

Chemical-Free Treatment & Conditioning

COOLING TOWER (HVAC) WATER TREATMENT PAYBACK & SAVINGS CALCULATION WORKSHEET



TWT® 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 GPM requirements and 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 recirculating HVAC, process cooling, agriculture, industrial processing, waste water and other fluid based systems. Each product line offers a variety of both stand alone and compre-

hensive treatment solutions for end to end fluid management, for all types of applications.

To learn more about TWT products & systems visit our website at www.twtwatertreatment.com

TWT® Technologically Advanced Methods for Water & Fluid Management
“The Competitive Edge”



FIELD TESTED AND PROVEN EFFECTIVE

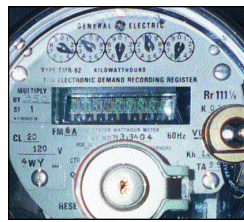


The Return On Investment of a TWT System is Undeniably Significant From Operational, Economical, and Safety Points-Of-View.



HARD DOLLARS SAVINGS- Chemicals, Salts Water & Energy

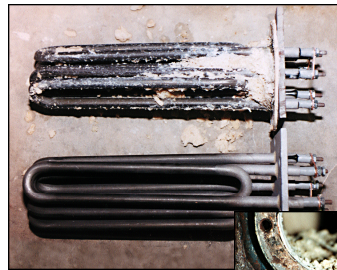
- Usage reductions of around 90% or more are typical.
- Water In - typically the HVAC industry concentration ratio can be increased from 2-3 to 6-8 (while still reducing the chemical consumption), indicating an annual make-up water savings of 60% or more. Savings would include conservation incentives.
- Water Out - volume of discharged water is reduced proportionately, along with the fees. Depending on actual chemical, salt use reduction and local laws, further savings may be possible if blow down water can be recycled and/or sent directly to the sewer system.



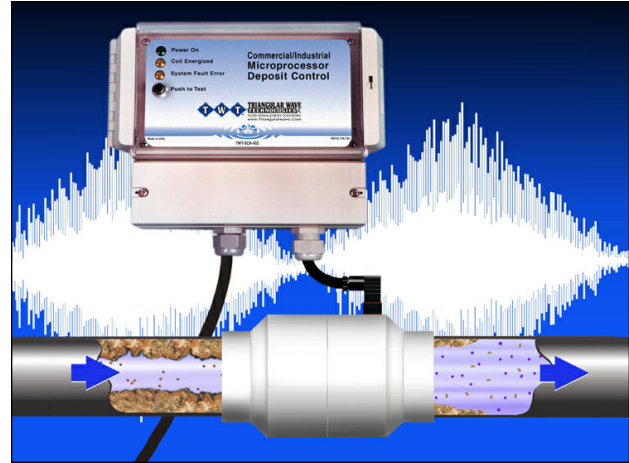
- Energy - systems have been found to deliver between 5 and 15 % energy savings when compared to a well functioning chemical system because the controller adapts to changes in water conditions without operator intervention. Energy savings can be much higher (up to 40 %) vs. a poorly performing chemical system or no chemical system at all.

SOFT DOLLARS - Materials, Labor, Time, Safety

- Chemical, salt handling and storage costs - reduced material and labor costs, freed-up storage space and cost allowance for increased safety (risk reduction). Reduction comparable to chemical cost reduction (up to 90 %).
- Maintenance, repair, replacement and downtime costs (chemical & salt delivery systems) - due to reduced usage rate. Reduction comparable to chemical and salt cost reduction (up to 90 %).



- Maintenance, repair, replacement and downtime costs (plumbing system, tower and cooling systems) - due in part to the adaptability described above under "Energy". Cleaning of the system and/or during shut down is also generally easier with TWT technology, as any film on any surface can be easily removed with a soft cloth. Additionally, the lower level of chemicals in the system will make it safer for workers doing the cleaning (75 - 90 %).



Complex modulated signal field provides the necessary molecular agitation for scale and bio-film prevention and removal

LIFECYCLE SAVINGS

- Savings continue typically for 10 years or more from date of installation. Savings accelerate after the payback period and continue for the life of the system. Lifecycle savings are thus typically many times the cost of the TWT System.

HARD DOLLARS

- Can be estimated from purchase records or water volume and prices from the previous year.

SOFT DOLLARS

- Costs should be estimated based on the average of 10 years of data, or the age of the system if less than 10 years old, to smooth out the effect of infrequent repairs and replacements.

LIFECYCLE SAVINGS

- Are calculated as the net present value of the sum of the annual savings over 10 years using a reasonable interest rate (e.g. prime plus 2 %).

TYPICAL PAYBACK is less than 2 years when considering **HARD DOLLARS ONLY.**

TWT: The Ultimate in Chemical-Free Water Treatment & Conditioning

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, disinfection, and ultraviolet purification treatment and conditioning, TWT has the versatile, efficient, cost-effective methods to solve your fluid management problems end to end.



TRIANGULAR WAVE DEPOSIT CONTROL SYSTEMS SAVE WATER, SEWER, ENERGY AND CHEMICAL COSTS.

The Triangular Wave Deposit Control System is an advanced method for controlling scale and bio-fouling in fluid systems. It is applicable with once-through and recirculating HVAC, heating, and process cooling systems as well as agricultural, industrial processing, wastewater, and other fluid based systems. The TWT Deposit Control System performs many functions that lead to significant cost savings.

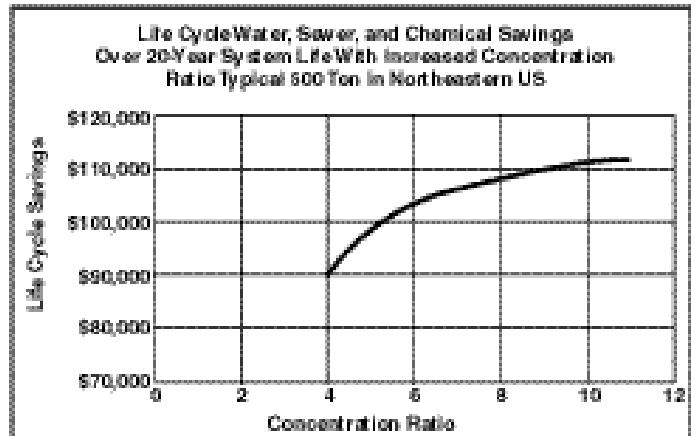
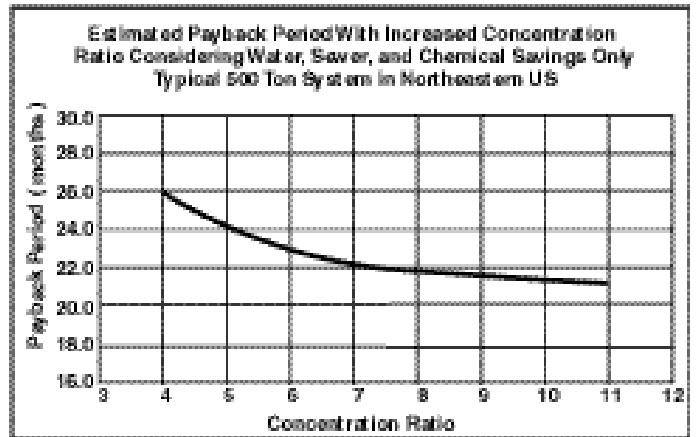
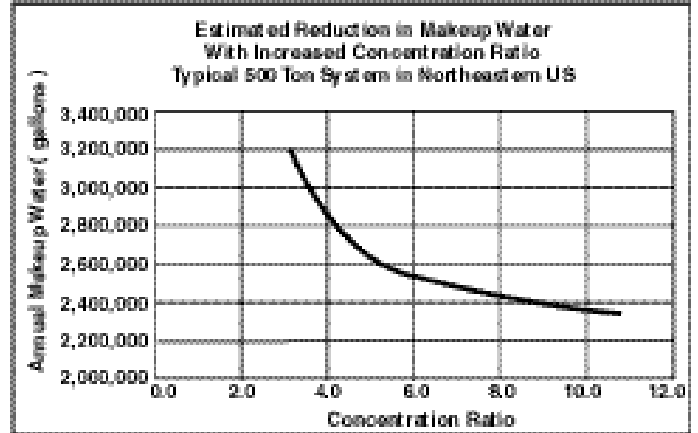
For example:

- Increased cycles of concentration in cooling systems=**Significant water savings.**
- Increased heat transfer from non-scaled tube surfaces=**Significant energy savings.**
- Deposit control means **blowdown can be reduced**, because concentrations of total dissolved solids in the water may be allowed to rise without concern for scale build-up.
- Deposit control means **no chemical treatment** is needed to keep equipment surfaces free of scale and biofilm.

A typical 500-ton cooling tower system located in the northeastern United States may be operated safely at a concentration ratio of 6 - 8, or higher, with a Triangular Wave Deposit Control System installed. If the original concentration ratio was 3, then the annual blowdown water savings would be 700,000 gallons, contributing to a **24% reduction in make-up water**. In warmer regions or areas of the country with harder water, the savings may be even greater.

The typical combined water and sewer costs for the blowdown water would be approximately \$3.00 per 1000 gallons, and the chemical treatment costs would be about \$6,000 per year. At those costs, **the annual savings would exceed \$8,200.**

The payback period for a TWT Deposit Control System is typically between 9 and 18 months. If a 20-year life at 3% interest is assumed, then **the present value of life cycle savings would be about \$108,000 or greater.**



Energy Savings Mechanism

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. 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)

The return on investment of a TWT Deposit Control System is undeniably significant from operational, economical, and safety points-of-view.

