



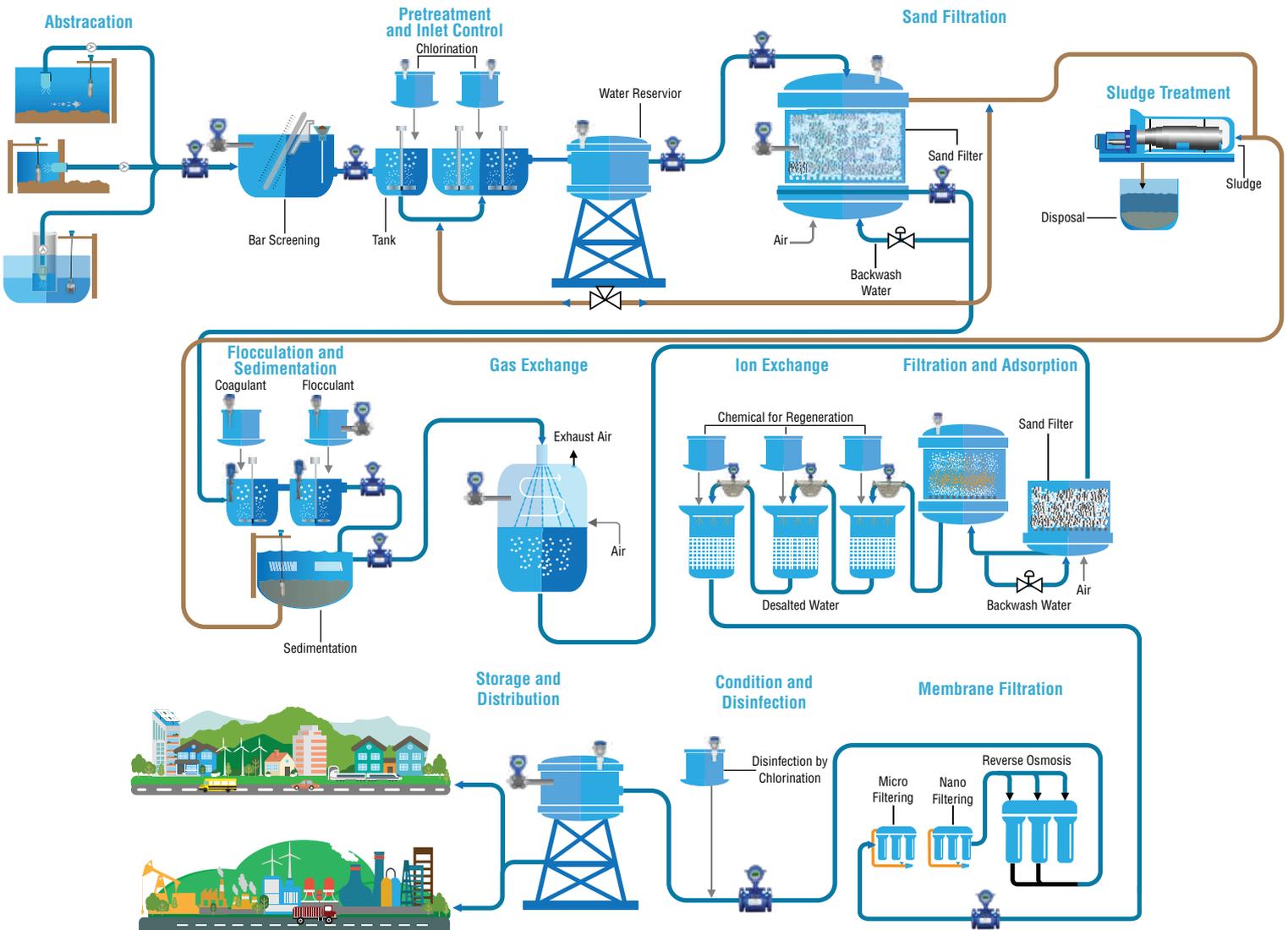
The water industry is changing rapidly, adapting to increased population pressure and climate change. There is considerable pressure on industry and academia to develop sustainable water management strategies and technologies.

# **WATER** **INDUSTRY MARKETS**

Instruments For Water Industry Process Control



# WATER INDUSTRY PROCESS CONTROL





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# INTRODUCTION ABOUT WATER INDUSTRY

The provision of adequate water supply is essential for the development of entire regions. Tek-Trol provides highly advanced, market-oriented, and cost-effective measuring instruments and customized and fully equipped solutions. Our technology and products improve the performance of plants. Our products are safe and easy to operate and maintain, ensuring sustained savings and productivity. The range of products includes precision level transmitters for tank of any size, flow meters for partially filled pipes and biogas, analytical sensors for process monitoring and quality control systems. Our Flow, Level, Pressure products provide accurate and reliable measurement in Water Industry Process Plant.



# COST SAVING INSTRUMENTS FOR WATER INSUDTRY

## FLOW MEASUREMENT

- Tek-Clamp 1200A Ultrasonic Clamp-on Flow meter
- Tek-Flux 1400A Electromagnetic Flow Meter
- Tek-Cor 1100A Coriolis Flow Meter

## PRESSURE MEASUREMENT

- Tek-Bar 3110B Exp-Proof Piezo Differential Pressure Transmitter
- Tek-Hydro 4500A-D Differential Pressure Level Transmitter

## LEVEL MEASUREMENT

- Tek-Sound 4200B Two Wire Ultrasonic Level Transmitter
- Tek-Wave 4300C Free Space Radar Level Transmitter
- Tek-Flex 4100C Programmable Two-Wire TDR Level Transmitter
- Tek-Sub 4800B Submersible Level Transmitter
- Tek-Sub 4800D Wastewater Submersible Level Transmitter

## DP FLOW MEASUREMENT

- Tek-DP 1610D Integral Orifice Assemblies
- Tek-DP 1610C Orifice Flanges and Plates
- Tek- DP 1640A Venturi Tube Meters

# PRETREATMENT AND INLET CONTROL

Pretreatment process is a fundamental and essential stage of the water treatment process. The purpose of the pretreatment process is to remove most of the non-soluble solids or chemicals or microbiological contamination from raw water. It also reduces the pollutant loads and protect all the subsequent steps in the treatment plant. The raw water is typically collected from the sources, including rivers, lakes, or reservoirs. Large water pumps are used to transfer the raw water from water source to water treatment plant. This raw water is passed through a screening process for water treatment. Treatment facilities are often engineered to utilize gravity water flow as much as possible to reduce pumping costs. Tek-Trol's Ultrasonic Clamp-on and Electromagnetic Flow Meters are used for open channel and close pipe flow measurement.

The screening process is a post treatment of pre-treatment. Water treatment is start at the screening process. In this process large particles (such as fish, wood, paper, plastic) are removed from the raw water. A large metal screen is used for screening, which is also called a bar-screen. It removes large particles which are trapped on the screen. The Bar Screen is made of stainless steel and is located at the front of the water source intake. The inlet level in screening process is measure by Tek-Trol's Submersible Level, Ultrasonic Level, and Hydrostatic Pressure Level Transmitters. These screens are routinely raked or cleaned. The screenings can be discharged into containers, wash compactors, screw conveyors, conveyor belts, etc. Tek-Trol's Electromagnetic Flow Meter and Differential Pressure Transmitter are measured inlet flow and pressure of water, respectively sealing at the sides prevents solids from circumventing the filter. The level of containers is measured by Tek-Trol's Submersible Level Transmitter.

- **Flow Measurement**

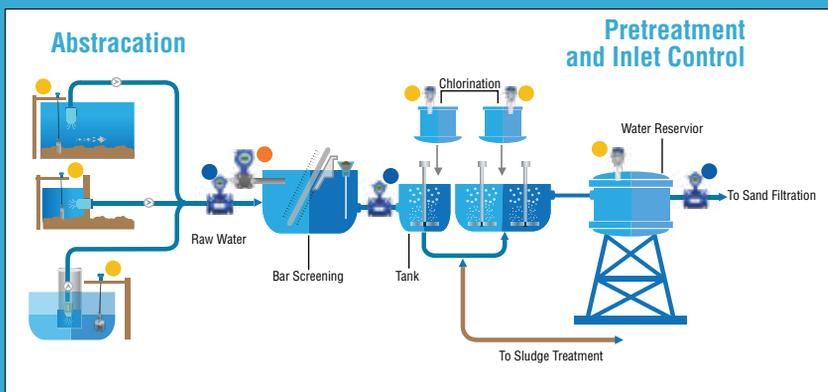
Tek-Clamp 1200A Ultrasonic Clamp-on Flow meter  
Tek-Flux 1400A Electromagnetic Flow Meter

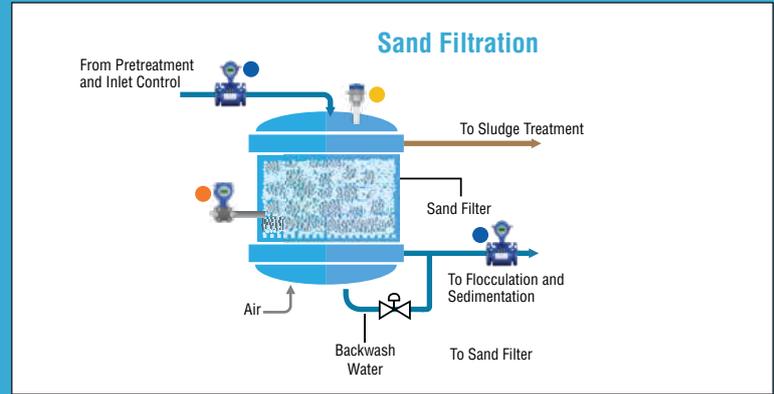
- **Pressure Measurement**

Tek-Hydro 4500A-D Differential Pressure Level Transmitter  
Tek-Bar 3110B Exp-Proof Piezo Differential Pressure Transmitter

- **Level Measurement**

Tek-Sound 4200B Two Wire Ultrasonic Level Transmitter  
Tek-Sub 4800B Submersible Level Transmitter  
Tek-Sub 4800D Wastewater Submersible Level Transmitter





# SAND FILTRATION

A sand filter is a simple and robust filtration process that removes suspended solids and reduces turbidity. Along with it removes floating and sinkable particles. Sand filtration is a water treatment operation for product safety and reliability. Sand filter technology is pressurized sand filters strain solids from the water treatment stream. Water is pumped into the top of a sand filter vessel, where a plate or other device equally disperses the water across the media bed. This dispersion ensures that the water does not “channel” through the sand.

It is mostly used for backwater water disposal. The filter consists of a steel body with two low-pressure floors and a bottom plate. Tek-Trol’s Differential Pressure Transmitter is used to control the backwash. This bottom plate is welded onto the body where wash heads are mounted. The filter’s operation is calculated by the filtration rate, which is controlled at the effluent outlet. The inflow of gravity is adjusted for the head of water in the supported reservoir always remains constant. This inflow of blackwash and water is measure by Tek-Trol’s Electromagnetic Flow Meter. The filtration rate is controlled by flow, level, and pressure measurement device. Tek-Trol’s Ultrasonic Level and Hydrostatic Pressure Level Transmitters are used to monitor the level of contamination of the filter. Sand filtration is frequently used in the treatment of groundwater to remove dissolved iron.

- **Flow Measurement**

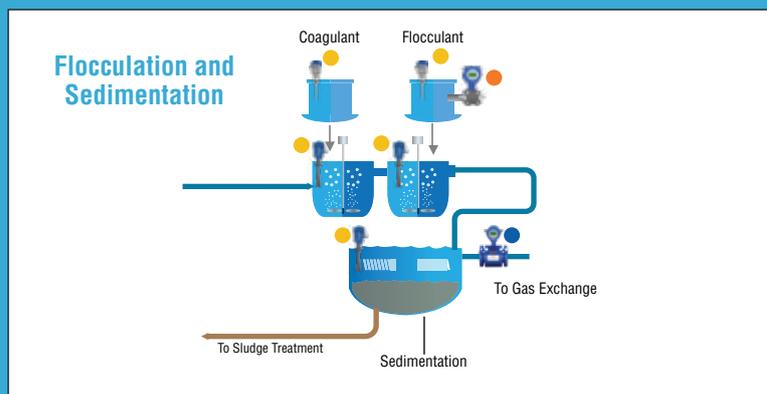
Tek-Flux 1400A Electromagnetic Flow Meter

- **Pressure Measurement**

Tek-Hydro 4500A-D Differential Pressure Level Transmitter  
Tek-Bar 3110B Exp-Proof Piezo Differential Pressure Transmitter

- **Level Measurement**

Tek-Sound 4200B Two Wire Ultrasonic Level Transmitter



# COAGULATION, FLOCCULATION AND SEDIMENTATION

In the sand filtration process, the solid suspended particles are not removed completely. The large, heavy particles settle easily, but the smaller and lighter particles settle very slowly or, in some cases, do not settle. Due to the non-settle particles, the sedimentation process is mostly followed by a chemical process known as coagulation. Coagulation is a process where chemicals (coagulants) are added to the water to bring the non-settling particles together into larger, heavier masses of solids called floc. Conventional plants separate coagulation (or rapid-mix) stage from flocculation (or slow-mix) stage. These stages are followed by sedimentation, and then filtration.

Coagulation and Flocculation are used to remove color, turbidity, and other microorganisms from water. The floc is separated by sedimentation or filtration in the water treatment process. The most used coagulants are aluminium sulphate and ferric sulphate. Coagulants are measure at a rate determined by raw water quality near the inlet of a mixing tank or flocculator. Tek-Trol's Guided Wave Radar Level Transmitter is used to measure inlet level of mixing tank. The coagulant is immediately and fully dispersed on treatment by adding it at a point of high disturbance. The water passes the flocculate into the sedimentation tank (also known as a clarifier) to allow aggregation of the flocs, which settle out to form sludge. The water and inlet flow is measure by Tek-Trol's Electromagnetic Flow Meter. This sludge needs to be removed. Coagulation is reduced the time required to settle out suspended solids. Coagulation effectively removes the fine particles which difficult to remove. It can also remove many protozoa, bacteria, and viruses.

## SEDIMENTATION

Sedimentation is a process that reduces the turbidity and suspended solids particles. Sedimentation tanks are designed to reduce the velocity of water flow where suspended solids are settled under gravity. Sedimentation tanks are usually rectangular. Tek-Trol's Non-Contacting Radar Level Transmitter is used to measure sedimentation tank level. The inlet and outlet are place opposite ends of the tank. The inlet should be designed to distribute the incoming flow to avoid streaming. This screaming reduces sedimentation efficiency. The outlet should be designed to collect the clarified water over the entire tank width. The tank should be covered to prevent contamination and ingress. The pressure in sedimentation tank is measure by Tek-Trol's Differential Pressure Transmitter.

### ● Flow Measurement

Tek-Flux 1400A Electromagnetic Flow Meter  
Tek-Cor 1100A Coriolis Flow Meter

### ● Pressure Measurement

Tek-Bar 3110B Exp-Proof  
Piezo Differential Pressure Transmitter

### ● Level Measurement

Tek-Wave 4300C Free Space  
Radar Level Transmitter  
Tek-Flex 4100C Programmable  
Two-Wire TDR Level Transmitter

# GAS EXCHANGE AND FILTRATION

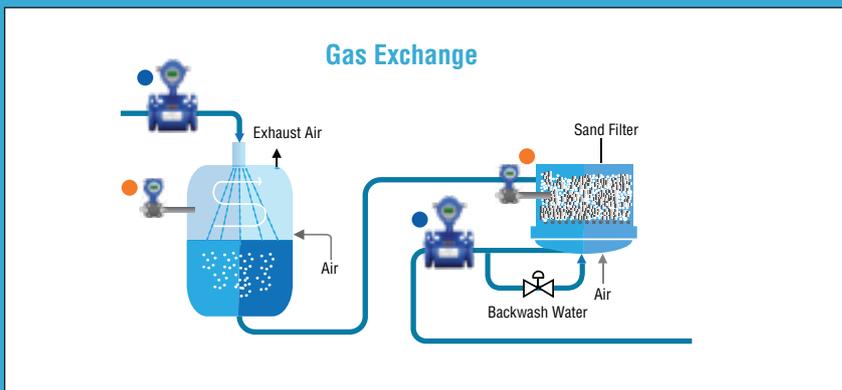
Sedimentation does not remove enough suspended particles from the water to make it crystal clear. The remaining non-settling particles cause turbidity in the water and protect microbes from disinfection. Filtration removes these non-settled particles. Clarified water enters the filters from the top. Tek-Trol's Electromagnetic Flow Meter is used to measure water flow. Gravity pulls the water down through the filters, where it collects in a drain system at the bottom of the unit. The air pressure in filtration process is measure through Tek-Trol's Differential Pressure Transmitter. There are various types of materials used in filters, i.e., sand and gravel. Most of the process plants are using granular activated carbon for excellent mechanical filtration of particulate matter. Solid Suspended particles are trapped by the filter media pore spaces, which removes harmful protozoa and natural color. Gas exchange is a chemical process that removes bacteria and viruses from the water. Adsorption process removes unwanted tests, odor, and micropollutants from the drinking water.

- **Flow Measurement**

Tek-Flux 1400A Electromagnetic Flow Meter

- **Pressure Measurement**

Tek-Bar 3110B Exp-Proof Piezo Differential Pressure Transmitter



# ION EXCHANGE PROCESS

Ion exchange is a reversible chemical reaction that removes dissolved ions from water and replaces them with similarly charged ions. It is used to remove other dissolved ionic species. Tek-Trol's Ultrasonic Level Transmitter is used for level measurement and control. The Ion exchange process is commonly referred to as 'water softening' and is carried out to reduce calcium and magnesium content. These ion particles are removed by aeration method. The aeration process is designed to achieve the efficient mass transfer of oxygen into water and the removal of gases and volatile compounds through air stripping. The flow of efficient mass is measure by Tek-Trol's Coriolis Flow Meter. Oxygen transfer can usually be achieved by a simple cascade or diffusion of air into water. Stripping of gases or volatile compounds require specialized plant which provides a high degree of mass transfer. Tek-Trol's Electromagnetic Flow Meter is used for water flow measurement in Ion Exchange process.

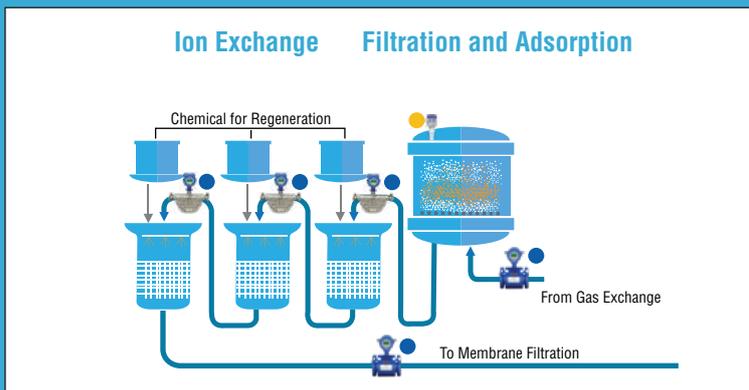
- **Flow Measurement**

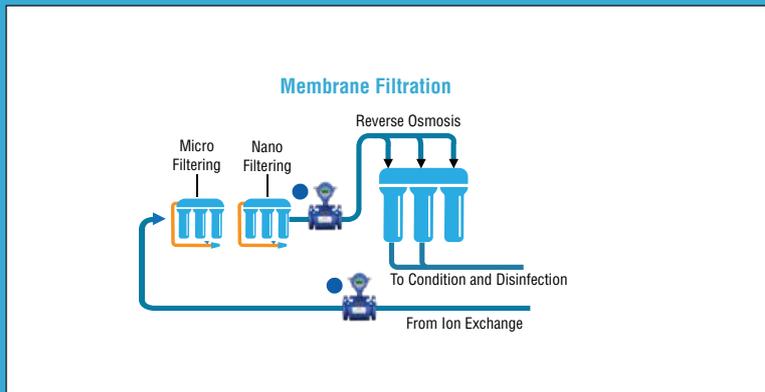
Tek-Cor 1100A Coriolis Flow Meter

Tek-Flux 1400A Electromagnetic Flow Meter

- **Level Measurement**

Tek-Sound 4200B Two Wire Ultrasonic Level Transmitter





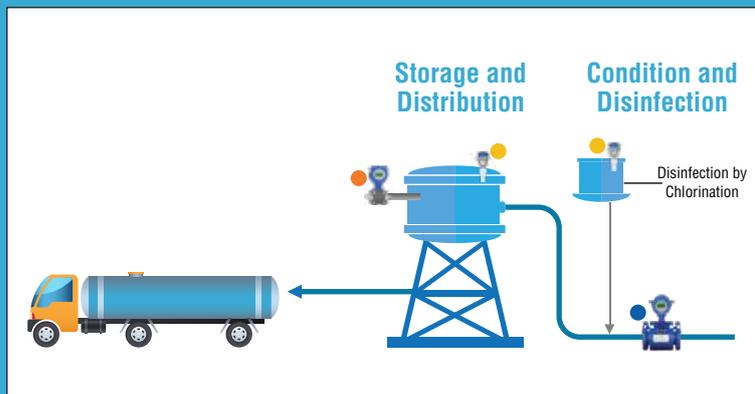
# MEMBRANE FILTRATION

The membrane filtration process includes micro-filtration, nano-filtration, reverse osmosis. The membrane is a thin and porous sheet of material that can separate contaminants from water when a driving force is applied. This treatment is commonly used to remove bacteria, other microorganisms, particulate material, and natural organic material. Membrane filtration is a highly efficient water treatment process, which ensures quality in measurement. In this process, flow is used as the primary process parameter. Tek-Trol's Electromagnetic Flow Meter is used to measure flow to filters. Accurate quality monitoring eliminates scaling and fouling processes at the inlet.

- **Flow Measurement**

Tek-Flux 1400A Electromagnetic Flow Meter





## STORAGE AND DISTRIBUTION

Filtered water is then stored in a tank for further use. Storage usually takes place in an underground storage tank called a "clear well." Water also store in elevated storage tanks that are visible around town. Tek-Trol's Ultrasonic Level Transmitter is used to measure water level of storage tanks. This store water is used in emergencies like power outages, fires, floods, etc.

The stored water is distributed through underground pipelines in homes, commercial areas, and the industry. Tek-Trol's Differential pressure Flow Meter are used for DP flow measurement and Electromagnetic Flow Meter is used for full pipes flow measurement. The distribution system consists of large water pumps at the treatment plant, overhead water storage tanks, large pipelines, smaller pipelines, fire hydrants, valves, and water meters in your front yard. Tek-Trol's Differential Pressure Transmitter is used for pump discharge and network pressure measurement.

- **Flow Measurement**

Tek-Flux 1400A Electromagnetic Flow Meter

- **Pressure Measurement**

Tek-Bar 3110B Exp-Proof Piezo Differential Pressure Transmitter

- **Level Measurement**

Tek-Sound 4200B Two Wire Ultrasonic Level Transmitter





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