METSI ENVIRO TECH PVT LTD

Innovative Technological Environmental Solutions

CLAIRE FONTAINE® Resin Based Filtration System

Introduction

Filtration is a treatment process that is used to accomplish to physically remove a pathogenic organism from the source water or by reducing suspended solids to protect downstream disinfection processes. Filtration processes have been used in water treatment for several centuries. Pressure filtration processes are still widely in use throughout the water industry.

There are two main types of mechanisms to consider in filtration processes:

- Transport mechanisms: How the particles come in contact with the filtration matrix (e.g. sand, membrane surface).
- Removal mechanisms: The mechanisms that physically remove a particle from the process water. This can include physical, chemical and biological mechanisms.

The dominant removal mechanisms that apply to water media filtration are as follow:

- Straining: a size exclusion-based physical removal mechanism in which particles that are larger than the available pore space are physically removed from the filtered water.
- Adsorption: a physical or chemical mechanism in which a compound is removed when it attaches to a physical surface, either of the filter media or of previously deposited and/or adsorbed particles.

The exact mechanisms that contribute to the removal of a target compound or organism will vary depending on the selected filtration technology, the source water and operating conditions. In membrane filtration technologies, the following two mechanisms are dominant:

Sieving: the mechanism that applies to porous membranes. It occurs when suspended or colloidal particles are physically prevented from transport across a physical membrane as a result of size exclusion, i.e. the particle is larger than the pore(s) within the membrane material.

Rainwater which falls on hardness minerals such as calcium and manganese, collects in underground aquifers and causes scaling. This scale builds up becomes unsightly or interferes with the efficiency of applications, and needs to be removed. Just 1.6mm of scale build up will cause a 12% loss in heating efficiency in boiler water. Softened water also reduces the excessive use of detergents and soaps.

Filters

Filtration is the process to remove impurities from water using a fine physical barrier.

METSI ENVIRO TECH PVT LTD
Innovative Technological Environmental Solutions

Pressure Sand Filter

Pressure Sand Filter is used for removal of suspended solids & turbidity from Water & Wastewater. Pressure Sand filter ensures the maximum utilization of the surface area, lesser pressure drop across the filter bed and effective removal of the impurities.

Raw water is passed through the pressure sand filter, the filter media (Fine quartz sand) is supported on gravel & pebbles bed of progressively larger sizes. During the filtration cycle the filter bed retains the dirt and suspended particles from the water and accumulates within the filter bed. Clear water can be collected from the outlet of filter.

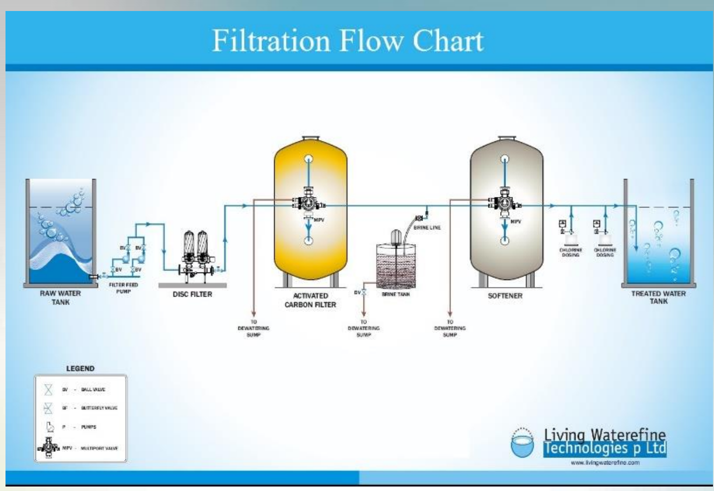
These filters reduce turbidity from the raw water& can accept to load up to 25-50 NTU. Fine mesh sand is used as the filtering media & the filters can be operated only at lower velocities.

Activated Carbon Filter

Activated Carbon Filter is used to adsorb chlorine, organics, tri-halo methane (THM), taste, odor, and color from Water & Wastewater. Activated carbon is a charcoal that has been treated with oxygen to open up millions of tiny pores between the carbon atoms. The activated carbon has a massive surface area (2000 – 3000 square meters per gram of activated carbon) making it highly effective at adsorbing impurities from water.

Activated carbon filtration is an adsorptive process in which the contaminant is attracted to and adsorbed onto the surface of the carbon particles. The efficiency of the adsorption process is influenced by carbon characteristics (particle and pore size, surface area, density and hardness) and the contaminant characteristics.

Activated carbon is primarily used for removal of free residual chlorine, color, odor. Activated charcoal is used as media for removal of above said impurities and works on surface absorption principle.



METSI ENVIRO TECH PVT LTD
Innovative Technological Environmental Solutions

Models

Model No.	Flow Rate (LPH)	Vessel size (Inch)
	Min - Max.	Dia. x Length
CFSF-500	160 – 500	8 x 44
CFSF-1000	500 – 1000	10 x 54
CFSF-1500	1000 – 1500	13 x 54
CFSF-2000	1500 – 2000	14 x 65
CFSF-4000	2000 – 4000	16 x 65
CFSF-6000	4000 – 6000	21 x 72
CFSF-8000	6000 – 8000	24 x 72
CFSF-12000	8000 – 12000	30 x 72
CFSF-17000	12000 – 17000	36 x 72
CFSF-30000	17000 – 30000	48 x 72
CFSF-50000	30000 – 50000	63 x 64

Note :

- Exact models selection will be based on characteristics of input water: suspended solids, organic loads, velocity and end purpose of quality of water.
- Typically for waste water, we require larger size vessels compared to water treatment filtration as the suspended solids & organic loads are higher in waste water.
- There are two kinds of systems, one is operated manually & the other is automatically operated.
- The manual system is operated with a five-valve system which includes service & back wash. In case of a softener system, there will also be a port for regeneration.
- The automated back wash system operates on pneumatic valves & back wash is triggered off, either on pressure differential or on fixed intervals.

Demineralization & Mixed Bed Systems

A demineralization system (DM) is a de-ioniser (DI) and uses synthetic resins similar to those used in water softeners. Typically used on water that has already been prefiltered, DI uses a two -stage process to remove virtually all ionic material remaining in water.

Filters to house the resins are made up of Fiber Reinforced Plastic (FRP) material.

Two types of synthetic resins are used, one to remove positively charged ions(cations) and another to remove negatively charged ions (anions).

Cation deionization (DI) resins exchange hydrogen(H-) IONS with cations, such as calcium, magnesium and sodium. Anion deionization resins exchange hydroxide (OH-) Ions with cations, such as calcium, magnesium and sodium. Anion deionization resins exchange hydroxide (OH-) ions for anions such as chloride, sulphate and bicarbonate. The displaced H+ and OH -combine to form H2O.

Resins have limited capacities and are regenerated. Cation resins are regenerated with acid and Anion resins with a strong base.

From the demineralization system, water enters the Two bed and mixed bed (MB) deionizer. In the mixed bed system, the anion and cation are blended into a single vessel to produce higher quality water of dissolved ions or minerals, out the maximum resistance of 18.3 megaohms/cum. Mixed Bed system resins are housed in a single mild steel vessel with inner rubber lining.

The typical demineralization system & mixed bed deionizer system follows rules of exchange capacities of resins to deliver the end results and is designed specifically for each project.

Typical Characteristics of a DM System

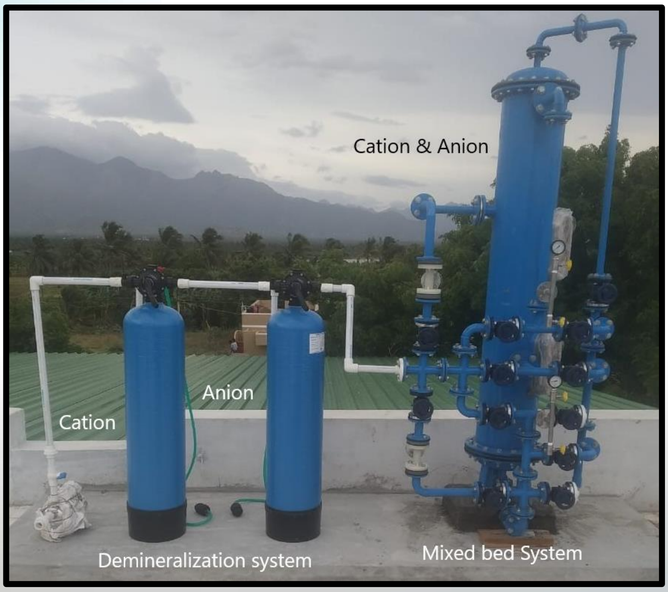
Maximum Gross Flow*	m3/hr
Minimum Flow	m3/hr
Regeneration Time (Including MB System)	hours
Maximum Flow to Drain during Regeneration	m3/hr
Chemical Time per Regeneration	hours
Chemical Usage per Regeneration;	
HCl (32%)	kg
NaOH (100%)	kg
Effluent Output	pH
Required Power - Max. (Including MB System)	kW

Typical Characteristics of a MB System

Maximum Gross Flow*	m3/hr
Minimum Flow	m3/hr
Regeneration Time (Including DM System)	hours
Maximum Flow to Drain during Regeneration	m3/hr
Chemical Time per Regeneration	hours
Chemical Usage per Regeneration;	
HCl (32%)	kg
NaOH (100%)	kg
Effluent Output	pH
Required Power - Max. (Including MB System)	kW

METSI ENVIRO TECH PVT LTD

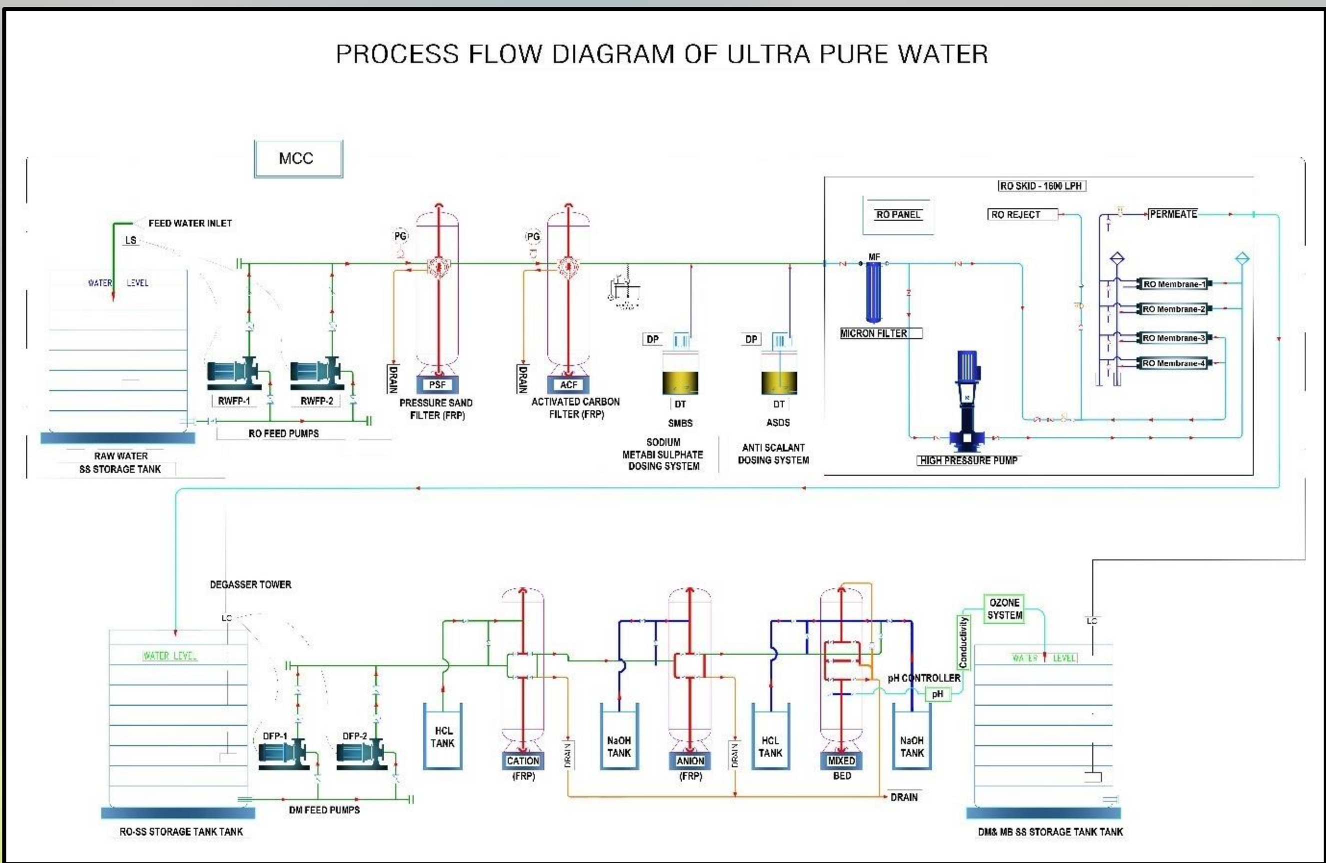
Innovative Technological Environmental Solutions



The system can be run manually or automated through Pneumatic Valves run via compressor, wired through a PLC based panel board. The objective is to ensure the DM & MB system runs in a single pass and the backwash through Pneumatic valves is done periodically based on input water as monitored by the online conductivity meter.

The overall system from raw water to ozonated water can be customized for various applications like hospitals, electronics, pharmaceuticals, etc following various stages of filtration, R.O, DM, MB & Ozonation.

For example, flow chart for ultra-pure water is provided below:



No. 120/30, C-2, 2nd Cross, Hennur,
Bangalore - 560 043, India.
T : +91 90609 88475 E sales@metsiet.com

5(3), Central Avenue,
Kodambakkam, Chennai - 600 024, India.
E : admn@metsiet.com.

CIN Number:
U29100KA2017PTC104837
www.metsiet.com