

## ADDING VALUE TO YOUR SYSTEMS



WATER  
TREATMENT  
COMPONENTS



WATER  
HANDLING  
COMPONENTS



WASTEWATER  
TREATMENT  
COMPONENTS

GF Piping Systems

+GF+

# Application Solutions Made Easy

Water Treatment



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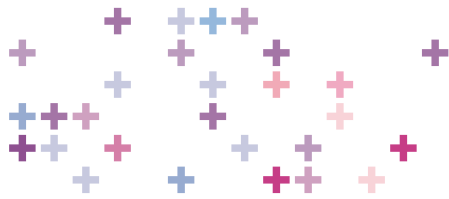
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# Market Segments



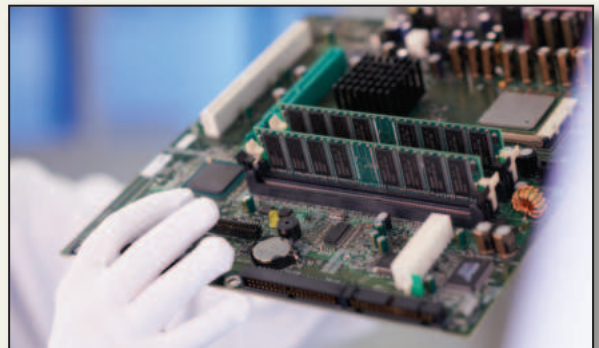
**Building Technology**



**Water Treatment**



**Chemical Process Industry**



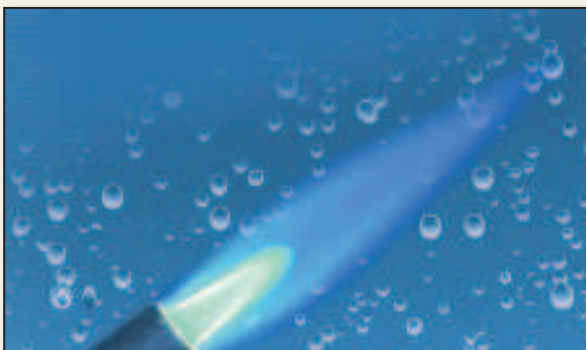
**Microelectronics**



**Marine**



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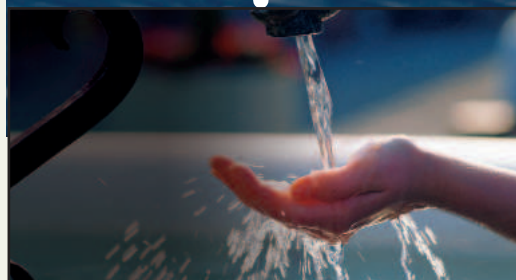
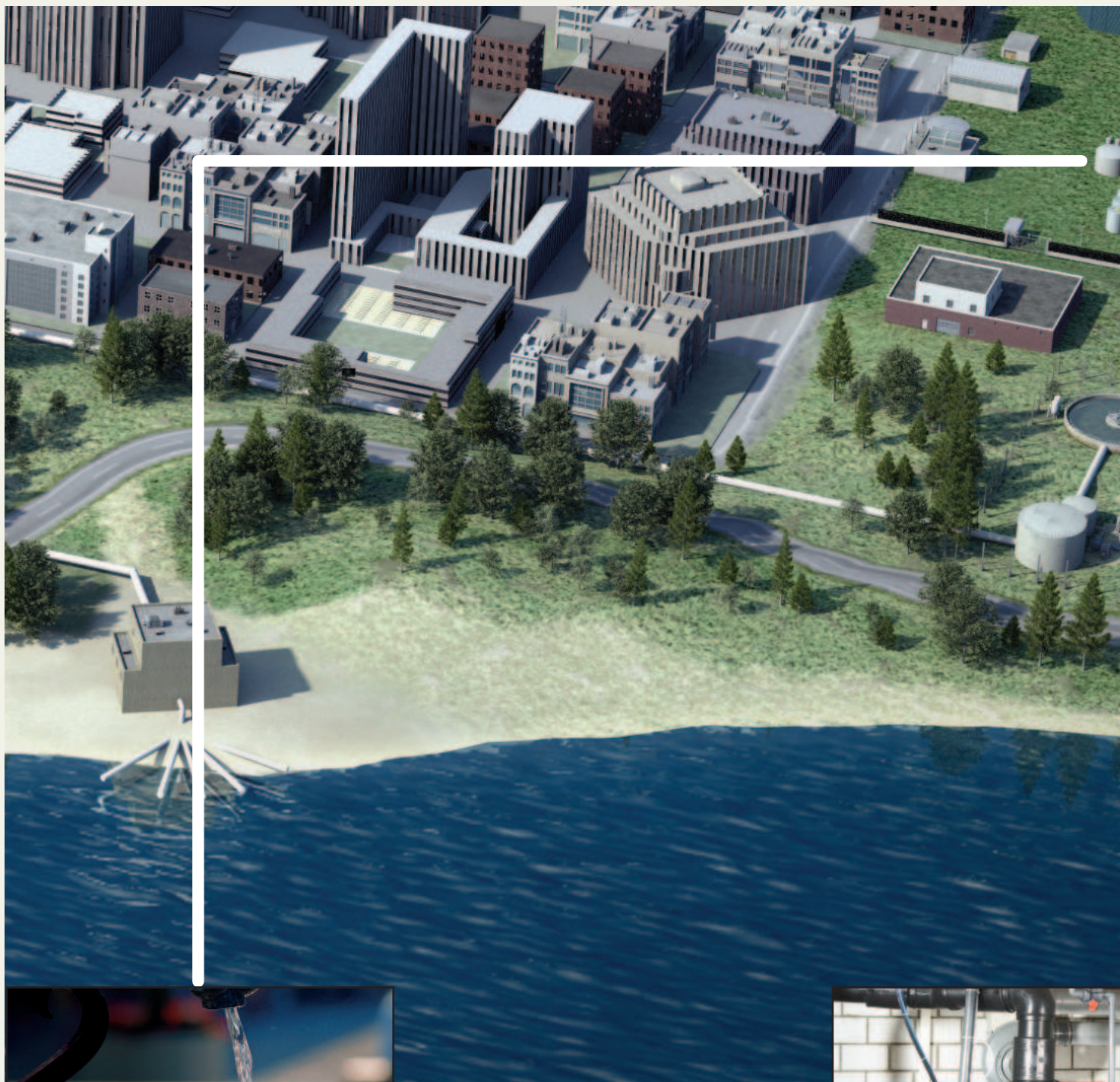
**Energy**





Market Segment

# Water Treatment



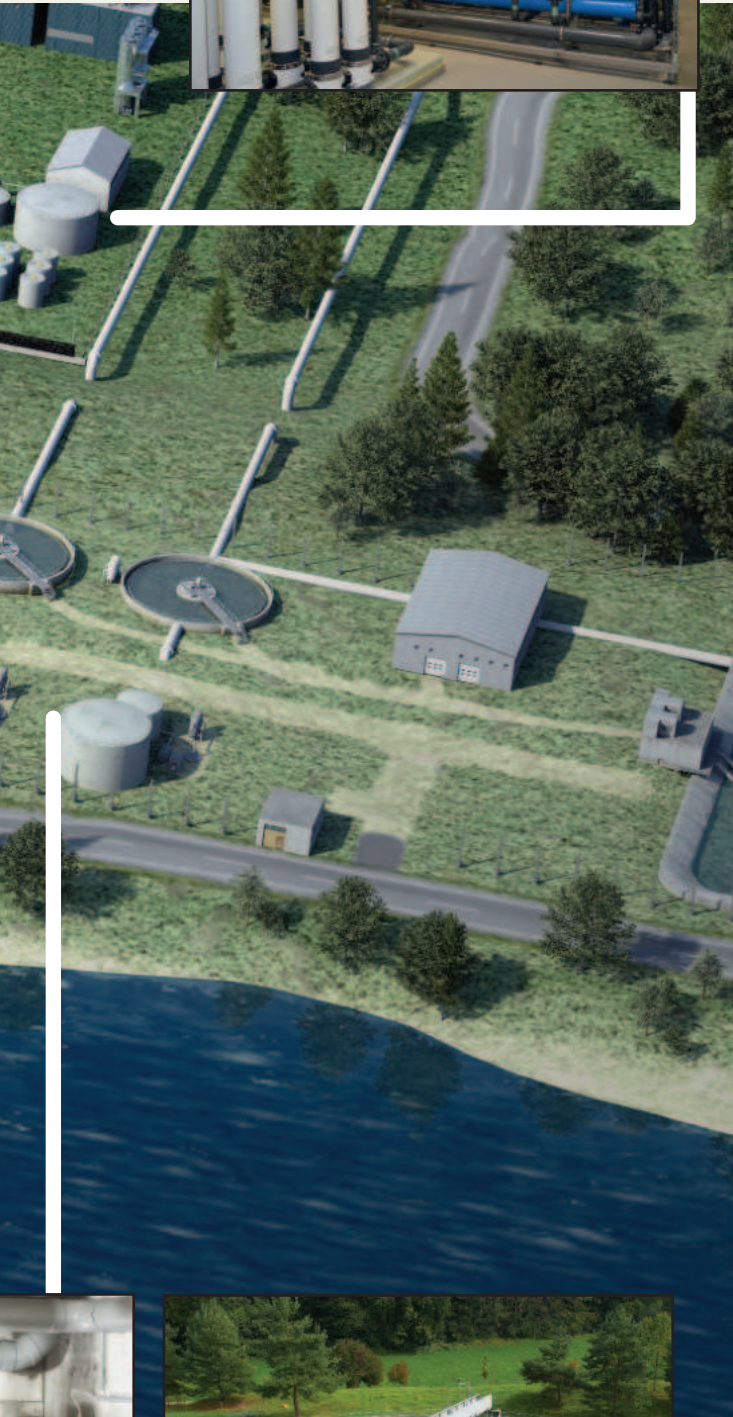
Drinking Water Process



Industrial Wastewater Treatment



## Industrial Process Water



## Municipal Wastewater Treatment

# Overview

Water treatment, whether it is for municipal or industrial applications, involve modifying the properties of the water to reduce the impact on the processes or the environment. Monitoring of the quantity, quality, filtering, levels of pH, particulate matter, salts, and chlorine levels are all important in delivering clean water across the globe.

### We have a solution to meet your application needs.

Depending on the application area, our customers have to face different challenges in water treatment processes ranging from guaranteeing high water qualities, to providing reliable measurements to assuring stringent regulations. This is where GF products are positioned to accommodate the automation market by offering a wide range of valves, pipes, fittings, and measurement and control options to suit the most popular industrial applications.

### GF offers product measurement solutions ranging from:

- Flow
- pH/ORP
- Conductivity/Resistivity
- Temperature
- Pressure
- Level
- Chlorine
- Turbidity
- Dissolved Oxygen

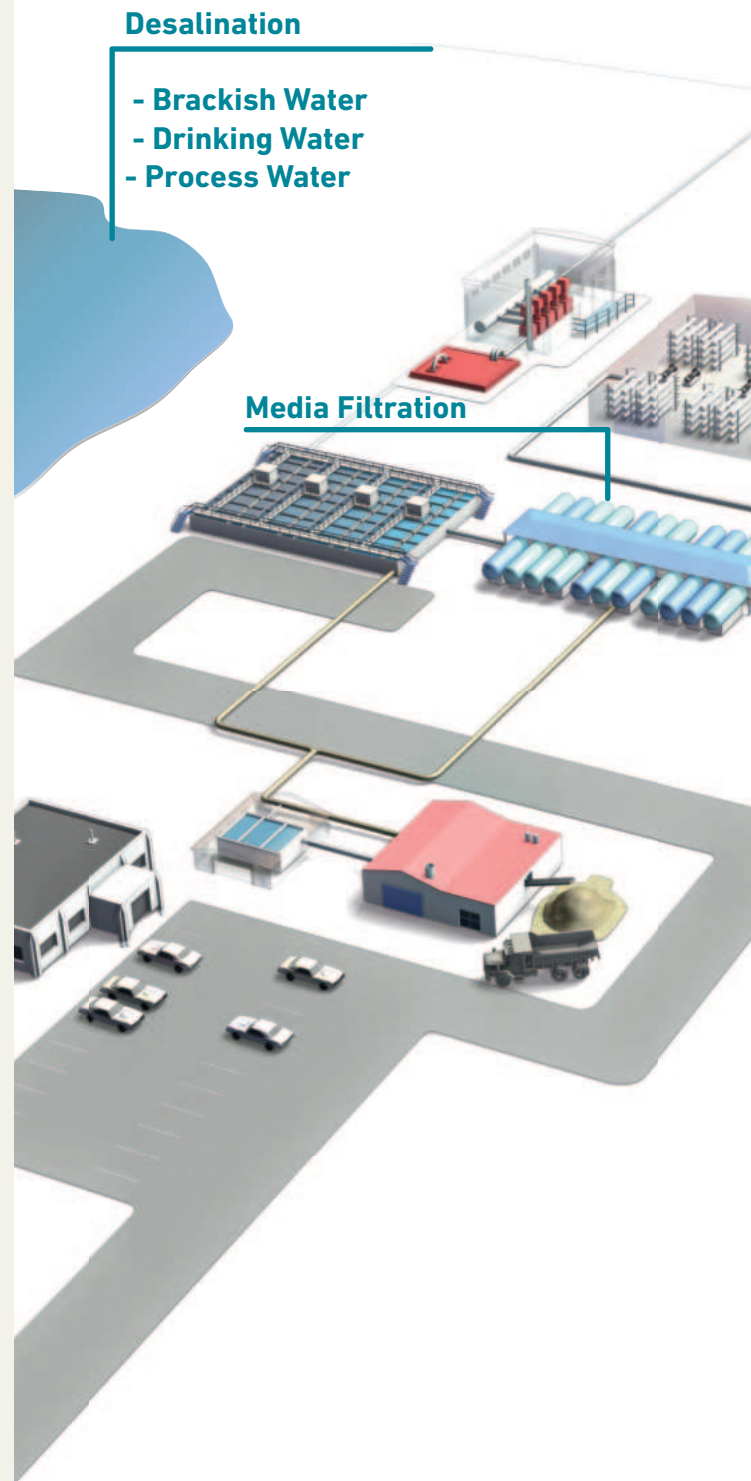
## Application Areas

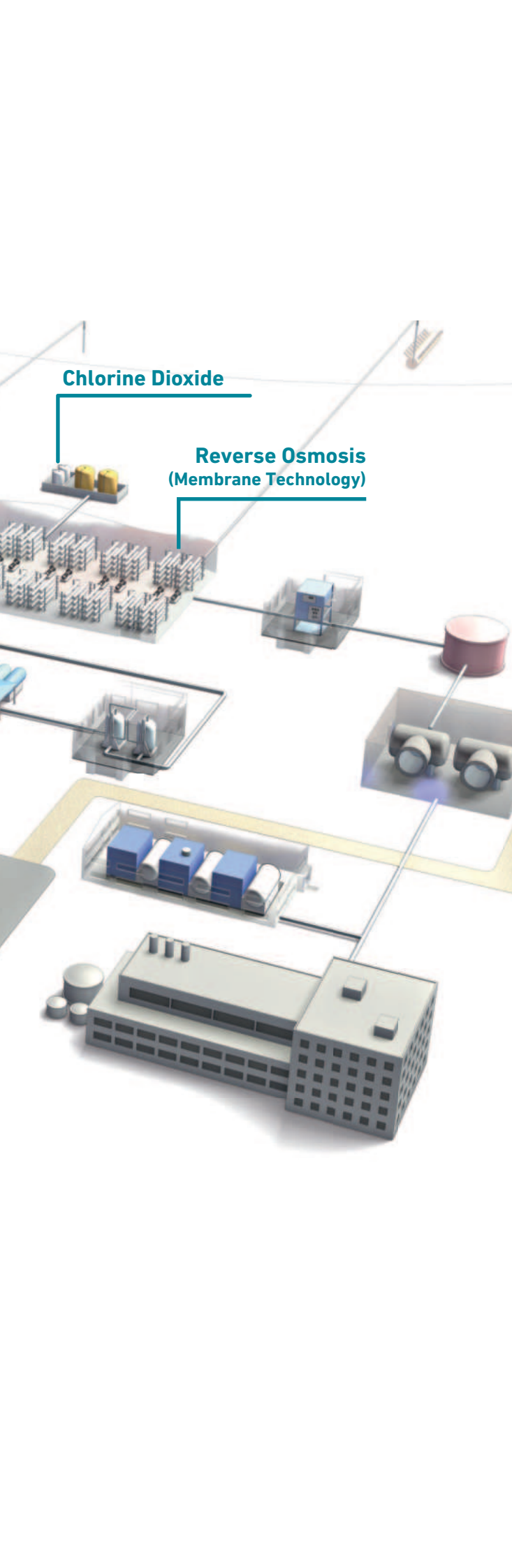
# Industrial Process Water

## Long lasting solutions with a focus on high water quality and purity

Water is an essential and indispensable element in nearly all industrial processes. In sectors such as food and beverage or pharmaceutical production, water is either used as a primary product or in the area of cooling, steam generation or boiler feed systems. Using water in the industrial environment requires consistently high water quality, namely precisely defined physical parameters like ion purity, acidity or conductivity.

High water quality in terms of purity for feed boilers, production processes and cooling systems is the key requirement and an absolute necessity for industry today. Avoiding any form of contamination, scale formation and corrosion is achieved through applications such as deionization, electrodialysis and new membrane-based solutions. The plastic products and additional technologies provided by GF Piping Systems Signet product line, supports the industry in designing an efficient, reliable and cost effective water treatment system. Signet instrumentation technologies warrant a long service life, regardless of how challenging the specific needs for pure industrial process water may be.





## Application Areas

# Industrial Wastewater Treatment

**Cost effective solutions from GF Piping systems for safety conveying corrosive fluids even at elevated temperatures**

Power plants, petrochemical complexes, steel mills, or processing facilities and many other water intensive industries are increasingly forced by authorities to clean their wastewater before disposal into rivers and lakes.

Wastewater treatment plants for inorganic caustics and acids are small chemical plants themselves. Corrosion resistance and staff safety are the top priority issues for waste containing piping systems. GF Piping Systems' philosophy for safe transport of liquids and gases meets these advanced process needs. GF products are designed for a maximum of uptime reliability and maintenance simplicity and a minimum of energy consumption during operation.



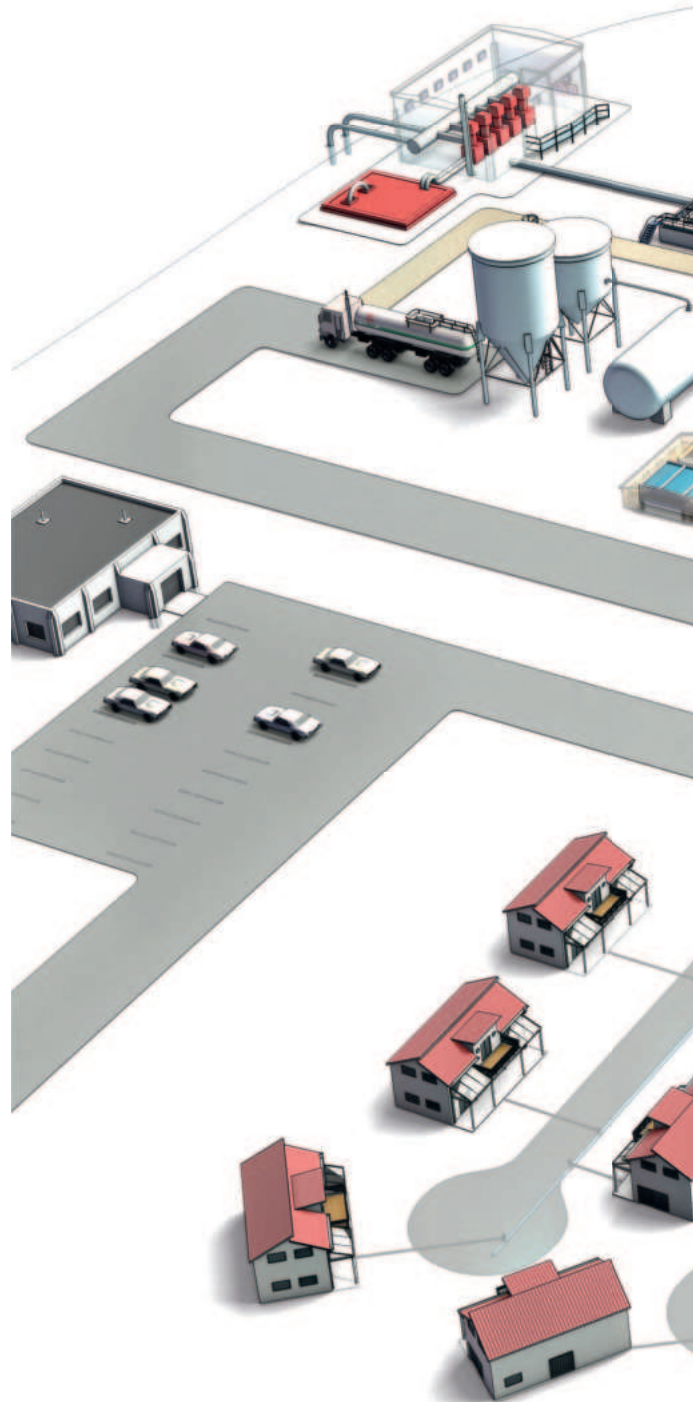
## Application Areas

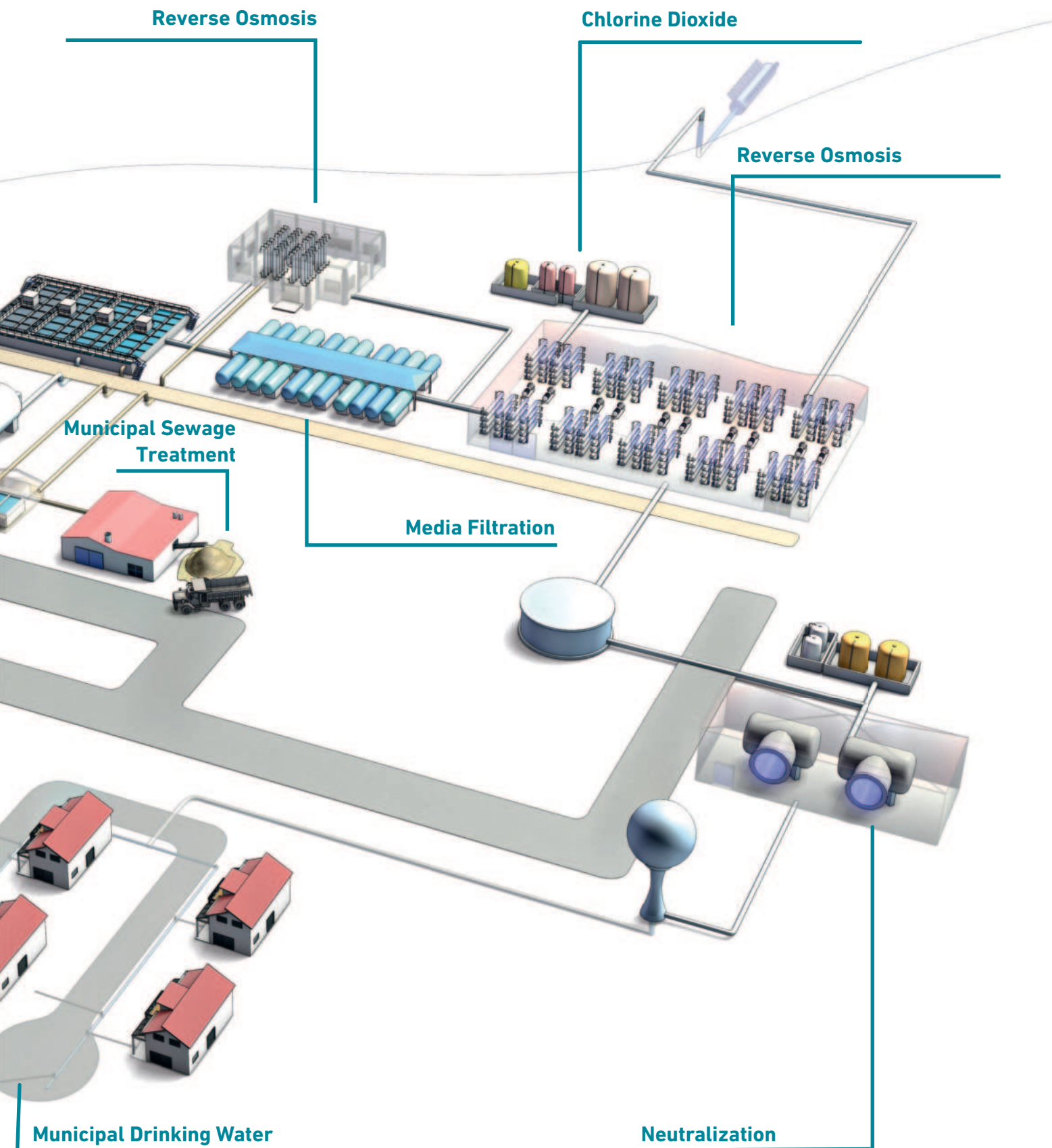
# Drinking Water Process

## GF Piping Systems offers the optimal system solution behind the scenes

Producing drinking water is always a challenge. The proper selection of plastic material for pipes, valves and fittings according to their chemical and mechanical properties is essential for the long-term safe and reliable operation of treatment systems and facilities. It is also imperative to choose the appropriate instrumentation for chemical dosing and process control, ultimately ensuring safe and reliable product water quality.

At and between every stage of the process, from plant intake to distribution, for all your conveyance, measurement and control needs, the GF Piping Systems package of products resists corrosion, increases safety for personnel and equipment, lowers maintenance costs, helps reduce bio-fouling, and is quick and easy to install.







## Application Areas

# Municipal Wastewater Treatment

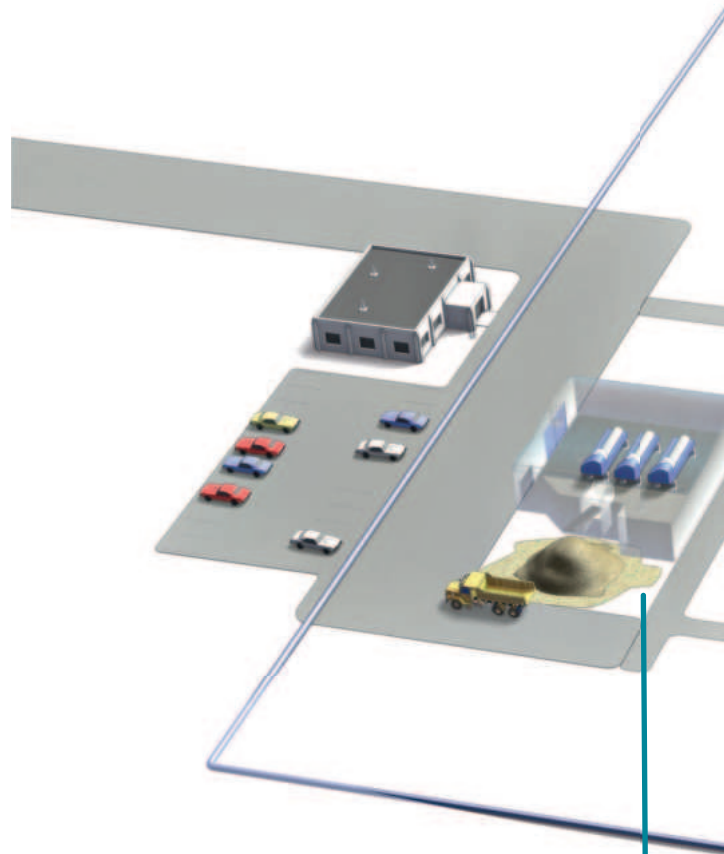
## State-of-the-art systems from GF Piping Systems for efficient and environmentally-friendly wastewater treatment

Installation of efficient and environmentally friendly methods for municipal wastewater treatment plants is one of the main challenges of our time. Key developments such as the compilation of wastewater treatment plants with water recycling processes aim for optimization regarding quality, life-cycle costs and environmental requirements. Instead of discharging the treated effluent into a receiving water, reuse systems arrange further purification steps until the wastewater reaches either potability status or fulfills an industrial specification. Advanced plastic solutions meet those challenges, allowing significant process optimization at the same time.

Membrane technologies, chemical dosing systems and polymer preparations are only some of the applications that require efficient and safe water conveyance systems. With the high quality system solutions of GF Piping Systems - offering pipes, fittings, automation and instrumentation from one source - the optimal compatibility of all components is warranted.

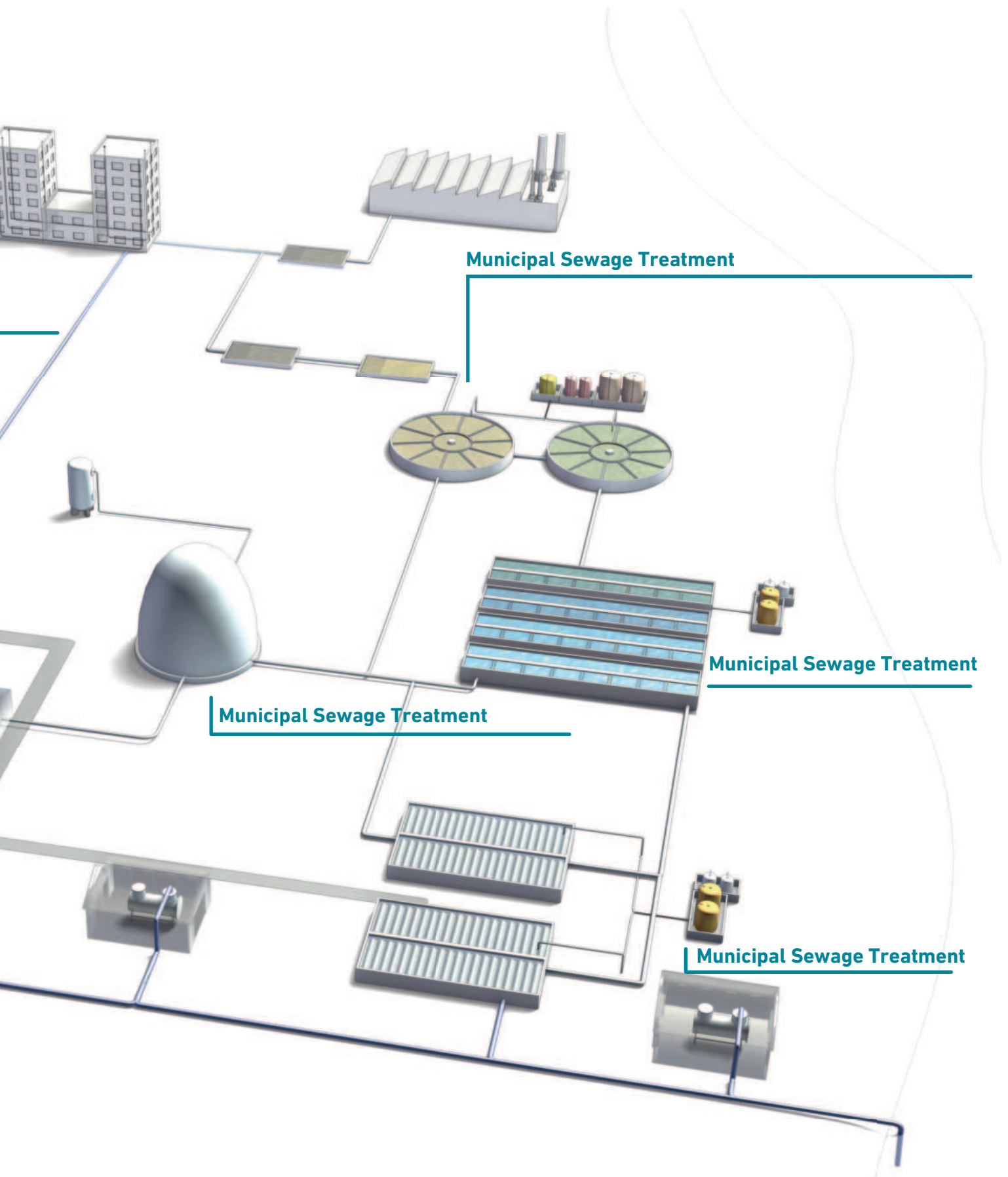
### Media Filtration

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### Municipal Sewage Treatment

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# Chlorine Dioxide Control

Chlorine dioxide is extremely volatile and cannot be manufactured and transported safely in compressed gas cylinders. A chlorine dioxide generator is used on-site to manufacture chlorine dioxide. Chlorine dioxide is formed when sodium chlorite is introduced to either chlorine gas ( $\text{Cl}_2$ ), hypochlorous acid ( $\text{HOCl}$ ), or hydrochloric acid ( $\text{HCl}$ ). The efficiency of chlorine dioxide to disinfect decreases (same as chlorine) as temperatures become lower. Low temperatures cause sodium chlorite to become separated into layers (stratification) and can damage the storage vessel.

There are many uses for chlorine dioxide. It is used for disinfection in water treatment for municipalities, food, fruit and vegetable washing and beverage manufacturing. It is also used as a slimicide in paper and pulp machines and can be used in circuit board cleansing in the electronics industry. It is commonly used in wastewater treatment as well as industrial water treatment in applications such as cooling water utilities.

Signet products offer reliable measurement solutions to monitor a cooling tower application.

1. Flow allows the user to monitor the volume of liquid being treated with  $\text{ClO}_2$ .
2. Monitor pH in  $\text{ClO}_2$  injection from the chlorine dioxide generator. It is very effective over a wide pH range.
3. Monitor and control of temperature to ensure maximum disinfection.
4. Monitor a hydrostatic level using a temperature sensor, to accurately indicate chemical feed levels.

## Instruments

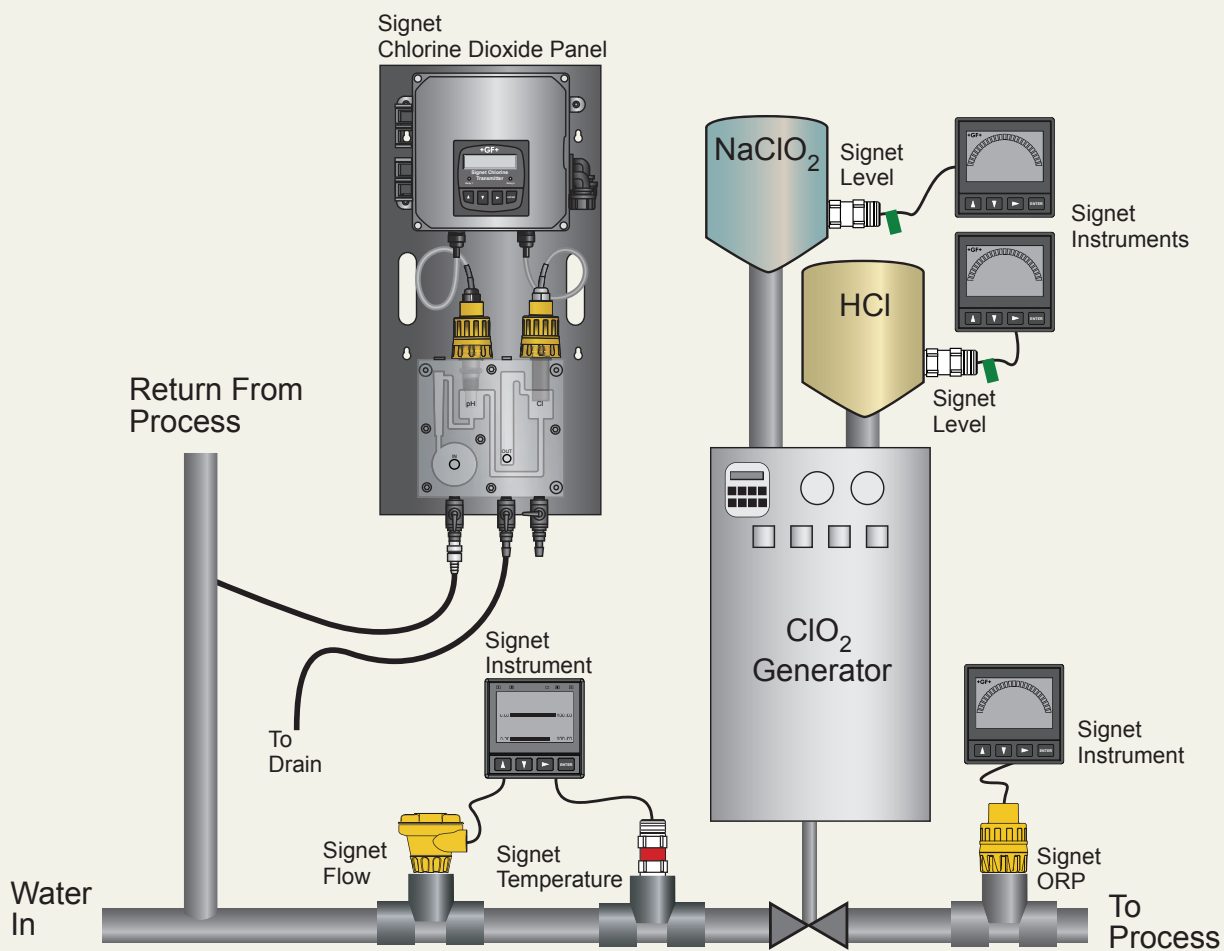
- + 8900
- + 9900
- + 9950



## Flow

- + 515
- + 2536
- + 2551





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#### pH/ORP

- + 2724-2726
- + 2734-2736
- + 2774-2777
- + 2750/2751
- + 2760



#### Temperature

- + 2350



#### Pressure

- + 2450



#### Chlorine

- + 4632





# Cooling Towers

Cooling towers are used to dissipate heat through the cooling of a water stream as it passes through the cooling tower. Most cooling towers remove the heat through the evaporation of water in the tower. Dry cooling towers use heat exchangers to transfer the heat from the water to the air.

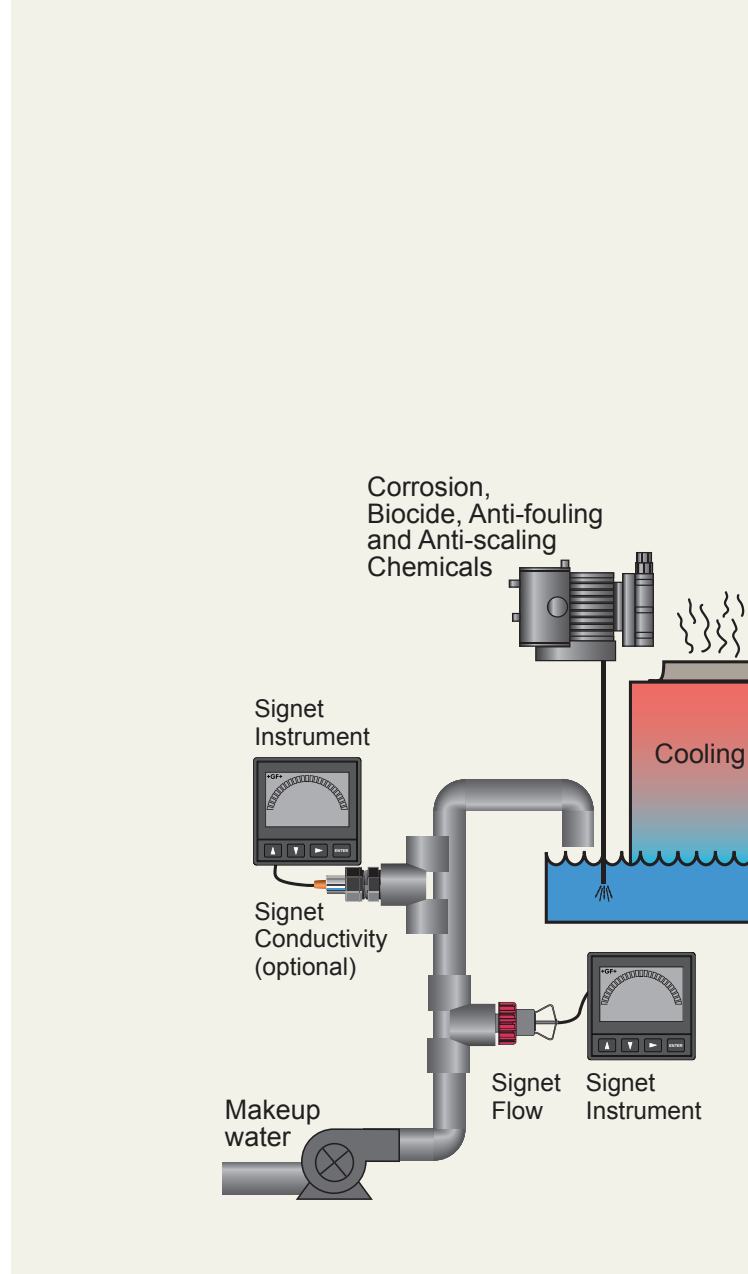
Common applications include cooling of processes within chemical, food processing, and manufacturing plants, power plant cooling, refrigerated warehouse cooling, and building HVAC systems.

Here are a few common challenges when dealing with a cooling tower application. The importance of protecting heat exchangers from the build up of scale, corrosion reduction in metal components of the cooling system, pipes, heat exchangers, and pumps is critical for an efficient system. Reducing the danger of Legionella, and increasing efficiency of the cooling system and reducing water and chemical consumption are additional factors as well.

Operators may face some challenges relating to acid cleaning to reduce scale build up, and heat exchanger failure due to corrosion and possible environmental and legal issues due to Legionella exposure to the public, chemical and water expense as well as sewer charges.

Signet products offer reliable measurement solutions to monitor a cooling tower application.

1. Maintain proper pH range to reduce corrosion, scaling, and to maximize chemical treatment program efficiency.
2. Maintain biocide levels, through ORP control or the use of a 4630-XX ampormetric chlorine system, to prevent Legionella and biological fouling in the system.
3. Maintain proper conductivity levels to reduce water usage and control scaling tendencies.
4. Calculate water evaporation by monitoring water make up and water bleed off for sewer charge credit.
5. Control chemical feed based on make up water addition for corrosion protection and scaling potential reduction.
6. Monitor closed loop pH and conductivity levels to detect leakage or heat exchanger failures.



## Instruments

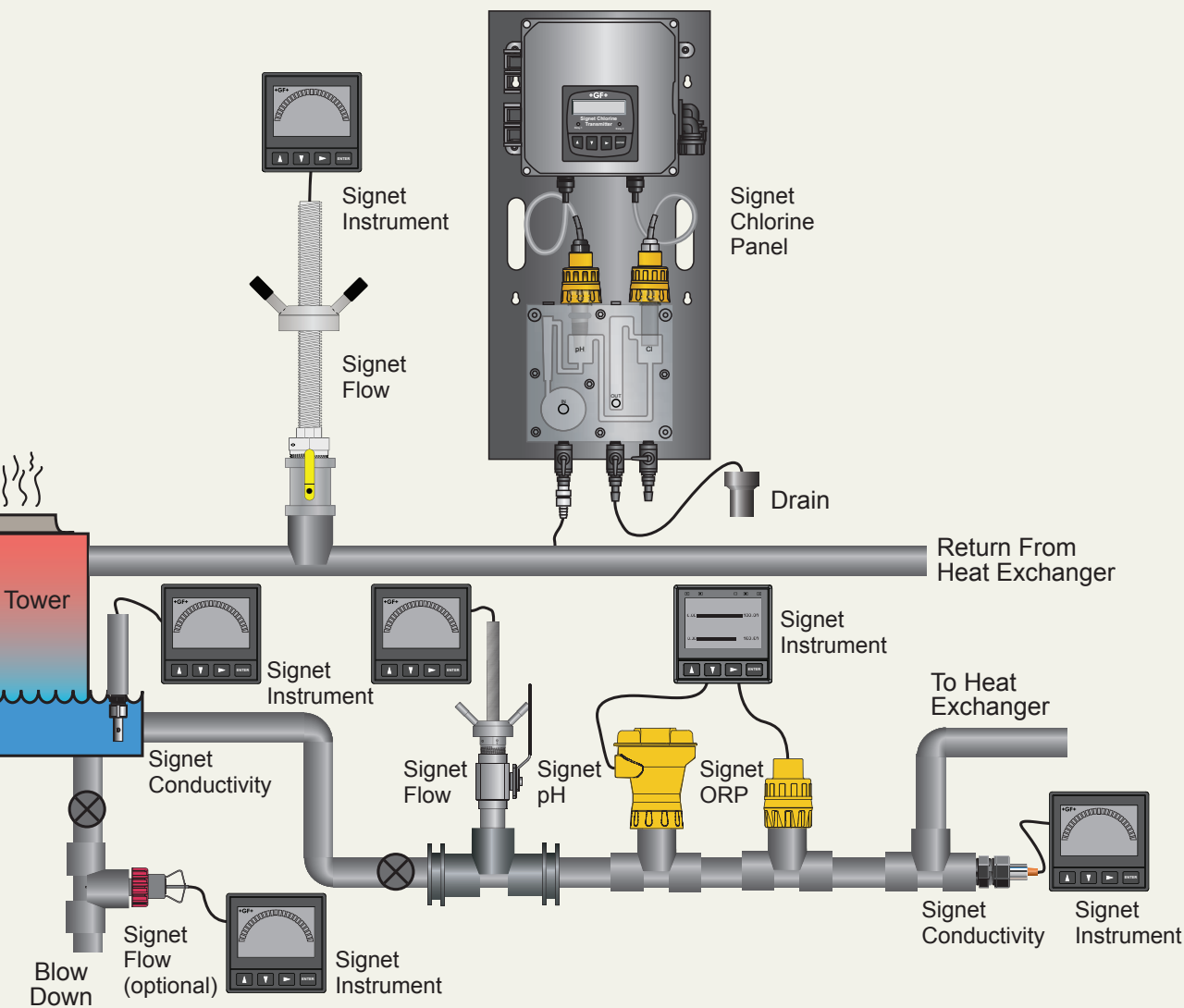
- + 8900
- + 9900
- + 9950



## Flow

- + 515
- + 2536
- + 2551
- + 2552





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#### pH/ORP

- + 2724-2726
- + 2734-2736
- + 2764-2766
- + 2774-2777
- + 2750/2751
- + 2760



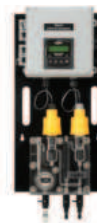
#### Conductivity

- + 2818-2821
- + 2839-2841
- + 2850



#### Chlorine

- + 4630



# Deionization

## Mixed Bed Twin Bed Ultra-Pure Water

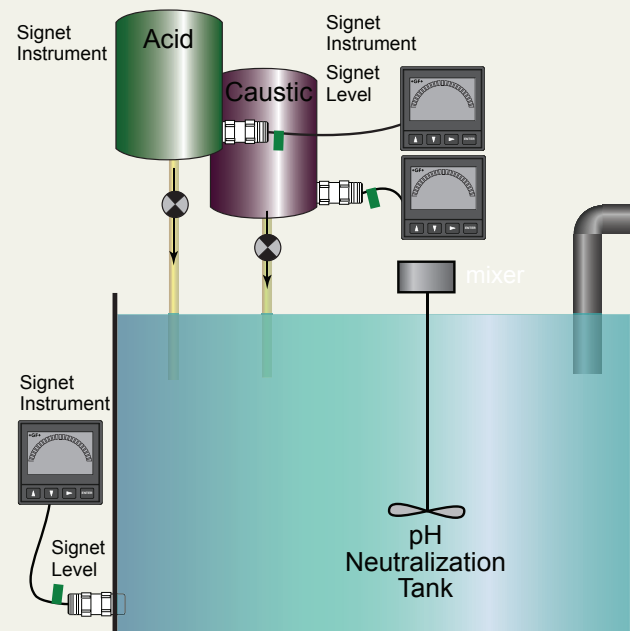
Deionization is the process of removing minerals from water to produce pure water, which has a very low and/or nominal mineral content, or ultra-pure water which is virtually mineral free. This process typically passes processed water through two separate beds, cation and anion, followed by a mixed bed.

The production of Ultra-Pure Water (UPW) for use in an industrial, pharmaceutical or laboratory environment must meet the strictest standards to ensure high purity and guarantee minimal contaminants. GF Signets line of industrial sensors and metering systems provides an accurate real time information to monitor the complete process from the influent line to the product water feeding the application and waste water to the drain.

Depending on the specific application and the water quality needed, the Ion exchange systems can contain several banks of twin bed ion tanks, each tank would be filled with either a cation or anion resin bead that feed a single or bank of mixed bed which sometimes referred to as a "polishing tank", and is usually in line after a double pass RO system or a two bed deionizer system. The cation and anion resins in one tank allows the hydrogen and hydroxyls ions to combine immediately to produce high quality pure water.

See how Signet products offer reliable measurement solutions in various desalination applications.

1. Monitor flow in the amount of feed water being cycled into the resin tanks.
2. Monitor the use of the product water being used in the application.
3. Monitor and control the pH Neutralization process. Monitor the pH after the optional degasser has stripped out the CO<sub>2</sub>.
4. Monitor conductivity in the influent water quality a two tank or mixed bed system. This allows the operator to verify the quality of the feed water or RO product water.
5. Resistivity using a Conductivity sensor, monitors the water quality of the product water to the application or to the mix bed system.
6. Level using a Pressure sensor, monitors levels in various tanks.



### Instruments

- + 8900
- + 9900
- + 9950



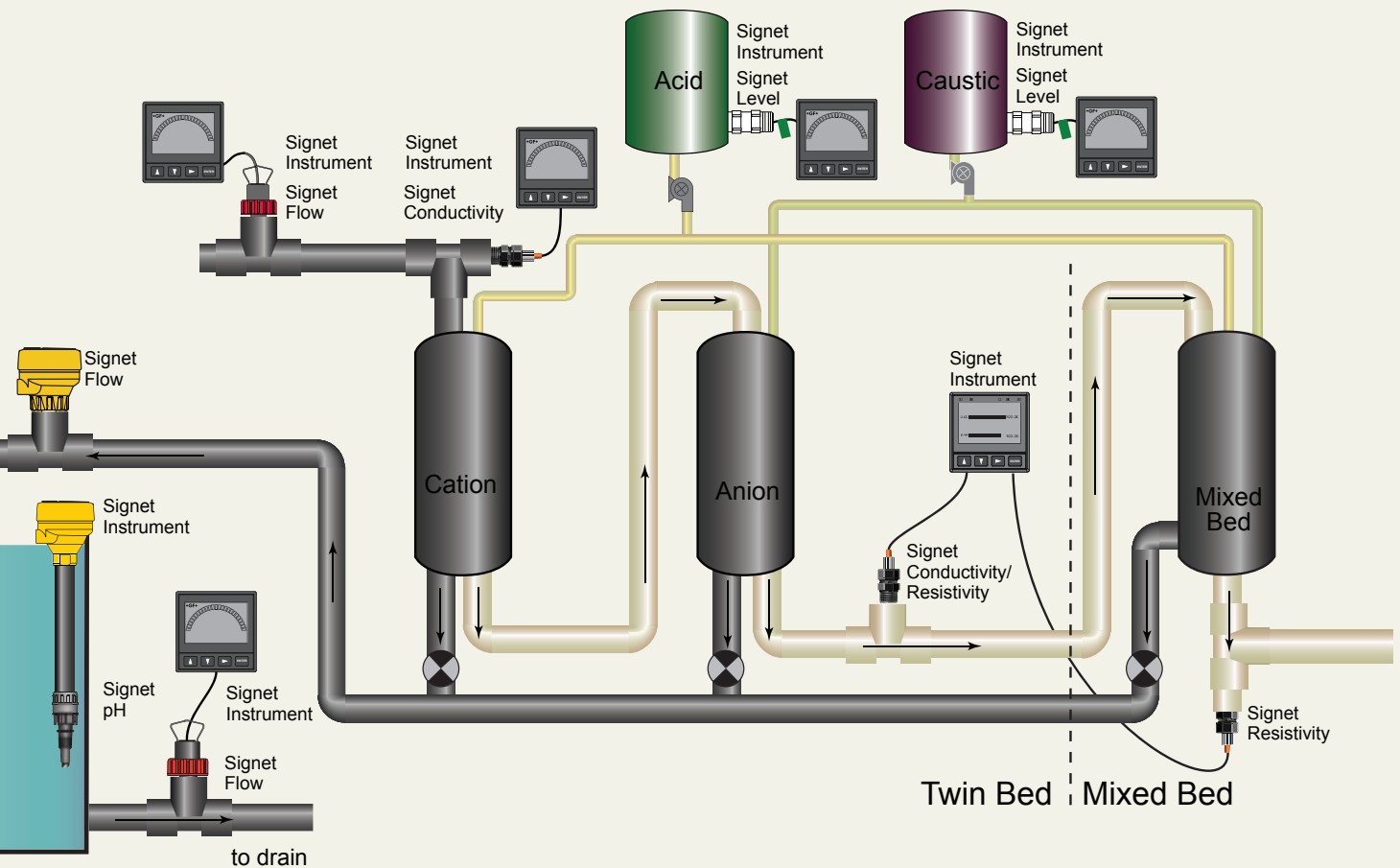
### Flow

- + 515
- + 2536





## Chemical Regeneration



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### pH/ORP

- + 2724-2726
- + 2734-2736
- + 2774-2777
- + 2750/2751
- + 2760



### Conductivity

- + 2818-2821
- + 2839-2841
- + 2850



### Pressure/Level

- + 2250
- + 2450



# Desalination

## Brackish Water Drinking Water Process Water

With the increase in the world's population and a strain on potable water demands, desalination plants and potable skids are utilizing the ocean to meet the world's water requirements. This is especially true in remote locations where the cost of distribution systems is costly.

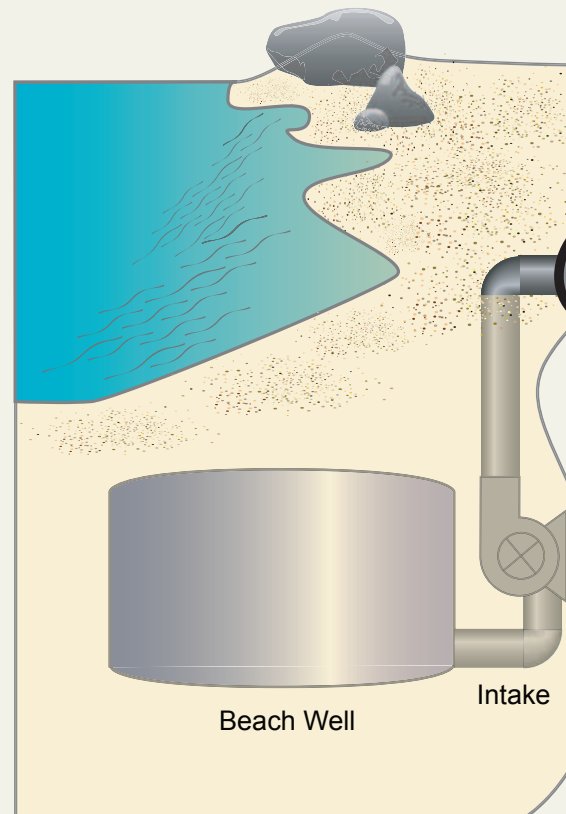
The desalination process begins with a water intake. Since water intakes can draw in more than just water, it is necessary to have a multifaceted filter system to remove the impurities, prior to reaching the RO filter system. The initial filtration process generally consists of multimedia and cartridge filters, pH adjustments (if necessary) and the injection of scale inhibitors to protect the membrane.

After the initial filtration is completed, water is pumped into RO membranes. The water pressure must be maintained sufficiently high to overcome the osmotic pressure for the RO membranes.

As the water passes the RO membrane, it is separated into two flow streams, permeate and concentrate. Permeate (product water with low TDS) passes through the membrane and into a storage tank in preparation for the final stage of desalination. Concentrate (wastewater), with high concentration of brine, may be collected for further processing before being returned to the ocean.

See how Signet products offer reliable measurement solutions in various desalination applications.

1. For drinking water, pH is monitored and controlled, thru chemical additives for example, to ensure the water does not corrode the pipes within the distribution systems.
2. Monitor flow amount of incoming water being processed. Low flow is a good indicator of clogged filters.
3. Monitor discharge levels of brine or concentrate.
4. Conductivity measures and monitors influent and effluent TDS levels.
5. Level using Pressure sensor, measure the hydrostatic level to accurately monitor levels of stored process water.



### Instruments

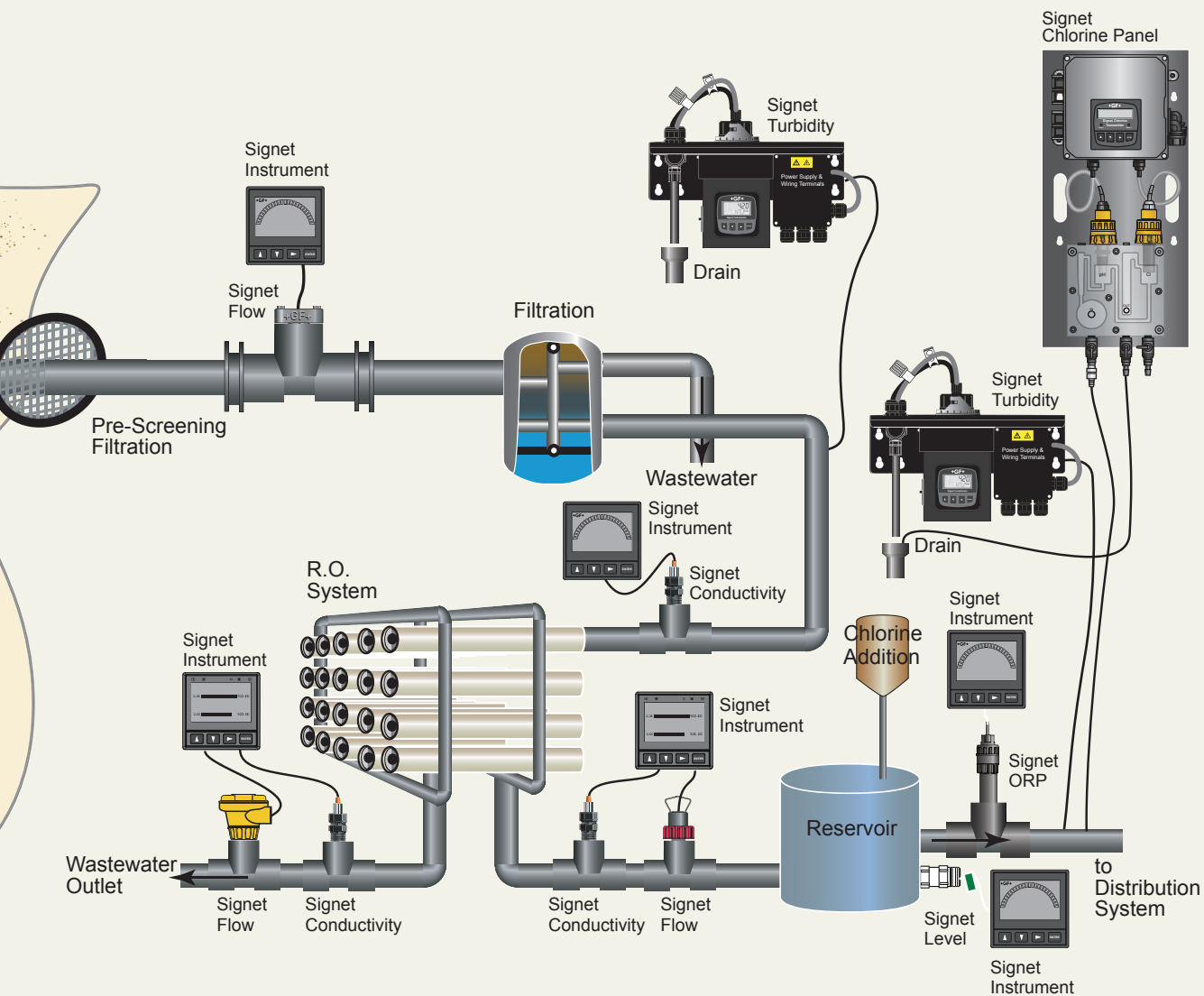
- + 8900
- + 9900
- + 9950



### Flow

- + 515
- + 2536
- + 525
- + 2551





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#### ORP

- + 2725, 2726
- + 2735
- + 2775-2777
- + 2750/2751
- + 2760



#### Pressure/Level

- + 2250
- + 2450



#### Chlorine

- + 4630



#### Conductivity

- + 2818-2821
- + 2839-2841
- + 2850



#### Turbidity

- + 4150





# Media Filtration

Gravity media filtration is effective in reducing turbidity, foul taste, and odor by removing impurities through chemical absorption and physical straining of the water between the media material. The classic filtration technique uses pressurized water that typically flows top down, passing through several material layers, leaving suspended particles behind. In multi-level filtration processes, hydroanthracite or gravel can be used, in addition to sand, to filter particles up to 10-15 µm from fluids.

Some common issues in media filtration may include: maintaining unit performance to design parameters and maximizing service life, minimizing fouling, prevention of scaling and minimizing chemical attack. Customers may have experienced problems with filter clogging, active carbon exhaust or determining when to backwash.

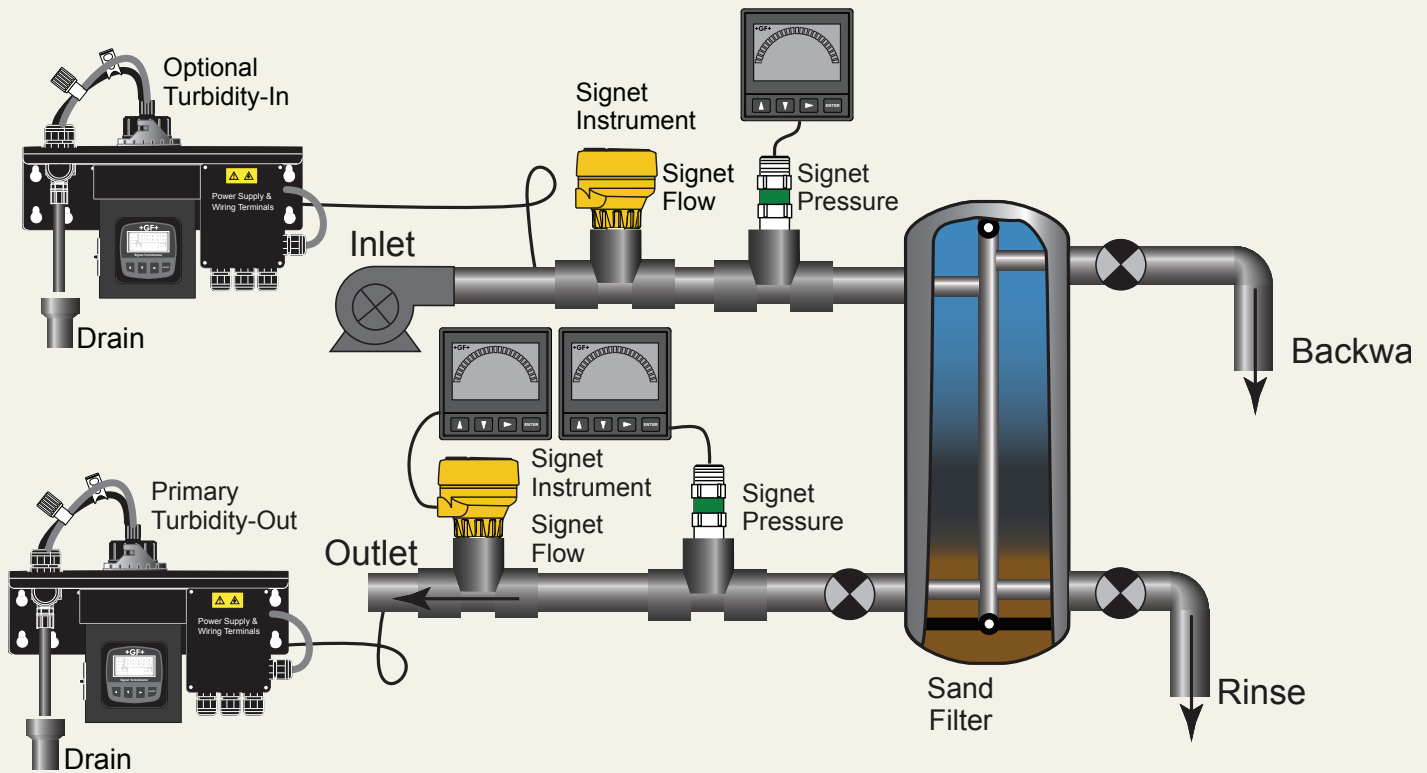
Signet products are well suited in a media filtration application. See how Signet products can provide a solution for you.

1. Total flow tracks the amount of water processed through the media. This is a good indicator for planned maintenance.
2. Flow rate monitors the efficiency and could be an indication that the system needs to be backwashed.
3. Influent or effluent pressure detects head loss. As the filter system experiences head loss, this is a good indicator that the media is clogging or may experience break through (filter allowing large material to pass the filter media).
4. Measuring disinfectant levels detects the efficiency of the active carbon filter.
5. Increased turbidity levels could be an indicator of break through.

## Instruments

- + 8900
- + 9900
- + 9950





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#### Flow

- + 515
- + 2536
- + 2551



#### Pressure/Level

- + 2450



#### Turbidity

- + 4150



# Reverse Osmosis

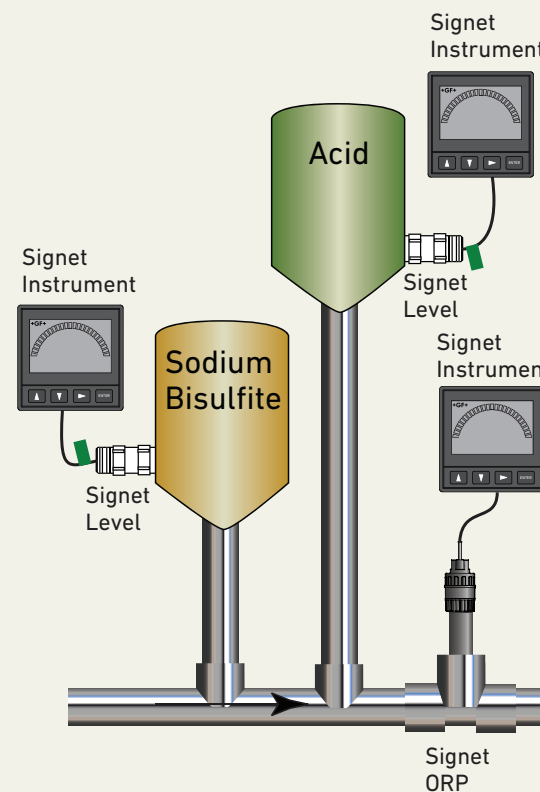
## Membrane Technology

Membrane technology is increasingly being implemented to harvest drinking water and process water from surface water, seawater and reverse osmosis. It is an ideal application for GF's Signet product range, which offers a vast range of plastic instrumentation components for your system solution. Complete solutions from GF Piping Systems, offer a maximum of security and profitability for efficient processes, for instance by eliminating maintenance costs caused by rust and deposits.

Reverse osmosis is a physical process for separation of dissolved substances, some key challenges users may face, are maintaining unit performance to design parameters and maximizing service life. Minimizing fouling, prevention of scaling and minimizing chemical attack is crucial for the reverse osmosis process. Customers may have experienced service life or premature breakthrough; thru-put or pressure drop, back-flush automation or leak detection.

See how GF Signet's measurement and control products can be used in a reverse osmosis application.

1. Monitor flow, pH, conductivity, temperature and pressure.
2. Control of key parameters, pressure and flow rates.
3. Monitoring of process efficiency:
  - a. Reject ratios: Multi-channel controllers leveraging conductivity sensors
  - b. Process efficiencies: Leak detection via flow monitoring
4. Automation of bypass and safety operations
  - relays and valves to divert bad feed-water, automate purge functions, and divert output during process excursions (membrane failures).



### Instruments

- + 8900
- + 9900
- + 9950

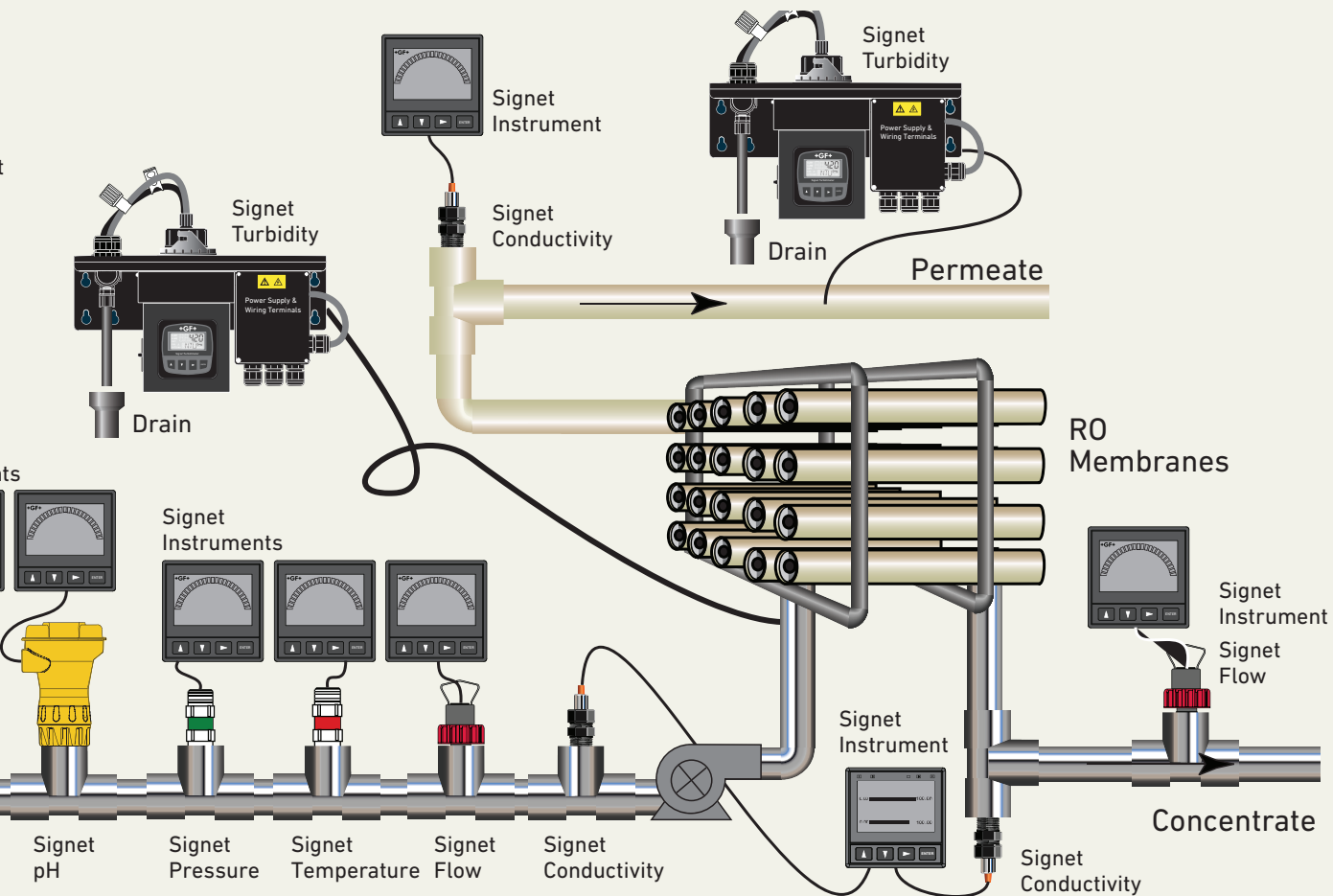


### Flow

- + 515
- + 2536
- + 2551







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#### pH/ORP

- + 2734-2736
- + 2724-2726
- + 2774-2777
- + 2750/2751
- + 2760



#### Conductivity

- + 2818-2823
- + 2839-2841
- + 2850



#### Temperature/Pressure/Level

- + 2250
- + 2350
- + 2450



#### Turbidity

- + 4150



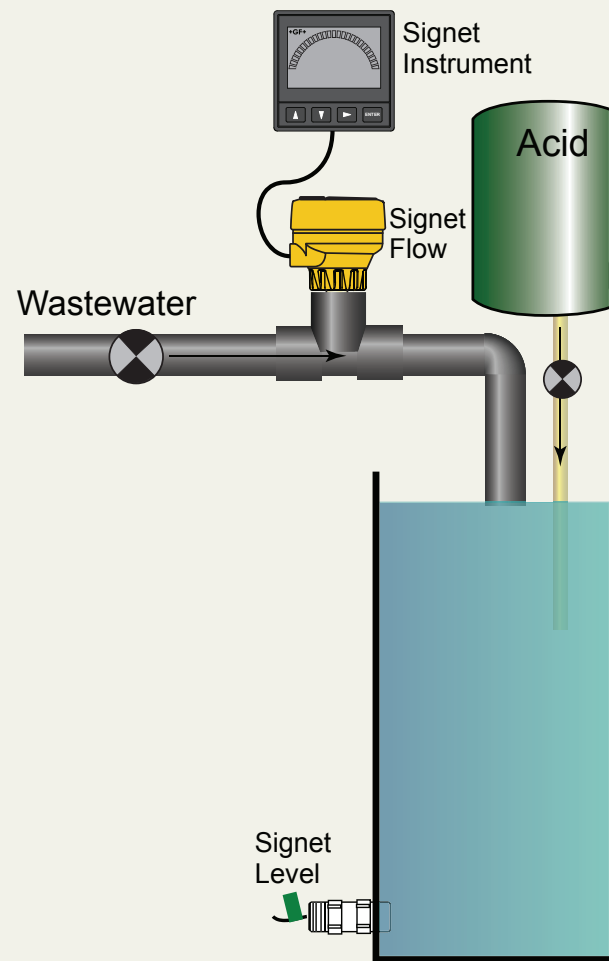
# pH Neutralization

Local water authorities require the neutralization of industrial wastewater discharge to protect the ecological systems in the surrounding lakes, rivers, and oceans, or to protect the local sewer networks and treatment plant. It is more efficient to perform the neutralization process in tanks rather than making the adjustments in a flowing piping system.

The neutralization process can be complex and is different for each industrial location. Operators must meet environmental health and safety requirements in order to prevent fines and penalties. Reporting effluent discharge is important to the process.

Signet measurement and control products provide efficient solutions to fully automated processes.

1. Flow is used to measure influent flow and Volume to internal process. Monitor daily generation of wastewater to be treated – can determine a inefficiency in the manufacturing process by:
  - Monitoring the amount of waste being transported to the neutralization tanks.
  - Monitoring and controlling chemical injection.
  - Monitoring and recording effluent discharge to the sewer per local regulations.
  - Calculating volumetric totals of daily waste generation or production consumption.
2. Level monitors chemical inventory in the tanks, as well as monitoring the level of wastewater being stored prior to processing.
3. pH sensors and instruments measure the pH of wastewater for control of the neutralization process, as well as monitors the pH of water being discharged into the sewer.
4. ORP sensors - (Applicable for oxidizer neutralization) measures the ORP of the wastewater for control of the neutralization process. User can also monitor the ORP of the water being recycled into process or the environment.
5. Conductivity monitors salt discharge levels that are set by the plant authority.



## Instruments

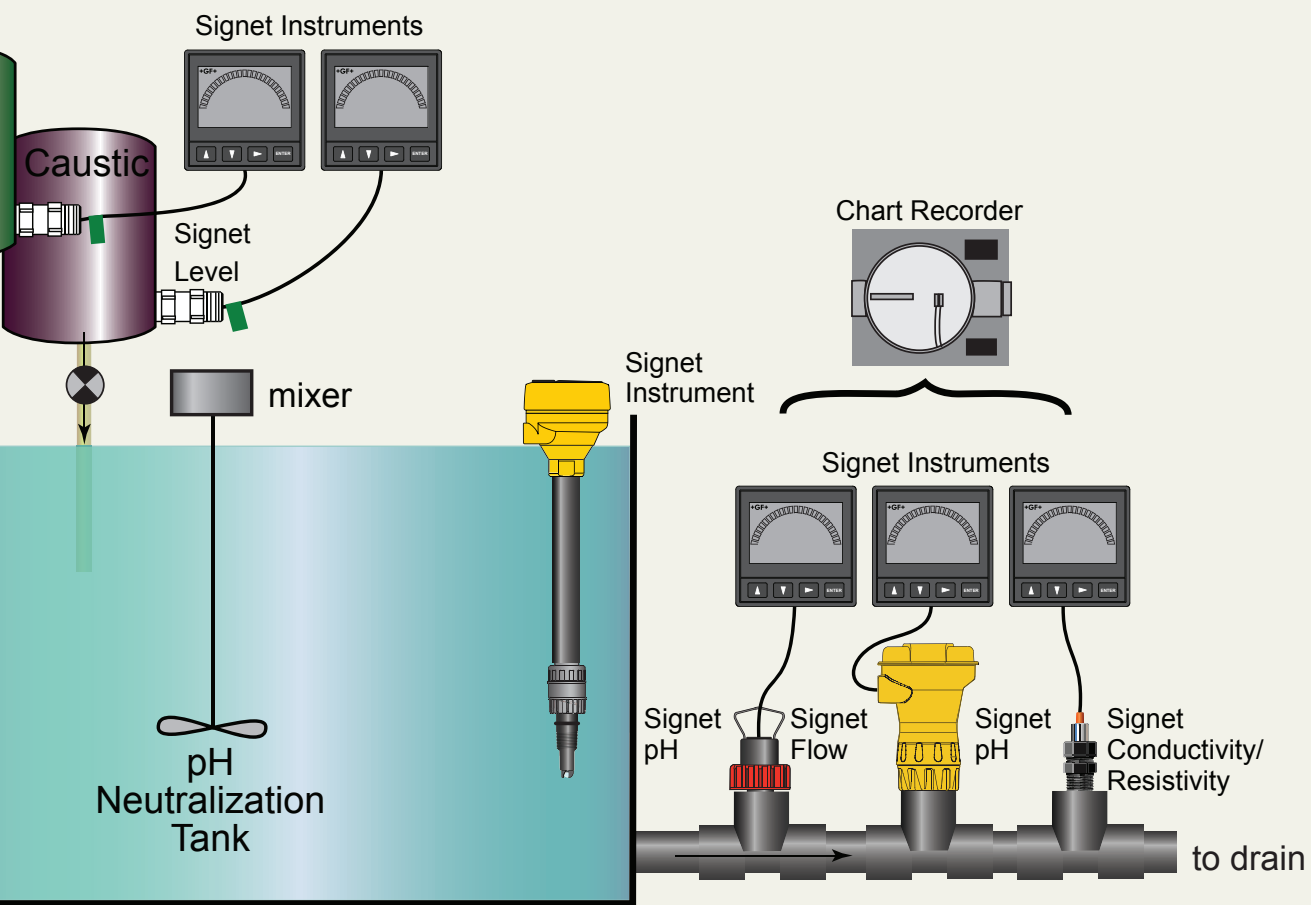
- + 8900
- + 9900
- + 9950



## Flow

- + 515
- + 2536
- + 2551





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#### ORP

- + 2724-2726
- + 2734-2736
- + 2764-2766
- + 2774-2776
- + 2750/2751
- + 2760



#### Conductivity

- + 2818-2823
- + 2839-2841
- + 2850



#### Pressure/Level

- + 2250
- + 2450





# Water Treatment

## Municipal Drinking Water

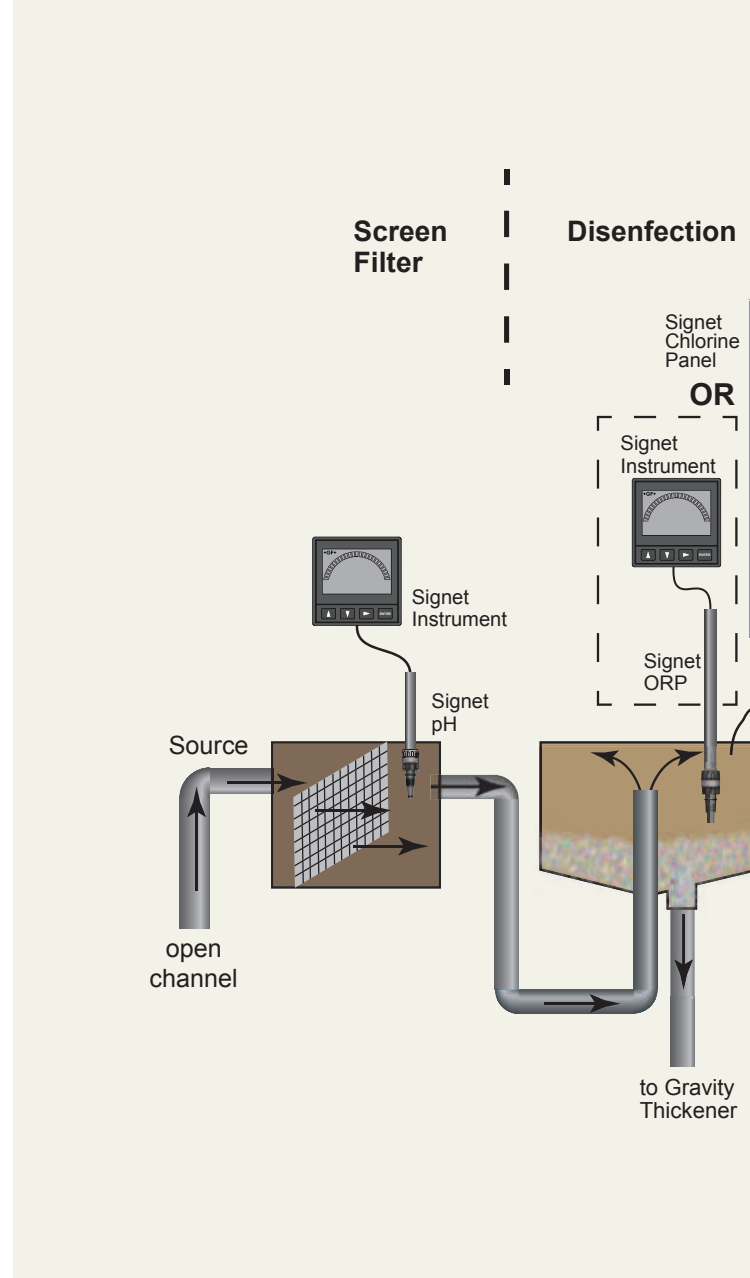
Municipal Treatment is used to treat the geographic area which may include water from wells, rivers or lakes. Treatment is needed to protect the environment and decrease health risks. It contains many pathogens harmful to humans, and can be treated with a disinfectant, usually chlorine, to reduce the number of pathogens in the water.

The process within a water treatment plant could include the following: disinfectant process with chlorine or chlorine dioxide or ozone. The coagulation process which introduces "Alum" or other chemicals to produce "floc" which attracts suspended particles and causes them to clump together. Sedimentation, allows large particles to settle at the bottom of the tank. Media filter and RO process.

Signet products can address some issues operators may face in municipal wastewater treatment plants. Some examples include, high electricity costs and chemical costs, regulatory fines or inaccurate and high maintenance flow monitoring.

As a global solutions provider, Signet products can offer various measurement to solve your needs.

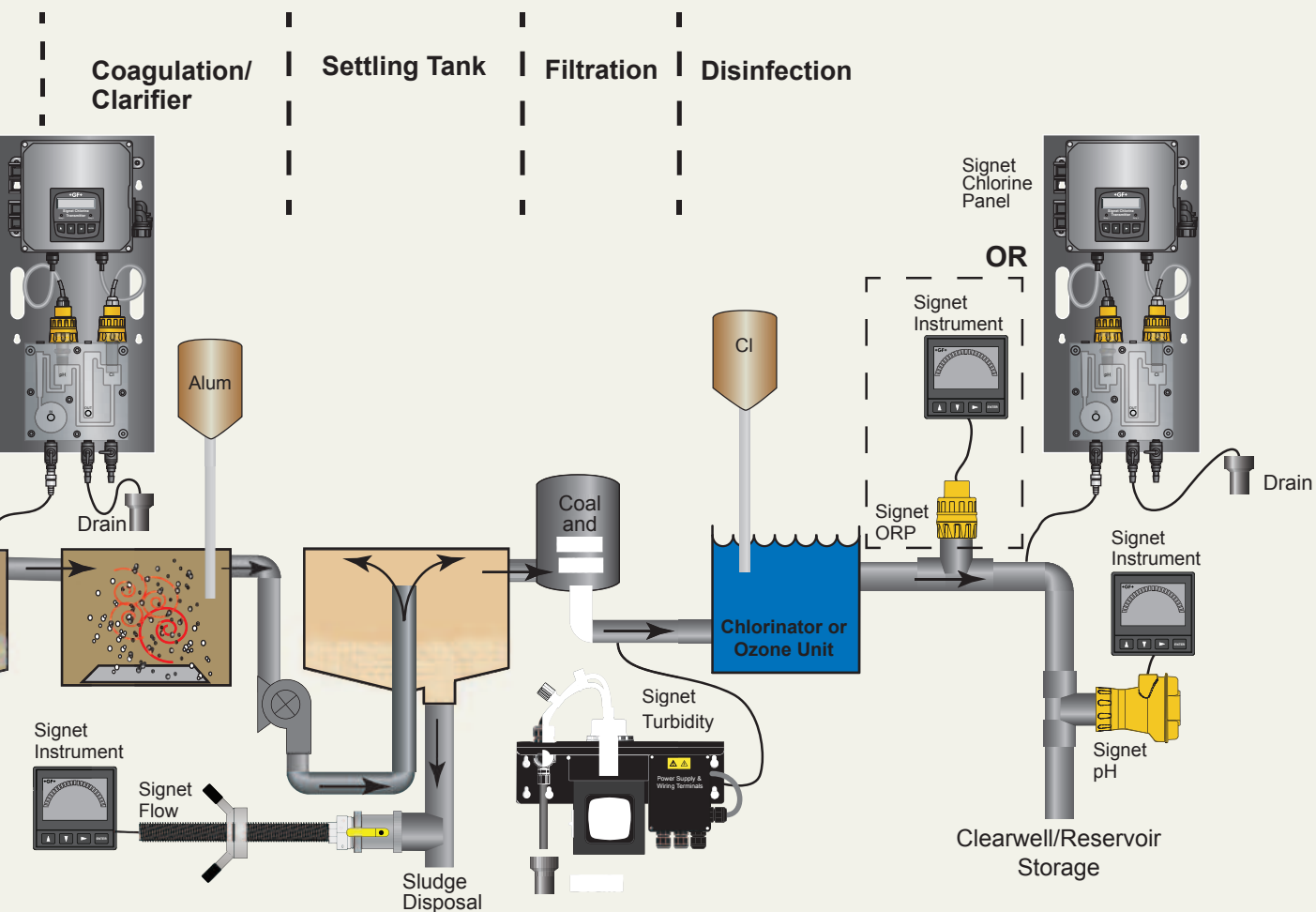
1. Dissolved oxygen monitoring and control will greatly reduce electricity usage for aeration applications.
2. ORP or Free Chlorine monitoring reduces chlorine cost and dechlorination costs.
3. Turbidity, ORP or Free Chlorine, and pH monitoring for compliance reporting.
4. Level monitoring for chemical inventory monitoring.
5. ORP or Free Chlorine dechlorination monitoring and control.
6. Magmeter flow monitoring reduces maintenance and increase accuracy of wastewater flow monitoring.



### Instruments

- + 8900
- + 9900
- + 9950





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#### pH/ORP

- + 2724-2726
- + 2734-2736
- + 2774-2776
- + 2750/2751



#### Dissolved Oxygen

- + 2610



#### Turbidity

- + 4150



#### Chlorine

- + 4630



# Water Treatment

## Wastewater Sewage

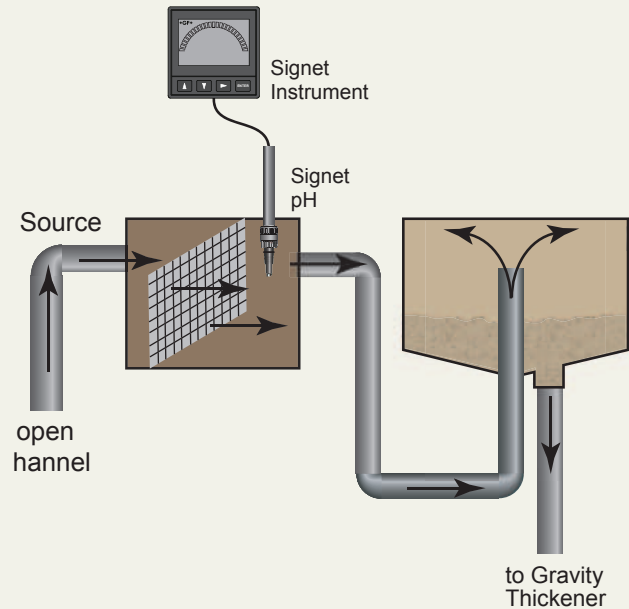
Municipal Wastewater Treatment is used to treat the wastewater of a geographic area. Wastewater treatment is needed to protect the environment and decrease health risks. Wastewater treatment reduces the contaminants that cause excessive oxygen demand in natural waters. The treatment process requires microbial organisms that consume the organic waste in the wastewater stream. This reduces the organic waste by up to 90%. Wastewater contains many pathogens harmful to humans. Wastewater can be treated with a disinfectant, usually chlorine, to reduce the number of pathogens in the water.

Operators may experience challenges with optimizing aeration energy usage, reducing chemical disinfection usage, ensuring compliance with discharge permits as well as obtaining accurate flow measurements of waste streams with high solid content.

GF Signet's measurement and control portfolio offers a wide range of products to solve your application needs.

1. Dissolved oxygen monitoring and control will greatly reduce electricity usage for aeration applications.
2. ORP or Free Chlorine monitoring reduces chlorine cost and dechlorination costs.
3. Turbidity, ORP or Free Chlorine, and pH monitoring for compliance reporting
4. Level monitoring for chemical inventory monitoring.
5. ORP or Free Chlorine dechlorination monitoring and control.
6. Magmeter flow monitoring reduces maintenance and increase accuracy of wastewater flow monitoring.

### Primary Clarifier

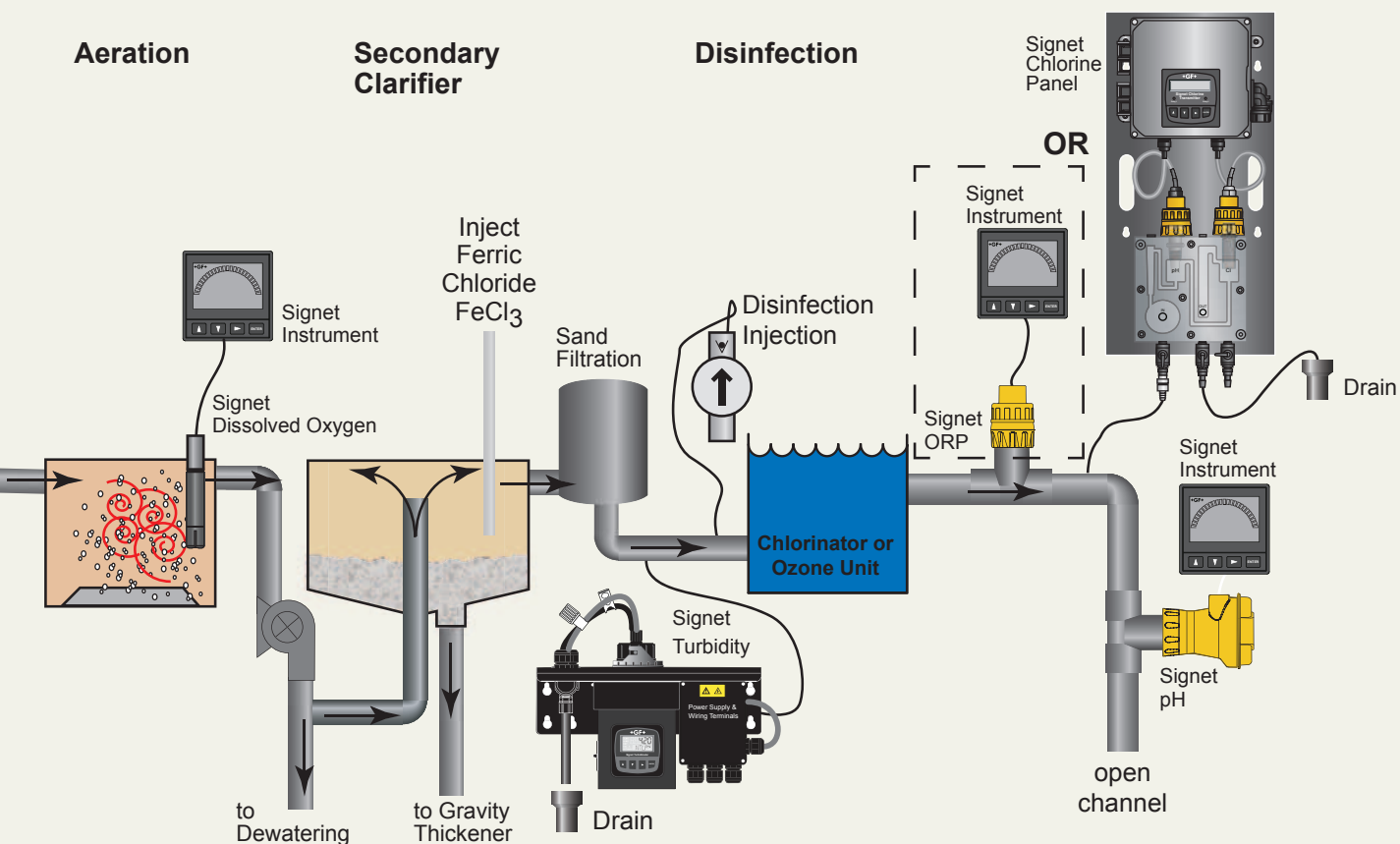


### Instruments

- + 8900
- + 9900
- + 9950







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#### pH/ORP

- + 2724-2726
- + 2734-2736
- + 2774-2776
- + 2750/2751



#### Dissolved Oxygen

- + 2610



#### Turbidity

- + 4150



#### Chlorine

- + 4630





# MENA

region

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