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HEAT OPTIMIZED TECHNOLOGY "HOT" SERIES SYSTEMS FOR CARBON TOWERS

A BETTER WAY TO SANITIZE AND ELIMINATE BIOFOULING

Bacteria in production water and biofouling of water treatment systems can create operational challenges for beverage manufacturers. To meet these challenges, Evoqua offers the Heat Optimized Technology "HOT" Series Systems. The Hot technology process provides thorough sanitization of new or existing carbon towers, reduces backwash water by up to 75% and adds process control.

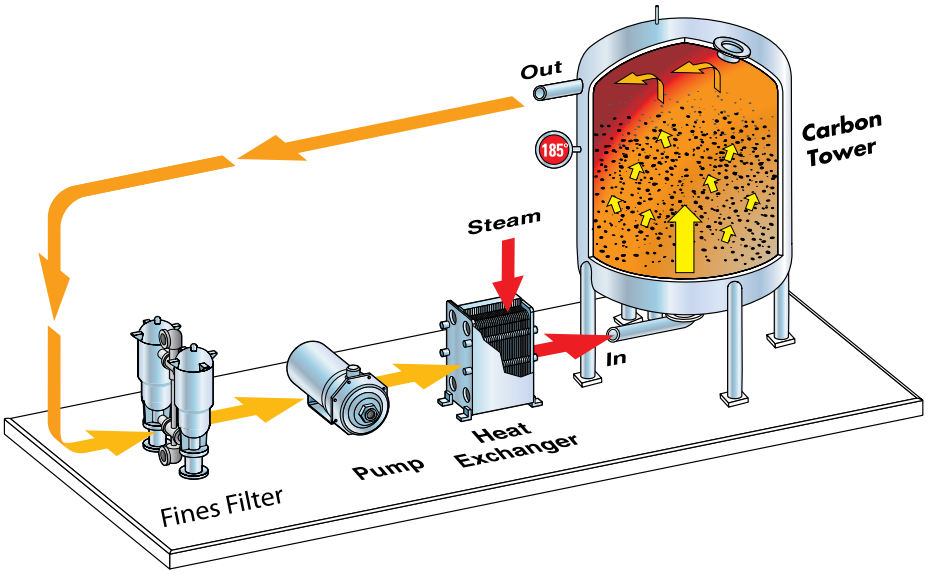
With a small footprint, the fully skidded, stainless steel systems are a small addition, but offer many benefits to existing carbon tower installations:

- More thorough kill lessens the bacteria count to <10 colony forming units (cfu)/ml or tighter to significantly increase the number of days between sanitizations
- Up to 75% reduction in backwash water conserves precious resources
- Less biofouling and cleaner carbon significantly extend the useful life of the carbon bed and substantially reduce costs
- The heating system can sanitize the loop distribution piping and polishing equipment for improved operations

Using hot water, HOT Series Systems eliminate the potential for bed contamination that can exist from utilizing plant steam.

Whether you need an entire system including carbon towers or want to add a HOT Series System, Evoqua can assist you with all your beverage industry needs.

HOT SERIES FLOW DIAGRAM WITH OPTIONAL CARBON TOWER



HOT SERIES SYSTEM OPERATION

Backwash

As in normal backwash, HOT Series Systems start with a 5 minute backwash procedure and the time is adjustable. The backwash cycle removes sediments, contaminants and debris.

Backflush

After the backwash cycle, the backflush cycle begins. This cycle runs for 15 minutes (time is adjustable) and is used to reclassify and expand the carbon media to combat channeling. Unlike conventional backwash systems, HOT Series Systems allow this cycle to be performed in a "closed loop" configuration to reduce water consumption up to 75%.

Sanitization

When sanitization of the carbon is scheduled the HOT Series System begins the backwash cycle, as previously outlined. Then it goes into the closed loop backflush cycle and a heat exchanger is energized to raise the backwash water, media and tank temperature from ambient to 180°–185°F (82°–85°C). The heating process takes approximately one hour. The backwash water is continuously recycled for the entire heat-up time. During this time, due to the suspended nature of the carbon, optimum bacteria kill and destruction of biofouling formation takes place. Bed contamination cannot occur from the introduction of steam that has been treated with boiler chemicals and energy and water are not wasted. The heated tower temperature can be allowed to cool naturally with no hold time, or it can be cooled with an optional chilling exchanger after a 15–30 minute hold period.

Return to Service

Finally, a short rinse cycle (filter to waste) is used to resettle the bed and displace the backwash water. The system can now be placed on-line with assurance of a near zero bacteria count.

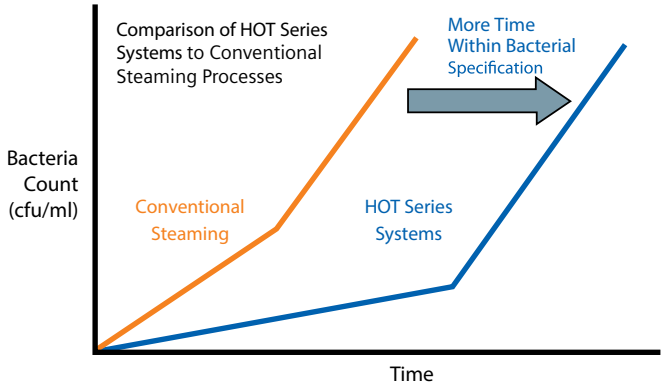
The 150 gpm HOT Series System is capable of operating in conjunction with one to three carbon towers.

COMPARISON OF HEAT SANITIZATION TECHNIQUES WITHIN A SINGLE 84" DIAMETER CARBON TOWER

Time	Conventional Steaming	HOT Series Systems	HOT Series with Optional Chilling Exchanger
Backwash to Drain (Minutes)	20	5	5
Backwash Recycle&Heat (Minutes)	- -	60	60
Heat-Up (Minutes)	240	- -	- -
Hold Time (Minutes)	30 - 60	- -	15 - 30
Cool Down (Minutes)	480	480	60
Rinse to Drain (Minutes)	5	5	5
Total Time (Minutes)	805	550	160
(Hours)	13.4	9.2	2.2
Operator Attention (Hours)	3	0.5	0.5
Total Water Used (Gallons)	13,800	4,500	4,500

THE RESULT

HOT Series Systems have been field proven to provide more effective microbial kill than conventional steaming processes. Bacteria return time is increased from a few days to more than a week. This is due to uniform heating of the carbon bed in the expanded state and reduced potential for cold spots. Conventional steaming techniques are unable to obtain perfect heating due to the way in which steam is fed into the tower. Steam can also channel through the carbon bed.



WATER DISTRIBUTION SYSTEMS

Beverage manufacturers who have extremely low bacteria specifications are utilizing loop configuration water distribution systems to keep the water moving more effectively than "dead ended" systems. The heating system included with HOT Series Systems can serve double duty by sanitizing the loop distribution piping and polishing equipment, as well.

UPGRADING EXISTING STAINLESS STEEL AND CARBON STEEL VESSELS

HOT Series Systems can be retrofitted for existing stainless steel and non-stainless steel carbon towers. With carbon steel vessels, the units will typically operate at lower temperatures of approximately 140°–160°F (60°–70°C), depending on the vessel's internal lining and components.

STANDARD PRODUCT ORDERING INFORMATION

Sample Part Number	67/HOT	150	T	2	M	N

67/HOT Heat Optimized Technology System

Flow Rate

150	50-150 gpm (for models CT050, CT100, CT150)
250	151-250 gpm (for models CT200, CT250)
350	251-350 gpm (for models CT300, CT350)

Piping Material

T	SS Tubing with Threads, Flanges and Tri-clamps
S	SS Sanitary Tubing with Tri-clamps only, 180 grit ID polish

Electrical Requirements

2	208/240 VAC, 3 Phase, 60 Hz
4	480 VAC, 3 Phase, 60 Hz

Controls

M	Manual
A	Automatic

Cooling Exchanger

C	Cooling Exchanger Included
N	No Cooling Exchanger

HOT Series Systems are much more efficient than heating the carbon bed directly with steam. This is especially true because hot water sanitization takes place while the carbon bed is expanded. The hot water can penetrate all of the pores in the carbon more thoroughly and thus gets at the tough to find organisms and biofilms.

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