



WATER TREATMENT SYSTEM



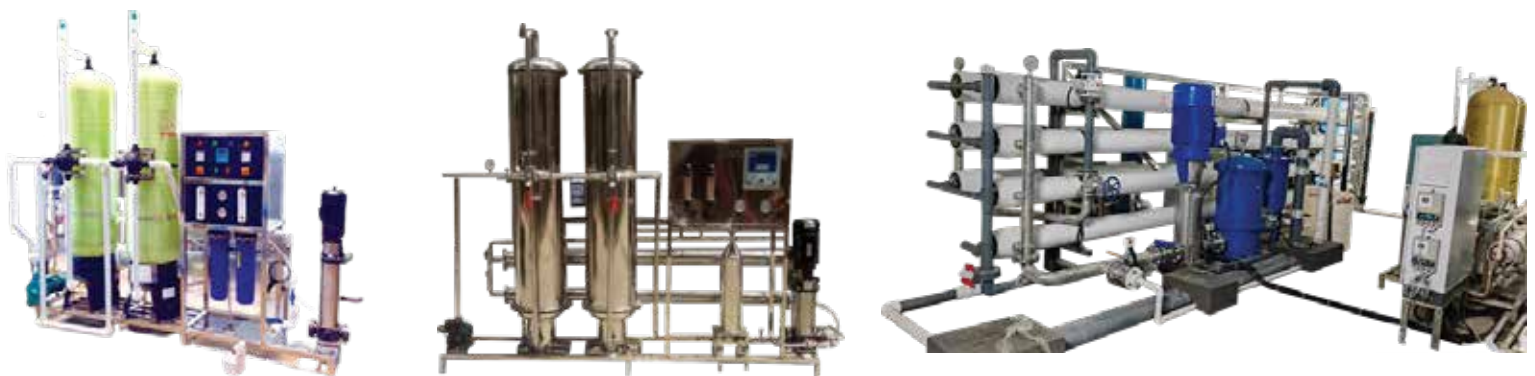
Waterman Engineers offers unique filtration systems to improve the treated water quality by removing physical impurities, organic compounds, colour, odor, iron, manganese, turbidity, etc. & also to control BOD & COD in the water. Waterman offers wide variety of water purification/treatment systems.

Reverse osmosis (RO) system is widely used for the purified water generation system, By this system the feed water quality we can improve by mean of color, Smell, then properties like Total dissolve solids, dissolve sulphate, phosphate, Magnesium, hardness, calcium, turbidity and many more different properties by such different machinery and by different process of the removal of such properties of feed water respectively.

In this product we can increase the feed water capacity same way we can also increase the efficiency of the output water Like we can go from 1000 LPH to 1,00,000 LPH & more also as per customer requirement.

Waterman Engineers proposing contemporary, competent and cost-effective water purification plant that is designed to filter, destroy and recover all contaminants from water and delivers truly purified version of the water that is ideal for industrial use or releasing into the environment.

Waterman Engineers is renowned manufacturer and supplier of **Industrial RO Plant in India**. These **Industrial RO plants** are fully automatic. Our industrial RO water purifier system is fully customized and suited to an industrial area.



Waterman Engineers provides complete SS RO Plant (SS 304/SS 316). Mainly used for Mineral Water/Beverage Industry/Pharmaceutical. As per client's requirement it can be made Semi-Automatic or Automatic.

Same way in this Reverse osmosis system there is single stage and two stage RO system both are used in such different aspect by mean in this system first stage there water quality mainly convert in the Human water drinking stage it means the control PH , Turbidity, odorless, colorless, and other properties as per norms of the drinking water quality requirement

Same way there is second stage RO system in this water quality is near to the distill water it means the water TDS is less than 10 or 5 same way there is less in hardness and the sulphate contains is nil, magnesium contains nil, phosphate contains is nil, and other properties as per the customer the machinery requirement for any product respectively.

With a double pass reverse osmosis (DPRO) system, the permeate water is fed to a second reverse osmosis unit to produce purer water. With a one or two stage RO, the concentrate or reject stream is fed to a second RO system to produce water. A reverse osmosis system is used to purify the water by removing about 99% of all dissolved solids from the feed water. Single pass reverse osmosis systems produce product water (permeate) and reject water (concentrate) at the same time.

Waterman innovative dual-pass reverse osmosis system technology helps reduce dissolved solids by 99.9 percent while maximizing water recovery. Demineralized water is produced with a double pass reverse osmosis system to ensure a final conductivity of less than 5 $\mu\text{S} / \text{cm}$. This pure water is used to prepare the dialysate required for haemodialysis. Demineralized water must be not only chemically but also biologically high-purity. High quality is guaranteed by this ultrapure water treatment system with a solution that can be disinfected with hot water. The reverse osmosis system can be disinfected with hot water up to 80 ° C and guarantees high quality without the use of chemicals.





Demineralization plant is based on cost effective ion technology with counter current regeneration. DM Plant is the process of removing mineral salts from water by using the ion exchange process. The DM Plants are loaded with highly efficient CATION & ANION exchanger & are also loaded with degasification system to remove every trace of minerals from the system.

Waterman Engineers offers standard DM Plants with FRP / MSRL & SS construction.

Demineralized Water also known as Deionized Water, Water that has had its mineral ions removed. Mineral ions such as cations of sodium, calcium, iron, copper, etc and anions such as chloride, sulphate, nitrate, etc are common ions present in Water. Deionization is a physical process which uses specially-manufactured ion exchange resins which provides ion exchange site for the replacement of the mineral salts in Water with Water forming H^+ and OH^- ions. Because the majority of Water impurities are dissolved salts, deionization produces a high purity Water that is generally similar to distilled Water, and this process is quick and without scale buildup. De-mineralization technology is the proven process for treatment of Water. A DM Water System produces mineral free Water by operating on the principles of ion exchange, Degasification, and polishing. Demineralized Water System finds wide application in the field of steam, power, process, and cooling.



Electro deionization (EDI) is an electrically-driven water treatment technology that uses electricity, ion exchange membranes and resin to remove ionized species from water.

In this System the membranes remove the salt and minerals from the feed water and outcomes it absolute deionized water comes and we can use further for our process majorly there are two types of EDI system chemical sanitizable system and another is hot water sanitizable system respectively.

- Chemical Sanitizable System
- Hot water Sanitizable System

Both the types of deionization system works on the same parameter for the treatment of water and remove acids, minerals and salt precisely but there is some minute difference in both the EDI system it means in chemical system the system consist of Ion exchange membrane, Resin and the chemicals for the process of the water Treatment, same way there is one another system which is hot water sanitizable which consist of ion exchange membrane, resin and utilization of the hot water for removing the minerals and salt from the feed water.

Electro deionization (EDI) is a continuous, chemical-free process of removing ionized and ionizable species from feed water using DC power. EDI is typically used to polish reverse osmosis (RO) permeate, and is a smart alternative to – and effective replacement of – conventional mixed bed ion exchange (IX). Using electro deionization eliminates the need to store and handle the hazardous chemicals used for resin regeneration in mixed beds. And since electricity is EDI's only consumable, this method of permeate polishing does not produce a hazardous waste stream.



It is the system which works on the principal of the super heating of the feed water after that there is heat exchanger process for the feed water comes in different level of water consumption which we can use for the injection or for any type of drug mixing stage without any type of reaction with other chemicals or any type of change in mineral will we add this water respectively.

As we know there is some content of microorganisms, pyrogen and other forms of bacteria, COD, BOD and many more. But after this process there is not any single amount of micro content and same way the TOC of the water is also less than 0.300 which was as same as distill water.

In this process there is feed water becomes super-heated steam having the temperature about 140 or even more after this there is heat exchanger process which performs back to the stage of liquid water by this process the raw water becomes the final required water which was needed for the drug mixing process without any type of chemical reaction respectively.

In this process there is recovery of the water about 90 to 95 %.

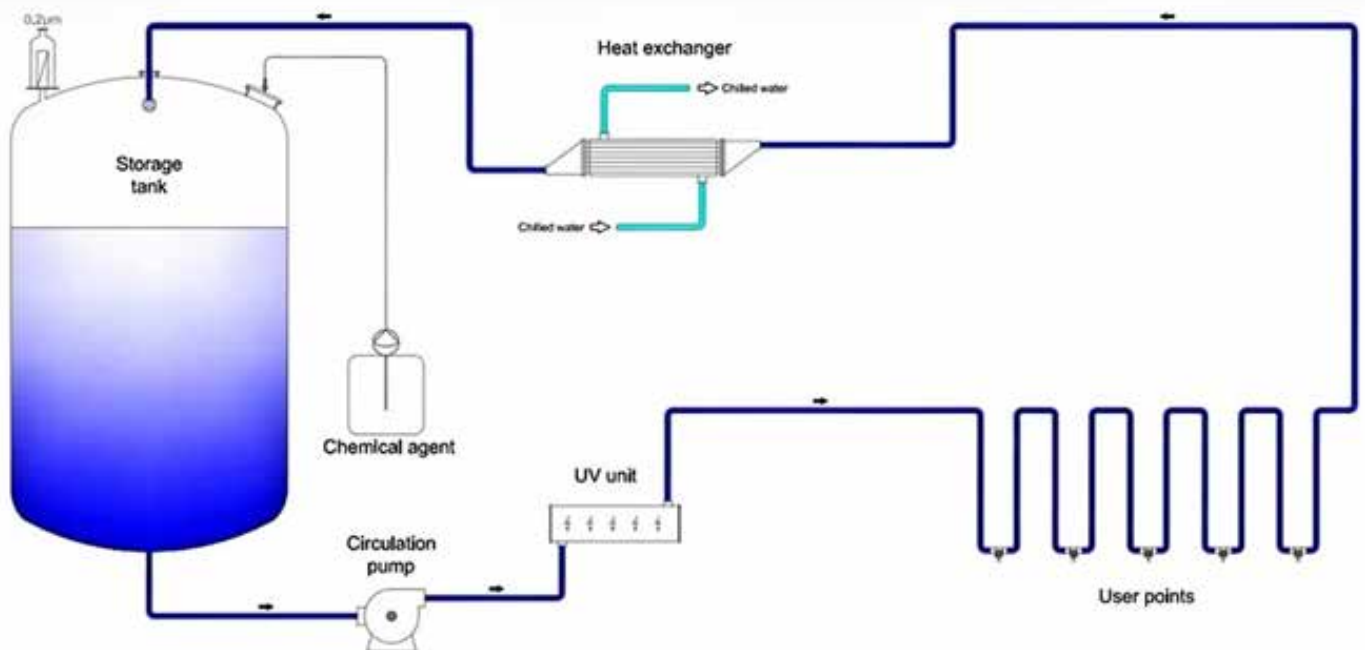
Feed water	Conductivity of water	TOC of water	Recovery after WFI system (%)
500 LPH	Less than 1	0.3	90 to 95 %
1000 LPH	Less than 1	0.3	90 to 95 %
2000 LPH	Less than 1	0.3	90 to 95 %
5000 LPH	Less than 1	0.3	90 to 95 %
10,000 LPH	Less than 1	0.3	90 to 95 %

This WFI system feed water want some specific requirement like the conductivity of the feed water is less than 1 same way there is not any type of dust particle or any type of microorganisms respectively.

Water for Injection is a pharmaceutical grade of pyrogen-free water that is largely used in medicines administered intravenously and comes directly in contact with the patient's bloodstream. Thus, understandably it needs to be free of bacterial endotoxins.

In fact, owing to its highly sensitive use case, water for injection has to meet extremely stringent standards of quality set forth by international regulatory bodies with strict validation requirements for Water for Injection (WFI) generation systems. While there are some variations to this process, water for WFI is usually checked for:

- Character (Appearance)
- Conductivity
- Heavy Metal
- Nitrates
- Total Organic Carbons (TOCs)
- Bacterial Endotoxins
- Total Viable Aerobic Count





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