



Drinking Water Treatment Solutions for Small Communities

Water Technologies

SIEMENS

Siemens Water Technologies provides solutions for the removal of :

- Antimony
- Arsenic
- Cryptosporidium
- Giarda
- Iron
- Manganese
- Nitrates
- Perchlorate
- Phosphate
- Radionuclides
- Selenium
- TOC
- Turbidity
- VOCs



Solutions for Drinking Water Treatment

Water is our planet's most valuable natural resource. Yet, as populations continue to grow, many municipalities are faced with growing concerns about the availability of usable water to meet the demand. Even in areas where the water is plentiful, it must often be purified before it is acceptable for drinking. As the cost of water increases and as drinking water standards grow increasingly more complex, Siemens Water Technologies is the partner to choose for supplying and managing your drinking water treatment programs.

Siemens Water Technologies provides safe, reliable and cost-effective drinking water treatment programs geared for the needs of small communities. We know that it is sometimes difficult for small communities to comply with current and future regulations. That's why we have developed products and services that take the guesswork out of solving your contaminated drinking water problems. Siemens Water Technologies provides you with peace of mind that your drinking water treatment challenges will be handled professionally, reliably, safely and – in complete environmental compliance.

We offer the broadest range of products and services to meet the needs of municipalities. We have the technology and equipment to solve all your drinking water issues and the turnkey services that help you manage your process and manpower. With Siemens, you get the benefit of working with a leader in the environmental and water treatment industry. Our full line of products and support services include:

- System design and technology selection
- Equipment supply and installation
- Filter media – supply, installation, removal and EPA compliant disposal
- Sanitization
- Membrane CareSM Program – supply, installation, cleaning and removal of RO membranes (Reverse Osmosis)
- Preventive maintenance and service contracts
- Analytical testing
- Remote monitoring
- Financing
- Grant Assistance
- Technical assistance with permit documentation



Large and diverse inventory of ion exchange resins.

Clarification
Recommended
for removal of:

- Turbidity

Ion Exchange
Recommended for
removal of:

- Nitrates
- Perchlorates
- Radionuclides
- Arsenic
- Iron
- Manganese

The Right Treatment Technologies for your Community

The right treatment technology for each community is dependent on a number of factors, including raw water source, flowrate and effluent requirements. In order to determine what type of water treatment technology accurately suits your situation, it is important that you first analyze the quality of your incoming water supply. This ensures the water treatment equipment you purchase will meet your specific water quality needs. Siemens Water Technologies operates a state-of-the-art water analysis laboratory which can assist in analyzing and reporting on your water sample.

The various technologies shown below treat specific types of contaminants. No single technology solves all contaminant issues; it may be necessary to combine technologies into an integrated water treatment system.

Clarification involves a combination of equipment and chemicals which increase the size of solids suspended in the source water to the point where they can settle. Water that is prepared for potable use is taken from surface sources that can contain relatively high amounts of suspended solids and

dissolved minerals. Large suspended solids will often settle on their own over a period of time (settling time) and fall to the bottom of the clarifier vessel. Smaller solids, dissolved solids and other contaminants require chemical treatment in combination with a mixing step to cause collision of these smaller solids causing them to increase in size to the point they will settle on their own. Solids are removed in the clarification process so that the final filters do not clog frequently.

Ion exchange resin is a cost effective and efficient treatment technology for a wide variety of contaminants and water chemistries. Ion exchange systems rely on the process of exchanging harmful positive and negative ions in solution for harmless ions. As the contaminant-laden waters are passed through the resin bed, the exchange process continues until the resin is "exhausted" and can no longer exchange "good for bad" ions. Siemens Water Technologies gives you the flexibility of on- or off-site regeneration of exhausted resins and can arrange for proper disposal and/or thermal destruction to prevent recontamination.



Granular activated carbons for liquid and vapor phase applications

Choosing the Right Treatment Technology

Media Filtration is the process of removing suspended matter from water by obstructing its passage with a granular media. As water, laden with solids passes through the media, the particles are captured within the filter material. An underdrain beneath the filter bed collects filtered liquid. In a typical filtration bed, the filter media consists of a bed of sand, or a combination of sand and anthracite coal. In a down flow filter arrangement, multi-layer, mixed-grade medias allow solids to pass deeper into the bed before collection, resulting in higher filtration rates and longer run lengths before backwashing is necessary. Filtration does not remove dissolved solids.

Activated Carbon is an adsorption media process that involves passing contaminated water through a bed of activated carbon. Adsorption is a natural process by which molecules of a dissolved compound collect on and adhere to the surface of an adsorbent solid. Granular activated carbon is a particularly good adsorbent medium due to its high surface area to volume ratio and its affinity for many organic contaminants. This high surface area permits the accumulation of a large number of contaminant molecules.

Granular activated carbon is considered the Best Available Technology (BAT) by the Environmental Protection Agency (EPA) Maximum Contaminant Levels (MCLs) for removing many organic contaminants that exceed maximum.

Media Filtration

Recommended for removal of:

- Iron
- Manganese
- Turbidity

Activated Carbon Adsorption

Recommended for removal of:

- TOC
- VOC
- Taste
- Odor



Granular Ferric Hydroxide (GFH® Media)

Recommended for removal of:

- Arsenic
- Selenium
- Phosphate
- Chromium
- Antimony

Membrane Filtration

Recommended for removal of:

- Giardia
- Cryptosporidium

Reverse Osmosis (RO)

Recommended for removal of:

- TDS
- Nitrates
- Giardia
- Cryptosporidium

The **GFH®** is an adsorption media process which uses an NSF, Standard 61-approved, iron-based, non-regenerable media to adsorb contaminants from drinking water supplies. Like other adsorption processes, the water to be treated passes through the media to remove the contaminants. Once the media has depleted its adsorption capacity, it is removed from the vessel and replaced with fresh GFH media. In many cases, the exhausted media can be landfilled following TCLP (Toxicity Characteristic Leachable Procedure) testing and certification as a non-hazardous waste. Since GFH is a single-use media, there are no on-site regeneration chemicals or concentrated liquid waste disposal issues.

Reverse Osmosis (RO) is the process by which water, under pressure, is passed through semi-permeable membranes used to remove various soluble inorganics present in the water. The membrane will pass the water, but rejects the dissolved materials to waste. The purified water that passes through the membrane is the permeate or product water. Nanofiltration is a variation of RO with the ability to retain larger ions and pass smaller ions resulting in a permeate that is less corrosive to piping.

Waters may have to be pretreated to remove constituents which may attack the membrane or impair its performance. pretreatment may include removing oxidizing iron and manganese salts, filtering out precipitates, adjusting the pH or removing oil and grease which may form films on the membranes.

Membrane Filtration uses microporous filters to remove suspended solids, colloidal particles, cysts and bacteria while providing the same high-quality finished water regardless of incoming water turbidity. Contaminants smaller than the pore size of the membrane are physically retained and will not pass through the membrane. During normal operation, the membranes are backwashed to sustain optimal performance. In addition to the periodic backwashing, preventative maintenance techniques, such as a short maintenance wash, maximize the time between full chemical cleanings. These systems, employed at more than 700 municipal installations worldwide, provide drinking water that meets all current and anticipated future regulations.



OSEC® sodium hypochlorite generator

Choosing the Right Treatment Technology

Chemicals are typically added to water for the purpose of disinfection, pH adjustment, coagulation, removal of suspended solids and prevention of scaling. In most cases, chemicals are added as a pretreatment step to enhance and increase the performance of the treatment process.

Disinfection in drinking water applications is a vital element to public health. The goal of disinfection is the destruction or inactivation of disease producing organisms, to eliminate the spread of waterborne diseases.

Chlorine disinfection is the most commonly used method. Chlorine offers the advantages of residual protection, ease of application, and control and monitoring. Whether metered as a gas in solution, or fed as a liquid solution, it is a reliable, cost effective disinfection solution.

CHEMICAL ADJUSTMENT
Recommended for the destruction or
inactivation of disease producing organisms



The Barrier M® UV system is ideally suited for small community drinking water systems.

Ultraviolet disinfection offers many advantages over other forms of water treatment for microbiological contaminants. Most importantly, it does not introduce any chemicals to the water, it produces no by-products, and it does not alter the taste, pH, or other properties of the water. When used with various forms of filtration, UV light is capable of inactivating microorganisms such as bacteria, viruses, molds, algae, yeast, and protozoa like cryptosporidium and giardia. Used alone UV light generally has no impact on chlorine, VOCs, heavy metals, and other chemical contaminants.

ULTRAVIOLET DISINFECTION
Recommended for inactivation of waterborne pathogens.



Products and Services

At Siemens Water Technologies, we can help manage your drinking water needs. We offer the broadest range of technologies, backed by industry-leading brands and technical support teams. By working together, we take care of your community's water. For a more comprehensive look at the complete range of available technologies we offer, please visit our website www.siemens.com/water

Cartridge Filtration

- Absolute rated cartridge filters
- Bag filter housings and filter bags
- Filter cartridges

Chemical Feed

- Chemical induction systems
- Chemical feed equipment and storage systems
- Chemical feed skids
- Chemical metering/feed pumps and controls
- Custom chemical feed packages
- Fluoridation
- Lime systems
- pH neutralization
- pH/oxidant/transmitter/monitors
- Polymer feed systems and controllers
- Turbidity measurement

Clarification

- Packaged clarification/filtration plants
- Clarification systems
- Lime softening systems

Disinfection

- Ultraviolet disinfection
- Ultraviolet (UV) sterilizers
- Gas feed system
- OSEC® sodium hypochlorite generators
- Chlorine dioxide systems and chemicals
- Calcium hypochlorite feeders
- Residual chlorine analyzers and controllers

Ion Exchange

- Anion/cation exchangers
- Deionization: continuous, mixed beds, two beds
- Demineralizers
- Softeners



Media Filtration

- Activated carbon systems (granular)
- Anthracite filters
- Filter parts and underdrain systems
- Gravity filters
- GFH® ferric-based media
- Multimedia filters
- Powdered activated carbon treatment systems
- Pressure filters

Membrane Filtration

- Microfiltration (MF)
- Nanofiltration (NF)
- Reverse Osmosis (RO)
- Ultrafiltration (UF)

Services

- Analytical laboratory service
- Carbon change out/exchange services
- Controls and instrumentation/upgrades
- Emergency response service
- Field erected package treatment plants
- Filter inspection
- Maintenance programs/contracts (water treatment systems)
- Membrane: cleaning, replacement and chemical

- Off-site regeneration of ion exchange resins
- Programmable logic controllers (PLCs)/upgrades
- Resin analysis
- Resin replacement, testing, regeneration, cleaning
- Service contracts instrumentation and controls
- Upgrade and retrofit programs
- Water analysis

Temporary/Emergency Water Services

- Clarification
- Demineralization
- Filtration
- Reverse Osmosis
- Adsorption
- Softening





The Membrane CareSM Program provides services to keep systems operating at peak performance.

Services that Save Time, Money and Manpower Usage

The services you need, when and where you need them

Siemens Water Technologies offers services that help small communities manage their drinking water process, while also reducing staff time and operating costs. Our factory trained service technicians are ready to assist you quickly and efficiently from over 85 branches located throughout the US and Canada. Our strategically located service branches enable us to reach >85% of the US population within 2 hours. This allows us to schedule on-site visits when and where you need us. And, should unexpected issues or emergencies arise, you can rely on us with 24 hour, 7 days a week customer service just a phone call away.

Temporary and Emergency Mobile Water Services

Maintaining water quality is critical in the public water marketplace. We have helped communities ensure that their drinking water supply remains uninterrupted and unaffected by emergency or short term issues that can arise. In these critical situations, Siemens Water Technologies employs our temporary mobile water treatment systems. These systems offer a range of treatment options, including clarification, filtration, demineralization and reverse osmosis/membrane filtration. Each system can be installed on-site or trailer-mounted in one of our state-of-the-art, climatized assets. Some of our customers

have found mobile water treatment systems provide a rapid, cost effective solution when faced with scheduled maintenance shutdowns, seasonal water changes, raw water quality changes or changes in treated water requirements. The advantages of utilizing mobile water treatment systems include quick response from one of our regional dispatch centers, no capital expenditure and guaranteed water quality and volume.

Service and Operating Contracts

Siemens supplemental **service contracts** are custom tailored to help you get the most value from your water treatment equipment investment. Trained field service technicians provide expert evaluation of your equipment operation on a regular basis.

Preventative Maintenance programs are part of our service contract offering in which we provide necessary maintenance tasks to extend your equipment's useful life. Preventative Maintenance can include services such as filter media rebedding, ion exchange resin rebedding, RO membrane cleaning and parts replacement. With Preventative Maintenance, you decide the level of services and the frequency of visits that best matches your facility's needs.



Mobile clarification and filtration system ensures uninterrupted drinking water supply without capital expense.

With Siemens Water Technologies' WaterOne® operating contracts, we take responsibility for operation of the entire treatment system, we ensure you the lowest total treatment cost while ensuring maximum on-line operation, by continuously evaluating equipment and technology performance. We guarantee treated water quality and have the ability to quickly react to unforeseen circumstances. Existing plant personnel can be redeployed to improve manpower utilization and learning curve issues surrounding new technologies and systems are eliminated. Customers who choose our operating contracts still maintain strategic control of their operations, but have the confidence of written performance guarantees for quality and quantity of water provided, preservation of capital funds and a predictable and stable budgeted cost of water.

Membrane CareSM Program

Our Membrane CareSM Program is focused on keeping your reverse osmosis (RO) equipment operating at peak performance. In addition to maintaining an inventory of membranes and associated spare parts, our trained service technicians can provide assistance with membrane removal and installation or membrane cleaning, either on-site using your own clean-in-place skids or off-site, at one of our regional cleaning facilities. We offer membrane autopsies and complete laboratory services to evaluate system performance and improve productivity.

Ion Exchange Resin Services

The selection, application and supply of ion exchange resins are critical to the performance and cost effectiveness of your water treatment system. In addition to being the largest distributor of ion exchange resin in North America, Siemens Water Technologies also provides a full range of resin support services including laboratory testing, resin removal and installation, and resin disposal.

Carbon and Filtration Media Services

Siemens offers a wide variety of activated carbon and filtration medias, as well as standard support bed materials for every filtration or adsorption application. We also offer media removal, vessel and distribution inspection, installation of new media and reactivation or disposal of spent media, if required. Our media services ensure that your equipment continues to operate reliably and economically, while meeting regulatory requirements.

Analytical Water Testing

Before you can select the right combination of technologies to deliver the level of water quality that you need, it is essential to know exactly what contaminants are in your water. Our analytical testing laboratory offers complete certified testing services to pinpoint specific compliance issues.

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The information provided in this brochure contains merely general descriptions or characteristics of performance which in actual case of use do not always apply as described or which may change as a result of further development of the products. An obligation to provide the respective characteristics shall only exist if expressly agreed in the terms of contract.

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