



The EnviroTower Cooling Tower Water Treatment System *Technology Fact Sheet for EnviroTower Inc.*

Performance Claim

“Cooling tower circulating water conductivities and pH are maintained to minimize the occurrence of scaling, corrosion and biofouling in the system. Conventional system operation involves significant inputs of formulated chemicals and chemical compounds to the water to maintain levels of these parameters. The EnviroTower Cooling Tower Water Treatment System is a physical electro-magnetic conditioning process supplemented with low level inputs of ionic zinc and elemental iodine.

When operated in accordance with the manufacturer’s recommended procedures and nominal cooling tower maintenance adjustments, the system retains cooling tower water characteristics within accepted industry performance standards (see below) intended to optimize operational efficiencies, as follows:

1. Specific conductance in a range between 600 and 1200 mmhos¹;
2. pH in a range between 8.0 and 9.5¹; and,
3. Corrosion/corrosivity below 3 mils per year².”

¹ For operating ranges based upon calculations of the Langlier and/or Ryznar Stability Indices and applied using the relevant chemical characteristics of the circulating and make-up waters.

² Process Cooling & Equipment, 2003.

Technology Application

The EnviroTower Cooling Tower Water Treatment System can be used in industrial and commercial cooling processes, and is currently commercially available for full-scale use in Canada.

Performance Conditions

During the monitoring of the system, data were collected and analyzed for three pertinent parameters: conductance, pH, and, corrosivity.

The testing used to demonstrate the performance claims was of a non-standard nature. In particular, analyses were conducted by technicians on-site using calibrated conductance and pH probes, and corrosion coupons, rather than in a standard analytical laboratory. Data were all collected under conditions typical of routine cooling tower operations.

Due to fluctuating loads on chillers resulting from changing temperatures, the conductance occasionally required adjusting in order to bring it within recommended limits. These adjustments were made by the water treatment service contractor at the time of a service call.

Technology Description

The EnviroTower Cooling Tower Water Treatment System is a self-regulating system which automatically prevents scale, corrosion and microbiological fouling in the piping, condenser, spray bars and tower fill components of cooling tower circuits. No scale is formed, old scale build-up is removed and an anti-corrosion coating is formed on iron piping.



Technology Description (cont'd)

The system consists of two modules. Module A is responsible for recirculating water treatment and consists of a strainer, pump, separator and the Water Conditioner unit. Make-up water treatment is achieved in Module B, which consists of a Micro Mineral Suppressant Canister, an Iodine Canister, and a Water Conditioner unit. An electrostatic field, produced by the Water Conditioner unit, mobilizes hydrogen ions (H^+) from bicarbonate (HCO_3^-) to temporarily produce carbonate ions (CO_3^{2-}). Carbonate is supersaturated in the treated water and calcium carbonate is precipitated. The majority of the resulting solids are not in direct contact with cooling tower surfaces as they form; therefore, they do not adhere to surfaces as scale, but float freely or settle loosely instead. Before the calcium carbonate flocs can be resolubilized, they are removed from the cooling tower by the separator in Module A, and old scale adhering to the cooling tower surfaces is dissolved instead.

Verification

The applicant selected a review of existing series' of monitoring rounds of physical/chemical data related to the effects of the EnviroTower Cooling Tower System as a basis for the verification. Specifically, conductance and pH measurements were taken for 12 water towers equipped with EnviroTower Cooling Tower Water Treatment Systems at 9 schools in the Dufferin Peel Catholic District School Board (in the Greater Toronto Area, Ontario, Canada) during the 2002 and 2003 cooling seasons (May to September/October), as follows:

1. Conductance readings were taken approximately biweekly, and the number of readings per cooling season ranged from 7 to 12. A combined total of 234 conductance readings was taken during 2002 and 2003.

2. Readings for pH were not taken each time that conductance was measured, and the number of readings per cooling season ranged from 5 to 11. A combined total of 213 pH readings was taken during 2002 and 2003.

Corrosion was evaluated at a subset of three of the nine school locations by three different testing companies. Tests at two of these locations were replicated, in one case by a different company.

The verification was completed by Cantox Environmental Inc. (Mississauga, Ontario) using ETV Canada's General Verification Protocol (March, 2000).

What is the ETV Program?

The Environmental Technology Verification (ETV) Program is a joint Environment Canada - Industry Canada initiative delivered by ETV Canada. The ETV Program is designed to support Canada's environment industry by providing credible and independent verification of technology performance claims.

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