Filtration

Highly effective filtration systems for process & wastewater, in industrial applications.

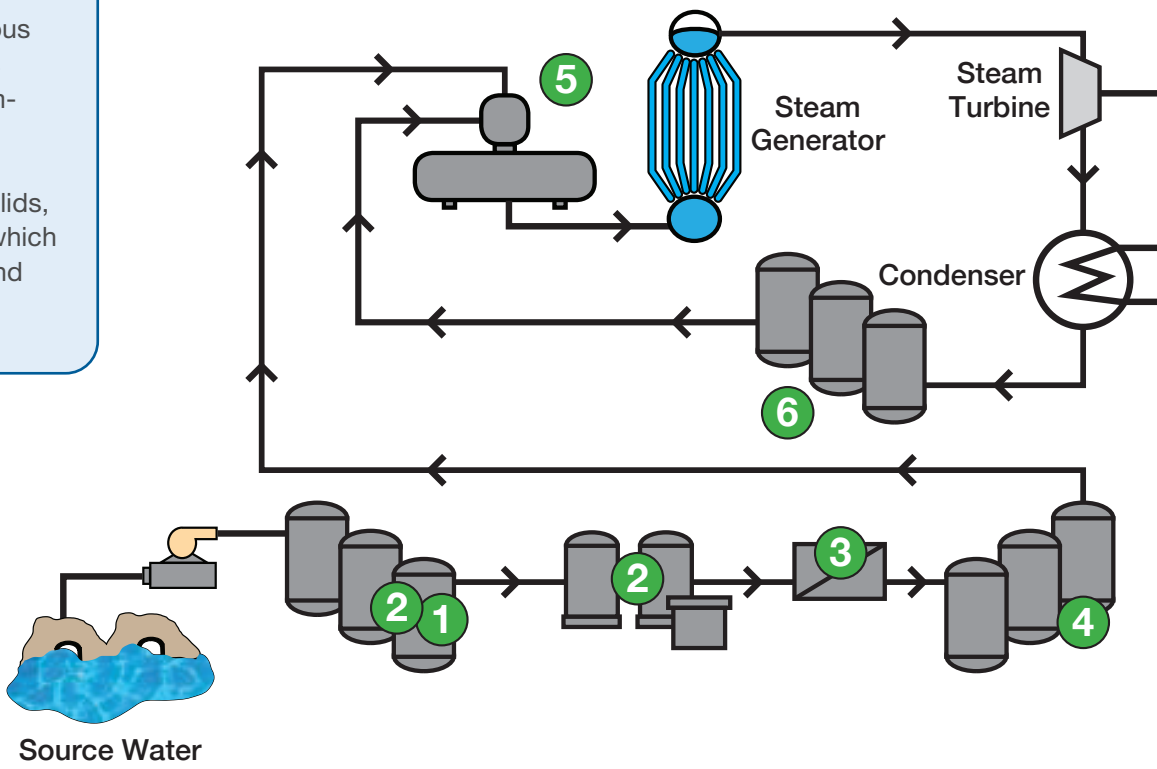
newterra®

newterra.com

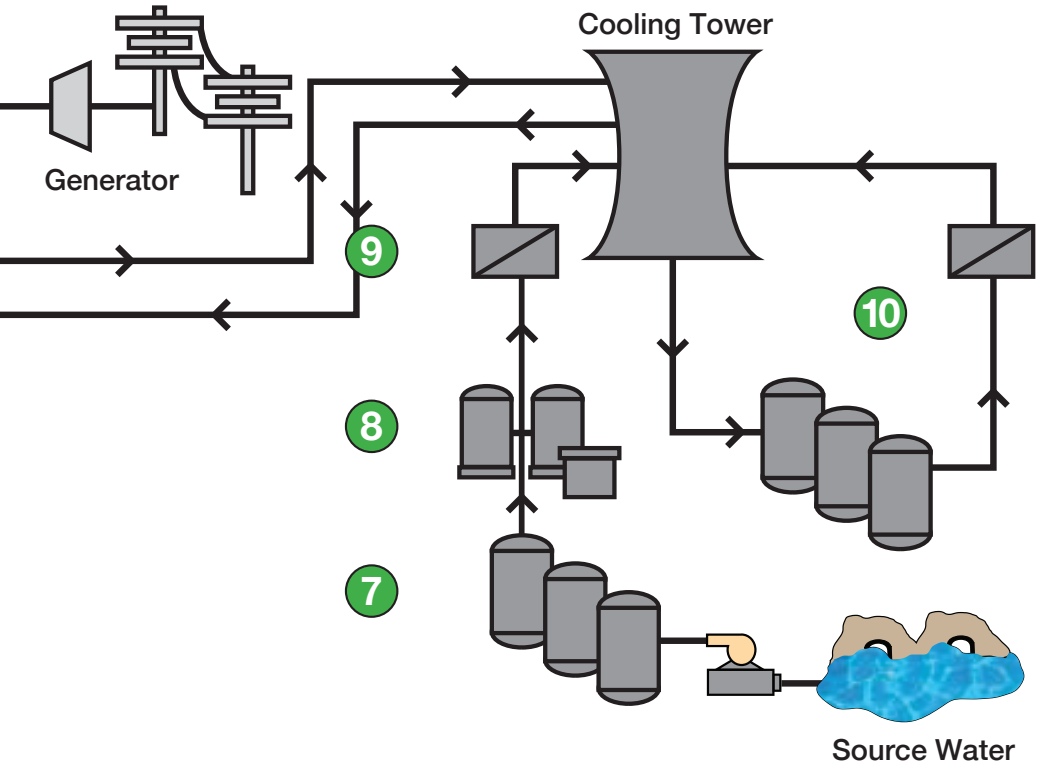
Filtration Equipment

Filtration Equipment

Technologies that are widely used for the removal of various impurities and contaminants from the feed water to steam-generating boilers (or other process equipment). Typical impurities are suspended solids, organics, chlorine and iron which can cause fouling, scaling and oxidation damage.



1. **Boiler Make-up Water – Filtration**
   Multimedia Filtration
   Screen Filtration
   Activated Carbon Filtration
   Iron Filtration
   Microfiltration/Ultrafiltration
2. **Boiler Make-up Water – Softening**
   Sodium Zeolite Softening
   Lime Softening
   Nanofiltration
3. **Boiler Make-up Water – Filtration**
   Dissolved Solids Reduction
   Nanofiltration
   Reverse Osmosis
   Demineralization
4. **Boiler Make-up Water – Polishing**
   Demineralization
   Electro-deionization
5. **Deaeration**
   Counterflow Deaeration – Spray/Tray
   Parallel Downflow Deaeration – Spray/Tray
   Atomizing Deaeration – Spray
   Vacuum Deaeration
6. **Condensate Recovery – Condensate Treatment**
   Mix Bed Condensate Polishing
   Deep Bed Condensate Polishing



7 Cooling Tower Make-up Water – Filtration
Multimedia Filtration
Screen Filtration
Iron Filtration
Microfiltration/Ultrafiltration

8 Cooling Tower Make-up Water – Softening
Sodium Zeolite Softening
Nanofiltration

9 Cooling Tower Make-up Water – Filtration
Nanofltration
Reverse Osmosis

10 Cooling Tower Water – Blowdown Recovery and Recycle
Multimedia Filtration
Screen Filtration
Activated Carbon Filtration
Microfiltration/Ultrafiltration
Reverse Osmosis

Multimedia Filtration

Construction

Vessels: Carbon steel, stainless steel or FRP (fiber reinforced plastic), ASME coded/stamped options

Design Pressure: As required

Internals: Stainless steel or schedule 80 PVC

Media: Anthracite, sand, garnet, fine gravel, coarse gravel

Face Plumbing: Carbon steel, stainless steel or schedule 80 PVC

Valve Operation: Pneumatic, water, electric or manual actuated

Skid Mounted Option: Carbon steel or stainless steel

Controls: PLC, stager/timer, metered or manual

Advantages

- Provides effective suspended solids filtration to 10 microns
- Contains several layers of various density media providing finer filtration than traditional sand-only filters
- Inlet/outlet pressure gauges
- Efficient internal designs
- Backwash flow control
- Pressure release valve for pressure fluctuations
- Safety vacuum release valve to prevent collapse
- Stand alone tanks or modular skid mounted (pre-piped & pre-wired) options
- Clear backwash drain line for visual inspection (PVC plumbing only)
- Steam sanitizable tank options (stainless steel vessel only)

Purpose

- To remove suspended solids (TSS, turbidity, SDI): Dirt, sand, and sediment
- Suspended solids are abrasive and can easily damage plumbing, valves and downstream equipment
- Suspended solids will plug filters and foul RO membranes
- Suspended solids are harmful to boilers and can cause fouling and thermal efficiency loss

Principle of Operation

Feed water enters the vessel through an inlet valve and is sprayed out over the bed of mixed media. The water then flows down through the bed. The coarse media layers trap large particles, and successively smaller particles are trapped in the finer layers of media. The result is a highly efficient filtering system since suspended solids removal takes place throughout the entire bed. The clean water enters the distributor system at the bottom of the vessel and travels upward via the center riser tube where it is then piped out of the vessel.

Over time the media will trap additional solids resulting in an increased pressure drop across the vessel. Once the pressure drop reaches a preset level the control system (or manual initiation) will trigger a backwash mode. During backwash the flow is reversed and the feed water enters down through the riser tube, exits out the distributor system and flows upward through the bed of media. This increased velocity up through the bed disturbs the media and releases the trapped particles which are sent to a drain.

Activated Carbon Filtration

Construction

Vessels: Carbon steel, stainless steel or FRP (fiber reinforced plastic), ASME coded/stamped options

Design Pressure: As required

Internals: Stainless steel or schedule 80 PVC

Media: Granulated activated carbon (GAC)

Face Plumbing: Carbon steel, stainless steel or schedule 80 PVC

Valve Operation: Pneumatic, water, electric or manual actuated

Skid Mounted Option: Carbon steel or stainless steel

Controls: PLC, stager/timer, metered or manual

Advantages

- Provides effective, continuous chlorine removal
- Can be used for organics removal in certain applications
- Contains highly porous granulated activated carbon
- Inlet/outlet pressure gauges
- Efficient internal designs
- Self adjusting backwash flow control
- Safety air release valve for pressure fluctuations
- Minimum energy and maintenance requirements
- Stand alone tanks or modular skid mounted (pre-piped & pre-wired) options
- Clear backwash drain line for visual inspection (PVC plumbing only)
- Steam sanitizable tank options (stainless steel vessel only)

Purpose

- To remove chlorine, trace organics, color and odor
- Chlorine can affect taste & odor of water
- Chlorine can degrade certain materials such as plastics and composites
- Chlorine causes unrepairable damage to most RO membranes
- Trace organics can affect taste & odor of water, be toxic and cause organic fouling of resins and membranes

Principle of Operation

Feed water enters the vessel through an inlet valve and is sprayed out over the activated carbon bed. The water then flows down through the carbon. The highly porous granulated carbon fines absorb and adsorb chlorine, organics and impurities. The result is a highly efficient filtering system that removes virtually all chlorine. The dechlorinated water enters the distributor system at the bottom of the vessel and travels upward via the center riser tube where it is then piped out of the vessel.

Over time, the carbon will trap additional solids resulting in an increased pressure drop across the vessel.

Once the pressure drop reaches a preset level the control system (or manual initiation) will trigger a backwash mode. During backwash the flow is reversed and the feed water enters down through the riser tube, exits out the distributor system and flows upward through the bed of carbon. This increased velocity up through the bed disturbs the carbon and releases the trapped particles which are sent to a drain. The backwash mode takes approximately ½ hour after which the vessel is then switched back into normal operation.

Iron Removal Filtration

Construction

Frame: Painted carbon steel or stainless steel

Membranes: Thin film composite

Membrane Housings: FRP

Controls: Customized for the end user

Piping: PVC, Duplex SS or Super Duplex SS

Instrumentation: Customized for the end user

Cleaning System: Integral to the skid or stand alone

Controls: Customized PLC controls

Advantages

- Provides effective iron removal with little or no chemicals
- Certain media can also remove manganese, hydrogen sulfide and some metals
- Inlet/outlet pressure gauges
- Efficient internal designs
- Self adjusting backwash flow control
- Safety air release valve for pressure fluctuations
- Minimum energy and maintenance requirements
- Stand alone tanks or modular skid mounted (pre-piped & pre-wired) options
- Clear backwash drain line for visual inspection (PVC plumbing only)
- Steam sanitizable tank options (steel vessel only)

Purpose

- To remove iron, manganese, hydrogen sulfide and/or certain metals
- Iron quickly falls out of solution and sticks to surfaces causing scaling and fouling
- Iron can plug filters, plumbing and foul RO membranes
- Iron will foul boiler tubes inhibiting heat transfer
- Hydrogen sulfide has an objectionable odor and is highly corrosive
- Metals can cause fouling on plumbing and RO membranes

Principle of Operation

Feed water enters the vessel through an inlet valve and is sprayed out over the iron removal media. The water then flows down through the media. The media attracts and pulls the iron out of solution. The result is a highly efficient filtering system that removes virtually all iron. The iron free water enters the distributor system at the bottom of the vessel and travels upward via the center riser tube where it is then piped out of the vessel.

Over time, the iron media will trap additional solids resulting in an increased pressure drop across the vessel. Once the pressure drop reaches a set level the control system (or manual initiation) will trigger a backwash mode. During backwash the flow is reversed and the feed water enters down through the riser tube, exits out the distributor system and flows upward through the bed. This increased velocity up through the bed disturbs the media and releases the trapped particles which are sent to a drain. The backwash mode takes approximately ½ hour after which the vessel is then switched back into normal operation.

pH Adjustment Filtration (Calcite)

Construction

Vessels: Carbon steel, stainless steel or FRP (fiber reinforced plastic), ASME coded/stamped options

Internals: Stainless steel or schedule 80 PVC

Media: Calcium carbonate

Face Plumbing: Carbon steel, stainless steel or schedule 80 PVC

Skid Mounted Option: Carbon steel or stainless steel

Advantages

- Provides pH adjustment without the addition of chemicals
- Inlet/outlet pressure gauges
- Safety air release valve for pressure fluctuations
- Stand alone tanks or modular skid mounted (pre-piped & pre-wired) options

Purpose

- To increase pH
- An effective alternative in applications requiring little or no chemicals usage

Principle of Operation

Feed water enters the vessel through an inlet valve and is sprayed out over the calcium carbonate media. The water then flows down through the media. The acidic water slowly dissolves the calcium carbonate which increases the pH.

The result is an effective way to increase pH without the use of chemicals. The increased pH water enters the distributor system at the bottom of the vessel and travels upward via the center riser tube where it is then piped out of the vessel.

Media	Service Flow Rate (gpm / sq. ft.)	Backwash Flow Rate (gpm / sq. ft.)	pH Range	Max Temp. (°F)	Regeneration Method	Regeneration Chemical	Also Removes	Additonal Notes
SUSPENDED SOLIDS REMOVAL								
Multimedia	3 - 7.5	12-20	Wide Range		None	None		Filters down to 10 microns
Carbon	3-7.5	10-20	Wide Range		None	None	Dissolved Organics	Feed water should be free of iron, oil and turbidity; Not a good choice for organic removal without chlorine present.
IRON REMOVAL								
Greensand	3-5	12-20	6.2 - 8.5	80	Intermittent or Continuous	Potassium Permanganate (Km_nO_4)	Manganese; Hydrogen Sulfide	Maximum limit of iron or manganese in feed water is 15 ppm, hydrogen sulfide is 5 ppm; Chlorine tolerable
Greensand Plus	3-5	12-20	6.2 - 8.5	No limit	Continuous	Chlorine	Manganese; Hydrogen Sulfide; Arsenic; Radium	
Birm	5	10-15	6.8 - 9.0		None	None	Manganese; Suspended Solids (excellent filter media)	Feed water must contain no oil or hydrogen sulfide; Organic material not to exceed 4-5 ppm; Chlorination greatly reduces Birm's activity. Free chlorine must be < 0.5 ppm; Dissolved Oxygen (D.O.) content must be equal to at least 15% of the iron (or iron and manganese) content
KDF-85	15	30	6.5 - 8.5	35 - 212	None	None	Hydrogen sulfide; Heavy metals	Removes iron and hydrogen sulfide levels up to 5 ppm
pH ADJUSTMENT								
Calcite	5	10	5.0 - 7.0		None	None		Increases pH; Also will increase hardness

About Newterra

Newterra designs, engineers, manufactures, and services environmental, water and wastewater treatment solutions that assure great performance, superb reliability, and the highest value to renew precious ecosystems. Newterra offers a broad portfolio of reliable, trouble-free technologies and outsourcing support for global municipal and industrial customers across diverse applications, including drinking water, industrial process water, wastewater, stormwater and remediation.

From the first interaction, you'll experience passionate experts who tailor solutions based on intimacy, knowledge and partnership to meet your operational, regulatory and safety goals. These experienced water experts uniquely question, listen, advise then deliver solutions and schedules – on time and on budget.

With 150 years in water treatment and tens of thousands of installations across every continent, you'll enjoy security and peace of mind from a trusted partner for life.

Now, what can we do for you?

40+ Professional Engineers

200+ Employees Worldwide

THOUSANDS of Installations Worldwide


Coraopolis, PA


Brockville, Canada


Chaska, MN

Trooper, PA


Heber Springs, AR

Portland, OR

Newterra, Ltd. | **newterra.com**
USA/Canada: **1.800.420.4056** | Outside USA/Canada: **1.613.498.1876**