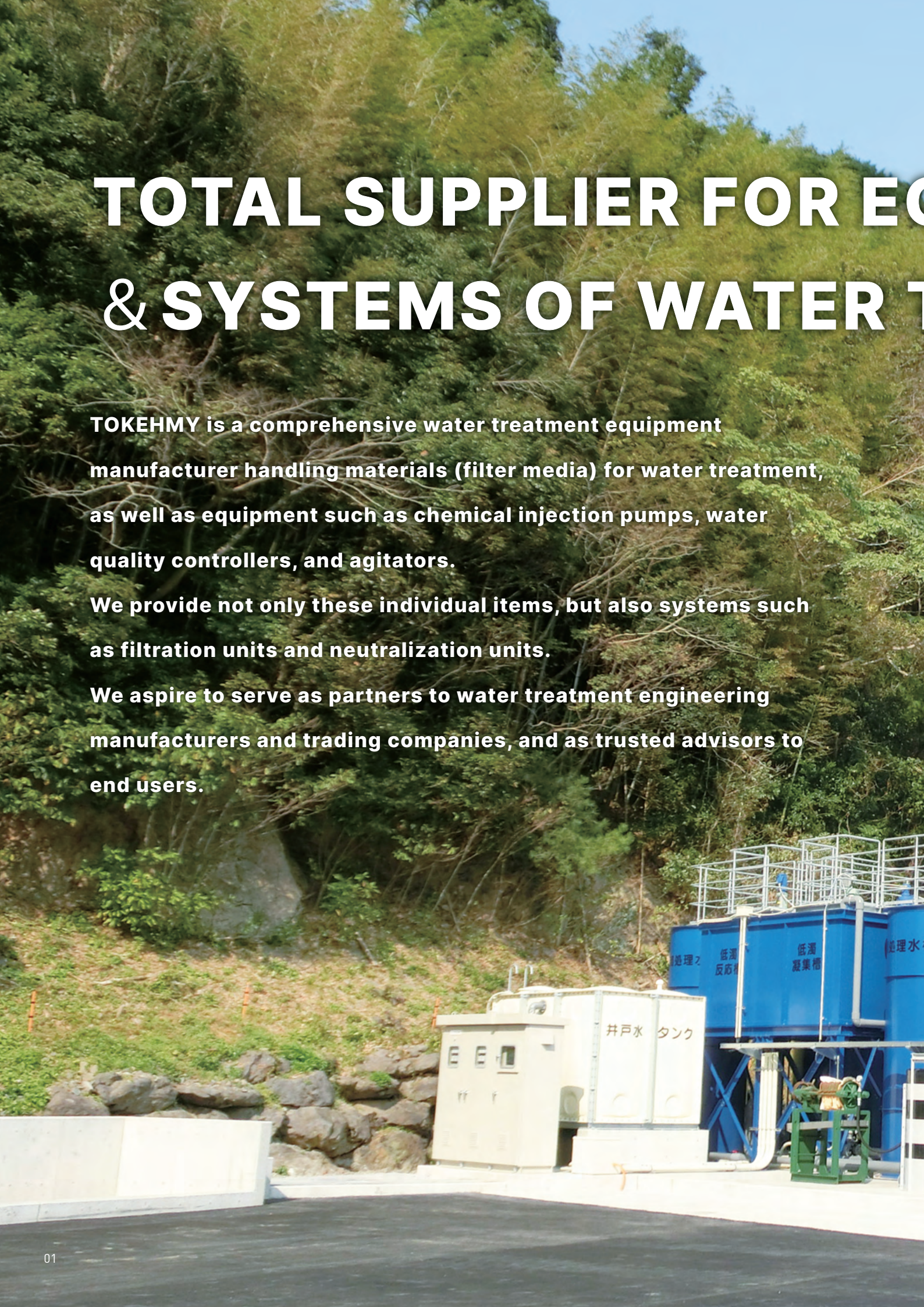
TOHKEMY

WATER TREATMENT SYSTEMS
GENERAL CATALOG

Granular Filtration　Fiber Filtration　Membrane Filtration　Thread Filtration
Coagulation Sedimentation　Pressure Floating Separation　pH Neutralizing

株式会社トーケミ



TOTAL SUPPLIER FOR EC
& SYSTEMS OF WATER T

TOKEHMY is a comprehensive water treatment equipment manufacturer handling materials (filter media) for water treatment, as well as equipment such as chemical injection pumps, water quality controllers, and agitators.

We provide not only these individual items, but also systems such as filtration units and neutralization units.

We aspire to serve as partners to water treatment engineering manufacturers and trading companies, and as trusted advisors to end users.

TOHKEMY

QUIPMENT
TREATMENT

INDEX WATER TREATMENT SYSTEMS GENERAL CATALOG

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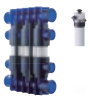


Granular Filtration and Fiber Filtration

Turbidity & SS / Iron & Manganese / Color / Ion Removal

Granular Filtration System Series (p5 ~ 12)

Standard filtration system used with granular filter media.
We will provide a system tailored to your specific removal requirements.
For system selection based on removal targets, please refer to Page 7–12.

Granular Filtration System

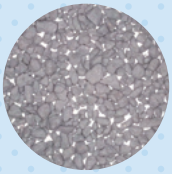
Turbidity & SS Removal

Filter Sand

Iron & Manganese Removal

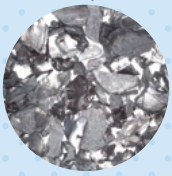
Manganese Sand

Color Removal



Radicalite

Activated Carbon Adsorption



Activated Carbon

Ion Exchange Resin

ActiResin

Fluorine Ion Removal

Acticite F

Other Filtration System Series (p13 ~ 17)

Besides the granular filtration system, we have fiber filtration system and bio reactor system.
Please refer on each pages after Page 13.

Moving Layer Type Filtration Equipment

Gravity and Back Wash Type Filtration Equipment

Superior Fiber Filtration Equipment

Ammonia Reduction for Groundwater Bio Reactor Systems

Granular Filtration System

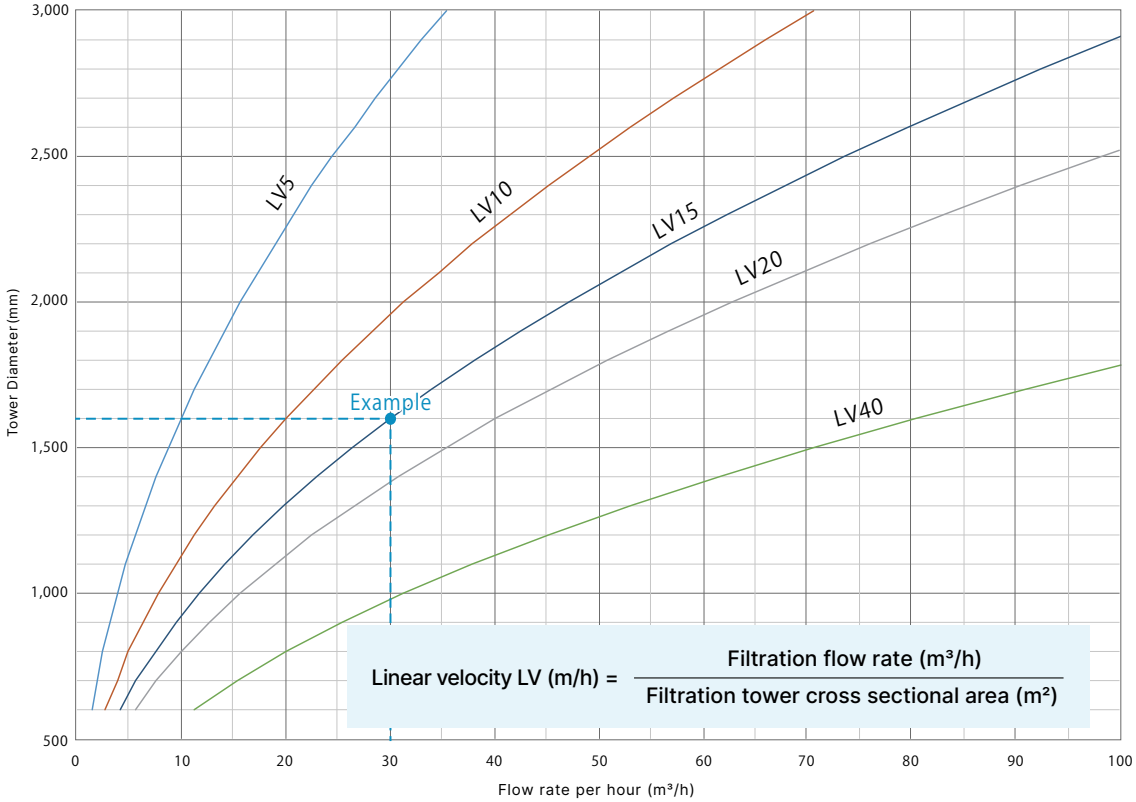
Our lineup includes sand filtration towers for turbidity and suspended solids removal, iron and manganese removal filtration towers, color removal filtration towers, activated carbon adsorption towers, and ion exchange resin towers.
We provide one-stop service tailored to your water quality, from filter media selection to filtration system design, manufacturing, installation, construction, and commissioning.

Common specifications for filtration tower on Page 7-12. For more information on different objects of removal, please refer on each page.

Filtration tower dimensions:
ø2,900mm x SH1,830mm

Relationship Between Filtration Tower Size and Flow Rate

- Lineup includes tower diameters from φ600mm to φ3,000mm (other sizes are available on special request).
- It is recommended to calculate the filtration time per day as 22 hours or less in consideration of washing time.



$$\text{Linear velocity LV (m/h)} = \frac{\text{Filtration flow rate (m}^3\text{/h)}}{\text{Filtration tower cross sectional area (m}^2\text{)}}$$

Example

Flow rate per hour is 30m³/h

When processing at standard filtration velocity (linear velocity) LV = 15m/h, a filtration tower with diameter of ø1,600 mm or more is required.

Specifications

Filtration Tower

		Drinking Water Treatment	Reclaimed water	Corrosion resistant specification	Options
Main body material		SS400			SUS304,FRP
Painting	outside	Polyurethane resin painting			Salt resistant painting
	internal	Epoxy resin painting for waterworks	Non-tar epoxy resin painting	Hard rubber lining	FRP lining
Front piping		SGP-Zn	SGP-Zn	VP	HIVP,SUS304 TP
Tower internal piping		SGP-Zn	SGP-Zn	VP + strainer	HIVP,SUS304 TP
Automatic valve		Pneumatic double-acting type butterfly valve			Electric butterfly valve, Electric 5-way valve
Main applications		●Turbidity and SS removal ●Iron and manganese removal ●Color removal	●Turbidity and SS removal ●Color removal	●Activated carbon adsorption tower ●Ion exchange tower ●Chloride ion (above 200mg/L)	●Air washing ●Surface washing

■ We will propose the optimal filter tower specifications based on the filter media, water quality, surrounding environment, installation location, and other factors.

■ For chloride ion concentrations of 200 mg/L or higher, we recommend corrosion-resistant specifications

■ When use pneumatic double-acting type butterfly valve, an instrument air (compressor) is required.

●SS400: steel plates, steel strips, structural steel, flat steel and steel bars ●SUS304: Austenitic stainless steel ●SGP-Zn: Carbon steel pipe for piping (zinc plated)
●VP...Rigid polyvinyl chloride (PVC) pipes ●HIVP...Impact-resistant rigid PVC pipes ●SUS304 TP...Stainless steel pipes

Control Panel

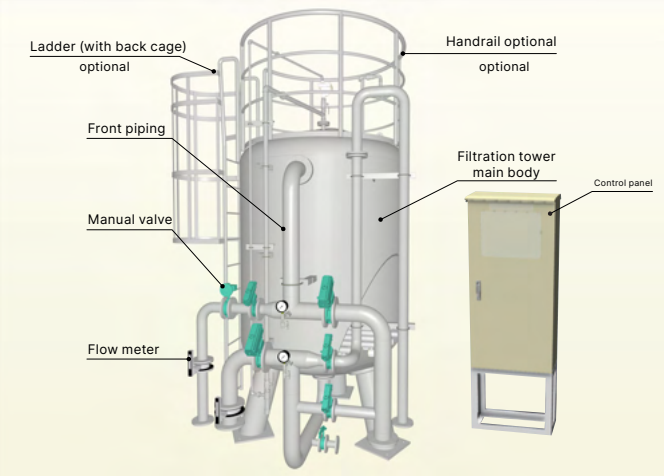
		Standard select switch type	Standard touch panel type	Salt damage resistant type	Options
Place of installation		Outdoor	Outdoor	Outdoor	Indoor
Cabinet	Material	Steel plate	Steel plate	Steel plate	Stainless steel
	Painting	Melamine resinbaking painting	Melamine resin baking painting	Polyester powder coating	Zinc plating
	Color	Munsell 5Y7/1	Munsell 5Y7/1	Munsell 5Y7/1	on Request
Machine operation		Select switch	Touch panel	Select switch	Touch panel
Process indication		Indicator lamp	Touch panel	Indicator lamp	-
Measurements display on panel *1		Indicator	Touch panel	Indicator	Measuring instrument CP panel-mounting/ separately(signal only) Measurements:pH,turbidity,residual chlorine,etc.
Data loging *1		Data logger	Touch panel	Data logger	-
Main applications		General Plant		Salt damage area	-

■Remote monitoring of operational status, such as each measured value and process, is also available (optional).

■We can accommodate your specifications. Please contact our sales department.

*1: Please specify the number of measured value (4-20mADC) inputs.

Image of Exterior View



▼Select switch

▼Touch panel

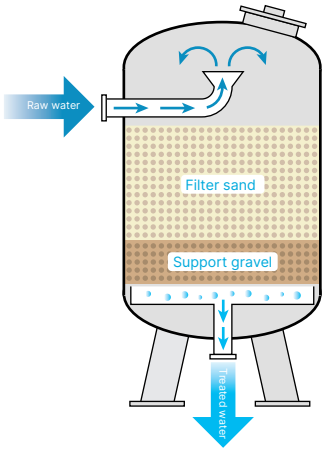
Granular Filtration System

Turbidity & SS Removal

Target Contaminants

Turbidity S S

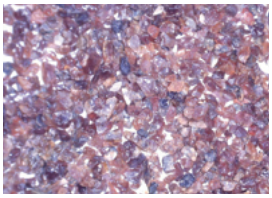
This filtration tower is designed to remove suspended solids dispersed in water.
The standard treatment method is a single-layer system, where filter sand gets layered on top of supporting gravel. For more effective filtration, a dual-layer systems with anthracite on top of the filter sand, or further triple-layer systems by adding garnet under filtration sand are also available.
Ceramics can also be used in place of filter sand to speed up the filtration process.



Filter Media


Filter Sand
(for rapid filtration)

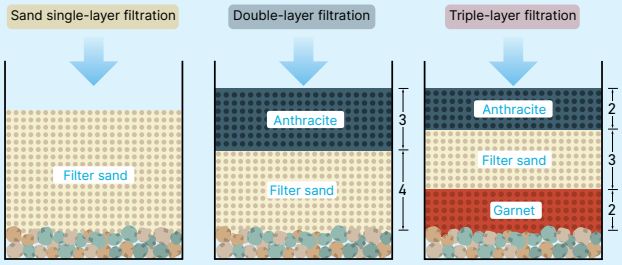

Anthracite


Garnet


Ceramics

Features of multi-layer filtration compared to sand single-layer filtration

- High filtration efficiency due to large void percentage and high turbidity capture volume.
- Low head loss relative to the amount of turbidity captured, enable a long filtration duration.
- High filtration velocity and small filtration area.
- High water recovery rate due to low ratio of backwash water to filtered water volume.



Product Specifications

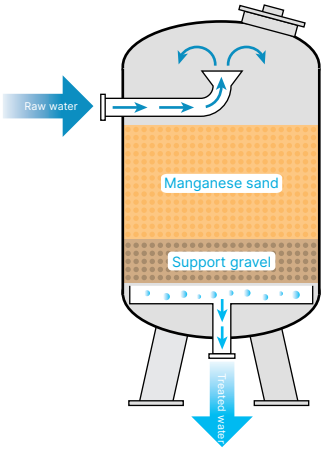
Operating Environment	Place of installation	Indoor or outdoor
	Temperature	0~40°C
Raw Water	Water temperature	0~40°C (No freezing)
	Water quality	Turbidity: up to 10 degree SS: up to 10mg/L
General Conditions of Use	Filter material type	Single-layer: filtration sand or ceramics Multi-layer: anthracite+filtration sand or ceramics(+garnet)
	Filteration velocity	Standard: LV10~20m/h (min.5m/h ; max.40m/h)
	Max. operating press.	0.3 MPa
Treated Water	Water quality	Turbidity: not more than 2 degree SS: not more than 5mg/L
Backwash Water	Backwash velocity	LV20~40m/h

Target Contaminants

Fe Mn

Iron & Manganese Removal

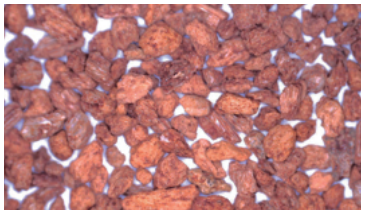
Groundwater contains high levels of iron and manganese. This occurs because iron and manganese are more abundant in the Earth's crust than other metals, dissolving into groundwater through its carbonate components and becoming mixed in.
For use as drinking water or utility water, these must be removed to levels below regulatory standards.
For filtration, we recommend contact oxidation treatment using iron/manganese removal media (manganese sand, Ferrolite series, Toyolex F). Additionally, dual-media filtration with anthracite allows simultaneous removal of turbidity and iron/manganese within a single tower.



Filter Media

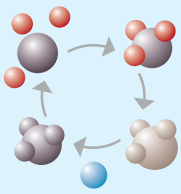

Manganese Sand


Ferrolite HC


Toyolex F

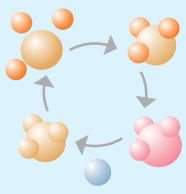
Mechanism of Chlorine Catalytic Oxidation

Manganese ions in raw water are removed by being oxidized by sodium hypochlorite using manganese dioxide on the filter media surface as a catalyst, then adhering to the filter media as manganese dioxide. Caution is required as the filter media becomes inactive if the sodium hypochlorite concentration in the water becomes insufficient.



Mechanism of Air Catalytic Oxidation

This contact oxidation filter media utilizes dissolved oxygen without employing oxidizing agents such as sodium hypochlorite. By avoiding chemical use, it helps reduce operating costs. It is also effective in environments where residual chlorine in treated water is undesirable.



Product Specifications

Operating Environment	Place of installation	Indoor or outdoor
	Temperature	0~40°C
Raw Water	Water temperature	0~40°C (No freezing)
	Water quality	Iron: up to 12mg/L, Manganese: up to 2mg/L
General Conditions of Use	Filter material type	Iron removal: Toyolex (Air catalytic oxidation) Manganese removal: Ferrolite (Chlorine catalytic oxidation) Iron+Manganese removal: Anthracite+Ferrolite (Chlorine catalytic oxidation)
	Filteration velocity	SV5~10m/h^{-1}
	Max. operating press.	0.3 MPa
Treated Water	Water quality	Iron: not more than 0.3mg/L Manganese: not more than 0.05mg/L
Backwash Water	Backwash velocity	LV20~40m/h

Granular Filtration System

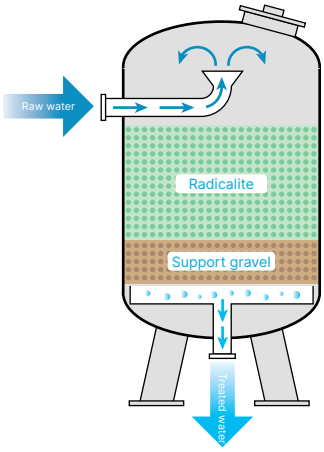
Target Contaminants

Color(Humic substances) Removal

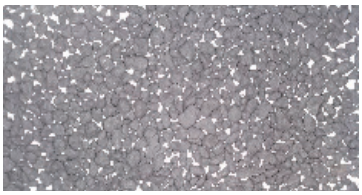
Color

Some groundwater sources contain color components. These color components are broadly categorized into inorganic color (caused by metal ions such as iron and manganese), organic color (from naturally occurring organic compounds like humic substances), and biological color (from algae and bacteria). Here, we introduce a removal system specifically targeting organic color.

* We will propose the optimal treatment equipment, such as color removal media (Radicalite Series), activated carbon, or coagulation filtration, tailored to the raw water quality and required water quality specifications.



Filter Media



Radicalite

- No generation of sludge.
- Ease of routine maintenance.
- Easy adoption to existing filtration equipment.
- Performance retention with annual replenishment(10%) basically.

Humic substance color

Humic substance color is a general term for dark brown organic matter in soil, believed to originate from ancient plant components decomposed by microorganisms, which is common throughout the area of Japan.
It is difficult to remove through conventional water purification treatment and requires extremely strong oxidizing power for oxidation and decomposition, making this method very effective.

Mechanism of Color Removal

Radicalite is a specialized filter media developed to remove humic orginal color.
It utilizes O radicals generated through a catalytic reaction with chlorine-based oxidants to break the resonance between the chromophores and auxochromes of humic substances,thereby reducing color intensity.

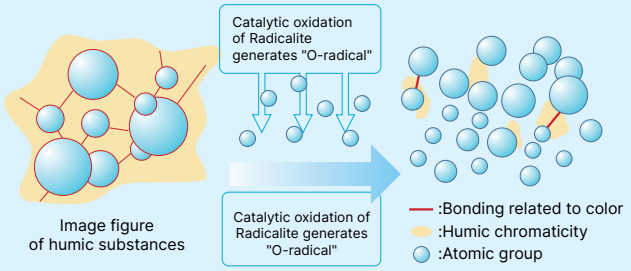


Image figure of humic substances

Product Specifications

Operating Environment	Place of installation	Indoor or outdoor
	Temperature	0~40°C
Raw Water	Water temperature	0~40°C (No freezing)
	Water quality	Color : up to 20 degree
General Conditions of Use	Filter material type	Radicalite UC3 or SC3 (Organic chromaticity)
	Filteration velocity	SV5~10h^{-1}
	Max. operating press.	0.3 MPa
Treated Water	Water quality	Color: not more than 5 degree
Backwash Water	Backwash velocity	LV30~40m/h

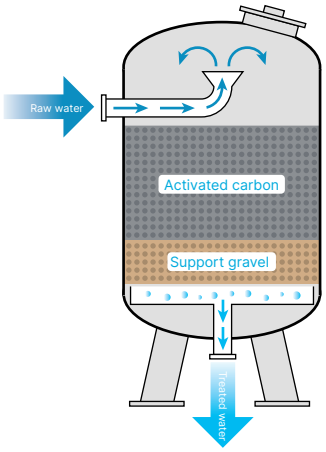
Granular Filtration System

Activated Carbon Adsorption Towers

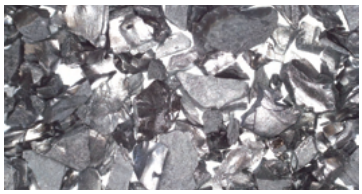
Target Contaminants

Color Odor Cl THMs COD

Activated carbon, characterized by its porous structure, possesses the property of adsorbing numerous substances within its pores. Furthermore, since the surface of activated carbon is nonpolar, polar molecules like water are less readily adsorbed, and it exhibits a characteristic preference for adsorbing low-polarity organic compounds.
This property is utilized to remove organic color components, odor components, COD components, and trihalomethanes. It is also effective for removing residual chlorine through surface oxidation.



Filter Media

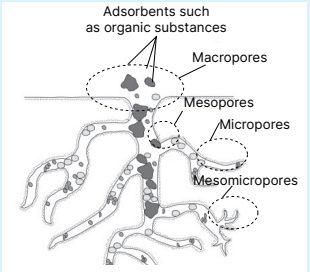


Activated Carbon

- Activated carbon products are broadly classified into plant-based and coal-based types depending on the manufacturing raw materials.
- Activated carbon for water treatment KEMY CARBON TA-30 series is inspected in accordance with JWWA A 114: 2006 or JIS K 1474: 2014.
- We can manufacture the activated carbon according to customer specifications. Please contact us.

Mechanism of Removing Organic Substances

Since carbide has been activated with steam, very fine holes (pores) can be seen on the activated carbon.These pores are divided into four types: “macropores”, “mesopores”, “micropores” and “mesomicropores”.As shown in the figure on the right side, particles such as organic substances enter the “macropores" and “mesopores”, and finer particles enter the “micropores” and “mesomicropores”.
The mechanism of adsorption by activated carbon is to remove pollutants from raw water by incorporating adsorbents (particles such as organic matter) into the pores.



Product Specifications

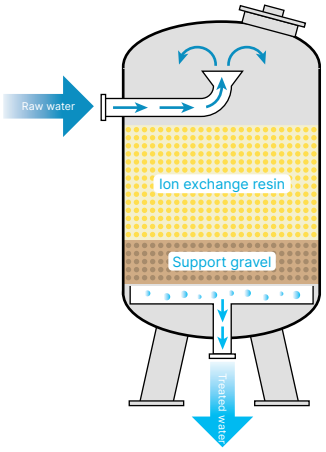
		Organic substances removal	Free residual chlorine removal
Operating Environment	Place of installation	Indoor or outdoor	
	Temperature	0~40°C	
Raw Water	Water temperature	0~40°C (No freezing)	
	Water quality	Water contained organic substances	Free residual chlorine removal : not more than 1.0mg/L
General Conditions of Use	Filter material type	Coal-based activated carbon TA-30C	Coconut-based activated carbon TA-30N
	Filteration velocity	LV5h^{-1}	LV15h^{-1}
	Max. operating press.	0.3 MPa	
Treated Water	Water quality	According to result of water test	not more than 0.1mg/L
Backwash Water	Backwash velocity	SV15~25h^{-1}	

Granular Filtration System

Target Contaminants: Hardness, Ion

Ion Exchange Resin Towers

Japanese tap water is transparent and cleanly treated. However, this clear water contains ions such as sodium, calcium, and chlorine, as well as silica. Therefore, a removal may be necessary for an use as manufacturing water. These ions cannot be removed by physical filtration using filter sand or anthracite. An ion exchange resin tower is a device that removes unwanted ions from water by exchanging the ions held by the resin with the ions in the water that need to be removed.



Filter Media

ActiResin

- The lineup includes both cation exchange resins and anion exchange resins.
- Select cationic resin for soft water production.
- For pure water production, both types of resins can be used in a mixed bed (one-tower type) or separately (two-tower type).

Mechanism of Ion Exchange

As the name implies, the mechanism of ion exchange involves the exchange of ions in the raw water for ions bound to the functional groups of the ion exchange resin. For example, in the case of cation exchange resins used in water softening, as shown in Figure 1, the sodium ions bound to the resin exchange with calcium and magnesium ions in the raw water, in order to remove hardness.
However, as ion exchange continues, the number of sodium ions bound to the resin decreases, and ion exchange gradually becomes impossible.
In such case, the removed ions, such as calcium ions, are once again exchanged with the initial sodium ions by bringing a large amount of sodium ions into contact. This is called "regeneration" of the ion exchange resin. (Figure 2)

Figure 1

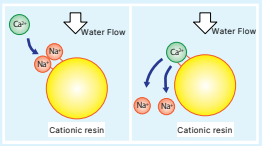
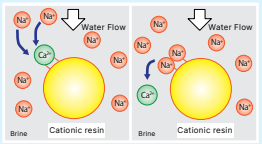


Figure 2



Product specifications

		Water softening	Pure water treatment
Operating Environment	Place of installation	Indoor or outdoor	
	Temperature	0~40°C	
Raw Water	Water temperature	0~40°C(No freezing)	
	Water quality	Hardness object contained	Ionized objectcontained
General Conditions of Use	Filter material type	Cation resin	Cation resin+ anion resin
	Filteration velocity	SV8~20m/h	
	Max. operating press.	0.3MPa	
Treated Water	Water quality	Hardness: not more than 10m/L	Conductivity: not more than 2μS/cm

Standard regeneration process (For Water softening treatment)

Operation	Outline
Liquid flow	Perform water softening(removing hardness object)
Backwash	Loosen the resin. Discharge turbidity captured on the resin surface and in the spaces among resins
Regeneration	Regenerate the hardness removal capacity by flowing brine
Extrusion	Drain the brine(may be collected)
Flushing by water	Completely drain the remaining brine

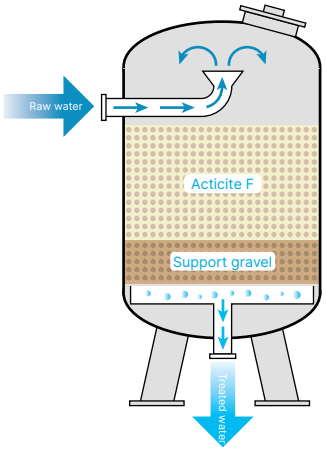
Repeat

Target Contaminants

F

Fluoride Ion Removal (Acticite F)

The groundwater in some areas contains fluoride ions. In case the concentration is more than 0.8mg/L under the tap water standard, a removal is necessary. Acticite F is the granulated filter media to use the LDH: Layered Double Hydroxide, which has the special fluorine ion removal ability for water treatment.We offer the proper system for this media.



Filter Media

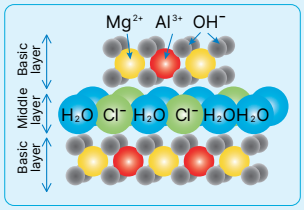
Acticite F

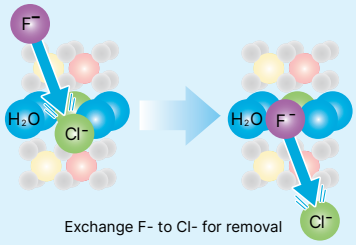
- Can treat fluoride ions to levels below the water quality standard (0.8 mg/L).
- Can be used as an alternative to bone charcoal, which was frequently used for fluoride ion removal.
- Has passed leaching tests for water supply equipment and materials.

Mechanism of Fluoride Ion Removal

Flouride Ion in the ground water is getting removed by exchanging it with Chloride ion contained in the middle layer of the Layered Double Hydroxide (LDH).

LDH structural model





Exchange F- to Cl- for removal

Acticite F has the ion selectivity. Hydrogen carbonate ion, which is more abundant in groundwater, has high selectivity compared to fluorine ion, and decreases Acticite F's life notably. Therefore, hydrogen carbonate ion is necessary to be removed before removal of fluorine ion.
* For more information on fluorine ion removal, please contact our sales staff.

Hydrogen carbonate ion ≫ Fluoride ion>Sulphate ion>Hydrogen carbonate ion

Product Specifications

Operating Environment	Place of installation	Indoor or outdoor
	Temperature	0~40°C
Raw Water	Water temperature	0~40°C (No freezing)
	Water quality	Fluorine ion: 0.8~20m/L
General Conditions of Use	Filter material type	Acticite F
	Filteration velocity	Not more than SV10h^{-1}
	Max. operating press.	0.3MPa
Treated Water	Water quality	Fluorine ion: not more than 0.8m/L
Backwash Water	Backwash velocity	LV20m/h

Other Filtration Equipment (For Turbidity & SS Removal)

Moving Layer Type Filtration Equipment

Target Contaminants

Turbidity S S Fe

Conventional filtration systems require stopping filtration during cleaning because the process is divided into filtration and washing stages. However, this method can operate both filtration and washing at the same time, which makes it possible to treat water consecutively without stopping filtration process. The washing water tank is unnecessary, which reduces installation space.

Features

- Flow raw water in and send air, then both filtration and washing process are done at the same time.
- No need for back wash pump.
- Unnecessary for keeping the amount of washing water inside the treated water tank, reduction of installation space.
- Fully automated operation, easy for maintenance.

Applications

- Decontamination for raw water with much of suspended substances (Pretreatment filtration)
- Iron removal filtration with high concentration

Product Specifications

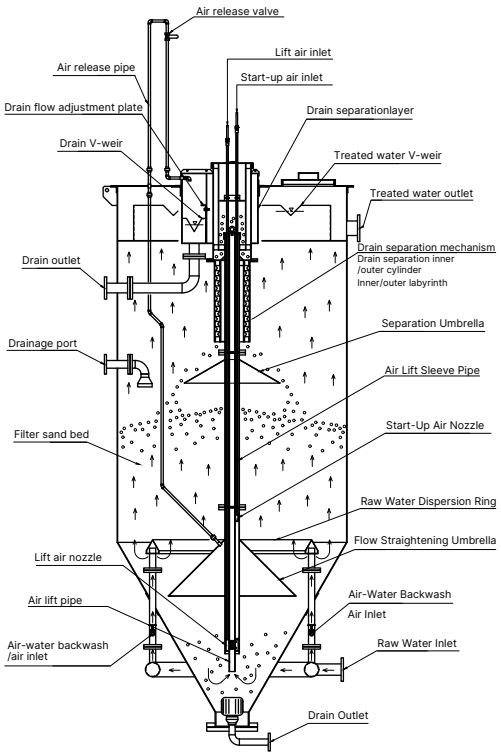
Operating Environment	Place of installation	Indoor or outdoor
	Temperature	0~40°C
Raw Water	Water temperature	0~40°C (No freezing)
	Water quality	Turbidity: Not more than 100 degree SS: Not more than 100/L
General Conditions of Use	Filter material type	Single-layer: Filter sand (Filter material only for Moving Layer Type Filtration Equipment)
	Filteration velocity	Standard LV8~10m/h
Treated Water	Water quality	Turbidity: Not more than 10 degree SS: Not more than 10mg/L
Washing	Wash water flow rate	10~15% of raw water flow rate
	Washing air volume	30~60NL/(min·m²) 0.2~0.3MPa

This device also complies with the “Sewerage Service Agency Specifications.”

▼ Sewerage Service Agency Specifications

Continuous Filtration Method	Continuous Filtration, Continuous Cleaning Sand Filter
Filtration Rate	Below 200m/day (LV=8.3m/h or less)
Raw Water Concentration and Selected Water	When BOD is 20 mg/L or less and SS is 20 to 30 mg/L The SS concentration of filtered water is 10 mg/L or less
Cleaning	Water volume: Less than 10% of raw water volume Air volume: Less than 30 NL/min/m² Air pressure: 0.3 Mpa
Filter Media Type	Effective Diameter: Approx. 1.0mm Uniformity Coefficient: 1.4 or less Loss on Ignition: 0.75% or less Specific Gravity: 2.57–2.67

Flow Sheet



Gravity Backwashing Filtration System

Target Contaminants

Turbidity　S S　Fe　Mn

This filtration system automatically cleans the filter media using cleaning water stored at the top of the tower, without requiring power equipment such as pumps. After cleaning, the treated water is stored in the cleaning water tank before use. However, by installing multiple towers, treated water can be used continuously. Additionally, by adding an automatic valve, cleaning can be performed at a specified time.

Features

- Washing tank combined type, save the facility and power expense compared with other filtration equipment.
- No need for back wash pump for washing.
- No need for keeping capacity for washing water inside the treated water tank, save the installing space.
- Fully automatic operation, easy for maintenance.

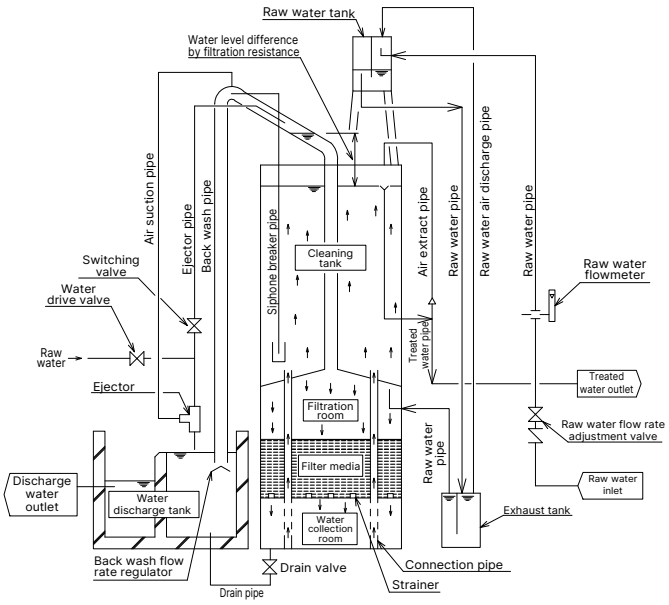
Applications

- Decontamination and filtration of raw water with comparatively less of suspended substances
- Iron and manganese removal and filtration

Product Specifications

Operating Environment	Place of installation	Indoor or outdoor
	Temperature	0~40°C
Raw Water	Water temperature	0~40°C (No freezing)
	Water quality	Turbidity: Not more than 10 degree SS: Not more than 10m/L
General Conditions of Use	Filter material type	Single-layer: Filter sand
	Filteration velocity	Standard LV10m/h
	Max. operating press.	0.2MPa
Treated Water	Water quality	Turbidity: Not more than 2 degree SS: Not more than 5m/L
Backwash Water	Backwash velocity	LV30~40m/h

Flow Sheet



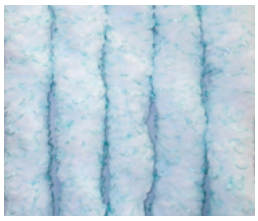
Superior Fiber Filtration Equipment

Target Contaminants

Turbidity S S Fe

Actifiber®

By utilizing fiber as the filter media and effectively cleaning it through a unique cleaning mechanism, we have achieved reproducible filtration performance. Compared to granular media, the higher void ratio within the fiber media allows for greater capture of suspended solids, enabling high-speed filtration. Fiber filter media [Actifiber®] offers features such as space savings and reduced wastewater volume.



P series
(For purification
/industrial water filtration)

R series
(For circulation
/wastewater filtration)

1000 mm series
FRP Housing

1500 mm series
SUS Housing

Features

- Suitable for high turbidity

Raw water with its maximum 100 NTU turbidity would be treated with the value less than 5NTU (with coagulant).

- Reduction of installation space

Since the filtration speed can be increased by about 5 times compared to the granular filter material (approx. LV20~80m/h), the size of the filtration tower can be reduced to save the installation space.

- Reduction of washing water volume

Simultaneous cleaning of strong air and water is adopted for cleaning, and a large cleaning effect can be obtained with a small amount of cleaning water.

- Large amount of turbidity captured

The void ratio is 90% or more (sand and anthracite is approx. 50%), and since a large amount of fibers of several tens of μm is used, the surface area is large, and the amount of turbidity trapped is larger than that of granular filter media.

For purification & industrial water filtration (P series)

Applications

- Measures for high concentrated river water, changed water condition, and prevention against contaminating into sewage with rain water
- Pretreatment before membrane filtration such as SMF
- Decontamination of industrial water
- Fresh water generating from rainwater to reclaimed water
- Removal of high concentrated iron in groundwater
- Recirculation filtration for pool

For circulation & wastewater (R series)

Applications

- For tertiary treatment of wastewater, such as septic tanks
- Filtration for appereciation ponds and culture ponds
- Side filter for cooling water
- Recirculation filtration for public bathes, appereciation ponds, and so on)

Product Specifications

Fiber Type		For purification・industrial water filtration (P series)	For circulation・wastewater filtration (R series)
Fiber Filter Media	Single fiber diameter	Approx. 50 μm	Approx. 50 μm
	Filter material diameter	Φ 120mm	Φ 120mm
	Material	Polypropylene(PP)	
	Nominal length	1000mm, 1500mm	

Please note

In case of using with high temperature, acid-resistance, and alkali-resistance, please contact our sales staff.

Unit Specifications

1000mm series (Compact and light weight type) material: FPR

Features Light filter vessel made from FRP. No need to put media into tank at user's place.

Model	Filtration tower inner diameter	Reference amount of treated water (LV20～50m/h)	Washing drainage volume (per process)	Washing specifications	Materials and others
AFU-□300	φ300mm	1.4～3.5m³/h	Approx.0.4m³	Back washing speed LV25m/h Backwash Air LV500m/h	Housing：G-FRP Differential pressure used(ΔP)：0.05MPa less Equipment pressure used：0.2MPa less Operating temperature：0～40°C (No freezing) Mounting：Comb holding type
AFU-□400	φ400mm	2.5～6.2m³/h	Approx.0.7m³		
AFU-□500	φ500mm	3.9～9.8m³/h	Approx.1.0m³		
AFU-□600	φ600mm	5.6～14m³/h	Approx.1.4m³		

Select either P (for purification & industrial water filtration), or R (for circulation & wastewater) for □.

1500mm series (Turbidity captured up and high performance type) material: SUS

Features Filter media replacement is easy with the cartridge method. In comparison with fiber length 1,000mm series, larger amount of turbidity captured, great decrease of washing times. And more, high speed filtration, more efficient treatment.

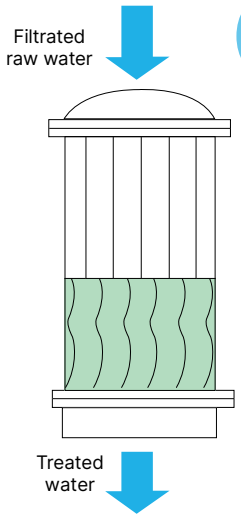
Model	Filtration tower inner diameter	Reference amount of treated water (LV20～80m/h)	Washing drainage volume (per process)	Washing specifications	Materials and others
AFU-□315	φ300mm	1.4～5.6m³/h	Approx.0.6m³	Back washing speed LV40m/h Backwash Air LV500m/h	Housing：SUS304 Differential pressure used(ΔP)：0.1MPa less Equipment pressure used：0.3MPa less Operating temperature：0～40°C (No freezing) Mounting：Cartridge type
AFU-□515	φ500mm	3.9～15m³/h	Approx.1.6m³		
AFU-□615	φ600mm	5.6～22m³/h	Approx.2.3m³		
AFU-□915	φ900mm	12～50m³/h	Approx.5.1m³		
AFU-□1215	φ1,200mm	22～90m³/h	Approx.9.0m³		
AFU-□1415	φ1,400mm	30～123m³/h	Approx.12.3m³		
AFU-□1615	φ1,600mm	40～160m³/h	Approx.16.1m³		

Select either P (for purification & industrial water filtration), or R (for circulation & wastewater) for □.

Flow Sheet

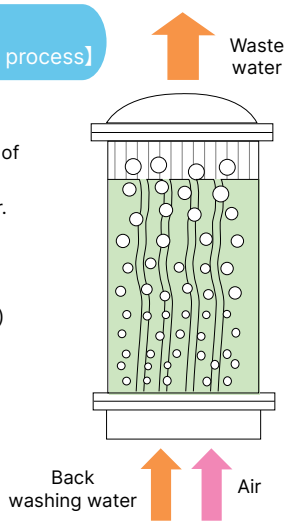
Filtration

Media is compressed by filtration water and catches turbidities.



Washing 【Water and air washing process】

Back washing opens the filtration media and uses small amount of back wash water and much amount of air. In a short time, high washing efficient. (Washing time 20 mins, Air washing LV 500m/h)



Groundwater Ammonia Reducing Biological Treatment System

ActiSomonas

Target Contaminants

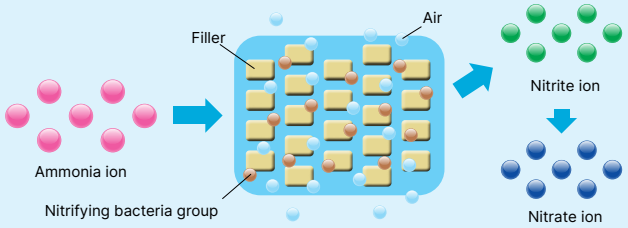
Ammonia

Goundwater sometimes contained ammonia ion. To reduce ammonia ion, the breakpoint treatment is common, which uses sodium hypochlorite and consumes much chemicals.
Using too much sodium hypochlorite may make the concentration level of chloric acid exceed the tap water standard (less than 0.6mg/L). Therefore, we have developed a system that utilizes microorganisms instead of hypochlorous acid.

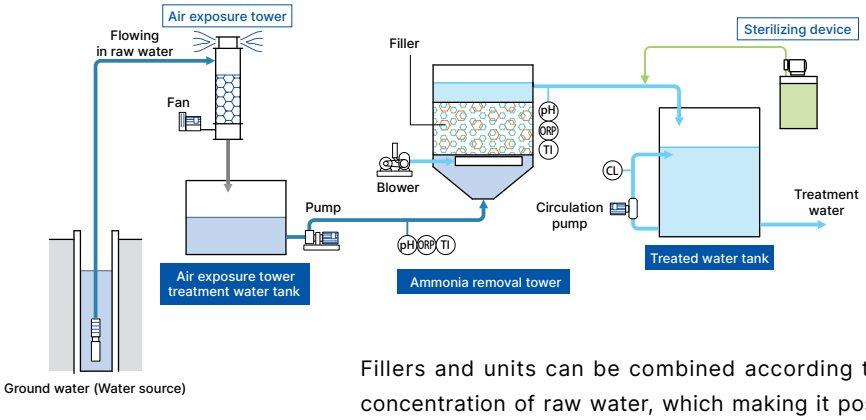
Applications	Treatment of ground waterwith high ammonia concentration

Mechanism of Ammonia Treatment

By utilizing nitrifying bacteria colonizing the filter media to oxidize ammonia,
the amount of sodium hypochlorite required for well water treatment can be reduced.



Flow Sheet



Fillers and units can be combined according to the ammonia concentration of raw water, which making it possible to handle high concentrations of ammonia.

Unit Specifications

Processing Power	5 m^3/h	10 m^3/h	20 m^3/h	30 m^3/h	40 m^3/h	50 m^3/h
Air Exposure Tower	ø400mm	ø500mm	ø700mm	ø900mm	ø1,000mm	ø1,100mm
Air Exposure Tower Treatment Water Tank	1m^3	2m^3	4m^3	6m^3	10m^3	10m^3
Ammonia Removal Tower	ø1,000mm	ø1,300mm	ø1,900mm	ø2,300mm	ø2,600mm	ø2,900mm
Treated Water Tank	3m^3	5m^3	10m^3	15m^3	20m^3	25m^3
Installation Space L×W	9×4m	10×4m	11×5m	14.5×5.5m	15×6m	16×7m

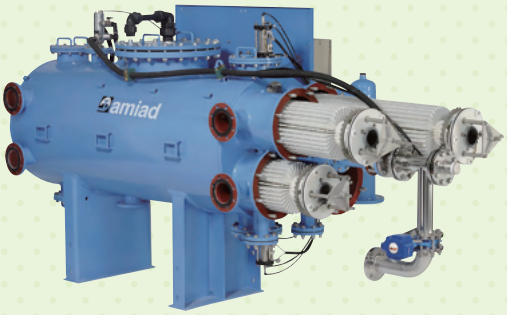
Membrane Filtration and Thread Type Filtration

General Bacteria & Cryptosporidium Removal

SMF Cassette System

SMF Vessel System

SMF Naked System



Thread Type Filtration Equipment

Actifiber＋SMF Complex System

Ultra-Precision Membrane

SMF Cassette System

Target Contaminants

Turbidity S S Crypto Bacteria

The demand for advanced treatment of water is increasing. The micropore membrane as filter media enables water purification that cannot be achieved by sand filtration. However the membrane filtration is suitable for advanced processing, it is weak for high loads.
In order to make the membrane function effectively, we have developed the Super Micro Filter (SMF) cassette that can be washed with air and is resistant to high loads.

Features

- **Achieves high flux by special membrane formation**
  Flux: Approximately 4 times compared to the conventional products.
- **Achieves excellent washing ability by using water and air together**
  Achieves effective turbidity discharge by bubbling and backwashing with permeated water.
- **Capable of removing Cryptospodium and Legionella**
  Since SMF-PVDF has a nominal pore size of 0.05 μm, it is possible to remove Cryptosporidium and Giardia, which are the enemies of drinking water, and Legionella, which is the enemy of hot bath facilities and cooling towers.

Applications

- Decontamination and infection control for water and beverage facilities
- Circulation and Filtration for Hot Bath Facilities and Pools
- Pretreatment of RO membrane equipment
- Aseptic seawater production* [fishery processing]

*Pretreatment may be required.

Product Specifications

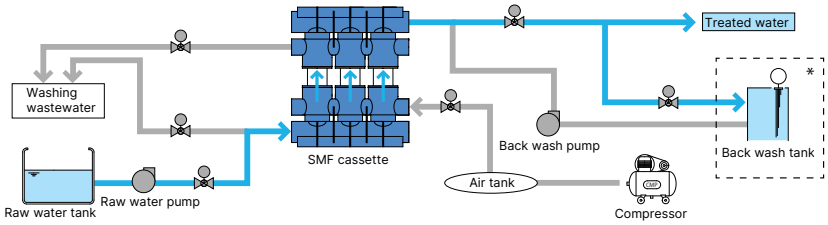
Model		SMF-PVDF
Membrane Material		PVDF（Polyvinylidene Fluoride）
Nominal Pore Size		0.05μm
Membrane Area		2.2m²
Filtration Method		External Pressure Full-Flow Filtration Method
Membrane Shape		Hollow Fiber (Capillary Type)
Cassette Material		Polycarbonate
Cassette Dimensions		W 356mm × D 90mm × H 450mm
Cassette Weight		（Dry）4kg　（Wet）8kg
Connection Specifications		TS Connection（25A、40A）
Operating Conditions	Pressure	0~0.2MPa
	Water Temperature	5～40°C
	pH	During Operation : 3~10 During Chemical Cleaning : 2~11
Fresh Water Filtration Capacity*1		1.52
Design Filtration Capacity*2 (m³/h) Water Temperature of 25°C.	Fresh Water System	0.22~0.42
	Seawater System	0.29~0.39
	Pool Circulation Water	0.28~0.55

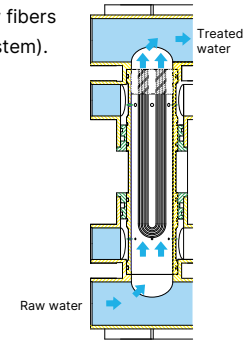
*1 Calculated based on the filtration water volume of the test module at a supply pressure of 0.2 MPa and water temperature of 25°C.
*2 The filtration flow rate varies depending on operating conditions such as raw water quality, water temperature, supply pressure, and backwash conditions. This value is a guideline. Please consult our sales representative during the design phase. Furthermore, conducting a membrane filtration test using the actual raw water allows for determining the precise design filtration flow rate, backwash conditions, and other operating parameters. We offer membrane filtration testing for a fee.
*3 This refers to seawater after pretreatment, such as sand filtration.

Flow Sheet

Filtration process

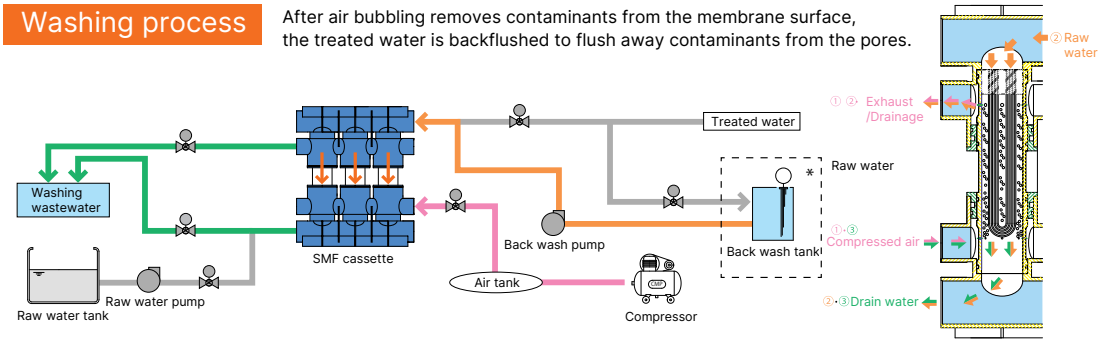
Raw water permeates from the outside to the inside of the hollow fibers to produce treated water (external pressure full-flow filtration system).





Washing process

After air bubbling removes contaminants from the membrane surface, the treated water is backflushed to flush away contaminants from the pores.



Standard washing method

Washing process	① Air wash 30 sec. ② Backwash 40 sec. ③ Water drainage 50 sec.	Backwash flow rate	1.5 to 2 times of the filtration flow rate
Air wash volume	3Nm³/h (Per cassette)	Washing frequency	Once every 30 minutes

*The cleaning method varies depending on the properties of the raw water.
*The unit type doesn't include any back wash tank and uses water in treated water tank

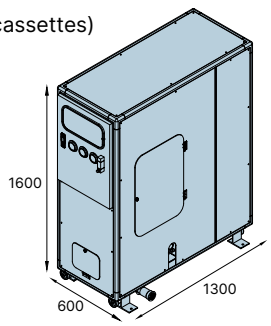
Specifications

Number of Cassettes	2～4	6	8～12	14～18
Membrane Area(m²)	0.44～0.88	13.2	17.6～26.4	30.8～39.6
Standard Processing Capacity(m³/h)	0.6～1.3	1.9	2.6～3.8	4.5～5.8
Compressor(kW)	0.2～0.4	0.4	0.75	1.5
Air Tank(L)	Approx.20	Approx.40	Approx.80	Approx.120
Unit Type	Package type	Package type	Unit type	Unit type
Approximate Dimensions(m)	0.6 × 1.3 × H1.6	0.6 × 1.7 × H1.6	1.5 × 1.7 × H1.9	1.7 × 1.7 × H1.9
Backwash Water Tank(L)	200(included)	200(included)	Not included	Not included

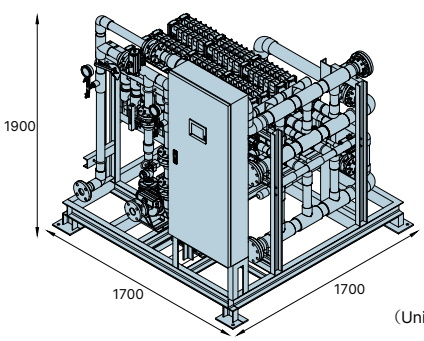
* When the raw water is from the purification system (water temperature 25°C)

Dimentional Outline Drawing

Package type
(Example : 2 ~ 4cassettes)



Unit type
(Example :
14 ~ 18cassettes)



(Unit:mm)

Ultra-Precision Membrane

Target Contaminants

Turbidity S S Crypto

SMF Vessel System

A vessel-type SMF membrane capable of compact large-capacity processing. Membrane shape is the Hollow thread. With a membrane of 40m² per vessel, enabling a treatment capacity of 6.8m³/(m²·d) (for clean water at 25°C and an operating pressure of 0.2MPa).
PVDF membrane attached, which has physically strength and high endurance for chemicals, and advances effect of both air and chemical wash. This is the reason of keeping filtrating ability stable even in the severe raw water condition with heavy load.

Features

- **Achieves high flux through special membrane technology**
  Clear water flux: 6.8 m³/(m²·d) (0.2 MPa, 25°C)
  High flux enables large-capacity water purification.
- **Excellent cleaning capability achieved through combined water and air use**
  Effectively removes turbidity by combining backwashing with permeate water and bubbling.
- **Capable of removing Cryptosporidium and Legionella**
  With a nominal pore size of 0.05 µm, it can remove Cryptosporidium, a major threat to drinking water, and Legionella, a major threat to hot bath facilities and cooling towers.

Applications

- Decontamination and infection control of water and beverage facilities
- Advanced treatment of tap water
- Pretreatment of RO membrane equipment
- Aseptic seawater production* (Fish processing)
  * Pretreatment may be required.

Product Specifications

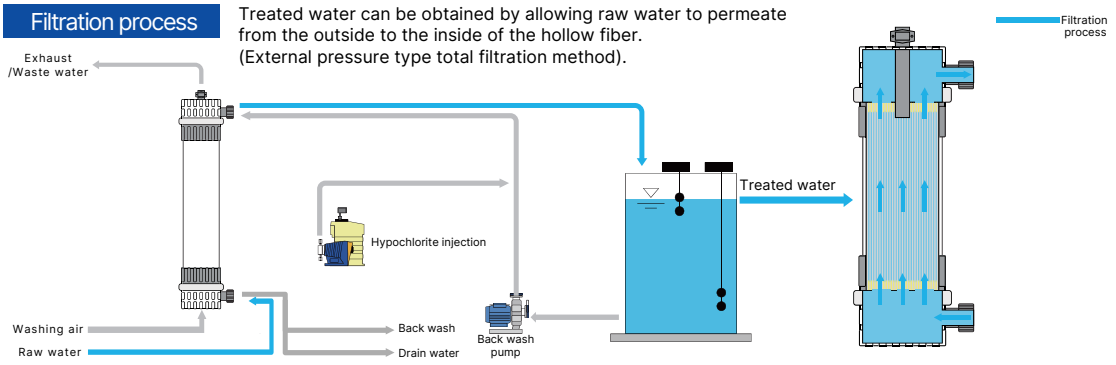
Model		SMF-PVDF-V40
Membrane Material		PVDF
Nominal Pore Size		0.05µm
Membrane Area		40m²
Filtration Method		External Pressure Full-Flow Filtration Method /Cross-Flow Method
Membrane Shape		Hollow Fiber (Capillary Type))
Housing Material		U-PVC
Modules Dimensions		φ225mm × H1850mm
Modules Weight		(Dry)45kg (Wet)90kg
Connection Specifications		50A Housing Pipe Fitting
Operating Conditions	Maximum Operating Pressure	0.3MPa
	Maximum Membrane Differential Pressure	0.2MPa
	Water Temperature	5~40°C
	pH	During Operation : 3~11 During Chemical Cleaning : 2~12
Design Filtration Capacity*2 (m³/h) Water Temperature of 25°C	Water Purification System	2.8~5.5m³/h
	Seawater System*2	3.7~5.1m³/h
	Sewage System	2.0~3.5 m³/h

*1 Filtration capacity varies depending on operating conditions such as raw water quality, water temperature, supply pressure, and backwash conditions. This value is a guideline. Please consult our sales representative during design.
Accurate design filtration capacity, backwash conditions, and other operating parameters can be determined by conducting membrane filtration tests using actual raw water. Membrane filtration tests are available for a fee.
*2 This refers to seawater after pretreatment.
* When placing an order, please consult with our sales representative to determine the number of vessels and operating conditions based on the required treated water volume.

Flow Sheet

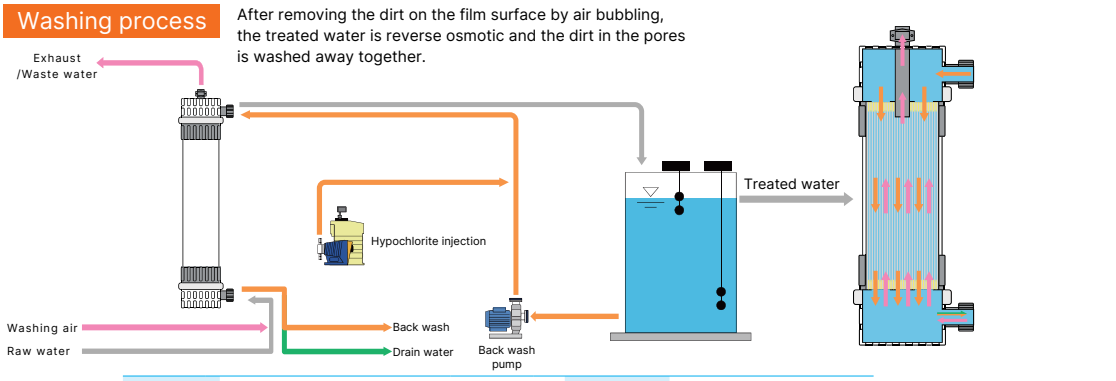
Filtration process

Treated water can be obtained by allowing raw water to permeate from the outside to the inside of the hollow fiber.
(External pressure type total filtration method).



Washing process

After removing the dirt on the film surface by air bubbling, the treated water is reverse osmotic and the dirt in the pores is washed away together.



Standard washing method

Washing process	① Air wash 30 sec. ② Backwash 40 sec. ③ Water drainage 50 sec.	Backwash flow rate	About twice the volume of filtered water
Air wash volume	12 Nm³/h (Per cassette)	Washing frequency	Once every 60 minutes

Air washing process
Back washing process
Water drainage process

*The filtration and washing methods above are our company recommended. It depends on quality of raw water and other conditions. For more information, please contact to our sales staff.

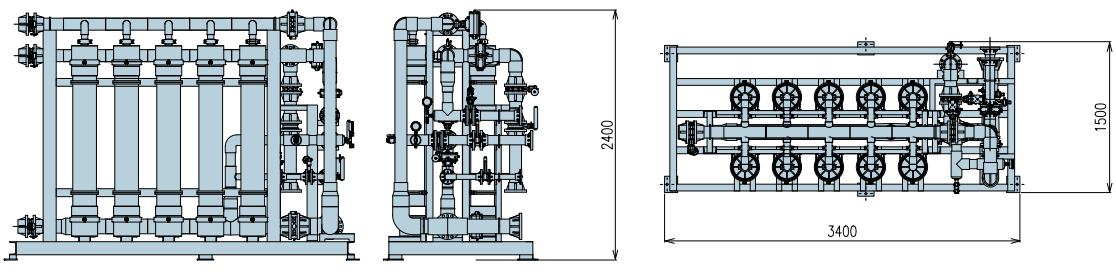
Unit Specifications

Vessel Count	1	2	3	4	6	8	10
Membrane Area (m²)	40	80	120	160	240	320	400
Standard Treatment Capacity (m³/h)*	5	10	15	20	30	40	50
Compressor (kW)	0.75	0.75	1.5	2.2	3.7	3.7	3.7
Air Tank (L)	Approx.50	Approx.60	Approx.80	Approx.100	Approx.160	Approx.200	Approx.250
Equipment Model	Unit type	Unit type	Unit type	Unit type	Unit type	Unit type	Unit type
Approximate Dimensions (m)	1.0 × 1.2 × 2.3H	1.0 × 1.6 × H2.3	1.0 × 2.0 × H2.3	1.0 × 2.4 × H2.4	1.5 × 2.6 × H2.4	1.5 × 3.0 × H2.4	1.5 × 3.4 × H2.4
Backwash Tank (L)	500	1000	1500	2000	3000	4000	5000

* When the raw water is from the purification system (water temperature 25°C).

Dimentional outline drawing

Example: 50 m³/h (10 modules × 1 unit)



【Side view】 【Front view】 Plan view (Unit:mm)

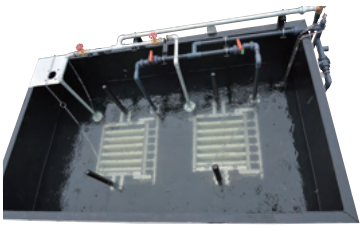
Ultra-Precision Membrane

Target Contaminants

Turbidity S S Crypto

SMF Naked System

Membrane and suction filtration with the module immersed into tank.
A hollow fiber membrane (naked) can be washed by air. The PVDF is used as its material, which is strong against chemicals, therefore it is possible to keep stable and certain amount of treated water and its quality even under harsh conditions.
Not only for water treatment for clarification of high loaded and high turbidity water, but also for wastewater treatment with MBR (Membrane Bio Reactor). (Refer to p31)



Features

- **Small installation scale and space saving**
  By a large membrane area with 20m²/module, the entire space for equipment can be smaller.
- **Corresponding to the increase in treated water volume**
  By installing to existing water purification facilities, it can correspond to the increase in treated water volume.
- **Stable treated water quality**
  Stable treated water quality can be ensured even if the quality of raw water deteriorates during rainfall in rivers.
- **Enables water recycle**
  A PVDF membrane with a nominal pore size of 0.05 μm provides clear treated water that can be used directly as miscellaneous water.

Applications

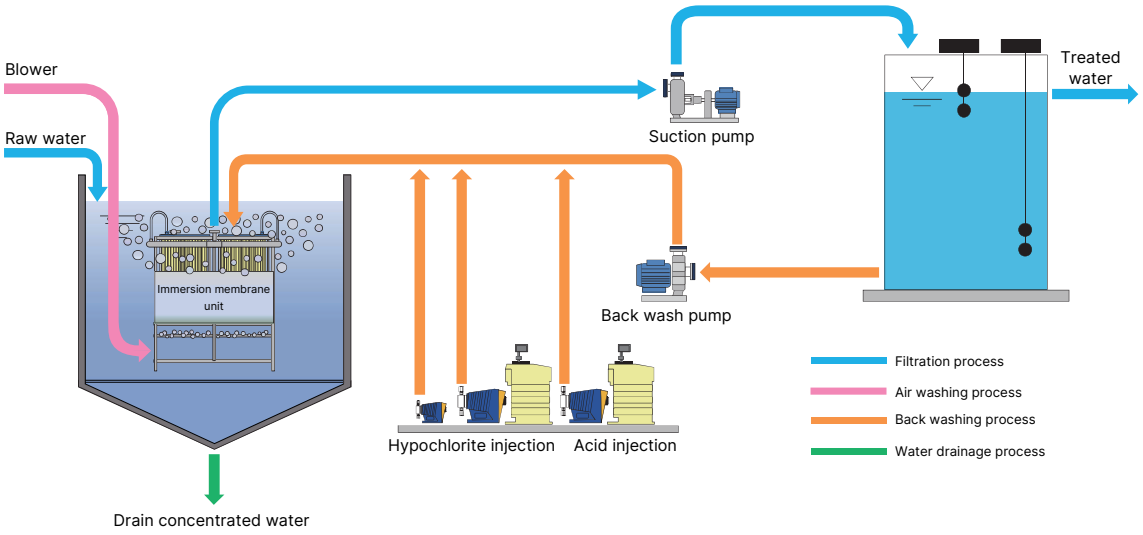
- A water purification facility with raw water of a river which turbidity rises sharply when it rains.
- Improvement of water recovery rate by concentrating and collecting backwash wastewater from the filter
- Improvement of water quality in existing water purification facilities
- Recycling wastewater such as miscellaneous wastewater

Product Specifications

Model		SMF-PVDF-N05	SMF-PVDF-N20
Membrane Material		PVDF	
Nominal Pore Size		0.05μm	
Filtration Method		Suction Filtration Method	
Membrane Shape		Hollow Fiber (Capillary Type)	
Collector Pipe Material		ABS	
Membrane Area		5m²	20m²
Module Dimensions		W618 × D45 × H890mm	W744 × D40 × H1,622mm
Module Weight		(Dry)2kg (Wet)5kg	(Dry)10kg (Wet)20kg
Design Flow Rate*1 (m³/h)		0.13~0.21	0.50~0.83
Tank Water Quality Guideline		Suspended Solids 800~1,000mg/L	
Operating Conditions	Pressure	(Recommended) -35 kPa or higher	
	Water Temperature	5~40°C	
	pH	During Operation3~11	During Chemical Cleaning2~12

*1 Design flow rate varies depending on operating conditions such as raw water quality, water temperature, supply pressure, and backwash conditions. This value is a guideline. Please consult our sales representative during design.
* Please note that oils and silicone-based defoamers may clog the membrane.

Flow Sheet



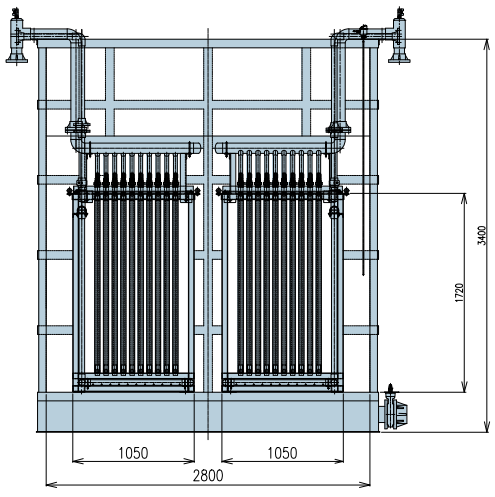
Unit Specifications

Number of Modules	IMF-N05-10 × 1	IMF-N05-15 × 1	IMF-N05-10 × 2	IMF-N05-15 × 2	IMF-N20-10 × 1	IMF-N20-10 × 2
Elements	SMF-PVDF-N05 × 10	SMF-PVDF-N05 × 15	SMF-PVDF-N05 × 20	SMF-PVDF-N05 × 30	SMF-PVDF-N20 × 10	SMF-PVDF-N20 × 20
Membrane Area (m^2)	50	75	100	150	200	400
Standard Treatment Capacity (m^3/h) *	1.7	2.6	3.4	5.2	6.7	13.4
Blower Capacity (m^3/min)	0.35	0.55	0.73	1.08	0.89	1.82
Equipment Type	1Unit	1Unit	2Unit	2Unit	1Unit	2Unit
Approximate Dimensions (m)	1.2 × 1.5 × H2.5	1.2 × 1.9 × H2.5	1.2 × 2.8 × H2.5	1.2 × 3.5 × H2.5	1.4 × 1.5 × H3.4	1.4 × 2.8 × H3.4

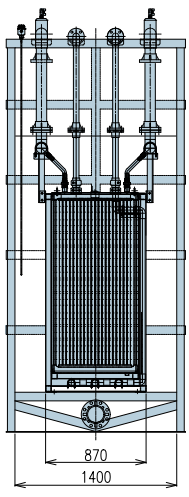
* When the raw water is from the purification system (water temperature 25°C).

Dimentional Outline Drawing

Example: 384 m^3/d (10 modules × 2 units)



【Front view】



【Side view】

(Unit：mm)

Thread Type Filtration Equipment

Protozoa (5μm and 8μm), which can't be extincted with sodium hypochlorite, is effect to be removed by the membrane filtration equipment. Once infection accident occures, it can be a bad influence not only for each household to keep drinking water but also for hospitals, restaurants, public institutions and customers and hotels on tourist sites. In some cases human life may be affected.
The thread type filtration equipment is the new special "water supply treatment system" for reducing turbidity and removing cryptospoligym, which innovated good points of both sand filtration and large porous membrane.

Features

- With 3 micron filtration accuracy,(Filtraion accuracy same as large porous membrane)
- Cryptosporidium is removed at 99.9%
- Miracle response rate 99.5% or more*1
- Treat 2,800 tons/day (MTG model)
- Very compact design, outdoor installation possible
- Low price・low cost for maintenance*2

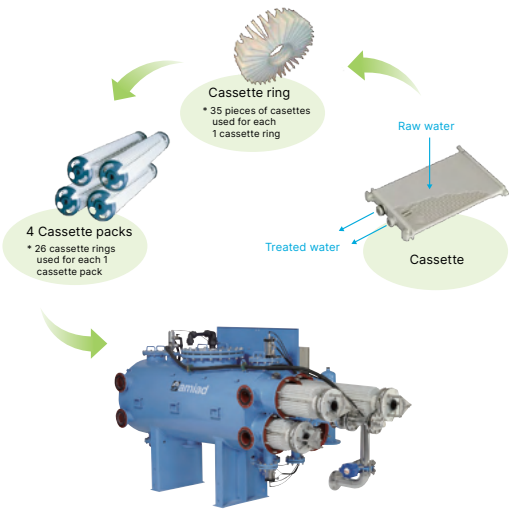
*1:Standard washing frequency (Once/day)
*2:Maintenance possible in each municipalities

Applications

- Water purification plants
- Industrial water
- River water and groundwater
- Various cooling circulating water
- Wastewater for processing water
- Filtration for wastewater and others

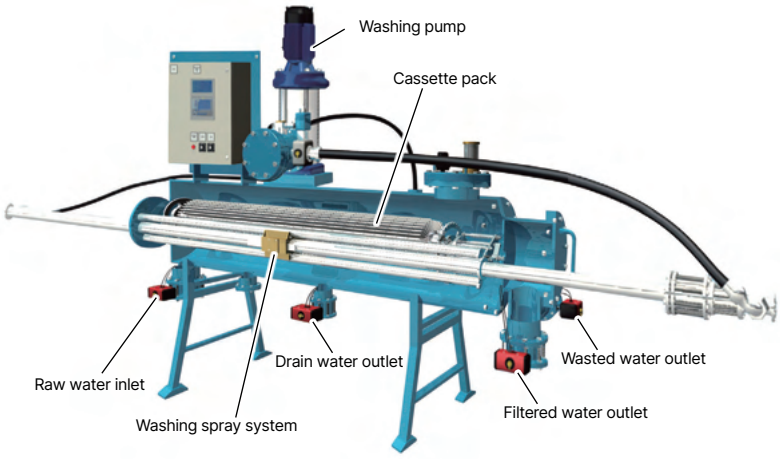
Product Specifications

Specifications／Models	MTG-JW	MT44P-JW	MT22P-JW
Standard Flux (m³/m²・Day)	100	100	100
Standard Treatment Flow Rate (m³/Day)	2,800	700	238
Filtration Accuracy	3		
Cryptosporidium Removal Rate	99.9%		
Response Rate (Washing 1 time/Day)	99.5% or more		
Amount of Washing Water Discharged (Per time m³)	3～5	1.3～1.5	0.6～0.8
Washing Logic	By pressure and timer		
Standard Operating Pressure (MPa)	0.1		
Washing Time (Per time)	12～15mins		
Number of Cassette Packs	4	1	1
Maximum Pressure Resistance (MPa)	1		
Maximum Pressure Loss (MPa)	0.02		
Connection (JIS Flange)	200A	100A	50A
Weight on Operating (kg)	3,000	1,050	650

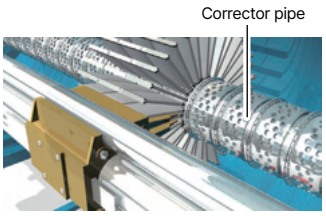


The exterior view of Thread type filtration equipment「MTG-JW」

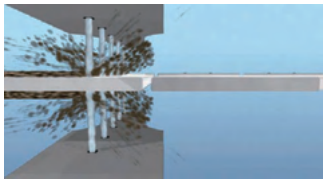
Operating Outline



MT45P-JW Exploded view/exterior view



Pic.1: Purified water spraying system and cassette pack



Pic.2: Cross-section of washing cassette

1 Raw water is pressed and sent from raw water inlet to internal part of the devise, and then filtered from the outside to the inside of the cassette(filter media). The filtered water is gathered to the collector pipe and flow to the filtered outlet.

2 Fine particles are captured on the surface and inside the cassette.When the set differential pressure value or timer time is reached, the cleaning process automatically begins.

3 For washing, water flowing stops for a while and water drains through the internal part of the equipment, then the washing spray system(refer to the Pic.1) sprays jet spray with high pressured jet water on to the cassette. It certainly removes minute particles piled up on the cassette surface and inside.

4 After finish washing all cassettes, it moves to the drain waste water process automatically. Waste water washs away the minute particles inside housing. When drain waste water process is completed, it is returned to the filtration operating process again and waited until the next washing starts.

Flow Sheet

Water purification treatment Example pictures

Other membrane filtration equipment

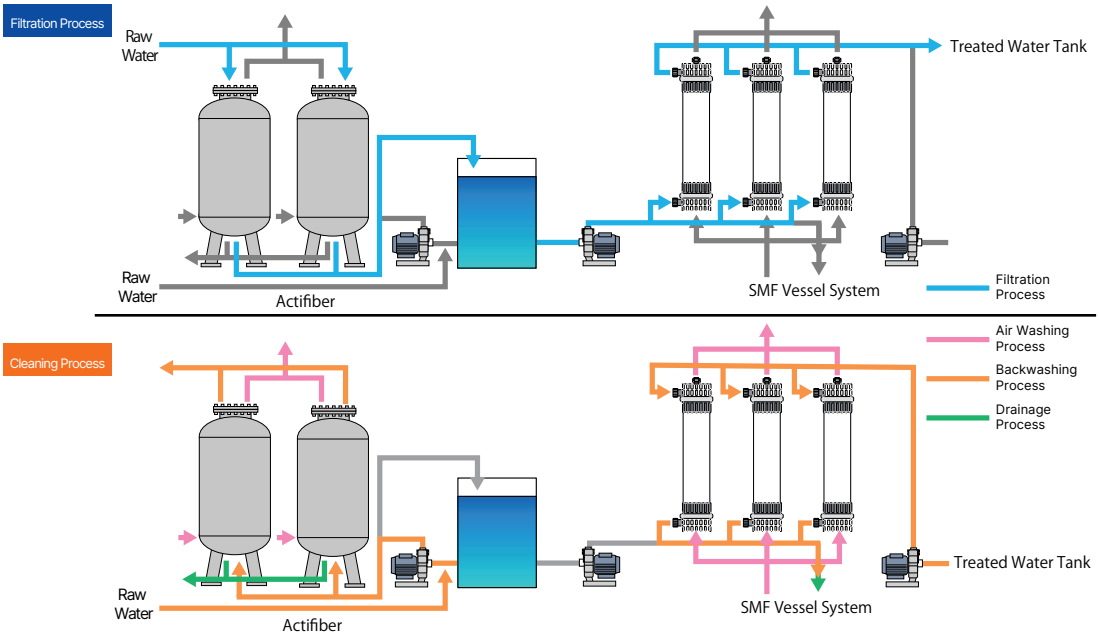
Please feel free to contact us if you have any inquiries of RO equipment selection.

Actifiber+SMF Complex System

While membrane filtration is suitable for advanced processing, it has weaknesses against high loads.
Therefore, in order to make the membrane, which is the main player in advanced processing, function effectively, a fiber filter medium that is resistant to high-load filtration is standard equipment as a pre-filter. Here, we provide a compact system that is easy for customers to us.

Actifiber + SMF Cassette System

Flow Sheet



Unit Specifications

Model		PW-100PVDF	PW-300PVDF
Treatment Water Volume		100m³/d (4.2m³/h)	300m³/d (13m³/h)
Standard Discharge Volume		10m³/d	30m³/d
Actifiber	Number of Filtration Towers	AFU-300 × 2Towers	AFU-500 × 2Towers
	Filtration Pump Capacity	117L/min	327L/min
	Backwash Pump Capacity	30L/min	85L/min
	Roots Blower	1.2m³/min(40kPa)	3.3m³/min(40kPa)
	Approximate Dimensions	2.2W × 2.5L × 2.4H	2.8W × 2.9L × 2.4H
	Backwash Tank	1000L	2000L
	Backwash Water Volume (Every 4 Hours)	550L/Tower	1550L/Tower
SMF Vessel Type	Number of Vessels	SMF-PVDF-V40 × 1	SMF-PVDF-V40 × 3
	Filtration Pump Capacity	83L/min	250L/min
	Backwash Pump Capacity	166L/min	500L/min
	Compressor	0.75kW	1.5kW
	Air Tank	Condition50L	Condition80L
	Approximate Dimensions	1.0W × 1.2L × 2.3H	1.0W × 1.2L × 2.3H

Waste Water Treatment

Coagulation and Sedimentation Unit

Dissolved Air Flotation Separation System

MBR Unit

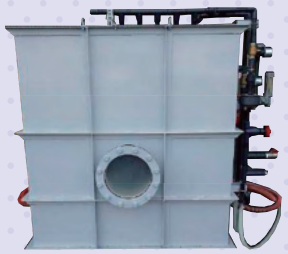
Features

- Unitized each equipment, no need for much space to install.
- Easy install, minimize on-site construction works and save time for work.
- We arrange them as cutomer requests.

How to Decide the Settings For Each Treatment Method.

- Coagulation sedimentation unit
  Through jat test and precipitation test, choose the chemicals and investigate the agitation strength, stegnation time, sedimentation velocity, turbidity of treatment water, flocculation volume and sludge quantity.
- Pressure floating separation unit
  Through jar test and floating test, choose the chemicals and investigate stegnation time, floating velocity, pressurized water amount, pressurized power, air to solid ratio and others.
- MBR unit
  According to the raw water quality and targetting quality of treated water, we provide the suitable treatment system.
  We offer demonstration experiment with actual raw water by our test equipment.
  Please give us your cooperation for the sample water test and on-the-spot test to decide the specification.

▼MBR test equipment



Size：Approx.2.0㎡ 1600×1100×1601H （mm）

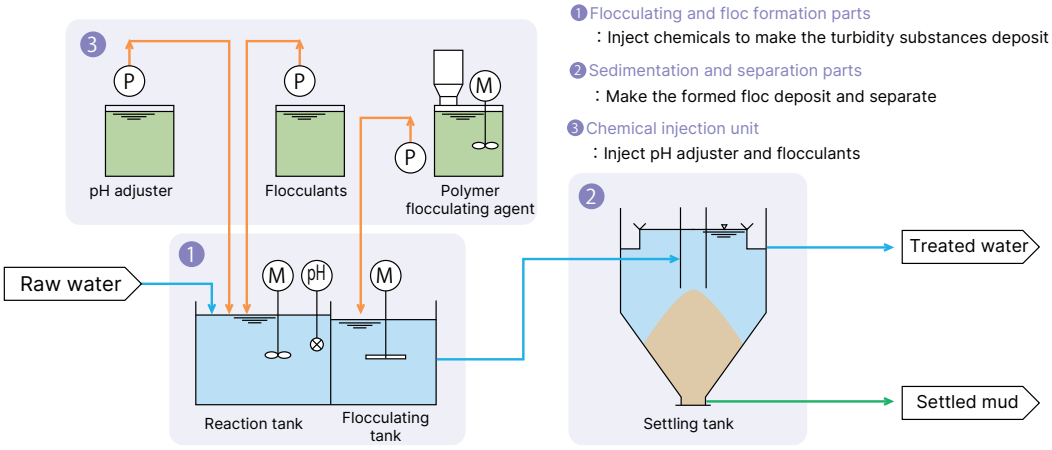
Coagulation Sedimentation Unit

A water treatment method in which suspended substances are flocculated with a flocculant and precipitated and separated by gravity.
Ideal for post-treatment of high turbidity raw water, heavy metal-containing wastewater and waste sludge of biological treatment.

Applications

- Treatment of wastewater containing heavy metals
- Pretreatment of filtration equipment (when raw water has high concentration)
- Solid-liquid separation of biologically treated water, etc.

Flow Sheet



❶Flocculating and floc formation parts
：Inject chemicals to make the turbidity substances deposit easily

❷Sedimentation and separation parts
：Make the formed floc deposit and separate

❸Chemical injection unit
：Inject pH adjuster and flocculants

Unit Specifications

Model：Cylindrical tubular coagulation sedimentation treatment method

Amount of Treated Water(m³/h)	not more than 1.5	not more than 2.5	not more than 4.0	not more than 6.0
Approximate Equipment Dimensions L×W×H(m)	4×2.1×3.4	4.4×2.3×3.7	4.6×3.0×4.1	5.3×3.3×4.4
Power-supply	3P 200V ×Approx.1.5kW	3P 200V ×Approx.1.5kW	3P 200V ×Approx.2.2kW	3P 200V ×Approx.2.5kW
Approximate Operating Mass(t)	6.1	8.7	15.0	22.1
Mud Collection Method	Gravity mud collection method			
Required Material Quality	Reaction tank Coagulation tank Settling tank Stand SS400			
Painting	Inner surface：Non-tar epoxy resin coating after 2 types of cleaning			
	Outer surface: After 2 types of cleaning, rust preventive coating, polyurethane resin paint topcoat			

* Surface loading means the amount of water($m^3/m^2 \cdot h$) per 1 square meters.
* Design cuboid tank is possible for your request.
* With our experiences, we design the surface loading as 0.5~1.0 $m^3/m^2 \cdot h$.
* Please contact us before selecting as the amount of treatment may vary depending on the water quality.

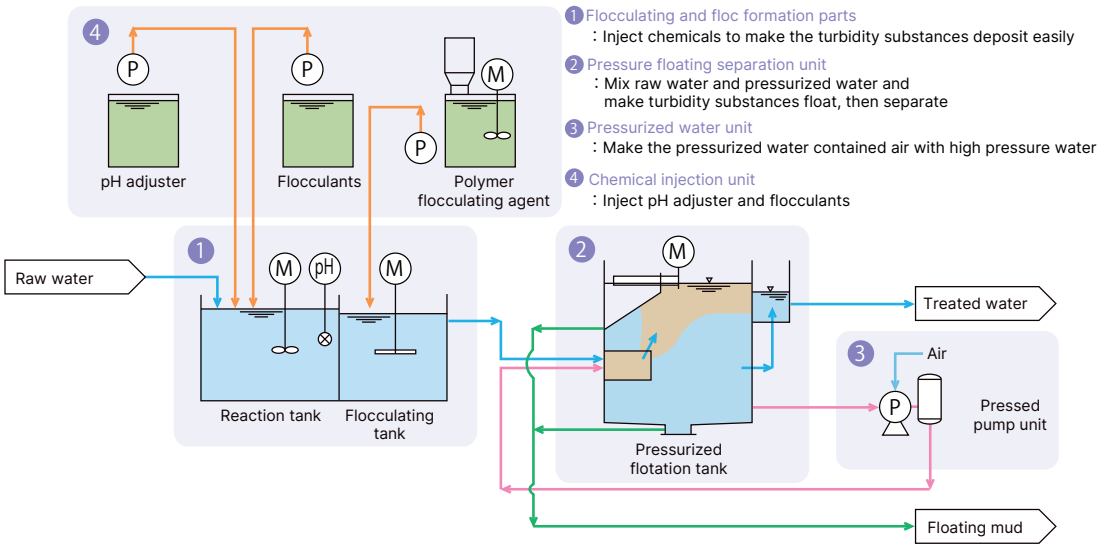
Dissolved Air Flotation Separation System

A water treatment method in which air bubbles are attached to a relatively light and hard to precipitated, by gravity, suspended substance to float and separate it.Ideal for emulsion(oil)-containing wastewater treatment.

Applications

- Paper mill : Wastewater treatment
- Steel factory :
  Treatment of oil-containing water
- Food factory :
  Oil treatment, turbidity removal, etc.
  as pretreatment for biological treatment

Flow Sheet



Unit Specifications

Model：Cylindrical tubular levitation processing method

Amount of treated water (m³/h)	Not more than 1.0	Not more than 2.5	Not more than 5.0	Not more than 7.5	Not more than 10.0
Approximate equipment dimensions L×W×H(m)	2.7×1.9×2.8	3.3×1.9×2.8	4.1×2.1×2.9	4.8×2.4×3.0	5.6×2.7×3.1
Power-supply voltage	3P 200V ×Approx 2.5kW	3P 200V ×Approx 2.5kW	3P 200V ×Approx 3.5kW	3P 200V ×Approx 5.5kW	3P 200V ×Approx 6.5kW
Approximate Operating Mass(t)	3.0	4.5	9.0	11.0	14.0
Mud collection method	Upper mud collection method driven by a reducer				
Required material quality	Reaction tank Coagulation tank Pressurized flotation tank Stand SS400				
Painting	Inner surface：Non-tar epoxy resin coating after 2 types of cleaning				
	Outer surface: After rust preventive coating, polyurethane resin paint topcoat				

* Surface loading means the amount of water($m^3/m^2 \cdot h$) per 1 square meters.
* Design cuboid tank is possible for your request.
* With our experiences, we design the surface loading as 0.5~1.0 $m^3/m^2 \cdot h$.
* Please contact us before selecting as the amount of treatment may vary depending on the water quality

Target Contaminants

S S BOD

MBR Unit

MBR : Membrane Bioreactor is the treatment system with immersion MF membrane(precision filtration membrane) into biological treatment aeration vessel and gain pure water by filtration under reduced pressure.

Features

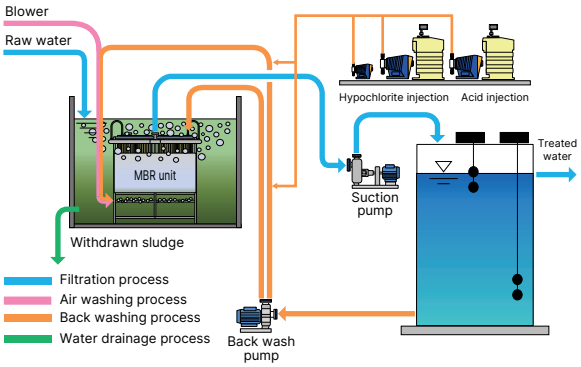
- **Resolve the problems of the wastewater increase with increased production**
  Changing to the MBR from the installed sedimentation treatment equipment can correspond to them.
- **Shorten the treatment time and improve efficiency**
  Filtration under reduced pressure separates solid and liquid and doesn't need any time for sedimentation and separation. Besides standard biological treatment aeration vessel has the MLSS as approx.2,000~3,000mg/L, the MBR vessel can make the high concentrated one as approx.8,000~10,000mg/L, which means the efficient biological treatment possible.
- **The treatment water quality is as good as to be reused.**
  The SMF membrane nominal pore diameter is 0.05μm, which makes the turbidity of treated water less than 1 degree. It doesn't need for sand filtration as the latter part of treatment.

Product Specifications

Model		SMF-PVDF-N05	SMF-PVDF-N20
Membrane Material		PVDF	
Nominal Pore Size		0.05μm	
Filtration Method		Suction Filtration Method	
Membrane Shape		Hollow Fiber (Capillary Type)	
Collector Tube Material		ABS	
Membrane Area		5m²	20m²
Module Dimensions		W618 × D45 × H890mm	W744 × D40 × H1,622mm
Module Weight		(Dry)2kg (Wet)5kg	(Dry)10kg (Wet)20kg
Design Flow Rate*1 (m³/h)		0.04～0.10	0.17～0.42
Tank Water Quality Guideline		MLSS 8,000～10,000mg/L	
Operating Conditions	Pressure	(Recommended) -35 kPa or higher	
	Water Temperature	5～40°C	
	pH	During Operation3～11 During Chemical Cleaning2～12	

*1 The design treatment capacity varies depending on operating conditions such as raw water quality, water temperature, supply pressure, and backwash conditions. This value is a guideline. Please consult our sales representative during design.
* Please note that oils and silicone-based defoamers may clog the membrane.

Flow Sheet



Applications

- Corresponding to the wastewater increase with production increase
- Bulking measure and improvement of treated water quality
- Improvement of water quality of installed wastewater facilities
- Reuse as recycled water

Unit Specifications

Number of Modules	MBR-N05-10 × 1	MBR-N05-10 × 2	MBR-N05-10 × 3	MBR-N20-10 × 1	MBR-N20-10 × 2
Elements	SMF-PVDF-N05 × 10	SMF-PVDF-N05 × 20	SMF-PVDF-N05 × 30	SMF-PVDF-N20 × 10	SMF-PVDF-N20 × 20
Membrane Area (m²)	50	100	150	200	400
Standard Treatment Capacity (m³/d) *	20	40	60	80	160
Blower Capacity (m³/min)	0.35	0.73	1.08	0.89	1.82
Equipment Model	1Unit	2Unit	3Unit	1Unit	2Unit
Approximate Dimensions (m)	W2.0 × 1.9L × 2.4H	W2.0 × 3.2L × 2.4H	W2.0 × 4.5L × 2.4H	W2.0 × 2.1L × 3.4H	W2.0 × 3.6L × 3.4H

* Varies depending on raw water quality; this value is a reference.

pH Neutralizing Equipment

Model TPC

Model LPC

Model CPC

Three Lineups for Different Applications

Model: TPC　Continuous-type pH Automatic Neutralizer

Suitable for neutralization treatment of continuously discharged wastewater.
The system receives wastewater into the neutralization tank and discharges the amount received while neutralizing pH.

Model: LPC　Batch-type pH Automatic Neutralizer

Suitable when the amount of wastewater to be discharged at one time is fixed.
A certain amount of wastewater is received into the neutralization tank, circulating neutralization is performed, and the wastewater is discharged after neutralization is complete.

Model: CPC　Carbon Dioxide Method pH Automatic Neutralizer

Suitable for neutralization treatment of continuously alkaline wastewater.
This continuous neutralizer uses carbon dioxide (CO_2) as a neutralizing agent and requires less space than the TPC type.

Continuous-type Automatic pH Neutralizer

Model: TPC

Raw water flows into the neutralization tank, and chemicals are injected and agitated according to the pH value of the raw water, then naturally discharged while the raw water is continuously neutralized. It is suitable for the treatment of wastewater that flows into the system continuously.
The standard pH range that can be handled in a single-stage treatment is pH 4 to 11. If the pH range is greater than this, a 2- or 3-stage treatment with multiple tanks is expected, with coarse neutralization in the first stage and fine adjustment in the second and subsequent stages.

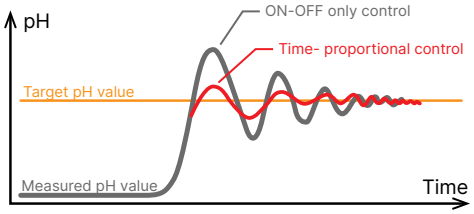
Features

- Reliable design with a residence time of 15 minutes in the tank.
- Optimal neutralization by time division proportional control.
- Tank material: SS400 + modified epoxy resin coating, SUS, FRP, and PVC are also available.

What is Time-Proportional Control

This is a control method to suppress hunting (excessive back-and-forth between the target value) caused by excessive chemical injection in pH neutralization.
The amount of chemical required for pH neutralization decreases as the target pH value is approached, but if the metering pump is operated at a constant rate, the target pH value will be greatly reduced due to over-injection of the chemical (e.g., ON-OFF only control). To prevent this, continuous operation is performed when the pH value is far from the target pH value,intermittent operation can be used to gradually bring the pH value closer to the target value. This control method is called time-proportional control. By varying the pump operation time proportionally to the target pH value, this prevents excessive injection of chemicals and ensures smooth adjustment to the target pH value.

Difference between time-proportional control and ON-OFF only control



Applications

- General factory wastewater
- Hospital wastewater
- Laboratory wastewater
- Concrete plant wastewater
- Rainwater in factories
- Cleaning wastewater
- Boiler wastewater
- Adjustment to a pH value suitable for treatment

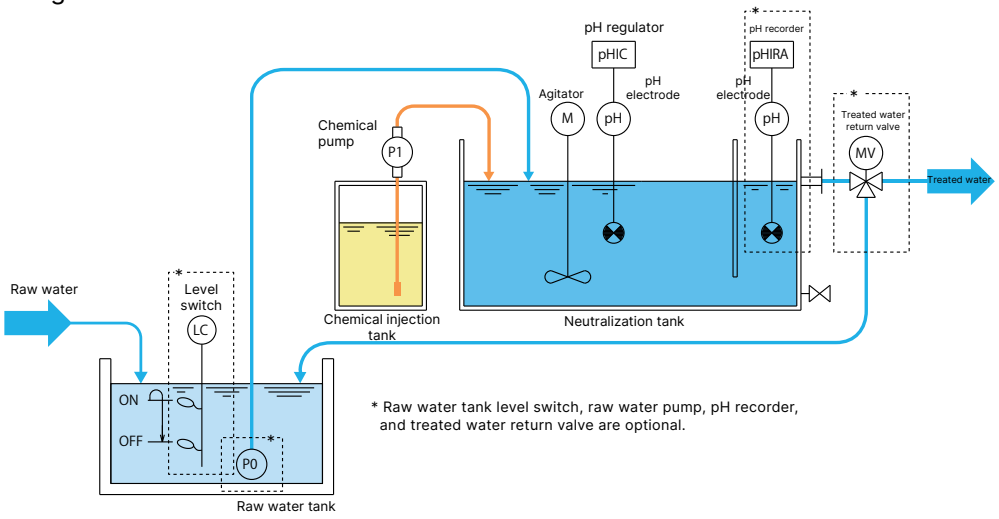
* Neutralization reactions may require more chemicals than the calculated value due to factors that inhibit the reaction of chemicals.
We also offer neutralization titration test using sample water. Please feel free to contact us.

Unit Specifications

Model	Amount of treated water	Capacity of neutralization tank	Agitator (medium speed type)	Chemical pump discharge rate (ml/min)		Chemical injection tank	Approximate dimensions (m)	Equipment mass (Approx.)	Operating mass (Approx.)
				60Hz	50Hz				
TPC-01	1m³/h	0.25m³	NKA4-002 0.2kW	6～30	5～25	50L	0.7W×1.4L ×1.6H	200kg	500kg
TPC-03	3m³/h	0.75m³	NTA4-002 0.2kW	14～70	12～58	100L	1W×1.73L ×1.72H	500kg	1,400kg
TPC-06	6m³/h	1.5m³	NTA4-004 0.4kW	24～120	20～100	200L	1.4W×2.08L ×1.78H	800kg	2,500kg
TPC-10	10m³/h	2.5m³	NTA4-007 0.75kW	60～300	50～250	200L	1.6W×2.25L ×2.265H	1,000kg	3,700kg
TPC-20	20m³/h	5.0m³	NTA4-015 1.5kW	120～600	100～500	300L	2W×2.77L ×2.605H	1,600kg	6,900kg
TPC-30	30m³/h	7.5m³	NTA4-022 2.2kW	200～1,000	160～800	500L	2.5W×3.36L ×2.815H	2,000kg	10,000kg

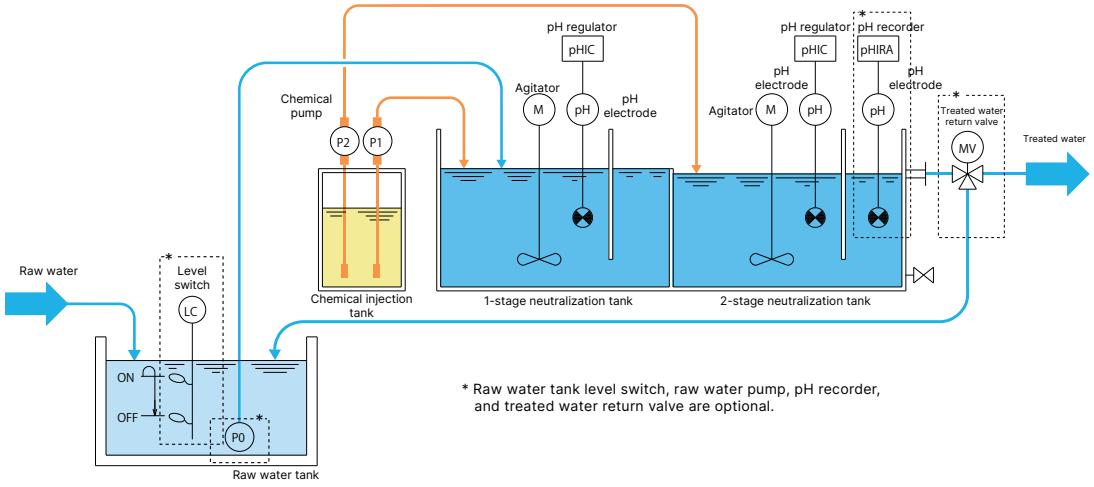
Flow Sheet

One-stage treatment flow sheet



* Raw water tank level switch, raw water pump, pH recorder, and treated water return valve are optional.

Two-stage treatment flow sheet



* Raw water tank level switch, raw water pump, pH recorder, and treated water return valve are optional.

Product Specifications

	Standard specification	Option
Installation location	Indoor	Outdoor
Raw water temperature	Max 40°C	-
Supported Chemicals	Sodium hydroxide, Sulfuric Acid, Hydrochloric Acid	-
Tank material	SS(TPC-01 PVC ONLY)	SUS304, FRP, PVC
Painting, internal surface treatment methods	Modified epoxy resin	Rubber lining, FRP lining
External input-output	"External interlocking input Batch alarm output(No-voltage contact output)"	No External interlocking input Individual alarm output (No-voltage contact output)
Power supply voltage	3P 200V	Operatable with a different voltage
Control Method	pH single control(Acidic or Alkaline)	pH dual control
Equipment	● Raw water pump inflow type(Circuit only) ● Neutralization tank ● Agitator for neutralization tank ● pH regulator ● pH electrode ● Common base ● Control panel ● Chemical tank ● Chemical injection pump	● Measuring tank ● Raw water flowmeter ● Raw water pump ● Raw water tank level switch ● pH recorder (with alarm circuit) ● 2- or 3-stage treatment ● Treated water return valve ● Discharge pump ● Chemical tank level switch ● Liquid barrier for chemical tank ● Neutralization tank lid ● Neutralization tank drain valve

* Please contact us for details on 2- and 3-stage equipment and other customizations.

Batch-Type Automatic pH Neutralizer

Model: LPC

After receiving a fixed volume of raw water into the tank, this system performs pH neutralization treatment while agitating the water in the tank with a circulation pump, and discharges the water when the pH neutralization treatment is complete. Suitable for wastewater that is regularly discharged in a given volume. The guideline for treatment is pH 1-13.

Features

- Reliable design with circulation of more than 3 turns/h in the tank
- Treatment time per batch: 3 to 4 hours
- Pumping is also possible in addition to natural discharge.
- Time-proportional control for optimal neutralization

Applications

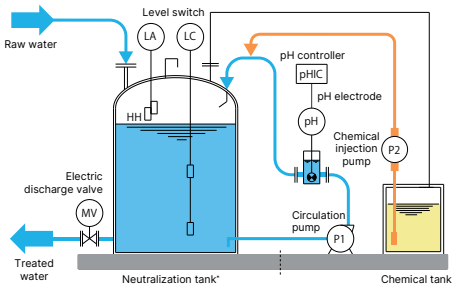
- Regeneration wastewater from water purification equipment
- Experimental wastewater
- Small amount of factory wastewater

* Neutralization reactions may require more chemicals than the calculated value due to factors that inhibit the reaction of chemicals.
We also offer neutralization titration test using sample water. Please feel free to contact us.

Unit Specifications

Model	Amount of treated water per batch	Capacity of neutralization tank	Circulation pump (magnet pump)	Chemical injection pump discharge rate (ml/min)		Chemical tank	Approximate dimensions (m)	Weight of equipment (Approx.)	Operating weight (Approx.)
				60Hz	50Hz				
LPC-01	0.8m³	PE 1m³	TSM-70P 0.2kW	24～120	20～100	50L	1.4W×1.85L ×1.7H	400kg	1,500kg
LPC-02	1.8m³	PE 2m³	TSM-100P 0.4kW	60～300	50～250	100L	1.6W×2.3L ×2.08H	500kg	2,600kg
LPC-03	2.7m³	PE 3m³	TSM-201P 0.4kW	60～300	50～250	100L	1.8W×2.55L ×2.25H	700kg	3,800kg
LPC-04	3.7m³	PE 4m³	TSM-211P 0.75kW	120～600	100～500	200L	1.9W×2.7L ×2.3H	900kg	5,100kg
LPC-05	4.4m³	PE 5m³	TSM-221P 1.5kW	120～600	100～500	200L	1.9W×2.8L ×2.6H	1,100kg	6,300kg
LPC-06	5.4m³	PE 6m³	TSM-221P 1.5kW	200～1,000	160～800	200L	2.1W×3L ×2.6H	1,500kg	7,700kg
LPC-08	7.4m³	PE 8m³	TSM-221P 1.5kW	200～1,000	160～800	500L	2.2W×3.1L ×3.1H	1,700kg	10,200kg
LPC-10	9.3m³	PE 10m³	TSM-231P 2.2kW	200～1,000	160～800	500L	2.5W×3.3L ×3.15H	2,000kg	12,500kg

Flow Sheet



* Optional without neutralizer tank base is possible.

Product Specifications

	Standard specification	Option
Installation Location	Indoor	Outdoor
Raw Water Temperature	Max 40°C	-
Supported Chemicals	Sodium hydroxide, Sulfuric Acid, Hydrochloric Acid	-
Tank Material	PE	FRP
External Input-Output	Batch alarm output (No-voltage contact output)	Individual alarm output (No-voltage contact output)
Power Supply Voltage	3P 200V	Operatable with a different voltage
Control Method	pH single control (Acidic or Alkaline)	pH dual control
Equipment	● Raw water pump inflow type(Circuit only) ● pH regulator ● pH electrode ● Chemical tank ● Chemical injection pump ● Control panel ● Neutralization tank level switch HH, M, L	● Raw water flowmeter ● Raw water pump ● pH recorder (with alarm circuit) ● Discharge pump ● Chemical tank level switch ● Liquid barrier for chemical tank ● Treated water return valve ● Neutralization tank drain valve

* Please contact us for other customization.

Carbon Dioxide Method Automatic pH Neutralizer

Model: CPC

Like the TPC type, this type continuously neutralizes raw water while discharging it. Carbon dioxide gas is used as a neutralizing agent. It reacts quickly and mixes easily, so the residence time in the neutralizing tank can be shorten and the installation area can be made smaller. In addition, even if an excessive amount of carbon dioxide gas is injected, the pH value will not drop below pH 5. Therefore, it is possible to prevent the pH value from dropping too low. The standard treatment range is pH 7 to 11.

Features

- Space-saving design with retention time of 1 minute in the tank.
- Easy handling due to carbon dioxide (CO_2) as a neutralizing agent, and salinity concentration does not increase.
- Optimal neutralization by PID control.

* Neutralization reactions may require more chemicals than the calculated value due to factors that inhibits the reaction of chemicals.

Applications

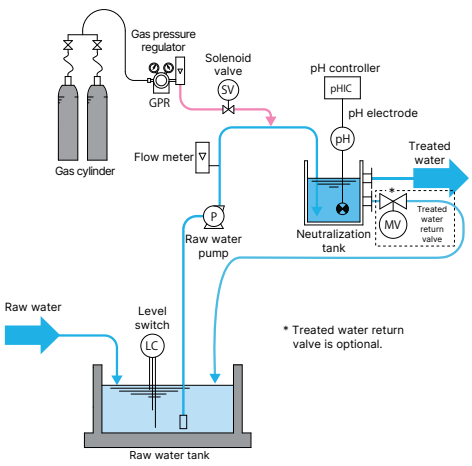
- Boiler blow water
- Factory wastewater

Unit Specifications

Model	Amount of treated water	Capacity of neutralization tank	Raw water pump (self-priming type)	Gas pressure regulator	Gas cylinder rack	Approximate dimensions (m)	Weight of equipment* (Approx.)	Operating weight (Approx.)
CPC-03	3m³/h	0.05m³	0.25kW (50Hz) 0.3kW (60Hz)	400W	With 2 racks	0.95W×0.4L ×1.6H	180kg	230kg
CPC-06	6m³/h	0.1m³	0.25kW (50Hz) 0.3kW (60Hz)	400W	With 2 racks	0.95W×0.48L ×1.7H	200kg	300kg

* The weight of the cylinder rack is not included.

Flow Sheet



Product Specifications

	Standard specification	Option
Installation Location	Indoor	Outdoor
Raw Water Temperature	Max 40°C	-
Supported Chemicals	Carbon dioxide (Gas)	-
Tank Material	PVC	SS+Modified epoxy resin, FRP, SUS304, Out-door spec: SUS304
External Input-Output	External interlocking input Batch alarm output (No-voltage contact output)	No external interlocking input Individual alarm output (No-voltage contact output)
Power Supply Voltage	3P 200V	Operatable with a different voltage
Equipment	● Raw water pump ● Raw water flowmeter ● Gas pressure regulator ● Control panel ● pH electrode ● pH regulator	● pH recorder (with alarm circuit) ● Discharge pump ● Treated water return valve ● Raw water tank temperature regulator ● Raw water tank level switch ● Neutralization tank drain valve

* Please contact us for other customization.

Raw Water

Pretreatment
Chemical injection



Chemical Injection

Granular Filtration
Fiber FIltration


Remove Fe and Mn
➡P.08


Decontamination
(Fiber Filtration)
➡P.15


Ammonia Removal
➡P.17


Thread Type
➡P.25

Precision Filtration


SMF Cassette System
➡P.19


SMF Vessel System
➡P.21


SMF Naked System
➡P.23

Advanced Treatment

UV (Ultraviolet)

Ozone

Activated Carbon
➡P.10

Ion Exchange
➡P.11

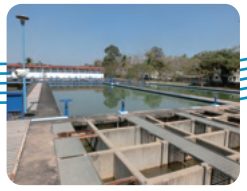

RO Membrane
➡P.27

Post Treatment
Chemical Injection



Chemical Injection

User images



Wastewater

Wastewater Treatment


Coagulation Sedimentation
➡P.29


Pressure Floating
➡P.30


MBR
➡P.31


pH Neutralizing Equipment
➡P.32

Water Treatment System Design & On-site Construction Works

Consultation for Filtration Systems & Water Treatment Equipment

Since 1965, we have been dealing with all kinds of customers through filter media, from well water treatment at small water purification plants to wastewater treatment facilities at factories. Taking advantage of our long experience, we will propose the optimum filtration process to obtain the water quality requested by our customers from all kinds of raw water such as well water, river water and industrial water.
We offer suggestions for improvement against cutomers' troubles on existing water treatment equipment as well as new suggestions. Please contact us for other customization.

- Raw water qualities' changes.
- Getting worse of recent treatment water quality.
- Because of increase of factory's production, request for increase the amount of factory water and waste water.
- Requests for changing to the more efficient treatment system, such as the system with reducing the treatment costs.

On continueing business, there is no end to worry about water treatment.
We offer the improving treatment methods according to the customers' requests.

Filtration Systems Consultation

We will hold hearings with customers at first, on customers circumstances, such as current problems and targetting water quality. Not only by e-mails and telephone but also by online tools or our visiting on customers and users, we can make consultations.

Selection of filter media from water quality analysis data

We will propose the specifications of the filter material from the water quality analysis data that the customer has. In case without any analysis date, we can analyze raw water to find the essential date.

Sample test at the analysis center

We will propose the optimum filter media specifications by receiving raw water from the customer and conducting jar tests and water flow tests at our technical center. In case with any conditions to operating method and using chemicals, we will consider the examination way according to the customer's request after the consultation in advance.

Field verification test

Water is living. The most reliable specifications can be determined by conducting the verification tests at the time of water intake. As it is said that [a picture is worth a thousand words], it can gain tremendous persuasive power and trust from users.

Water Treatment System Consultation

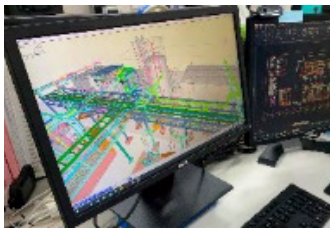
We manufacture and sell not only filter media but also equipment such as chemical injection pumps and water quality measuring instruments.
In addition to the filtration equipment, we design and manufacture the various water treatment unit equipment. We will propose the optimum process based on our long experiences in order to realize the water treatment desired by the customer.

- Design of water treatment equipment
  We offer suggestions and designs for renewal of the deteriorated equipment or for new installation of equipment to keep the water amount with increasing the manufacturing line. It is also possible to manufacture your familiar equipments as it is or add the new efficinet ability to the equipment.
  We design them according to your circumstances and requests.
- Production & Management
  We manufacture the equipment at our factories or cooperated companies.
  We manage the production and controll the qualities, following to the procedure of ISO9002 series.
- Installation and Commissioning
  We install our manufactured equipment to the site (installation, piping, electric piping and so on).We do commisioning as well, for your modified use of the equipment. We decide which and how much points of working we will take charge of, through the meeting with our customers.

【Hearings】

【Planning Design】

【Detail Design】



【Production & Management】

【Installation & Commissioning】

Tohkemy's water treatment system series

Combining our products realizes simple and efficient unit. It helps us to design the best type which is suit for the customers' requests, and to offer the safe and good operating controlling and cost performance equipment.

On-site Construction Works

We carry out not only the [Equipment installing construction] at introducing but also the [Maintanance construction] after it. Also, we enhance to conduct work quality control accordance with ISO 9000 series procedure at the working sites. We don't charge for quatation and investiment at the sites basically.
Please feel free to ask the orders to us to save your time and costs on field managing.

Construction Business Licence Number
Issued by MLIT(Special-24)No.15975　Water facilities work
Issued by MLIT(Ordinary-24)No.15975　Machinery installation work
Issued by MLIT(Ordinary-24)No.15975　Piping work

■ The filling works of filter media

In order to selling filter media, we also offer the filling works of filter media for customers' exsisting filter equipment or for new installed equipment.

■ The replacement works of filter media

Filter media cannot be permanently used and requires periodic replacement.We will inspect the degradation level of your current filter media and provide replacement proposals and installation services based on the results.

■ Filter media cleaning construction

We have the filter media whole cleaning method using the special device for reusing the media.

■ Remaking works of filtration pond

We clean filter media to reuse it and also repair the internal pipe and paint the inside parts at the water purification plants.

■ Repairment of the internal pipes inside the filtration tank

It is very difficult to inspect visually the water gathered parts at the bottom and the filter media may be flown away with treated water after degradation over time. We repair the parts at the time of replacement of the filter media.

Before repair

After repair

■ Installation work of water treatment equipment

We promise to install our designed water treatment equipment properly.

Please contact us for anything, including new installing, replacement of exsiting equipment and so on.

■ Installation work of Tohkemy's products

Please ask us to install our products including chemical pumps, agitators, water quality controllers as well as water treatment equipment.

■ Piping work

We offer piping works according to the customers specification. Especially about our manufacturer products, chemical pumps, we work it with deep consideration about necessary accessories. We also do the piping works after careful choosing the metering devices and valves.

■ Electrical work for controlling panels and others

We have qualified persons for electrical works of installing control panels which added to the water treatment equipment. Please feel free to ask us.

■ Maintenance work

Periodically maintenances are needed for filter media, membranes, and devices. We recommend periodically maintenances before the treated water is affected at any points.

www.tohkemy.co.jp/english/

CT No.EX-19 202512