

مبدأ العمل

الترشيح الابتدائي

(كالفلتر متعدد الوسائط او الفلتر الكربوني او السوفتر او الكارتريج فلتر)
فيه يتم مرور المياه بضغط من الاعلى الى الاسفل وفيه اما يتم
ازالة المواد العالقة والعكارة - او الكلور والروائح - او العسرة

WORKING PRINCIPLE

Pre-treatment equipment (also known as multi-media filter, activated carbon filter, water softener). Is a pressure filter, using the refined filter material filled in the filter, when the water comes from, when flowing through the filter layer from top to bottom, the suspended solids and viscous particles in the water are removed, thereby reduce the turbidity of water.





تكلفه قليله , تكلفه تشغيل قليله , سهوله التشغيل
تشغيل لمدته طويله بنفس الاوساط الترشحيه
تأثير قوي وفعال بمساحه قليله

1. Low equipment cost, low operating cost and easy management
2. The filter material can be used multiple times after backwashing, and the filter material has a long life
3. Good filtering effect, small footprint

TECHNICAL PARAMETER

Model	Productivity (T/H)	Motor Power (KW)	Filtration Accuracy (UM)	Turbidity Of Effluent (NTU)	Turbidity Of Raw Water (NTU)
CK-RO-500L	0.5	0.37	100	≤5	≤100
CK-RO-1000L	1	0.55	100	≤5	≤100
CK-RO-2000L	2	0.55	100	≤5	≤100
CK-RO-3000L	3	0.75	100	≤5	≤100
CK-RO-4000L	4	0.75	100	≤5	≤100
CK-RO-6000L	6	1.1	100	≤5	≤100
CK-RO-10T	10	1.8	100	≤5	≤100
CK-RO-20T	20	4	100	≤5	≤100
CK-RO-30T	30	5.5	100	≤5	≤100
CK-RO-60T	60	7.5	100	≤5	≤100
CK-RO-100T	100	15	100	≤5	≤100
CK-RO-200T	200	30	100	≤5	≤100

مبدأ عمل السوفتر

يقوم مبدأ عمل السوفتر او الميسر بالتخلص من العسوره في المياه او املاح الكالسيوم والمغنسيوم عن طريق مبادله املاح الكالسيوم والمغنسيوم الموجودين بالمياه ومبادلتهم على سطح ريزن بايون الصوديوم الموجود بملح التنشيط



WORKING PRINCIPLE OF SOFTENER WATER TREATMENT EQUIPMENT

Since the hardness of water is mainly formed and expressed by calcium and magnesium, the principle of magnesium formation and sodium ion exchange softening treatment is to pass the raw water through the sodium-type cation exchange resin to make the hardness components Ca2+ and Mg2+ in the water.Exchange with the Na+ in the resin, thereby adsorbing Ca2+ and Mg2+ in the water, so that the water is softened. After the resin absorbs a certain amount of calcium and magnesium ions, it must be regenerated. The regeneration process is to use the salt box rinse the resin layer with salt water to replace the hardness ions on the resin. With the regeneration waste liquid discharged out of the tank, the resin restores its softening exchange function.



TECHNICAL PARAMETERS

Model	Productivity (T/H)	Resin Tank	Resin Loading Quantiy (kg)	Brine Tank Size (L)	Pipe Size (IN)
CK-SF-1000L	1	1054	50	60L	3/4"
CK-SF-2000L	2	1366	100	80L	1"
CK-SF-3000L	3	1465	100	100L	G1"
CK-SF-5000L	5	2072	200	200L	G1 1/4"
CK-SF-10000L	10	3072	475	500L	G2"
CK-SF-15000L	15	3672	650	800L	G2"
CK-SF-20000L	20	4072	800	1000L	G2"



Pre-Treatment System for Industrial & Commercial Water Treatment

The **Pre-Treatment System** is a preliminary treatment in advance before the industrial, commercial and residential water treatment process. The pretreatment of water can help to reduce or remove entertainments in water, such as silt, clay, organic matter, microorganisms, mechanical impurities, calcium ions, magnesium ions, etc.

The filtration performance of pre-treatment decides the water quality of purification and post treatment. As well as, the water through pre-treatment has widely used in industrial productions.

REDAWATER GROUP can supply both equipment and solutions of pre-treatment to guarantee your efficient water treatment.

To achieve better water quality of your projects and application, we supply the complete system combination for reference. If you have specific requirements, just tell us your requirements, we will customize them for you.

- **Iron and Manganese Filter System:** Removes dissolved iron and manganese ions to prevent fouling and scaling in subsequent treatment stages.
- **Sand Filter System:** Removes larger particles and sediment, reducing turbidity and stabilizing water quality.
- **Multimedia Filter System:** Multi-layers of different materials to remove suspended solids and improve water clarity and quality.
- **Activated Carbon Filter System:** Removes organic compounds, odors, and chlorine, improving water quality and taste.
- **Water Softening System:** Removes calcium and magnesium ions, preventing scale formation and protecting downstream membrane systems.

Iron and Manganese Filter System

Iron and manganese filter system is composed of manganese sand filter material, aeration device, multiport control valves and FRP tanks (carbon steel or stainless steel tanks are also available) as the main filter system parts or components.

Iron and manganese filter system can help to remove the extra iron and manganese ions to guard people healthy and guarantee industrial production smoothly running.

Structures

- **Filter tank.** It commonly set two FRP tanks in the system: one is for aeration and one is for filter. You should decide the content of FRP tanks according to your flow.
- **Media.** This system adopts natural manganese sand as the filter material to effectively removes iron and manganese ions.
- **Water distributor.** Top distributor can help to achieve falling aeration of raw water and evenly distribution in the filtering tank. Bottom distributor can block impurities and help treated water flows out.
- **Multiport control valves.** Runxin control valves are available to save pipeline placement and make filter running more efficient.



Benefits

Iron and manganese filter system can effectively remove the extra iron and manganese ion in the underground water. It can provide qualified water quality for the following pre-filter systems and guarantee the equipment smooth running.

Treated Elements

- Iron ion
- Manganese ion

Water Quality

- Iron content ≤ 0.3 mg/L.
- Manganese content ≤ 0.1 mg/L

Working Principle

Aeration. Raw water is pumped into the aeration tank through the pump. After two aeration (Impeller aeration and falling aeration), water and air fully mixed, part of the low-valent iron and manganese ions are oxidized into high-valent iron and manganese ions, generating part of the iron hydroxide and manganese oxide precipitates, while through the exhaust valve with the aeration tank air pressure and water pressure changes intermittently from the exhaust port discharge CO_2 exhaust gas, so that the dissolved oxygen water pH alkaline (in addition to iron and manganese need to be carried out in alkaline water).

Filter & Backwash. The dissolved oxygen water fully mixed with oxygen enters the filter tank and flows through the natural manganese sand layer. Under the catalytic effect of manganese sand, divalent iron and manganese ions are oxidized to high valent iron and manganese ions and hydroxide precipitates are generated, and clean water is obtained by the filtering effect of manganese sand. Through the backwashing function of the filter valve, the hydroxide precipitates and impurities in the manganese sand are discharged from the filter tank by regular backwashing.



Notes:

- When the iron and manganese content of raw water is high, the iron content is more than 5 mg/L and the manganese content is more than 1.5 mg/L, because iron is easier to be oxidized than manganese, if manganese sand is used for treatment at the same time, it is difficult for the divalent manganese to be oxidized to tetravalent manganese. Therefore, it is generally necessary to use the secondary filtration method, that is, to use the first iron removal, so that the concentration of Fe_2^+ is lower than 2mg/L, and then manganese removal. The process is: Groundwater → Pump → Aeration → Primary filtration (iron removal) → Secondary filtration (manganese removal).
- When the iron and manganese content in raw water is low, with iron content lower than 5mg/L and manganese content lower than 1.5 mg/L, it can be removed by primary filtration. The process is: Groundwater → Deep well pump (variable frequency pump) → Aeration → Filtration (iron and manganese removal).

Applications

- Pre-filtration of Disinfection equipment.
- Preparation for ultra and RO filtration.
- Recirculation system.
- Rinse water processes.
- Irrigation system.
- Basin water filtration.
- Ground water filtration.
- Waste water treatment

MULTIMEDIA Filters System

Multimedia filter system can be used as the alternative to [sand filter system](#). It adopts FRP vessels (also available for stainless steel or carbon steel vessels) as vessels and anthracite coal, sand and garnet as filter media.

It is used to reduce the level of SDI (Silt Density Index). TSS (Total Suspended Solids) in incoming water. Suspended solids include small particles, such as silt, clay, grit, organic matters, algae and other microorganisms. Only remove the suspended solids, can reduce the high-pressure drop and guarantee the effectiveness of downstream filtration equipment such as precision filters, reverse osmosis membranes, EDI, UV as well as ion exchange polishing.

Structures

- **Filter Tank.** Our FRP tanks (including universal FRP tanks and FRP tanks with upper loading and lower discharge port) are popular during multimedia filter system. Stainless steel tanks are available.
- **Media.** Sand filter adopts single-size filtration media. You can adjust the sand size to achieve different water quality requirements. ideal size of each granule usually varies from 0.35 mm to 1.2 mm.
- **Water distributors.** Upper and bottom distributors may needed in this system. The bottom distributors can enable the stable running of filtering process and backwash process.
- **Multiport control valves.** This device can reduce your pipeline placement and make the system stable and smart running. Manual and automatic valves options are provided.



Benefits

Compared with [sand filters](#), multimedia filter system is composed of three filtration medias in different porosity, which can guarantee trap and retain all particles from large to small orderly. It has higher filtering efficiency and saves occupying are for the projects.

Besides, the backwash system, media depth and bottom distributors arrangement can guarantee the sediments filtered out throughout without losing the filtering media. In this way, the system service life is extended.

Treated Elements

- Silt
- Clay
- Grit
- Organic Matters
- Algae
- Other microorganisms

Water Quality

- Reduce SDI < 3
- Reduce turbidity < 0.2 NTU

Working Principle

The unfiltered water is distributed in the top of the sand filter and will slowly sink through the filter bed, leaving the dirt particles from the water behind in the fine pores of the sand. When a certain quantity of water has been filtered and the sand has reached a certain degree of pollution, the sand filter should start backwashing system. The multiport control valves can be manual or automatically control the backwashing system start or closed. During the backwashing, the water enters the tank from the bottom and the pores enlarge upon and the dirt is washed from the sand again. Then the dirt is discharged together with the backwash water. As a result, the sand recovers its filter performance.



Applications

- Suspended solids and turbidity reduction
- Groundwater remediation
- Pre-treatment for RO/NF and membrane system
- Pre-treatment for UV sterilizers
- Filtration of gray, river or surface water
- Tertiary treatment for waste water
- Cooling tower and heat exchanger
- Water features (fountains, etc.)
- Industrial process water
- Storm water
- Irrigation water
- Swimming pool water
- Potable (drinking) water
- Hotels and resorts
- Beverage and food processing

CARBON Filters System

Activated carbon filter system is an popular and widely used system during [water pre-filter system](#). It adopts activated carbons as filter material and [FRP tanks](#) (also available in stainless steel or carbon steel tanks) as the vessel. In the system, it can help to absorb residual chlorine, organics and suspended impurities and it can provide good conditions for subsequent Reverse Osmosis purification.

Besides, the carbon filter can effectively ensure the service life of post-stage equipment, improve effluent water quality, prevent pollution, especially prevent free residual chlorine poisoning pollution in reverse osmosis membrane, ion exchange resin.

Structures

- **Filter Tank.** Our FRP tanks (including universal FRP tanks and FRP tanks with upper loading and lower discharge port) are popular during multimedia filter system. Stainless steel tanks are available.
- **Media.** This system uses activated carbon, which can remove odors and chlorine in the water.
- **Water distributors.** Upper and bottom distributors with different types can suit almost all flows and tank sizes.
- **Multiport control valves.** This device can reduce your pipeline placement and make the system stable and smart running. Manual and automatic valves options are provided.



Benefits

Activated carbon, different from normal charcoal, is produced through activation process. It produces the high absorptive pores. This system takes advantage of the amazingly vast surface area possessed by activated carbon to eliminate the color, odor, taste in the water to improve the water quality.

Besides, it can eliminate the chlorine from water. Activated carbon filter is the basic and popular system during water treatment, the filter media is inexpensive and high efficiency to reduce project cost and improve water quality.

Treated Elements

- Chlorine.
- Color
- Odor
- taste
- Organics
- Colloid
- Pigment
- Heavy metal ions

Water Quality

- Reduce COD value.
- Reduce SDI value. $SDI < 5$
- Reduce TOC value. $TOC < 2.0$ ppm
- Total residual chlorine < 0.1 ppm

Working Principle

Carbon filter system adopts granular activated carbons to further remove residual chlorine, organics, suspended impurities and provide good water quality in the following reverse osmosis purification treatment.

Filter. The granular activated carbon has high carbon content, large molecular weight, large specific surface area for effective physical absorption of impurities in water. When the water flow through the pore of activated carbon, most of suspended particles, organics, etc are absorbed into the pore under the VDW (Van Der Waals' force).

At the same time, absorbed chlorine (hypochlorous acid) reacts on the surface of activated carbon and is reduced into chloride ions, thus the chlorine is effectively removed. After treated, the total residual chlorine < 0.1 ppm, which satisfy the RO (reverse osmosis) purification water quality requirements.

Backwash. While the filter operation, the intercepts in the pores and on the surface gradually increase, the pressure difference before and after the filter increases, until it fails. Under normal circumstances, the activated carbons can be backwash by the reverse water, so that most of the impurities are taken away and the absorption and filtration function restore.

When the activated carbon reaches the saturated absorption capacity and completely fails, the activated carbon should be regenerated or replaced to meet the engineering requirements.



Applications

- **Sewage Treatment Plant.** Activated carbon filter system can remove organic compounds, harmful chemicals, odors and other impurities in industrial wastewater.
- **Air Purification.** Activated carbon filters can help to remove smokes, odors and other volatile pollutants in air and gas purification and will not result in outgassing.
- **Analytical chemistry.** Purify organic molecules and chemicals by removing turbidity.
- **Metal finishing.** Purify organic molecules and chemicals by removing turbidity.
- **Groundwater remediation.** Purify organic molecules and chemicals by removing turbidity.
- **Pharmaceutical and chemical industry.** activated carbon filters act as a suitable carrier for precious metals and other catalyst applications.
- **Drinking Water Treatment.** Activated carbon filter offers better results than sand filters in removing worrisome compounds (chlorine, heavy metals, byproducts, and other volatile microorganisms) in municipal water.
- **Distilled Beverages Purification.** Activated carbon filters can help to filter organic components, including tastes, odor and colors of beverage for better texture and fermentation in juices and fruit-based beverages.

Water Softening System

Water softening system is composed of FRP water tank and brine tank with ion exchange resin and water distributor, which is the last link of the pre-filter system in the water treatment industry, and it mainly adsorbs and removes Ca^{2+} and Mg^{2+} in water through ion exchange resin to achieve the purpose of reducing water hardness. The softened water can prevent the concentrate water end of the RO membrane from chemical scaling of carbonate, sulfate, Ca^{2+} , and Mg^{2+} after entering the membrane treatment system, thus improving the performance of the membrane element and playing a role in ensuring the safe and stable operation of the system.

Structures

- **Brine Tank.** It is used to replace calcium and magnesium ions in the water softener tank to regenerate the ion exchange resin.
- **Ion Exchange Resin Water Softener.** Water softener tank is an important part of the water softening system. It is equipped with ion exchange resin and water distributor, and brine tank with the use of hard water into soft water.
- **Ion Exchange Resin.** It exchanges ions with anions and cations in water, mainly absorbs calcium and magnesium ions in water, and outputs soft water.
- **Water Distributor.** Upper and bottom distributors may need this system. Raw water can enter the water softener tank through the water inlet pipe and water distributor to achieve an even distribution of water.
- **Multiport Control Valve.** This device can reduce your pipeline placement and make the system stable and smart running. Manual and automatic valves options are provided.



Benefits

Water softening system is the last link of water into the membrane purification system, used to remove calcium and magnesium ions from the water, and reduce water hardness. It protects pipelines and equipment from corrosion and damage and prevents the emergence of membrane material contaminated by impurities to extend the service life of the membrane.

Treated Elements

- Calcium ions
- Magnesium ions
- Iron ions
- Chloride ions
- Carbonate
- Other ions

Water Quality

- **Water Hardness:** < 0 ppm

Working Principle

Stage 1: RUN (Softening)

Switch the button to the "RUN" position and the system starts to soften. Raw water enters the control valve from the water inlet and enters the FRP tank and resin layer through the top water distributor, softened water flows along the center pipe and drains from the outlet. The softening process is complete.

Stage 2: Backwash

When the softening performance cannot meet the requirements, the backwash station starts. Switch the button to the "Backwash" position. Raw water enters the control valve from the water inlet and enters the FRP tanks along the inlet pipe and downstream water distributor to eliminate resin impurities. Then the water is discharged from the discharge port.

Stage 3: Regenerate

When the backwash is completed, the generation station starts. Switch the button to the "Generate" position, and raw water enters the control valve from the water inlet and enters the brine ejector. Water flows rapidly to the ejector outlet and produces negative pressure. The brine is drawn into the tanks and flows through the resin layer along the central pipe and the bottom water distributor to achieve resin regeneration. Rare water is then discharged from the discharge port.

Stage 4: Slow Wash

Switch the button to the "Slow Wash" station. The brine ball valve is closed, raw water enters the control valve from the inlet and then enters the tanks through the ejector, and continues to slowly wash the resin layer along the central pipe and bottom water distributor to eliminate resin impurities and brine. Then the water is discharged from the discharge port.

Stage 5: Wash

Raw water enters the control valve from the inlet and then enters the tanks through the top water distributor and flows towards the resin layer with a large amount of water to thoroughly flush the resin layer and residual brine, then the impurities and residual brine will be discharged from the discharge port.

Stage 6: Filling Water

Switch the button to the "Filling Water" station. Raw water enters the control valve through the inlet and the brine ball valve opens at the same time. The water enters the brine tank and fills the water. Upon completion of filling, it will enter the "RUN" (softening) station again.



Applications

- **Drinking Water:** softened drinking water tastes good and reduces the harm of impurities in the water to the human body.
- **Boiler Water:** softened boiler water can reduce scale formation and damage to the boiler system.
- **Cooling Water:** removing hardness in water, reducing scale and sediment formation, and prolonging the service life of equipment.
- **Wastewater:** removing calcium and magnesium ions from water, and reducing water hardness, and scale and sediment formation in subsequent treatment.
- **Pharmaceutical & Chemical Industry:** reducing equipment clogging and corrosion, protecting product quality, and improving production efficiency and safety.
- **Food & Beverage:** reducing scale and sediment build-up on equipment, and improving product quality and hygiene standards.
- **Textile & Paper:** reducing clogging and corrosion, improving textile and paper quality, and reducing equipment failure rates.



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