements and comply with associated regulations.

Filtering rate — 30m/hr

7.4 Wastewater recycling treatment

Advantages — excellent wastewater recycling equipment, high accuracy and large filtration volume; effectively increase the recycling efficiency of wastewater.

Description — Possess high filtering efficiency; increase the efficiency of the associated water treatment facility and the possibility of recycling wastewater. It is considered the best recycling equipment in the market.

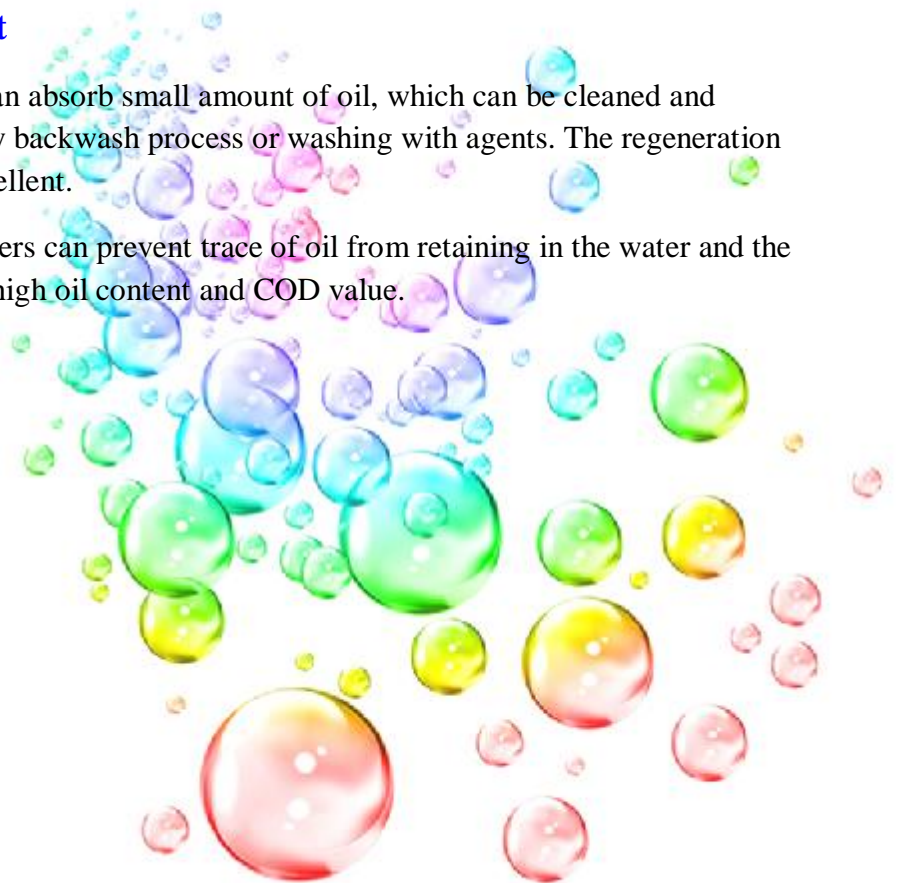
Filtering rate — 30m/hr

7.5 Oil separation treatment

Advantages — The fibers can absorb small amount of oil, which can be cleaned and recovered by backwash process or washing with agents. The regeneration effect is excellent.

Description — The fiber filters can prevent trace of oil from retaining in the water and the subsequent high oil content and COD value.

Filtering rate — 30m/hr



7.6 Direct cooling water dead end filtration treatment

- Advantages — **j** Reduce the storage area of associated equipment.
k Reduce the replacement frequency of filtering materials.
l Increase the filtration accuracy and volume.
m Reduce the consumption of backwash water.
n Excellent ability in removing ferric oxide and ferric hydroxide.
o Remove oil in water and help solve pollution problems.

Description — effectively overcome the disadvantages of sand filters; no replacement of filtering materials is required.

Filtering rate — 30~60m/hr

7.7 Side stream filtration of indirect cooling water

- Advantages — **j** Rapidly filter the pollutants in water such as sand, iron, algae, bacteria, and suspended solids. Effectively purify water quality and reduce S.S., organic materials and turbidity; largely increase the treatment effect of cooling water.
k Filter the S.S. in the water; solve the accumulation problem and avoid the corrosion induced by sediments; screen out the water scale crystals so as to reduce the possibility of scale accumulation; remove the suspended microorganism and corrosion products.
l No agglomeration takes place; alleviate the common problem of conventional sand filter working in cooling water.
m The fibers can be used for a long time; no replacement is necessary.

Description — **j** The fiber filtration can solve half of the problems caused by cooling water scale, corrosion, and microorganism.
k Long service life; no filtering material replacement is necessary.
l Unlike the sand filtration, no agglomeration and short circulating current takes place.

Filtering rate — 60~100m/hr

7.8 Substitute settling tanks

Advantages — The capacity of fiber filters is large, which can directly screen the flocculent colloids or particles. With the fiber filter working in the system, the settling tank load can be reduced or even the whole tank can be substituted.

Description — The backwash water volume is 1~3% of outlet water (filtered); largely reduce the necessity of installing settling tanks.

Filtering rate — 30m/hr

7.9 Filtration of tap water and groundwater

Advantages — **j** High filtration efficiency; filter rapidly.
k Filtering materials are easily washed and no replacement necessary.
l Low backwash water consumption; low cost for every ton of outlet water (filtered).
m High filtration capacity; small storage area.
n No short fiber migration and harmless to human.
o Directly filter the ground water; no need of settling tank.
p Excellent removing effect for iron; the removing rates for Fe^{+++} and Fe^{++} are 99% and 85% respectively.

Description — **j** The accuracy and effect of the fiber filter is better than the conventional sand filtration, so it can remove the suspended solids which can not be removed by the sand filtration.
k Without the need of manganese sand or adding any oxidant, the fiber filters can remove iron in the groundwater; there is no agglomeration taking place and no filtering material replacement is necessary.
l The bundle structure of fiber, no short fiber loss, the fiber can be use for long time °

Filtering rate — 30m/h

7.10 Pre-filtration for sea water desalination

Advantages — Effectively remove the impurity of sea water, excellent pre-filtration effect for RO facility.

Description — Effectively remove the colloid in the sea water by using fiber filter and decrease SDI value.

Filtering rate — 30m/hr

8. Project history of fiber filtering equipment

8.1 Wastewater recycling for power plant.

Wastewater treatment volume : 6000m³/day

Wastewater recycling process :

Industrial wastewater → Wastewater tank → (Dosing) → Pressure pump → Scum (floated-and-skimmed) tank → Clear water tank → Fiber filtering equipment → Recycling pipe

Raw water quality (before treatment) : COD 20~40 mg/L, max. 80mg/L
S.S. 30~40 mg/L, max. 150mg/L
Oil 30 mg/L

Outlet water quality (after treatment) : COD < 5 mg/L
S.S. < 5 mg/L
Oil < 1 mg/L nearly 0
Colloidal silica < 2 mg/L

Benefits of fiber filtering equipment : (1) Excellent oil removing effect;
(2) Effectively remove colloidal silica;
(3) Minimize S.S. value;
(4) Reduce COD value.



8.2 Reusing wastewater as the circulating cooling water of petroleum-chemistry companies.

Wastewater treatment volume : 10,000m³/day

Wastewater recycling process :

Water outlet from secondary settling tank → sedimentation tank → Pressure pump → Fiber filtering equipment → Reuse water pipe

Raw water quality (before treatment) : COD 40~80 mg/L
Turbidity 10~15 NTU

Outlet water quality (after treatment) : COD 20~30 mg/L
Turbidity < 3 NTU

Benefits of fiber filtering equipment : With the high filtration accuracy of the system, this project can effectively eliminate the problems caused by the S.S. and organic materials in the raw water, reusing the wastewater as the cooling water.



8.3 Wastewater discharge improvement for Airline industry.

Wastewater treatment volume : 24m³/hr

Wastewater recycling process :

Secondary outlet water → storage tank → Fiber filtering equipment → Effluent tank

Raw water quality (before treatment) : S.S. 20~60 mg/L Max. 80 mg/L
Iron 5 mg/L

Outlet water quality (after treatment) : S.S < 5 mg/L
Iron < 1 mg/L

Benefits of fiber filtering equipment :

- (1) Excellent performance of fiber filter, effectively remove suspension (S.S) in the water and solve the problem of unstable S.S in wastewater.
- (2) Avoid micro oil release which causes COD and exceeded oil
- (3) Effectively solve the iron problem that normal sand filter cannot remove.
- (4) No supplement or replacement of fiber filter



8.4 Urban wastewater discharge.

Wastewater treatment volume : 30,000m³/day

Treatment equipment : 8 sets of Φ3000 fiber filtering equipment

Secondary outlet water quality : S.S. 30 mg/L
COD 120 mg/L

Outlet water quality (after treatment) : S.S. 3 mg/L
COD 60 mg/L

Benefits of fiber filtering equipments : Good filtration effect. Effectively remove S.S. and solve the problem caused by high COD.

8.5 Urban wastewater discharge.

Wastewater treatment volume : 50,000m³/day

Treatment equipment : 6 sets of fiber filtering pool 4800(W) x 4800(L) mm/per set

Raw water quality (before treatment) : S.S. \leq 30 mg/L
Turbidity \leq 10 NTU

Outlet water quality (after treatment) : S.S. 3 mg/L
COD 60 mg/L

Benefits of fiber filtering equipments : Good filtration effect. Effectively remove S.S. and solve the problem caused by high COD.



8.6 Wastewater recycling for Electronics industry.

Wastewater treatment volume : 15m³/hr

Wastewater recycling process :

Discharging wastewater (rainwater & recycling water) → storage tank → Fiber filtering equipment → cooling water tower

Raw water quality (before treatment) : S.S. 40~80 mg/L

Outlet water quality (after treatment) : S.S. < 2 mg/L

Benefits of fiber filtering equipment :

- (1) Eliminate suspension above 2 μ m, recycle filtered wastewater as supplementary cooling water.
- (2) Reduce the emission water and increase the benefit of recycling.
- (3) No supplement or replacement of fiber filter.



8.7 Pure water quality improvement for power plants.

Water source : Surface water

Pure water producing process :

Raw water (surface water) → Clarification tank → Clear water tank → Fiber filtering equipment (§ 2000 x 2 set) → RO equipments

Removing rate of fiber filtering equipments :
(statistical value)

Iron	66~92.5%
Ferrous iron	72~80%
Suspended solids	80~100%
Colloidal silica	68~80%
Silica	25~60%
Organic material	32~67%



8.8 Pure water equipment for power plant.

Wastewater treatment volume : 500m³/hr (250 m³/hr x 2 sets)

Wastewater recycling process :

River water → settling tank → Fiber filtering equipment → tank of activated carbon → 3B4T pure water equipment → hot electric stove

Benefits of fiber filtering equipment :

- (1) Substitute for sand filter equipment.
- (2) High removal rate, pure water
- (3) Low backwash water volume, low operation cost.
- (4) Low square measure, easy to operate.



8.9 Pure water quality improvement for petroleum-chemistry companies.

Water quality : Water supply for factory

Pure water producing process :

Water plant → Storage tank → Fiber filtering equipment (ϕ 3000 x 4 set) → Ion-exchange resin pure water equipments

Benefits of fiber filtering equipments : (1)Solve the problems caused by the sediments accumulated in the ion-exchange resin, the washing period can be extended from once a week to once a month.



(2)Effectively prevent the accumulation of colloidal silica and the subsequent accumulation taking place on the turbine/boiler for power generation. The boiler and turbine used to be stopped and cleaned once a year, and now there has been no scale accumulated for 13 years. This project has last for ten years, and no filtering materials (fiber) have ever been replaced.

8.10 Circulating cooling water quality improvement for a steel group company's continuous casting process.

Wastewater treatment volume : 2,000m³/hr (in 2003)

Raw water quality (before treatment) : S.S. 30~50 mg/L
Oil 5~10 mg/L

Outlet water quality (after treatment) : S.S. < 5 mg/L
Oil < 2 mg/L

Benefits of fiber filtering equipment : Effectively remove S.S., iron, and oil in the circulating cooling water.



8.11 Cooling water quality improvement for steel companies.

Wastewater treatment volume : 150m³/hr

Operation process : Open side filtration of circulating cooling water

Raw water quality (before treatment) : S.S. 20 mg/L
Iron < 4mg/L

Outlet water quality (after treatment) : S.S. < 4 mg/L
Iron < 1mg/L

Benefits of fiber filtering equipment :



- (1) Reduce the cost of cleansing accumulated dirt.
- (2) Water clear after filtering.
- (3) No supplement or replacement of fiber filter.
- (4) Effectively filter suspension in the cooling water and increase the cooling effect.

8.12 Recycling of cooling water discharge for petroleum-chemistry companies.

Wastewater treatment volume : 35m³/hr

Operation process :

Discharging water of cooling tower→ original filtered equipment→ fiber filter equipment→ foldable filter module→ RO

Raw water quality (before treatment) : S.S. < 20 mg/L

Outlet water quality (after treatment) : S.S. < 2 mg/L

Benefits of fiber filtering equipment :



- (1) Solve the problem that re-supplies filter material regularly and poor performance of filtering.
- (2) A bundle of PP filter material can be used for a long term, no need to supplement periodically and easy to operate.
- (3) Good performance of filtering, effectively upgrade RO water quality and increase the efficiency of RO recycling.

8.13 Direct filtration of laminar flow water for steel factory.

Circulating water volume : 2400m³/hr (400m³/hr x 6sets)

Raw water quality (before treatment) : S.S. 20~28 mg/L (S.S. is mainly Iron)

Outlet water quality (after treatment) : S.S. 0.4~0.9 mg/L

Benefits of fiber filtering equipment :



- (1) Alleviate the problems of red water pollution.
- (2) Replacement of sand is not necessary.
- (3) Reduce the drainage volume of wastewater.
- (4) Increase the service life of cooling tower fans.
- (5) Increase the cooling effect.
- (6) Reduce the cost of cleansing and delivering accumulated dirt.
- (7) Solve the problem of nozzle block, increase yield rate of rolling steel.

8.14 Recycling of process wastewater for electronic factories.

Wastewater treatment volume : 12m³/hr(6m³/hr x 2sets)

Operation process :

Process cutting, electroplate, wastewater of sandblast→ storage tank→ fiber filter equipment→ recycling

Raw water quality (before treatment) : S.S. 60~100 mg/L (Max. 200mg/L)

Outlet water quality (after treatment) : S.S. < 3 mg/L

Benefits of fiber filtering equipment :



- (1) Reduce the emission of wastewater.
- (2) No need to supplement or replace filter material.
- (3) High accuracy of fiber filter, effectively eliminate suspension in the water, fully recycle and reuse wastewater.

8.15 Cleansing water in the washing tower and recycling for cooling and wastewater for electronic factories.

Wastewater treatment volume : $106\text{m}^3/\text{hr}(53\text{m}^3/\text{hr} \times 2\text{sets})$

Operation process :

Tap water → cleansing water in the washing tower → storage tank - fiber filter

condensed water ↗

equipment → précised filter module → RO cooling water

Raw water quality (before treatment) : S.S. < 60~100 mg/L (Max. 200mg/L)

Outlet water quality (after treatment) : S.S. < 3 mg/L

Benefits of fiber filtering equipment :

- (1) High accuracy of fiber filter, effectively eliminate suspension in the water, improve the blocking problem of precise filter module (use for 13 months without changing filter module).
- (2) No need to supplement or replace fiber filter, high return on investment.
- (3) Effectively upgrade the efficiency of back recycling equipment.



8.16 Biological wastewater recycling for Electronics factories.

Wastewater treatment volume : $240\text{m}^3/\text{hr}(120\text{m}^3/\text{hr} \times 2\text{sets})$

Working process :

Panel processing wastewater → storage tank → biological tank → settling tank → fiber filtering equipment → activated carbon equipment → précised filter module → RO

Raw water quality (before treatment) : S.S. 60~100 mg/L (Max. 200mg/L)

Outlet water quality (after treatment) : S.S. < 3 mg/L

Benefits of fiber filtering equipment :

- (1) Solve the problem of ineffective filtering of original sand-filter equipment, which caused block in the back recycling equipment.
- (2) No need to supplement or replace for fiber filter, excellent filter performance, provide good quality water and reduce the filter module replacement and RO block.
- (3) Effectively upgrade recycling benefit, save the recycling equipment and cost of other consumables.



8.17 Ground water filtration for electronics factories.

Groundwater treatment volume : $15\text{m}^3/\text{hr}$

Operation process :

Groundwater → sand filter → fiber filtering equipment → supplying water

Raw water quality (before treatment) : Iron $> 3\text{ mg/L}$

Outlet water quality (after treatment) : Iron $< 0.05\text{ mg/L}$

Benefits of fiber filtering equipment :

- (1) Effectively filter Fe^{2+} , Fe^{3+} and suspended article, provide high quality water and avoid iron and suspension pollution in the supplying system.
- (2) Direct filtration, no need to add oxygenate and install aeration apparatus. Filter material can be used over a long period of time, easy to operate and effectively save the operation cost.
- (3) Effectively clean groundwater, eliminate the pressure of water shortage and achieve excellent economic recycling efficiency.



8.18 Ground water filtration for electronics factories.

Iron content of the groundwater : $2\sim 3\text{ ppm}$

Iron content after fiber filtering : $0.07\sim 0.27\text{ ppm}$

Benefits of fiber filtering equipment :

- (1) Installation of sedimentation tank is not necessary.
- (2) If the water is filtered after aeration, then the iron (Fe^{+++}) content can be lower than 0.1ppm .
- (3) If the groundwater is filtered, the iron (Fe^{++}) content can be lower than 0.3ppm .
- (4) Replacement of filtering materials is not necessary.





Head Office: Anwin Enterprises
11F-3, No. 171, Sec. 4, Nan King East Rd,
Taipei City 10579, Taiwan (R.O.C.)
TEL : 886-2-27173969 FAX : 886-2-7173998
E-Mail : marketing@awint.com