

## Cooling Tower Conditioning System

Industrial Water Innovations' engineers set out to create a processing unit which would address the problems inherent with cooling towers, evaporating condensers and heat exchangers in industrial applications. These industrial pieces of equipment accumulate large amounts of silt in the water basins and become a breeding ground for any number of bacteria and algae, including dangerous microorganisms such as those causing Legionnaire's disease. Cooling towers also may require significant use of chemicals, requiring constant monitoring and maintenance to prevent system failure.

The design criteria was to design a system that would:

- Not disrupt the main flow of water to the cooling tower.
- Reduce the maintenance required not only on the cooling tower itself, but on components, such as heat exchangers, dependent on the system.
- Extend the life of the cooling towers and other components.
- Eliminate or greatly reduce the use of chemical biocides and prevent microbial growth.
- Maintain the basin free of debris and silt.
- Create a unit that would be, for the most part, autonomous and not require constant adjustments and monitoring.

The result is a **Cooling Tower Conditioning System**. The system uses a parallel approach in which a pump circulates water from the basin without disrupting the main water flow to the tower and can be easily installed with minimal downtime for the cooling tower. The system is a stand-alone, self-contained water cleaning and conditioning system specifically designed to solve cooling tower water and heat exchanger operational problems improving their efficiency while at the same time extending their life. It is comprised of several proprietary components, working together to render optimum results without the use or a substantial reduction in use of biocide chemicals or flocculants.



A single System is configured to treat 10% of a cooling tower main chilled flow. Two standard sizes are offered; A small size for cooling towers and evaporating condensers under 400 GPM of chilled flow, and a larger size for towers with 400 – 650 GPM of chilled flow. When flow is not known, cooling towers with basins up to 5000-gallons or up to 750-ton capacity is a good measure for the larger size system.

The system and can be installed in tandem for larger requirements.

The entire system is on a light 4'x4' structure that can be easily moved by pallet jack or forklift and can be reconfigured to a linear configuration of 2'x8' for narrow spaces.



An optional NEMA 4 fully enclosed option package is available if the system is to be installed outdoors and custom solutions can be designed to specific requirements.

The system's components include:

- Scale Prevention without chemicals
- Disinfection without chemicals
- Filtration
- State of the Art Control Panel
- Fan Control
- Basin Cleaning Jets

**SCALE PREVENTION:** This proprietary technology provides a unique combination of two technologies for the treatment and conditioning of the subject water. The formation of scale occurs when dissolved ions found in water precipitate to form compounds such as calcium carbonate. These compounds can form deposits on the surfaces of equipment and pipes. This component inhibits scaling by causing compounds to remain in suspension allowing them to pass harmlessly out of the system, which not only inhibits scale formation, but pre-existing scale dissolves and will exit the system over time. It also inhibits the growth of algae and reduces organic fouling. This catalytic process requires no power and utilizes non-sacrificial components (life of over 10 years). It triggers a crystallization process that prevents scaling or fouling of the catalytic core. This pre-precipitation of calcium carbonate inside the chamber converts it to harmless crystals. It is then boosted by turbulent interaction with the catalytic cores unique properties, which further ensures the calcium carbonate is in the aragonite form which prevents scaling of the system.

**DISINFECTION:** The system also contains a proprietary ultraviolet (UV) component, which is proven to be one of the most cost-effective and efficient methods of reducing biofilms in cooling tower water and is an EPA approved technology for the disinfection of drinking water and wastewater. It works instantaneously against all water-borne microorganisms, including bacteria, viruses, molds, spores and protozoa – including those resistant to chlorine. It is also very effective in the removal of various species of Legionella bacteria (the cause of Legionnaires' disease in humans) which are commonly associated with cooling towers and must be controlled by law. This technology is also compliant with NSF-Standards and is recognized as a reliable treatment technology for inactivating the deadly cryptosporidium protozoa. This stage is microprocessor controlled, extremely compact and operationally efficient and will inactivate 99.99% of the microorganisms (depending on the turbidity) passing through the system.



Designed, Machined, and Assembled in the USA

**FILTRATION:** This self-cleaning industrial filter is designed for these applications and, coupled with the other system components, has been optimized for the water make up of cooling towers and effectively keeps the basin free of debris and silt. This is also controlled by the microprocessor to monitor the differential pressure and start the backwash cycle.

**ENERGY SAVER AND EVAPORATION CONTROL:** A variable fan control, which responds to demand of chilled water by the process in which it is used, can achieve 50% or more in electrical savings and drastically reduce evaporation. This aids in keeping the fill and basin free of debris scrubbed from the atmosphere by action of a strong draft. The automatic control maintains the fan speed based on ambient and use conditions. This also reduces the quantity of make-up water for the tower and extends the life of the System

**BASIN CLEANING JETS:** During cooling tower operation airborne impurities such as dust, sand, organic matter and other contaminants are drawn into the cooling tower and ultimately settle in the cooling tower sump. Sweeper jet systems added to the return lines of the system makes the problem of settled solids more manageable. The turbulence created by the nozzles within the basin lifts the settled solids from the basin floor or sump surface and directs them towards the filter pump intake which are then removed by the filtration system.

### ***Optional System Components***

**CORROSION COUPON LOOP:** If an installation doesn't already have a coupon rack, one can be installed either in the conditioning system or alternate location. This allows monitoring of corrosion of steel piping and its related components without the need to shut down the system for a visual inspection. A coupon rack is simply a pipe loop to hold one or more small strips of metal (known as the coupon). Corrosion coupons will quickly indicate if a chemical corrosion inhibitor is effectively providing protection for a particular metal (galvanized steel, copper, etc.). Normally, system water is allowed to circulate over the corrosion coupons for about 30 - 90 days. The coupons are then removed and returned to a lab where they are cleaned and re-weighed.

**REMOTE MONITORING:** If required, the computer control system can be fitted with a remote access Ethernet or cellular access point, this will allow remote monitoring and connection to a global alarm system. (Control system may need to change at an additional charge)

Check the website for more detailed information or contact:

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