

**Versatile Fluid Management Products & Systems To Effectively  
Meet The Needs Of Any Industry and Application**



## **Triangular Wave Technologies, Inc.** **Fluid Management Solutions** **HARD WATER PROBLEMS SOLVED EASILY**

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.

### **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
  - Economical & Cost Effective • Energy & Water Savings

### **Applications:**

#### **Commercial • Industrial • Residential**

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

TWT Deposit Control Systems enhance other treatment technologies as well, including chemicals, ozone, ultraviolet, separators and other filtration systems, keeping them clean and enhancing their operation. In this way, their full treatment benefits are realized, with reduced maintenance requirements.

Consider using TWT Deposit Control Systems in conjunction with any fluid treatment systems as a complementary technology.

**Water And Energy Savings / Cost Effective**

**Bringing You the Best in Fluid Management Solutions**



# BENEFITS OF THE PATENTED TRIANGULAR WAVE SYSTEMS

## TWT Deposit Control Systems reduce or eliminate the need for chemical treatment of fluids and chemical cleaning of heat exchanger tube bundles and water pipes.

### 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

### 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
- 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 and 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

### OTHER BENEFITS

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. Recent studies by manufacturers of cooling systems indicate that systems that should last 20 years or more are lasting an average of 8 to 12 years.

### 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 below*. 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.

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

Example Increase in Energy Consumption as a Function of Scale Thickness\*

\* See Federal Technology Alerts/Non-Chemical Technologies for Scale and Hardness Control ( [http://www.pnl.gov/fta/11\\_non.htm](http://www.pnl.gov/fta/11_non.htm) )

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