



CASE STUDY

Bacteria-Killing Filter Media for Cooling Towers

September 2023

Industry

Hospitality

Application

Cooling Tower Filtration

The Problem

Biofilm, scaling and corrosion were winning the battle in the cooling tower of this Washington, D.C.'s 10-story hotel. Resulting operational inefficiencies in the 200-ton, multi-stack cooling tower led to guests complaining about hot, muggy rooms.

The Solution

Aqua-Stream™ side-stream filters using Pathex® filter media were installed on both cooling tower and chiller loops to replace oxidizing chemical biocides and more efficiently filter suspended solids for improved heat transfer exchange.

Pathex antimicrobial filter media kills bacteria on contact, tackling biofilm and its contributions to corrosion and further biofouling - without the need to handle or store harmful chemicals. The Aqua-Stream high-efficiency, side-stream filter continuously circulates a portion of cooling water for the reduction of suspended solids, down to the submicron (0.5 micron) level.

Together, Aqua-Stream and Pathex contributed to operational gains of 48% by improving heat transfer efficiency, reducing water and energy consumption and decreasing maintenance needs.

Outcomes

- 375% improvement in heat transfer efficiency
- Cooling tower heat transfer tripled
- Cleaner air, cooler water, and significant savings
- Energy savings of 162,490 kWh (\$46,400) per year
- \$8,700 in annual water savings
- Reduced use of water treatment chemicals
- Reduced system downtime



The proof is in the ΔT

Performance enhancement is measured by the change in water temperature (ΔT) between the inlet and outlet flows in the condenser water cooling tower (open) loop and chilled water evaporator (closed) piping loops of the system. Gains in heat transfer (increasing ΔT values) represent improved system performance. In this scenario, open piping loop uses makeup water for the cooling tower structure, while the closed piping loop feeds fan coil units and air handlers in the hotel.

Date	Tower Side °F			Evaporator Side °F		
	Inlet	Outlet	ΔT	Inlet	Outlet	ΔT
4/6/13	83.1	80.6	2.5	53.2	52.1	1.1
4/15/13	86.1	82.5	3.6	53.9	52.1	1.8
4/17/13	84.0	76.6	7.4	49.4	43.8	5.6
4/26/13	89.6	84.5	5.1	53.4	52.5	0.9
5/10/13	86.3	77.0	9.3	49.2	44.4	4.8
5/15/13	91.0	86.1	4.9	56.1	50.7	5.4
6/24/15	91.9	81.8	10.1	50.5	45.3	5.2
Avg.	87.4	81.3	6.1	52.2	48.7	3.5

Table 1.

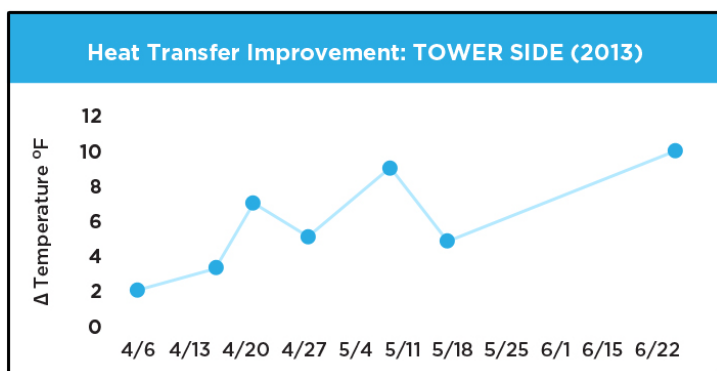


Figure 1. Net ΔT increase of 7.6°F in 11 weeks for tower (condenser) side of 200-ton cooling tower system.

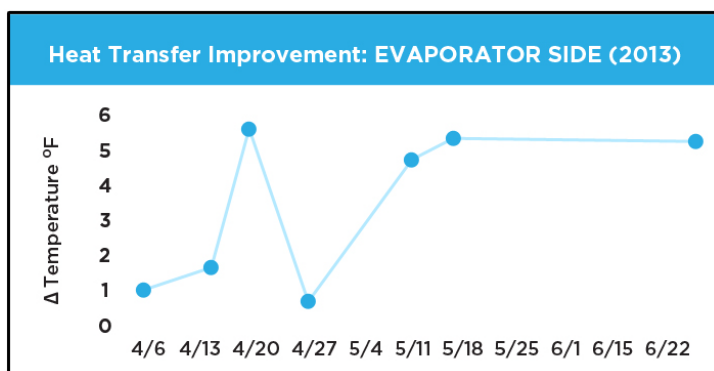


Figure 2. Net ΔT increase of 4.7°F in 11 weeks for evaporator (chiller) side of 200-ton cooling tower system.

Heat transfer data

Table 1 summarizes ΔT data over an 11-week period between April and June 2013. Inlet and outlet water samples were collected on the cooling tower and evaporator sides of the system.

The open loop cooling tower side of the system exhibited a net average water temperature gain of 7.6°F and averaged 6.1°F. The heat transfer on the tower side of the system tripled during the monitoring period. Figure 1 illustrates the steady heat transfer improvement for the tower side of the cooling tower system.

The closed loop for the evaporator side exhibited 375% improvement in heat transfer. A net water T gain of 4.7°F (5.6° - 0.9°), with an average temperature gain of 3.5°F, was realized for this loop of the cooling tower system. Figure 2 illustrates the heat transfer improvement and continued level of performance for the evaporator (chilled loop) side.

Visit AS Filtration online at www.asfiltermedia.com to learn more about solutions to common cooling water treatment concerns. To speak to one of our engineers about your water filtration needs, please contact us at 615.948.9996 or info@asfiltermedia.com.