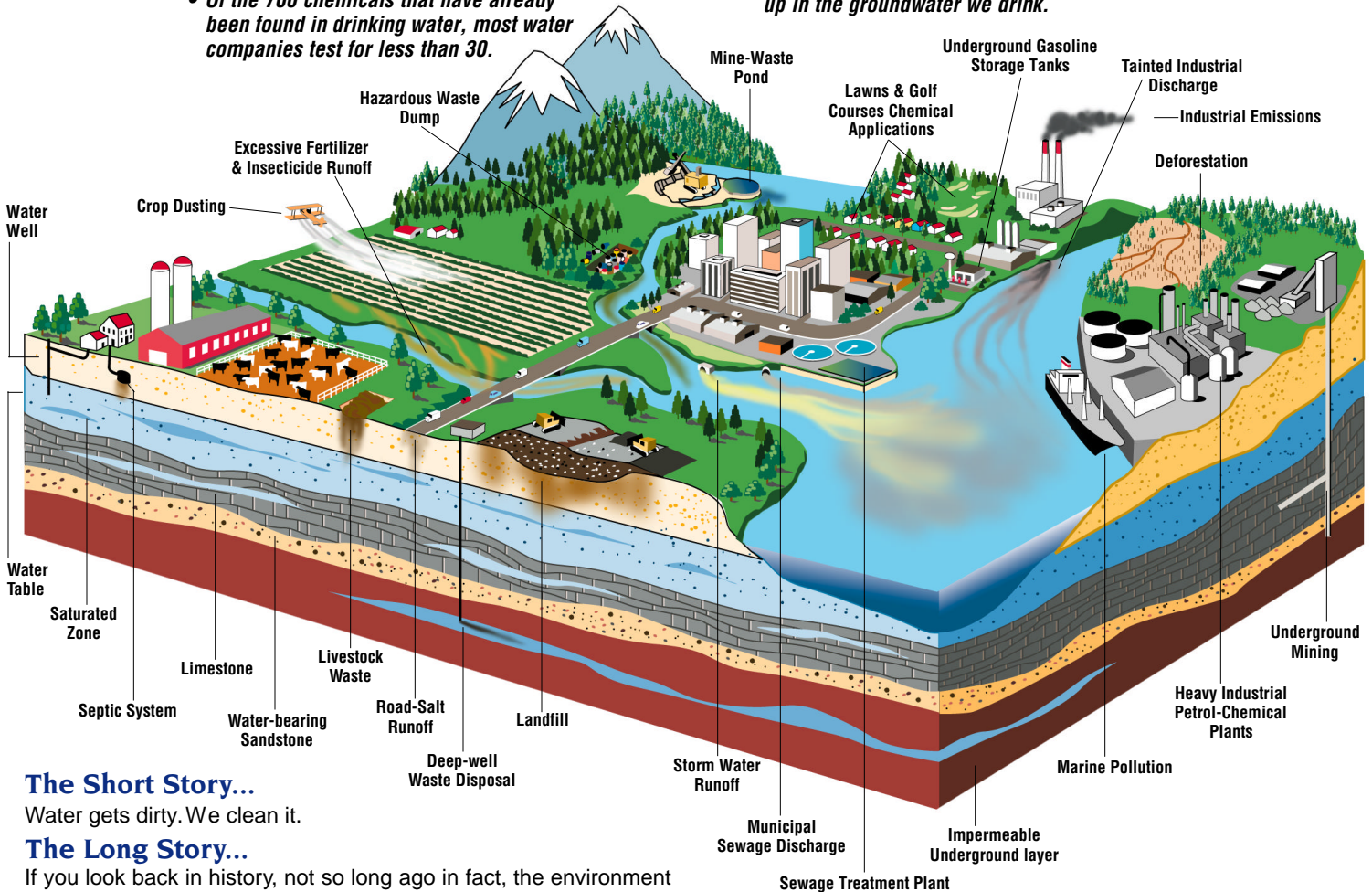


DO YOU KNOW WHAT'S IN YOUR WATER?

Water Problems and the Products to Solve them!

Over 500 billion pounds of hazardous chemical waste are improperly disposed of every year.

- Every day, 50 billion gallons of liquid hazardous waste are disposed at 26,000 disposal sites, 85% are located above aquifer. Some chemicals, such as TCE are too toxic, a single gallon can contaminate a years worth of drinking water for 3800 people.
- Every year, 100 billion gallons of liquid hazardous waste are absorbed into groundwater supplies.
- Of the 1,000 EPA Priority waste sites in the U.S., less than 20 have been cleaned up since the EPA's inception.
- Of the 700 chemicals that have already been found in drinking water, most water companies test for less than 30.
- This much we know... If we put toxic chemicals into or on the ground, they will eventually end up in the groundwater we drink.



The Short Story...

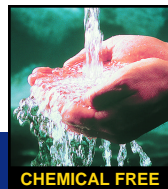
Water gets dirty. We clean it.

The Long Story...

If you look back in history, not so long ago in fact, the environment was pure. The abundance of fresh clean water, combined with the natural cycles of evaporation, purification (through ultra violet light found in the sun's rays), deionization (through thunderstorm activity) and precipitation, regularly returned fresh water to the earth's surface in the form of pristine rainfall, maintaining the integrity of our planet's water supply for eons. Once the atmospheric process of disinfection and purification was complete, that same clean water was drawn by the earth's gravity deep into aquifers miles under ground. Then the geothermal process forced that same water back up to the surface, squeezing the water through layers of rock and sediment, filtering out all of the remaining impurities,

replacing them with all of the vitalizing minerals required to sustain life. Unfortunately, things have changed. The earth is no longer the pure place it once was.

Federal, State, and Local authorities will do their best to bring us the best water possible. But, they cannot undo all damage to our water sources that has taken decades of ignorance and abuse to inflict



NO MATTER HOW TOUGH The JOB...TWT® Is The Solution

DEPOSIT CONTROL • FILTRATION • PURIFICATION • DISINFECTION



THERE ARE THREE BASIC CAUSES OF WATER/FLUID RELATED PROBLEMS

■ Scale

- Problems:
- Loss of heat transfer efficiency
 - Flow restriction in pipes and frozen valves
 - Back pressure increases energy needed to pump
 - Reduced reaction vessel capacity
 - Localized corrosion
 - Visible surface scale objectionable

■ Adverse Water Chemistry

- Problem:
- General corrosion

■ Biofilm

- Problems:
- General corrosion
 - Biocorrosion (both general and local)
 - Sludge
 - Disease and odors
 - Bacteria, Algae, Fungus, etc.

■ The End Results of Water Problems

- Wasted water • Ruined equipment • High energy costs
- Productivity losses • Product contamination or quality problems • Disease and odor in the cooling water environment

■ Materials That Deposit on Equipment and Cause Water/Fluid Problems

Materials may be animal, vegetable, mineral, or corrosive water chemistry. The sources of the materials include: pollution, wind borne dirt, bacteria, algae, chemical additives, and process components themselves. Some of the materials can grow; such as bacteria, algae, fungus, etc

■ Treatment

Scale, Adverse Water Chemistry & Biofilm Can Cost You Money!

Untreated fluid used in boilers, hot water systems, cooling towers and other fluid related equipment contains dissolved salts, gases and traces of many minerals and metals. These elements are the direct cause of scale buildup in pipes and equipment. If left untreated, scale buildup can increase fuel costs, repair and ongoing cleaning costs, downtime and may eventually result in significant equipment replacement.

The bottom line is that if the problem-causing materials are controlled, then 85% to 90% of the problems are eliminated. Treatment options include **removal** and **control**.

- Removal involves physical or chemical cleaning, filtration, ion exchange, softening, demineralization, reverse osmosis.
- Control involves adding chemicals or ozone, or electro-magnetically conditioning the water.

■ The Importance of Clean Water

Clean water is essential for human well-being and survival, agriculture, and industry. When water is consumed or absorb with harmful contaminants or in insufficient quantities, human condition can deteriorate through malnutrition, sickness, disease, miscarriage, and death.

■ The earth is abundant in water but only 1% of the earth's water is drinkable.

97% of the earth's water is in oceans and seas and contain intolerable levels of salt, While various desalination technologies exist, no cost-effective high-throughput method is available. The remaining 2% of the earth's water is frozen and not readily accessible.

Drinkable water comes from two sources: Surface water at lakes, reservoirs and rivers which supply most major cities, groundwater from wells that access underground geological formations such as aquifers which is used by smaller communities. While pristine water is usually clean, regulatory agencies monitor over 100 dangerous water contaminates which can come from rain runoff over hazardous waste, naturally occurring sources of contaminants, water treatment chemicals, and pollution from residential consumers, industry and agriculture.

Water is generally classified into two groups...surface water and ground water:

■ Surface Water

Surface water is just what the name implies; it is water found in a river, lake or other surface impoundment. This water is usually not very high in mineral content, and many times is called soft water even though it usually is not. Surface water is exposed to many different contaminants, such as animal wastes, pesticides, insecticides, industrial wastes, algae and many other organic materials. Even surface water found in a pristine mountain stream possibly contains giardia or coliform bacteria from the feces of wild animals, and should be boiled or disinfected by some means prior to using or drinking.

■ Ground Water

Ground water is water trapped beneath the ground. Rain that soaks into the ground, rivers that disappear beneath the earth, and melting snow are but a few of the sources that recharge the supply of underground water. Because of the many sources of recharge, ground water may contain any or all of the contaminants found in surface water as well as the dissolved minerals it picks up during its long stay underground.

Due to the different characteristics of ground and surface water, it is important that you know the source of your water. Of the 326 million cubic miles of water on earth, only about 3% of it is fresh water, and 2% of that is frozen. Only 1/2 of 1% of all water is underground; about 1/50th of 1% of all water is found in lakes and streams. The average human body is about 70% water. You can only survive five days or less without water.

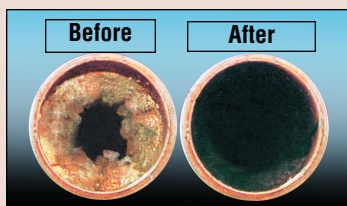
■ Hard Water: What is hard water?

Waters that contain dissolved minerals, such as calcium and magnesium above certain levels are considered "hard water" because water is considered a "solvent", i.e., over time it can break down the ionic bonds that hold most substances together, it ends to dissolve and gather up small amounts of whatever it contacts. For instance, in areas of the world where rock such as limestone, gypsum, fluor spar, magnetite, pyrite and magnesite are common, well water is usually very high in calcium content, and therefore considered "hard".

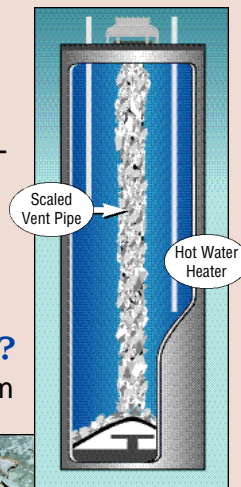
Hard water is the most common problem found in the average home. Hard water is water that contains dissolved hardness minerals above 1 grain of hardness per gallon (GPG*) or about 17 parts per million of hardness.

■ What are hardness minerals?

Calcium, manganese and magnesium are the most common.



Pounds of Scale Removed from a Hot Water Plumbing and Heating Systems



■ How do you measure hardness?

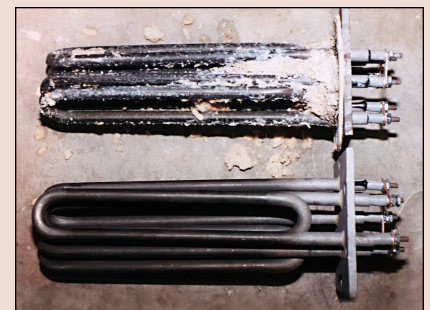
Parts per million or grains per gallon are the most common unit to measure hardness. One part per million (PPM) is just what it says: out of one million units, one unit. Grains, or grains per gallon (GPG) is a weight measurement taken from the Egyptians; one dry grain of wheat, or about 1/7000 of a pound. It takes 17.1 PPM to equal 1 GPG.

■ Why should hard water concern me? Problem

For many uses, it would not matter. For instance, to put out fires, wash the mud off the streets or float your boat, water would have to be pretty hard to cause a problem. But for bathing, washing dishes and clothes, shaving, washing your car, and for most commercial and industrial uses, as well as others, hard water is not as efficient or convenient as soft water.

For instance:

- You generally use only 50% as much soap cleaning with soft water or with water where the effects of hardness have been neutralized, as you do with hard water.
- Hard water and soap combine to form "soap scum" that can't be rinsed off, forming a "bathtub ring" on all surfaces and leaving unsightly spots on your dishes, fixtures, etc..
- Soap scum will remain on your skin even after rinsing! It will clog the pores of your skin and coat every hair on your body. This serves as a home for bacteria and causes diaper rash, minor skin irritation and skin that continually itches.
- When hard water is heated, the hardness minerals are re-crystallized to form hardness scale. This scale can clog your pipes and hot water heater, causing premature failure, and necessitating costly repairs or even replacement.
- For many industrial uses, the hardness minerals interfere with the industrial or commercial process, causing inferior product.



Scaled Tube Bundles Above

*Grains per gallon

Triangular Wave Technologies, Inc. (TWT®) Product Summary

Sorted by Technology

www.triangularwave.com

TWT, Inc. offers a full range of products & systems designed to address fluid problems wherever fluid flows. From patented deposit control technology to pre and post filtration needs, ionization, iron removal, disinfection, and ultraviolet purification treatment and conditioning, TWT has the versatile, efficient, cost-effective methods to solve your fluid management problems end to end.

- **Versatile Fluid Management Systems To Effectively Meet The Needs Of Any Industry and Application**
- **Controls scale, bio-film & corrosion**
- **Enhance operating efficiency & life cycle of equipment**
- **Saves water & energy**
- **Protection for new equipment: TWT provides new equipment with the ability to enhance it's features and benefit**
- **Treatment for existing equipment: Retrofit existing equipment to improve its operating efficiency and life cycle**

■ TWT® Patented Deposit Control

Technologically Advanced Method for Water & Fluid Management Providing Comprehensive End-To-End Treatment & Conditioning (chemical-free).

TWT Patented Deposit Control System–

The basic component in the TWT systems is the deposit controller. It is comprised of a microprocessor, solenoid coil wrap and/or a reaction chamber. The microprocessor is a patented controller that functions like a small computer to relay a continuous electrical power supply to the solenoid coil and/or reaction chamber. The reaction chamber is plumbed into the main water in-take line and/or just before each piece of vital processing equipment, and provides a factory-wrapped wire coil forming a solenoid. The solenoid conveys the triangular wave signal at the appropriate power level (as allowed by the model chosen) to the water passing through the chamber. This signal constantly changes the polarity, frequency, and amplitude of the current entering the water. This triangular wave treatment produces several benefits. It increases the capability of the water to hydrate scale ions and other colloidal

particles. In effect, the surface charge of the hydrogen molecules is enhanced and the water is made “wetter”. This “hydrated” water can dissolve unwanted particles, suspend them in solution, and allow them to be easily filtered out or flushed from the system. Accordingly, the mineral and biological particles that cause scale, deposits, and corrosion are dissolved and washed away. This means that the breeding environments for bacteria, such as bio-film and corrosion, are eliminated. The agitation created in the reaction chamber also disrupts the conditions essential for the normal reproduction of bacteria and they die, thus allowing them to be harmlessly flushed out of the system.

TWT Reaction Chamber–

The TWT Reaction Chamber is part of the patented TWT Deposit Control Technology, the function of which is to control scale and bio-film in the plumbing infrastructure, fixtures, and water-fed appliances found in the facility being treated. The Reaction Chamber provides a chamber through which the water flows and is exposed to the triangular wave signal that lies at the heart of the deposit control technology. As the fluid passes through, it is treated and then carries that treatment downstream, to condition the rest of the plumbing system, non-chemically and reliably.

To use in conjunction with the TWT Deposit Control Systems when required, Triangular Wave Technologies, Inc. has developed a line of factory-wrapped wire Reaction Chambers to address magnetic pipe environments. –Typically, wire coil cannot be installed on any magnetic pipe, such as steel, galvanized steel, ductile iron, or cast iron. If a coil is applied to such a pipe, the pipe becomes a shield and prevents the wave energy from entering the fluid path. The TWT Reaction Chambers solve this problem by providing an easily installed section of non-magnetic pipe to provide the proper pipe material for the Deposit Control System to work as designed. The TWT Reaction Chambers are fully sealed, protecting their two layers of factory-wrapped coil. The PVC, Stainless Steel and the Industrial Reaction Chamber systems are designed and manufactured to meet the highest quality specifications.

Copper Pipe Signal Enhancer

Copper pipes, although acceptable, are one of the more difficult of materials to work with. To overcome this...TWT has developed its Copper Pipe Signal Enhancer. This unit is placed between the Deposit Controller and the solenoid coil on the copper pipe. The function of the signal enhancer is to provide a proper impedance match and to ensure maximum energy transfer between the controller and the solenoid, which, in turn, ensures enhanced treatment of the fluid.

Magnetic pipe materials such as steel, galvanized steel, iron, ductile iron or cast iron become shields and prevent the proper energy transfer to the fluid path. For magnetic pipe applications we offer a full line of factory wrapped wire coil Reaction Chambers. TWT products are designed to provide comprehensive solutions to water and fluid management problems. The Copper Pipe Signal Enhancer and its equivalent for the magnetic pipe environment, TWT Reaction Chambers, offer the answer to limited signal penetration, ensuring optimal results. The copper signal enhancer is a passive signal / impedance matching circuit. This device provides a power boost to the conditioning signal in copper pipes.

Special Note: Copper pipe signal enhancers are to be used on copper pipes only.

Ionization: *For bacteria, algae, fungus control in Pools, Spas, HVAC*

IonGuard Purification System–

The IonGuard Purification System is an electrolytic copper /silver ion generator. The system units contain specially cast copper /silver alloy electrodes. These electrodes are mounted in a housing designed for easy access (HVAC & Pool Environments). The IonGuard Purification System purifies water through a process called ionization. This process utilizes a low voltage direct current (DC) to place precise and minute amounts of copper and silver ions into water systems. Copper ions kill algae and silver ions kill bacteria (integrate with TWT deposit control technology for enhanced results).

Ultraviolet Disinfection/Purification

High intensity bacteria control for potable water, waste water, food service, sanitary, pharmaceutical applications and anywhere the need for safe water required.

Ultraviolet Disinfection/Purification Systems–

The UV disinfection technology used in the system to provide safe, potable drinking water, free of disease-causing pathogens. As water passes through the UV chamber, UV light will attack and render harmless any bacterial, viral or spore contamination present in the treated water. “High intensity UV light destroys these contaminants with a 99.9% kill rate”. The output water is thus disinfected and offers exceptionally high quality for human consumption.

Ozone Disinfection

The Ozonator is a natural, safe way to purify water in many different applications. It eliminates the need for chemicals which can be irritating to people and costly to budget. The Ozonator converts Oxygen (O_2) into (O_3) by the action of the corona discharge system. Ozone is then injected into the water where it destroys viruses, bacteria and many other microorganisms. Taste, odor and color disappear and iron oxide, hydrogen sulphide, lignite and tannin are precipitated out, leaving your water pure and clean.

Filtration Systems–Commercial • Industrial • Residential

Filters are designed to trap various kinds of debris, dirt and organic particles that will otherwise enter your equipment and/or plumbing system, restrict your water flow and create a breeding ground for bacteria. Filtration is the first line of defense for residential, commercial, industrial facilities, where the source of water may be ponds, wells, streams or other water sources that have high exposure to contamination from airborne pollutants, surface run-off, agricultural or industrial waste or similar dangers.

The first step in achieving clean water is to install a filtration device that effectively removes particulate matter and similar debris. Filtration is an important step in water treatment, especially for water intended for human consumption. Filtration systems provide a bacteriostatic environment and are designed to remove, volatile organic chemicals, hydrogen sulfide and sulfur, herbicides, pesticides, chemical fertilizer residues, trihalomethanes and many other pollutants.

Triangular Wave Technologies, Inc. (TWT®) Product Summery

Sorted by Technology

www.triangularwave.com

Chemical-Free Iron Removal Systems–

For 12 to 50 ppm iron.

The Rust-Erase iron filter system is designed to effectively eliminate rust from your water supply economically and thoroughly. No more unsightly rust stains in the toilet, tub and sink., the laundry will be cleaner, too! The Rust-Erase Iron Filter works automatically. Every drop of water coming through the line is filtered to remove rust and other particles. The pre-set timer periodically activates the back-wash mechanism which keeps the filter medium fresh and effective for many years. Media is good for approximately 3 - 5 years or more depending on water conditions.

Effects of iron and manganese in water

When exposed to air, dissolved iron or manganese reacts with oxygen and is converted by oxidation to a colored, solid material that settles out of the water. Iron changes to white, then yellow and finally to a red-dish-brown color. Manganese forms a black residue. High concentrations of these sediments cause red-dish-brown or black stains on laundry and facility fixtures. Another result of iron and manganese in water is the presence of harmless bacteria in soil, shallow groundwater supplies and some surface water that secrete large amounts of red-brown (iron) or black-brown (manganese) slime that stain toilet tanks.

Integrated Water: Treatment & Conditioning Systems

MD Series Integrated Water Treatment Systems–

TWT® technologically advanced method for water management. Triangular Wave Technologies, Inc. All-In-One fluid management systems, the ultimate in water treatment & conditioning TWT® systems are factory engineered and assembled, applying all of the needed elements for maximum fluid protection, management, and peace of mind in one simple packaged solution. TWT® Filtration, Microprocessor Deposit Controller, Reaction Chamber, and UV Disinfection units are combined to provide a start-to-finish answer to simplified prevention, treatment and management of water line contamination dangers. The TWT All-In-One Fluid management water disinfection/purification systems are unique, compact, self-contained units for the treatment of water (well and ground water application).

DP Series Integrated Water Treatment Systems–

Technologically advanced method for water management. Triangular Wave Technologies, Inc. TWT® Patented Deposit Control/ Ultraviolet Disinfection / Purification systems, TWT® systems are factory engineered and assembled, applying the needed elements for maximum fluid protection, in one simple packaged solution. TWT Microprocessor Deposit Controller, Reaction Chamber, and UV Disinfection units are combined to provide a simplified prevention, treatment and management of water line contamination dangers. The TWT water disinfection/ purification systems are unique, compact, self-contained units for the treatment of water (municipal water application).

Bacterial Reduction Systems–

Technologically Advanced Fluid Treatment Methods for the Meat, Poultry and Other Related Processing Industries. Filtration • Deposit Control Technology • Ozone and/or UV Disinfection / Purification Combined for maximum effectiveness (bacteria reduction guaranteed).

Total Water Control System–

For large cooling system applications - computer controlled system featuring Deposit Controller, Ultra-violet Disinfection or longuard and Filtration. Low pressure systems to 6,000 gpm, high pressure systems to 36,000 gpm for cooling tower, process water and other industrial applications.

Transportable Water Treatment Systems–

The most economical and efficient way to produce safe drinking water in temporary situations. The TWT Transportable Water Treatment System is an integrated system of exactly selected components customized to remedy specific water treatment problems in temporary installations, remote areas or crisis situations. First developed for use in military camps related to the 1996 UN peace-keeping mission in Bosnia, the TWT are well suited to a wide range of applications. TWT systems are designed to produce safe drinking water, dependably and economically, from a wide range of problem input sources. The self-contained, transportable system filters out contaminants such as heavy metals, pesticides and parasites from any non-salt water source and kills all microorganisms including virulent bacteria and viruses.

The following information will allow you to restore the quality, taste and clarity of your water. If your water related problems have not been answered...The good news is, there is something you can do about it...

**REQUEST A QUOTE OR SEEK
TECHNICAL INFORMATION**

**REQUEST A QUOTE FOR WATER & FLUID
TREATMENT ON THE TWT WEBSITE HOME
PAGE: WWW.TRIANGULARWAVE.COM**

You may fill in this form on line and submit it to us as per below, or you may print it, fill it in, and fax it to us at (201) 576-0410. Please note that all fields marked with (*) must be filled, in order to receive a response. If you have trouble submitting this form via the Submit button at the top of this form, please send an e-mail to info@triangularwave.com with your contact information

TWT is happy to provide this on-line quote and information request form to make your evaluation and purchase process as streamlined as possible. Your complete system quote and/or additional information will be provided to you by either TWT or an authorized TWT dealer or distributor, via e-mail (or fax, if requested) Please feel free to call us with any questions.

- **Filtration**
- **Patented Deposit Control Technology**
- **UV Disinfection & Purification**

**COMBINED FOR MAXIMUM
EFFECTIVENESS—**

The Competitive Edge!

**CLEANER WATER IS
HEALTHIER WATER!**

**TWT® YOUR SIMPLE AND
SAFE SOLUTION**



**For a complete list of TWT® products,
systems and technologies visit our
website at: WWW.Triangularwave.com**

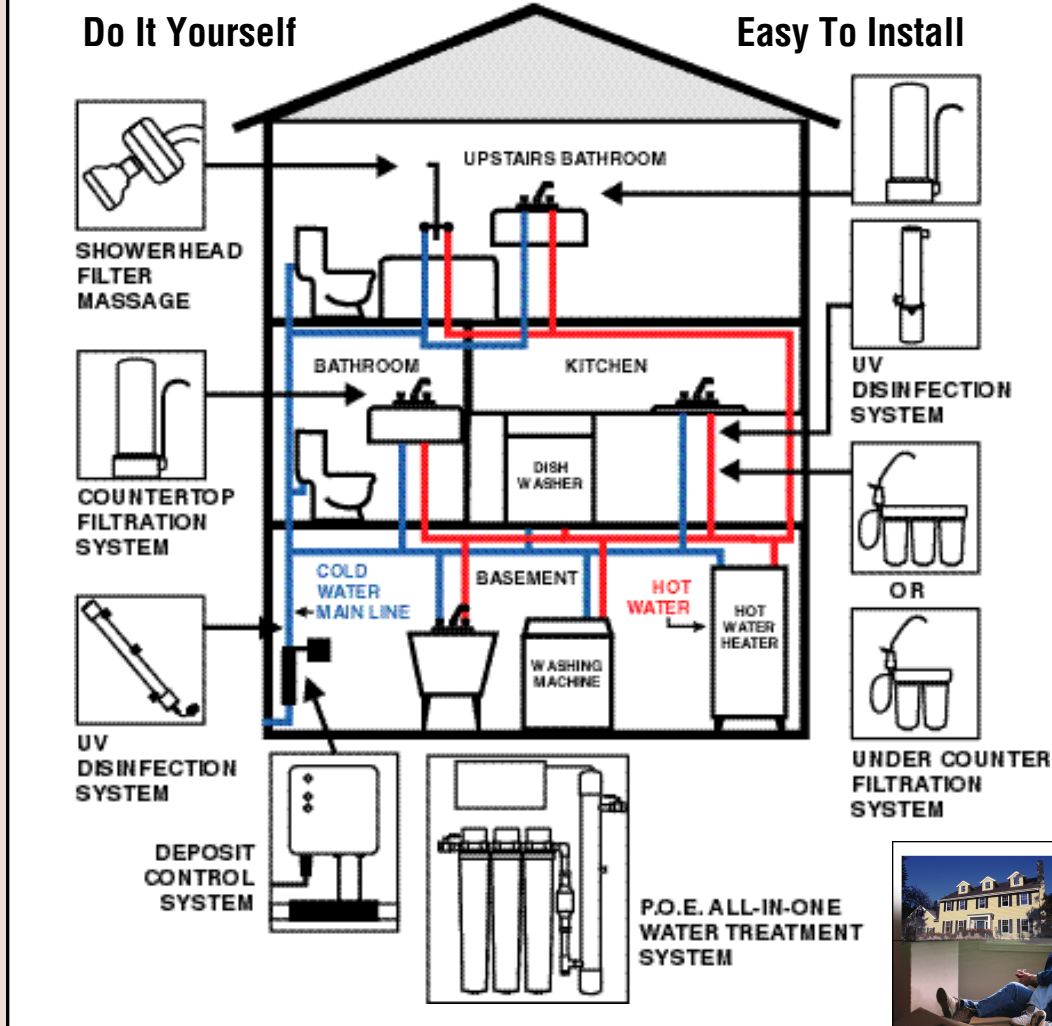
**On our home page you can download
and watch for latest product updates**

TWT Suggested Water Treatment Applications Home, Office and/or Facilities

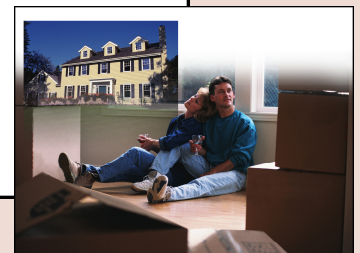
No need to lift, carry, buy or store heavy water bottles

Do It Yourself

Easy To Install



Restore the Quality, Taste and Clarity of your water.



How to Choose the Right System

Choosing the right system depends on these things...

- The optimum amount of water measured in gallons per minute (GPM) or gallons per day (GPD) necessary to satisfy your peak water usage.
- The pipe size and material of the water pipe P.O.E. (point-of-entry) or P.O.U. (point-of-use) feeding your home, office or facility.
- The water treatment requirements dictated by the base water quality and environmental factors found in your geographic location.
- The levels of chemical/biological contaminant's found in your personal water source as revealed in an independent water quality test.
- The current source requirements in your part of the world.

At TWT we feel the simplest way to choose a system depends on on your personal situation. Home/office and facility owners with

well water have different water treatment requirements than users who rent an apartment in the city, owner facilities supplied by municipal water.

People with municipal water may choose to rely on a scaled down system that meets their current needs, while people drinking untreated ground water or surface water need to fully account for all aspects of water treatment in order to guarantee the purity of their water. Contractors and architects building large projects or facilities managers responsible for maintaining expensive H.V.A.C. equipment have unique water treatment requirements as well.

If you need guidance choosing the right products or systems, contact us at: info@triangularwave.com.

TWT® the Ultimate in Chemical-Free Water Treatment & Conditioning— Prevents Scale Build-up Throughout the Fluid System

P.O.E. Point-of-Entry • P.O.U. Point-of-Use

www.triangularwave.com

■ Who will test my water for hardness?

If you are connected to a municipal supply, call the Water Superintendent, or your municipality. They can either provide the answer, or direct you to the proper individual who can. Remember the conversion factor: it takes 17.1 PPM to equal 1 GPG. In other words, if your water has 17.1 PPM calcium in it, divide 171 by 17.1 to get the answer in grains. This example would be 10 grains, or GPG. If you are on a private supply, you could contact your county extension agent; collect a sample in an approved container and send to the city or state health department for testing. You can also find a testing lab (try the yellow pages); or call a water conditioning company.



By the way, if you are on a private well, **YOU, AND YOU ALONE** are responsible for the safety of the water you and your family use and drink. You should test your supply for bacteria at least once per year and other contaminants at least every three years — more often under certain conditions.

■ Suffering from the scaling effects of hard water?

Solution

If your water tests over 1 GPG hardness, you should condition it with a **Triangular Wave Deposit Control System**.

The Triangular Wave System for neutralizing hardness and preventing the formation of lime deposits uses an electronic deposit controller; no salt or other chemicals are added to the water.

A. Deposit Control Systems:

Controls mineral and biological deposits, as well as corrosion in all fluid-based systems.

B. Factory Wrapped Wire Coil Reaction Chambers:

To use in conjunction with the TWT Deposit Control Systems to address magnetic pipe environments.



C. Copper Pipe Signal Enhancer:

The copper pipe signal enhancer must be used in all copper pipe applications to maximize the performance, and provide a boost to your application.

■ The Triangular Wave System will:

1. Give the benefits of soft water without adding salt or removing health giving minerals.
2. Prevent any further hard scale buildup in and on water equipment and fixtures.
3. Remove existing scale that is inside the water system.
4. Soften the existing hard scale around taps, basins, and toilets.
5. Reduce soap scum and improve the lather of soap.
6. Make the water feel silkier.
7. Reduce the harsh effects of hard water on skin and clothes.
8. Reduce water spotting on fixtures and surfaces in contact with the water.
9. Provide a much more environmentally friendly solution to hard water; no salts or chemicals.
10. Improve the taste of water as pipes will be cleared of both mineral and biological deposits.
11. Increase the growth rate of plants that receive treated water.

■ Water with Odors:

My water stinks! What can I do?

First, you must learn a little about your nose: Once you smell something, your sense of smell can be dulled for a short while, and you can't make accurate judgments of smell. For instance, if I blindfold you, let you smell gasoline, hand you a piece of onion to eat and tell you it is an apple, you can't tell it is not because your nose is not working properly!! (Your sense of taste is not working either — smell and taste are closely related and affect each other!) So, to correctly analyze your problem, you need to become a detective.

The best time to locate the smell is after you have been away from home for a few hours — this allows your nose to become sensitive to 'that smell' again. With your 'sensitized' nose, go to an outside spigot—one that the raw, untreated water flows from. Turn it on, let it run a few minutes, then smell it. If it smells—we found it. If not, we must look further. (Many, many smells are not in the raw water at all, they are introduced into the water inside the house.) Go to a cold, treated water spigot inside the house, turn it on

and let it run a minute; then smell. If this water smells, and the outside, untreated water didn't—you must have a device (cartridge filter, water softener, etc.) in the water line that needs to be cleaned and sanitized. If it is a cartridge, or "string" filter, replace the element and sanitize the housing. If you have a water conditioner call the Company where you bought the unit for advise on how to sanitize the unit.

If the cold, treated water inside didn't smell, turn on the hot water and let it run a few minutes—does it smell? If it does, chances are you have a sacrificial anode inside your hot water heater that is "coming apart at the seams" and throwing off a "rotten" egg odor. This obnoxious smell will drive you right out of your shower!

■ OK, it is my raw water that smells—Now what?

First you must determine what is causing the smell, and how strong it is.

■ Minor, Musty Smell

If it is a minor, or low-level smell, you MIGHT be able to solve it with a small, point-of-use Triangular Wave Counter Top or Under-Counter filter (filter media to be determined). You can place these filters on the water line going to the cold water where you draw you drinking water. Or, you might solve it with a **Triangular Wave Whole House All-In-One System** on your incoming water line to filter all of the water inside your home.



Double Unit Under-Counter Water Filter System—Ideal for Kitchens, Bathrooms



Counter Top Filter System



MD All-In-One Multi-Process Fluid Management System

■ Strong, Rotten-Egg Smell

Strong, rotten-egg odors in the raw water are usually the result of the decomposition of underground organic deposits. As water is drawn to the surface, hydrogen sulfide gas can be released to the atmosphere. In strong concentrations, this gas is flammable and poisonous. It rapidly tarnishes silver, turning it black. In sufficient quantities it is toxic to aquarium fish. As little as 0.5 ppm hydrogen sulfide can be tasted in your drinking water.

■ Strong, Musty Smell

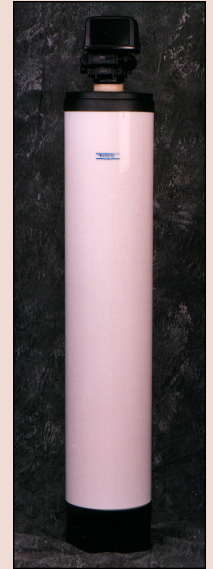
If you are unlucky enough to have this problem, you should consider the **Triangular Wave Whole-House System or Big Blue Filters Housings with 20" Sediment Filter and a 20" Carbon Filter.**



Big Blue Filters

■ Filters

Installation of a **Triangular Wave Whole-House filter with Sediment, KDF and/or granular activated carbon media** is often successful for hydrogen sulfide removal. The copper in the KDF media reacts with the hydrogen sulfide to form copper sulfide and water. The copper sulfide is insoluble in water and can be backwashed out of the Whole-House Filter. While other filter systems are available, they typically must be recharged with chlorine or potassium permanganate. The removal capacities of these types of filters are usually fairly low, and must be sized to contain enough media to prevent premature exhaustion, and subsequent passage of the smell to service. It is also typical that the amount of hydrogen sulfide can fluctuate rapidly, causing great difficulty in sizing the unit. In addition, potassium permanganate is extremely 'messy', and will leave stains that are very difficult to remove.



Whole House Filtration System

■ Rust staining in bathroom and fouling expensive appliances? Water that Stains

I have red stains in my sinks and other fixtures - Help! Red stains are normally caused by iron in the water. You must test to determine the amount and the type of iron you have. Some types are: oxidized, soluble, colloidal, bacteria or organic-bound. All are problems! It only takes 0.3 ppm to stain clothes, fixtures, etc.



Rust Erase Chemical-Free Iron Filtration

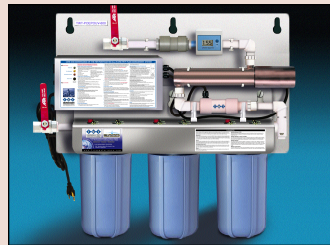
Take Control Over the Quality of Your Water

P.O.E. Point-of-Entry • P.O.U. Point-of-Use

www.triangularwave.com

■ Oxidized

This type of iron is usually found in a surface water supply. This is water that contains red particles when first drawn from the tap. The easiest way to remove this type of iron is by a Triangular Wave Deposit Control System in combination with a fine mechanical filter or iron removal filtration system. A cartridge type filter is usually not a good solution, due to the rapid plugging of the element. The Triangular Wave Deposit Control System will help the filter function better. Another method or removal is by feeding a chemical into the water to cause the little particles of iron to clump together, and then fall to the bottom of a holding tank, where they can be flushed away.



Point-of-Use / Point-of-Entry Treatment System



Point-of-Use / Point-of-Entry Treatment System

■ Soluble

Soluble iron is called "clear water" iron. After being drawn from the well and contacting the air, the iron oxidizes, or "rusts", forming reddish brown particles in the water. Depending on the amount of iron in the water, you may solve this problem with a **Triangular Wave Deposit Control System and a KDF/Carbon Filter.**



TWT Patented Deposit Control Technology

The Triangular Wave system conditions the iron particles and keeps them suspended in the water. The KDF media alloys function as catalysts to change soluble ferrous cations (positively-charged ions) into insoluble ferric hydroxide, which can be removed with regular backwashing.

With enough oxygen dissolved in the water, iron removal rates of 98 percent or better are common. You also may use an iron filter that recharges with chlorine or potassium permanganate, or feed chemicals to oxidize the iron and then filter it with a mechanical filter. You can sometimes



Dual Filtration Media

hide the effects of soluble iron by adding chemicals that, in effect, coat the iron in the water and prevent it from reaching oxygen and oxidizing.

■ Colloidal

Colloidal iron is very small particles of oxidized iron suspended in the water. They are usually bound together with other substances. They resist agglomeration, i.e., the combining of like substances forming larger, heavier, more filterable ones, due to the static electrical charge they carry. This iron looks more like a color than particles when held up in a clear glass, as they are so small. There are usually two treatment options: Feed chlorine to oxidize the organic away from the iron, thus allowing agglomeration to occur, or, feed in polymers that attract the static charge on the particles, forming larger clumps of matter that is filterable.

■ Potentially harmful bacteria in your water?

Iron bacteria are living organisms that feed on the iron found in the water, pipes, fittings, etc. They build slime all along the water flow path. Occasionally, the slimy growths break free, causing extremely discolored water. If a large slug breaks loose, it can pass through to the point of use, plugging fixtures. These types of bacteria are becoming more common throughout the United States. If you suspect bacteria iron, look for a reddish or green slime buildup in your toilet flush tank. To confirm your suspicions, gather a sample of this slime and take it to your local health department, or water department for observation under the microscope.

This type of iron problem can be treated with a combination of a **Triangular Wave Deposit Control System** and a **Triangular Wave Ultraviolet Disinfection System.** You must kill the bacteria, using the UV disinfection system where the water enters the building. **The Triangular Wave Deposit Control System** will condition the water and the conditioned water will dissolve, over time, the slime coating on the pipe walls. The combined deposit control/ UV system will work continuously to prevent regrowth. A filter alone will not solve this problem.



TWT All-In-One Multi-Process Fluid Management System—The Ultimate in Water Treatment and Conditioning

Do You Have Effective Water Treatment

P.O.E. Point-of-Entry • P.O.U. Point-of-Use

www.triangularwave.com

■ Organic Bound

When iron combines with tannins and other organics, complexes are formed that cannot be removed by ion exchange or oxidizing filters. This iron may be mistaken for colloidal iron.

Test for tannins; if they are present, they are most likely combined with the iron. Low level amounts of this pest can be removed by use of a combination **Triangular Wave Deposit**



Deposit Control Technology



Big Blue Filtration System

Control System and **KDF/Carbon** filter, which absorbs the complex. You must replace the carbon bed when it becomes saturated. Higher amounts require feeding ozone or chlorine to oxidize the organics to break apart from the iron and cause both to precipitate into filterable particles.

■ Have blue or green stains on my fixtures-Help!

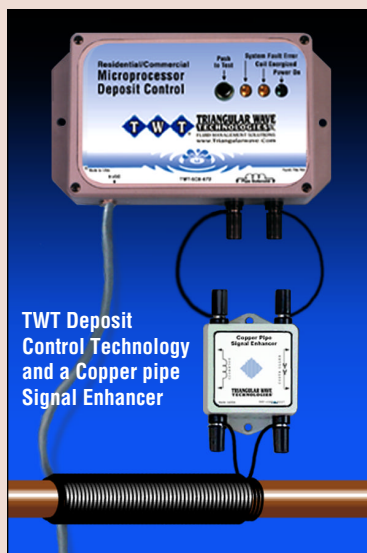
You either have copper in your water supply, or you have copper pipes and corrosive water. Test for copper in your water. Test the pH, total dissolved solids content and the oxygen content of your water.

■ Copper

Copper can be removed by a Triangular Wave KDF/Carbon Filter. The removal rate is about the same as it is for iron.

■ Copper Pipes and Corrosive Water

If your pH is from 5 to 7, you may raise it by passing the water through a sacrificial media such as calcite (calcium carbonate). By sacrificing calcium carbonate into the water, the pH of the water will be increased and the corrosivity will be reduced. Be sure to install a **Triangular Wave Deposit Control System** downstream of the calcite to prevent calcium scale from forming on the pipes and water appliances. If the pH is below 5, you will need to chemicals in the water. If the corrosivity is caused by excess oxygen, the hot water will



TWT Deposit Control Technology and a Copper pipe Signal Enhancer

be much more corrosive than the cold. Treatment is by feeding polyphosphate or silicates to coat and protect the plumbing, or to aerate the water to release the excess oxygen.

■ Toxic chemicals in your water?: Filters...What can they do?

There are many types of filters available in the market place today. We will try to group them by the method they use to filter water. Almost everyone has seen the ads for the filter that fits on the end of your kitchen sink or bathroom spigot. These filters usually use two basic types of filtration: a filter "pad" catches the large (usually over 25 micron in size) particles or "chunks", and a small amount of carbon absorbs organic and/or chlorine. The **Triangular Wave Slim-Line Shower Head Filter** and **Low-Flow Shower Head** are specifically designed to incorporate the proper flow rate for removal of chlorine, sediments, and other pollutants. The main problem here is the flow rates at which they are expected to work. If you purchase this type of filter, make sure it has a way of limiting the rate at which water passes through it. Next comes the cartridge type filters.

Filtration Systems



Counter-Top



Double Under-Counter



Iron Removal



Big Blue Filters



Point-of-Use / Point-of-Entry Treatment System

The **Triangular Wave Counter-Top and Under-the-Counter Filters** are in this category. Most common are the 10 or 20 inch long filters. This type filter will usually have a removable housing, into which different types of "elements" can be placed. A sediment filter cartridge element can be manufactured to remove certain larger sized particles. Most elements for home use will indicate 10 or 20 micron and larger removal. More expensive elements, usually for industrial use, may indicate a particle size (in microns).

Lots Of Companies Sell Products...TWT® Has The Solutions

P.O.E. Point-of-Entry • P.O.U. Point-of-Use

www.triangularwave.com

Remember, filters actually get better, or more effective, as they are used. The "junk" in the water collects on the surface of the filter and becomes a part of the filter as well. As it builds up, progressively smaller and smaller particles are trapped, but the flow rate through the filter slowly diminishes. The slowing of the flow rate can be a source of problems to water using appliances in your home.

If you use such a filter, regular changing of the filter element is very important. Remember, all filters, carbon especially, trap organics that bacteria feed on, and as the water sits without moving, they can multiply rapidly. So always change the elements on a regular basis.

■ Selective Resins

A relative new comer to the market, are small filters that contain resins that only remove specific things from the water, such as Nitrates, Fluoride or Lead. Technology is rapidly changing in this area. If you have a need for such a device, you should ask for supporting test results from an independent testing lab to verify that the unit will perform as advertised. Many states now have legislation that requires such data provided to you prior to purchase.

■ Deionization

Used mainly in labs, manufacturing processes, or for serious aquarium owners, DI filters are actually more complex than a filter. True filters, unlike the selective resin and DI units, work on a mechanical basis — they just 'catch' the particles that are too large to fit through the spaces between the filter media.

DI works by ion exchange, just like a water softener. Just as a water softener exchanges sodium for hardness minerals, a DI unit will have two types of resin in it: Cation and Anion. Basically, the Cation resin (like in a water softener) removes the ions with a positive charge, while the Anion resin removes those ions with a negative charge. Instead of using salt as a regenerant, acid and caustic are used. Some small DI cartridges are sold as "throw-aways", others can be returned for regeneration and reuse. These small units can treat only small amounts of raw, city water. Usually, it is much more economical to pretreat the water feeding a DI system with the reverse osmosis system.

One thing you must watch out for is VOC's (volatile organic chemicals). These chemicals have a lower boiling point than water (like benzene), and can vaporize and mix with the steam, carrying over into the product water. Some stills today have a volatile gas vent — a small hole at the top of the condensing coil that allows the venting of such substances. Many distillers have a carbon filter to "polish" the product

water before use and to remove any VOC's that may carry over.

The energy used to treat a gallon of water is usually about 3,000 watts, or about 25 cents per gallon (average) in the US. This treatment method requires that you "plan ahead" and make and store water for use, which makes it somewhat less appealing. The more elaborate units will make and store water automatically, but raise the initial investment and maintenance of the equipment.

■ Reverse Osmosis

This is a process that is often described as filtration, but it is far more complex than that. We sometimes explain it as a filter, because it is much easier to visualize using those terms. We should remember that osmosis is how we feed each cell in our bodies — As our blood is carried into the smallest of capillaries in our bodies, nutrients actually pass through the cell wall to sustain its' life. Reverse osmosis is just the opposite: We take water with "nutrients" (in this case, junk) in it, and apply pressure to it against a certain type of membrane, and, presto — out comes "clean" water.



Residential Reverse Osmosis Systems

Lets review the basics. If you take a jar of water and place a semi-permeable membrane (like a cell wall or a piece of skin) in it, dividing the jar into two sections, then place water in both sides to an equal level, nothing happens. But, if you place salt (or other such substance) into one side of the jar, you will notice that, after awhile, the water level in the salty side begins to rise higher as the unsalted side lowers. This is osmotic pressure at work.

The two solutions will continue to try to reach the same level of salt in each side by the unsalted water passing through the membrane to dilute the salty water. This will continue until the "head" pressure of the salt water overcomes the osmotic pressure created by the differences in the two solutions.

On the other hand, researchers have discovered that if we take that membrane and feed water with sufficient pressure to overcome the osmotic pressure of the two waters, we can "manufacture" clean water on the side of the membrane that has no pressure. We sometimes say we "filter" the water through the membrane. Depending on the membrane design, and the material it is made from, the amount of TDS (total dissolved solids) reduction will range from 80 to over 95 per cent. Different minerals have different rejection

Sensing Environmental Needs with Intelligent Solutions

P.O.E. Point-of-Entry • P.O.U. Point-of-Use

www.triangularwave.com

rates, for instance, the removal rate for a sample membrane is 99.5% for Barium and Radium 226/228; but only 85.9% for Fluoride and 94.0% for Mercury. Removal rates are very dependent on feed water pressures, and some membranes are not tolerant to high or low pH.

For home use, it is important to make sure you get a **Triangular Wave Deposit Control System**, a sediment

pre-filter, a KDF/Carbon pre-filter, membrane, storage tank and post carbon filter, and consider an RO system, as well. Some of these filters may be combined into one, e.g., the prefilter may be both a particulate and carbon. The deposit control system will increase the efficiency of the filters and RO unit and protect the RO membrane from scale deposits.



Big Blue Filtration System

The results are longer membrane life and more efficient filter action.

A lot of comments have been made concerning the "wasting" of water by an RO. True, the old style units with the early type membranes were more prone to becoming plugged, or fouled by the "junk" they removed from the water. To help keep this from happening, a small amount of water was allowed to run across the membrane to help carry away those impurities to drain. Early designs only recovered 1 gallon of good water for every 4-8 gallons used to keep the membrane clean.

Even worse, when the storage tank was full, water still ran to the drain because the early membranes were made of a material that the little "bugs" in your water supply (no, not pathogens, or dangerous to you in small numbers) loved to eat! So to prevent that, we just let the water run so they couldn't have time to stop and eat.

Now, **Triangular Wave Deposit Control Systems** condition the water and keep the "bugs" suspended in the water and away from the membranes. In addition, membranes are made to not only recover a much higher percentage of the feedwater, but the "bugs" don't eat them! Newer systems not only recover more, they can have a shut off device that stops all water flow when the storage tank is full.

A. Deposit Control Systems:

B. Factory Wrapped Wire Coil Reaction Chambers:

C. Copper Pipe Signal Enhancer:



Actual recovery rate is dependent on several factors, including the TDS, and just of what the TDS is composed, in your feedwater. Temperature and pressure also have a big effect on the amount of product water you can make in a given period. Remember, all RO units are normally rated using a feedwater temperature of 77° degrees F — is your feed water temperature that high?

■ Water Testing Information: When should I test?

Several factors will influence when and how often you test your water.

- Where do you get your water from?
- Has that source changed?
- Have you done any plumbing changes lately?
- Is there reason to believe that your water is contaminated?
- Is there a sickness or illness in your family affecting more than one person and over a longer than normal time period?



If you receive your water from a "public supply", i.e., a municipal supply, or a supply that provides water to more than 25 persons for 60 days per year (some states are different - check with YOUR local water department), you can be fairly certain that the water supply is checked on a regular basis. The frequency of the testing is based on the number of people served, and may vary from more than once per week to once per month, or even less.

Under these conditions, test when you move into a new residence to acquire a 'base line' of contaminant level, if any. Retest every three years, unless you have reason to believe that something has changed that could affect the quality of your water. If you have a private well, you are the only person who is responsible for the water your family drinks and bathes in. We recommend testing by your local Health Department every six months for Bacteria and Nitrate. These two tests serve as indicators for other types of contaminations — that is not to say forget the other tests; just that if you get a 'bad' test from them, you should also retest for the other types of contaminants as well.

Private wells should be tested on a regular basis for Pesticides, Herbicides, Metals, Organic and Inorganic chemicals and volatiles. Currently, no laws govern the frequency of such testing — **that is why we say YOU are the only person responsible for your family's water.** We recommend an initial test (for a base line), and then follow up testing at least once per year. Remember, one day after testing and finding "no contaminants", your source could become contaminated.

Bacteria Reduction—Not Just a System, It's The Solution

P.O.E. Point-of-Entry • P.O.U. Point-of-Use

www.triangularwave.com

■ What should I test for?: Coliform Bacteria

Coliform bacteria are a group of microorganisms that are normally found in the intestinal tract of humans and other warm blooded animals, and in surface water.

The presence of these organisms in drinking water suggest contamination

from a surface or shallow subsurface source such as cesspool leakage, barnyard runoff or other source. The presence of these bacteria indicate that disease-causing (pathogenic) organisms may enter the drinking water supply in the same manner if preventive action is not taken. Drinking water should be free of coliforms.

Triangular Wave UV Disinfection Systems kills at least 99.9% of bacteria, cysts, and viruses.



UV Disinfection/Purification Systems



UVC Series Disinfection/ Purification Systems

■ Cysts and Viruses

Cysts and viruses are microbiological contaminants, usually found in surface water supplies. Giardia lamblia cysts can cause giardiasis, a gastrointestinal disease. Another "bug" getting a lot of attention lately, is cryptosporidium, single-cell parasite measuring about 2 - 5 microns in diameter. Many surface water supplies contain this pest, which also comes from the intestine of warm blooded animals.

■ Nitrates

Nitrates in drinking water supplies may reduce the oxygen carrying capacity of the blood (cyanosis) if ingested in sufficient amounts by infants under 6 months of age. This could causes a disease called "methemoglobinemia", or "blue baby" syndrome. The EPA has established a maximum contaminant level (MCL) for nitrate at 10 mg⁰/l (ppm) measured as N. Unlike coliform or other types of bacteria, boiling the water will actually INCREASE the

amount of nitrates remaining in the water, thus increasing the danger to infants. If you have high nitrate water, either treat it with an approved treatment methodology or find another source. Boiling will only make it worse!

■ Lead

Lead is now known to leach from older sweat joints in copper pipe. As the water sits in the pipes, small amounts of lead dissolved into the water, contaminating it. Lead is particularly harmful to small children as they more rapidly absorb the toxic substance into their systems. The EPA has estimated that more than 40 million U.S. residents use water that contains more than the recommended levels.

A Triangular Wave Counter Top or Under-the-Counter point-of-use water filter with KDF and activated carbon will remove lead and other heavy metals from the water.



Under-Counter Filtration with Ultra Violet Disinfection



Point-of-Use Potable Water Treatment & Conditioning System



Double Under-Counter



Point-of-Use / Point-of-Entry Treatment System



OMini-Zap Portable Counter Top UV Filter System is the Perfect on Demand Water Treatment Solution For Use at Home and When You Travel to far Away Lands.

TWT® Chemical-Free Fluid Management Solutions–Pool/Spa

P.O.E. Point-of-Entry • P.O.U. Point-of-Use

www.triangularwave.com

■ Concerns about the level of chlorine/fluoride in your Pool/Spa Water?

Reduce or eliminate the use of chlorine–
Sparkling Clear Algae-Free Water for Pools & Spas

Easy on the Eyes

Gain peace of mind with TWT Enhanced Control Pool Management Systems, the chemical-free, safe and easy way to enjoy your pool and spa season! Your backyard or indoor pool is a place for relaxation. Everyone wants to avoid problems with their pool, and also with the effects of handling, storing, and swimming in harsh chemicals and treated water. The good news is TWT has the solution for both!

Super Sparkling Water

The Enhanced Control Pool Management System works with your existing pool filter and pump systems to control deposits and purify the water, killing and removing harmful bacteria and algae, and preventing corrosion and deterioration of your pipes and equipment. Reduce your chemical treatments and maintenance efforts by 80% or more, and make your swimming experience safe, fun, and environmentally friendly.

- Reduce the need for chlorine and get the same results with TWT chemical-free treatment & conditioning systems
- Protect the investment in your pool/spa from the harsh effects of chemicals
- Enhance water quality, and improve operating efficiency and equipment life cycle

Reduces the need for chlorine– Patented Deposit Control Technology–



A. Deposit Control Systems:

Controls mineral and biological deposits, as well as corrosion in all fluid-based systems.

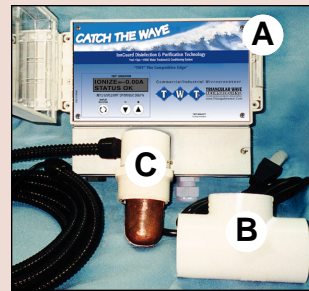
B. Factory Wrapped Wire Coil Reaction Chambers:

To use in conjunction with the TWT Deposit Control Systems to address magnetic pipe environments.



Drink, Bathe and Cook with
Pristine "Chlorine-Free" Water

IonGuard Ionization/Disinfection System



A. IonGuard Controllers:

IonGuard disinfection system disinfects water through a process called ionization. This process utilizes a low voltage direct current (DC) to place precise and minute amounts of copper and silver ions into the water systems. The TWT IonGuard Purification system releases controlled amounts of copper/silver ions into the water to kill algae, biofilm, fungi and other microorganisms.

B. IonGuard Electrode installation Kits

C. Replacement Electrodes

TWT® All-In-One Package Solution

Ionization, Disinfection & Purification with Deposit Control Technology.



Ultra Violet Technology

Ultra Violet disinfection & purification technology provides safe pool/spa water free of disease-causing pathogens.



UV Disinfection/Purification Systems



UVC Series Disinfection/ Purification Systems

■ Need to Enhance Water Quality, and Improve Operating Efficiency and Life Cycle of Vertical Hot Water Heater/Boiler Systems

Control Scale Deposits Bio-film • Corrosion Algae and Colloids In Your Fluid-Fed Equipment

The build up of scale deposits is a common and costly problem in Hot Water Heaters and Boilers in the residential, commercial environments. The higher costs of maintaining and cleaning heaters and boilers can be attributed to the continuous cleaning of scaled surfaces or to the increased energy and operating costs due to the poor conductivity of the fluid pipe. For example, a 2.0 mm scale layer can induce a 47% decrease in overall heat transfer. Moreover, scale deposits narrow the inner diameter of piping, increasing the amount of energy required to pump the water through the system.

- Removes Existing Scale on Heat Exchangers Over Time, Which Improves Heat Transfer for Greater Efficiency
- Eliminates Deposits in Pipes, and Fixtures
- Controls Scale and Bio-fouling in Water Fed Appliances
- Reduces Equipment Replacement & Downtime

■ Suffering from the scaling effects of hard water? *Solution*

If your water tests over 1 GPG hardness, you should condition it with a **Triangular Wave Deposit Control System**. The Triangular Wave System for neutralizing hardness and preventing the formation of lime deposits uses an electronic deposit controller; no salt or other chemicals are added to the water.

A. Deposit Control Systems:

Controls mineral and biological deposits, as well as corrosion in all fluid-based systems.

B. Factory Wrapped Wire Coil Reaction Chambers:

To use in conjunction with the TWT Deposit Control Systems to address magnetic pipe environments.



C. Copper Pipe Signal Enhancer:

The copper pipe signal enhancer must be used in all copper pipe applications to maximize the performance, and provide a boost to your application.

REQUEST A QUOTE OR SEEK TECHNICAL INFORMATION

- Dose your water smell bad?
- Do you have multiple concerns about the quality of your water?
- Are you uncertain about the quality of your water?
- Well water users: are you choosing the right solutions?

The good news is, there is something you can do to solve all of the problems you may encounter with your water

REQUEST A QUOTE FOR WATER & FLUID TREATMENT ON THE TWT WEBSITE HOME PAGE—NO MATTER HOW TOUGH THE JOB... TWT IS THE SOLUTION

You may fill in this form on line and submit it to us as per below, or you may print it, fill it in, and fax it to us at (201) 573-8710. Please note that all fields marked with (*) must be filled, in order to receive a response. If you have trouble submitting this form via the Submit button at the top of this form, please send an e-mail to info@triangularwave.com with your contact information

TWT is happy to provide this on-line quote and information request form to make your evaluation and purchase process as streamlined as possible. Your complete system quote and/or additional information will be provided to you by either TWT or an authorized TWT dealer or distributor, via e-mail (or fax, if requested).

For additional technical and product information visit us at

WWW.TRIANGULARWAVE.COM

Triangular Wave Technologies Products and Systems Features & Benefits— Prevents Scale Build-up Throughout the Fluid System

www.triangularwave.com

Advanced, microprocessor-driven deposit control systems for residential, commercial and industrial environments.

Triangular Wave Technologies, Inc. products and systems provide technologically advanced methods for water and fluid management that are both efficient and cost-effective. Components and subsystems chosen from across the range of treatment methods can be combined in different configurations to provide custom solutions specific to any industry, site or application. TWT systems work to consistently deliver high quality water, reduce scale and bio-fouling in plumbing systems, and to increase efficiency of both once-through and re-circulating HVAC, process cooling, agriculture, industrial processing, wastewater and other fluid based systems. Each product line offers a variety of both standalone and comprehensive treatment solutions for end-to-end fluid management, for all types of applications.

The Triangular Wave Deposit Control System uses a Current Source as the drive circuit to the pipe solenoid. A Current Source is the most reliable and strongest conditioning signal over a wide frequency range. Most waters have qualities that vary over time. Higher total dissolved solid concentration will cause greater impedance in the system. The TWT system, with a Current Source generator is able to sense the increased impedance and maintain the strong conditioning.

In effect, a clean, corrosion-free delivery system is restored and maintained in an environmentally safe and chemical-free manner. The result is clean pipes and tubing with no biofilm and reduced bacterial contamination.

Salt and chemical-free water conditioning for any application

■ Prevents Scale Build-Up

- Scale particles in the water receive an enhanced surface charge that causes them to repel each other and from the walls of the equipment

■ Eliminates Toxic Chemicals

- No recurring chemical expense
- No handling and storage of hazardous chemicals on site
- No chemical discharge

■ Reduces Corrosion

- Reduces bio-corrosion by preventing the formation of bio-growth on vessel surfaces where bacteria can attack the metal
- With higher concentration ratios and TDS, the pH will be higher and there will be much less tendency for corrosion

- Prolongs life cycle of equipment
- Increased cycles of concentration in cooling systems=**significant water savings**

■ Controls Algae and Bacteria

- Bacteria and algae must attach to something before they can feed and reproduce. The Triangular Wave System keeps the bacteria, algae, and their food dispersed in the water, off of surfaces, and away from their biofilm breeding ground
- Eventually the biofilm will die, too
- Improve the operating efficiency and life cycle of process infrastructure and equipment **SHORT PAYBACK PERIOD**
- The combined reduction of water, chemical and energy costs is enough to pay for the Triangular Wave System in as little as 9 to 18 months
- With the Triangular Wave Treatment, the systems can run at higher concentration ratios, meaning the amount of water removed as blowdown and the corresponding sewer charges are greatly reduced.

TWT treatment equipment is a reusable investment and retains its value – if you move your facility or reengineer your plumbing system, TWT equipment moves with you.

- With no chemicals being added, the requirements for pretreatment of blow down are eliminated
- One time cost vs. recurring monthly chemical=**better profit margin**
- Labor costs for maintaining the systems will be reduced
- Labor costs to clean the vessel surfaces will be reduced
- Costs to replace corroded parts like heat exchanger tube bundles, etc. will be reduced.
- Less downtime for equipment repairs an maintenance=**increased production**
- The Triangular Wave System requires little or no maintenance
- There is little electrical current flow through the electromagnetic system
- Reduces energy costs use through improved heat transfer efficiency
- Increased heat transfer from non-scaled tube surfaces=**significant energy savings**
- Easy interface with facility management hardware and software systems for centralized management

■ Benefits for Cooling & Heating Applications

The constant battle of monitoring cooling and heating systems will become a thing of the past. Balancing the water chemistry on a daily or weekly basis is not necessary with the Triangular Wave System. Cleaning of the systems will be much easier, involving a pressure wash one or two times per year, rather than extensive manual brushing and acid washing. When water systems are clean and free of deposits, heat transfer is at its most efficient. Scale and biofilm are great insulators, that are eliminated. Also scale buildup in pipes creates increased roughness and reduced flow area. Clean pipes mean less energy is needed to drive the pumps.

Energy costs may be reduced by up to 30%. Many municipal sewer agencies penalize and charge fees to users, because their blowdown contains hazardous chemicals, which the agencies must treat. Without chemicals in the blowdown, those fees can be avoided.

Unpolluted discharge from blowdown and bleed= environmental compliance. The workplace is safer, because the staff is not handling toxic chemicals.

Cooling and heating systems are large investments that need to be protected. The Triangular Wave System reduces corrosion, deposits, and harmful chemicals, all of which allow the equipment to meet or exceed life cycle expectations.

■ Treatment for Existing & New Equipment

Installed along with new and existing equipment to improve its operating efficiency and life cycle. TWT Deposit Control Systems enhance other treatment technologies as well, including chemicals, separators, ozone, ultraviolet, and other filtration systems, keeping them clean and enhancing their operation. In this way, their full treatment benefits are realized, with reduced maintenance.

■ Energy Savings Mechanism

The primary energy savings result from a decrease in energy consumption in heating or cooling applications. This savings is associated with the prevention or removal of scale build-up on a heat exchange surface where even a thin film (1/32" or 0.8 mm) can increase energy consumption by nearly 10%. Examples of savings resulting from the removal of calcium-magnesium scales are shown in **table**.

Scale Thickness (inches)	Increase Energy Consumption (%)
1/32	8.5
1/16	12.4
1/8	25.0
1/4	40.0

A secondary energy savings can be attributed to reducing the pump load, or system pressure, required to move the water through scale-free, unrestricted piping.

Example Increase in Energy Consumption as a Function of Scale Thickness

■ Specializing in:

- Chemical-Free Deposit Control Products & Systems
- Improving Operating Efficiency & Life Cycle of Equipment
- Control Scale Deposits/Bacteria/Corrosion/Algae and Colloids in Pipes, Fixtures and Equipment
- Ultraviolet Disinfection Systems / Ionization Purification Systems
- Pre & Post Water Filtration Products
- Custom System Design & Integration To Create Solutions For Your Own Industry-Specific Situation
- Value Added & Retrofit Programs
- Energy & Water Savings

■ Applications: Commercial • Industrial • Residential

- Cooling Towers • Heat Exchangers • Condensers & Chillers
- Food Processing Equipment • Swimming Pools & Spas
- Manufacturing Processing Equipment • Agriculture • Laundry
- Boilers/Water Heaters • Small Water-Fed Appliances
- Residential/Office Plumbing • Spray Systems
- Medical/Dental Laboratory • Car Wash
- And All Other Water And Fluid-Based Industries

■ TWT® is your simple and safe solution! Hard water problems solved easily

- Reduces Soap Scum and Improves Lather of Soap
- Reduces Detergent and Soap Use
- Reduces Effects of Hard Water on Skin and Clothes
- Removes Existing Scale on Heat Exchangers Over Time, Which Improves Heat Transfer for Greater Efficiency
- Control Scale and Bio-fouling in all Hot Water Heaters
- Non-Polluting / Environmentally Safe
- Performance Durability and Guaranteed
- Cost Effective (pays for itself)



The Triangular Wave System gives owners the positive benefits of soft water without the harmful salts



- Eliminate toxic chemicals & salts
- No recurring chemical expenses
- No handling and storage of hazardous chemicals on site
- No hazardous salt contamination



Improve the quality and taste of water at home, office, farm... Why spend hundreds of dollars for bottled water? Do you really want to carry, lift and store bottled water?

Sensing Environmental Needs with Intelligent Solutions

www.triangularwave.com

TWT, Inc. is focused on providing a complete selection of top quality water treatment, purification and conditioning solutions to discriminating consumers who demand the very best in water quality. Our mission is to provide you, the consumer, with direct access to premium water treatment technology solutions for you in your residential, Industrial and commercial applications

TWT, Inc. offers a full range of products & systems designed to address fluid problems wherever fluid flows. From patented deposit control technology to pre and post filtration, ionization, iron removal, disinfection, and ultraviolet purification treatment and conditioning, TWT has the versatile, efficient, cost-effective methods to solve your fluid management problems end to end.

- Controls scale, bio-film & corrosion
- Enhance operating efficiency & life cycle of equipment
- Saves water & energy

- Protection for new equipment: TWT provides new equipment with the ability to enhance it's features and benefit
- Treatment for existing equipment: Retrofit existing equipment to improve its operating

- Power/Current source available in your part of the world.

LOOKING FOR A CUSTOM SYSTEM SPECIFICATION?

- Regardless of the size of your home/facility, or your budget, TWT has the right water treatment products at the right price that will enable you to get the quality water you deserve
- For clients with moderate water usage requirements, TWT offers the right combination of Point-of-Use products (Counter Top, Under Counter, Shower Heads)... to ensure that all of the water you drink, wash with and cook with is safe for your consumption.

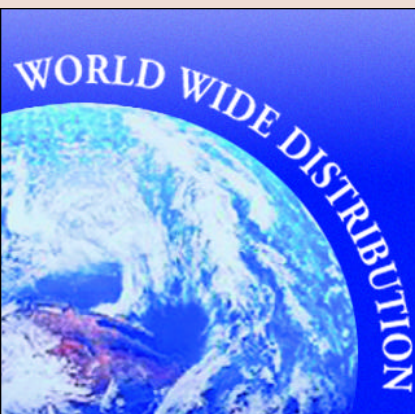
Chemical-Free Fluid Management Products & Systems To Enhance Water Quality, and Improve Operating Efficiency and Equipment Life Cycle



Versatile Products & Systems To Effectively Meet The Needs Of Any Industry & Application
• Control Scale Deposits • Bacteria • Corrosion • Algae • Colloids In All Fluid Based Systems



Water The Way Nature Intended It!
Chemical-Free



SATISFACTION GUARANTEED

Although Triangular Wave Technologies, Inc. has attempted to ensure the accuracy of the content of this publication, and its website, it is possible that they may contain technical inaccuracies, typographical, or other errors. Triangular Wave Technologies, Inc. assumes no liability for any error in its publications, and for damages, whether direct, indirect, incidental, consequential or otherwise.

Triangular Wave Technologies, Inc. provides these publications "as they are" without warranty of any kind, either express or implied, but not limited to implied warranties of merchantability or fitness for a particular purpose.

The published information in the publication and on the website are subject to change without notice. Triangular Wave Technologies, Inc. reserves the right to make changes in the products, systems, design and layout without notification to its customers.