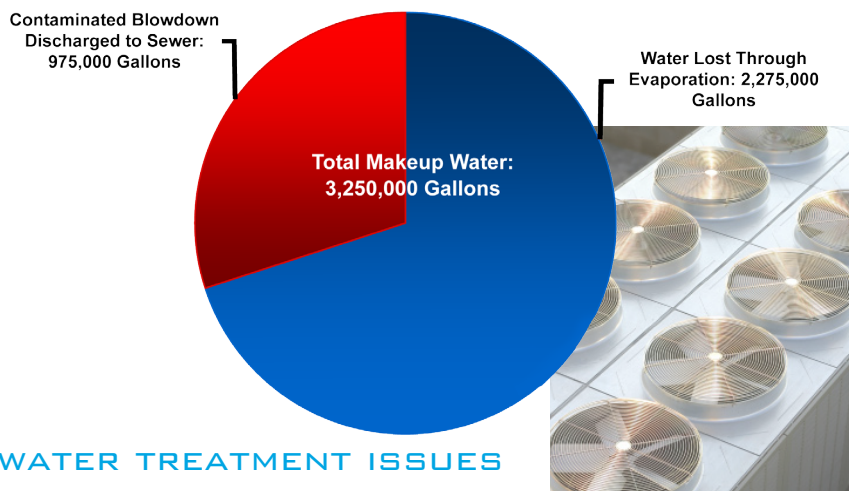


# ADVANTAGES OF PHYSICAL WATER TREATMENT IN COMMERCIAL & INDUSTRIAL APPLICATIONS

## COMMERCIAL & INDUSTRIAL WATER USES

Imagine waving a hot stove-pan in the air in an attempt to cool it. Next, picture the rapid cooling effect of this same hot pan submerged under a running tap, and you'll see how water cooling for commercial and industrial uses is far more efficient than air cooling. Commercial air conditioning systems and a wide array of industrial processes all use water for cooling because of this efficiency. Even though using water for cooling provides many advantages, its inherent challenges as a medium require closer examination.

**Typical Cooling Tower Water Consumption**  
(Assumption: 500 Ton cooling tower at 50% capacity for one year)



## WATER TREATMENT ISSUES

Chief among concerns in using water for commercial and industrial cooling is the formation of scale and biological growth. Corrosion can also contribute to premature equipment failure. These issues, taken together, necessitate effective treatment.

**SCALE** – as ground water is used in industrial processes its dissolved minerals are re-deposited on the heat transfer surfaces of expensive capital equipment. These deposits impede heat transfer efficiency and cost industries billions in wasted energy. Conservative estimates indicate a 1/8" inch layer of scale on heat transfer surfaces can reduce chiller efficiency by 15 to 22%. Scale also contributes to under-deposit corrosion.

**BIOLOGICAL GROWTH & BIOFILM** – Water is a breeding ground for bacteria. When left unchecked, bacteria amass in a slime called "biofilm." This slippery film impedes heat transfer even more than scale deposits. Biofilm as thin as a human hair can impede heat transfer by 25%.

**CORROSION** – As water dissolves gases such as oxygen and carbon dioxide, as well as various minerals in its surroundings, it can lead to a corrosive environment for metals in contact with it. When left unchecked, areas of localized corrosion can actually penetrate metal resulting in leaks and in the reduction in lifespan of capital equipment.



## WATER: THE OTHER LIQUID GOLD

There is no doubt that fossil-fuel based products form the backbone of energy driven developed countries. But as we move through the 21st century, increased demand for petroleum products is not the only headline. Fresh water is becoming an ever-more precious resource. Not only is global water consumption increasing, but shifting demographics are putting more strain on geographies with drier climates. Contamination of ground water sources is problematic, even as public awareness that "we are what we drink" grows. Approximately 70% of the human brain is composed of this life giving substance. Yet only 3% of the total water on the planet is potable with nearly two-thirds of this amount bound in polar ice caps.

Beyond the biological, life-sustaining necessity of fresh water for life on earth, is the economic impact of industrial and commercial water consumption. Indeed, agricultural, industrial, and commercial water consumption accounts for significantly more total water consumption than residential use. Therefore, reducing water consumption by improving the efficiency of our business operations is perhaps the single most powerful way to conserve our freshwater resources.

## ADVANCES IN TREATMENT: THE CASE FOR PHYSICAL WATER TREATMENT

Traditional water treatment methods include the use of a wide array of chemicals to keep systems clean. These chemicals must be regularly added to cooling systems and continually monitored to ensure proper performance. Many businesses also commit significant resources to store chemicals, maintain safety records and personal protective equipment, train employees in the proper application of chemicals, and pay the costs associated with pump failures, improper dosing, and spills.

Advances in alternative water treatment technologies are re-writing the rules of an industry once thought to be the sole domain of large chemical suppliers. The industry's most advanced electronic treatment system, Griswold Water Systems' Wave™, uses the most powerful electromagnetic resonant signals on the market to control scale and biological growth and contribute to less corrosive environments.

Powered with multiple digital microprocessors, the Wave™ fires powerful electromagnetic fields into the process water. This energy controls bacteria and seeds the process water with calcium carbonate crystals. These crystals become nucleation sites for the precipitation of carbonate and prevent scale from forming on heat transfer surfaces. Beyond the elimination of storing, moving, and injecting chemicals, consider the larger implications of using the technology as a part of the total water treatment solution:

### DIRECT IMPACT TO THE CUSTOMER

- Increase Cycles of Concentration to realize significant water savings, resulting in reduced water and sewer costs
- Eliminate sewer discharge fees by capturing 'clean' blowdown
- Eliminate the purchase of additional water by reusing chemical-free blowdown for irrigation or other uses
- Environmental stewardship: 1) conserve and preserve our natural resources by saving water and eliminating injection of toxic chemicals into the water supply and 2) reduce your carbon footprint
- Leadership in Energy & Environmental Design (LEED) credit through USGBC
- Reduced equipment failures, shorter downtime = higher productivity
- Fewer labor-hours spent servicing equipment
- Technology lends itself to less costly remote monitoring
- Elimination of storing, moving, and handling toxic chemicals; elimination of associated risks of spills and personal injury
- Improved monthly cash flow and reasonable return on investment

Customers and service providers alike are realizing energy savings, water savings, and improved capital equipment operation through electronic treatment. Please let us assess your application and provide a free return-on-investment or cash flow report. A better understanding yields confidence. *Griswold Water Systems: because the world depends on water.*



### ENERGY, WATER, AND THE ENVIRONMENT

Effectively treating water creates desirable outcomes which are tied directly to a corporation's bottom line.

#### Maximize Cycles of Concentration

Water chemistry can vary dramatically by source. Some waters are more conducive to scaling than others. Part of maximizing a cooling system's efficiency is to maximize Cycles of Concentration (CoC), or the degree to which minerals are concentrated. As system water is cycled higher through evaporation less make-up water is required but the potential for scaling increases. To effectively maximize CoC will reduce operating costs through a reduction in both total water purchased and discharged through the sanitary system.

#### Maximize System Heat Transfer

Keeping cooling systems free from scale and biological growth maintains system efficiency. When heat transfer surfaces are clean, pumps and fans do not need to work overtime.

#### Protecting People and the Environment

Controlling biological growth in water is essential in order to limit public exposure to harmful and potentially deadly bacteria such as Legionella. Also important is the preservation of our natural resources. The extent to which we can reduce or eliminate the discharge of toxic chemicals to the sewer is the extent to which we prevent the release of these chemicals farther downstream into our lakes and rivers.



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