Water Technologies

Heat Optimized Technology (HOT)

SIEMENS

General Description:

Bacteria in production water and biofouling of water treatment systems can create operational challenges for beverage and BioPharm manufacturers. To meet these challenges, the HOT Series systems were introduced. HOT technology is a Siemens patented process that provides thorough sanitization of new or existing carbon towers, reduces backwash water by up to 75%, and adds process control. HOT Series systems use hot water to eliminate the potential for bed contamination that can exist from utilizing plant steam. HOT Series systems can be provided independently, with or without an optional chilling exchanger, or as a complete system including carbon towers and ancillary equipment.

Standard Features:

The following features have been incorporated into the standard offering of the HOT Series:

- Programmable Logic Controller (PLC) with touch screen HMI
- All stainless steel skid and process piping
- Fully wired and hydrostatically tested prior to shipment
- Standard HOT system is designed to service from one to three carbon towers having equal backwash flow rates with no control alterations
- HOT Series systems provide for the following six modes of operation: In Service, Backwash to Drain, Backflush for Bed Re-characterization, Filter to Drain, Forward Closed Loop, and Sanitization
- Plate frame heat exchanger, SS plates
- Optional: plate frame chilling exchanger, SS plates

Operational Mode Description:

- In Service: normal forward flow of carbon tower
- Backwash to Drain: reverse flow to remove debris from the carbon media
- Backflush for Bed Re-characterization: reverse flow in closed loop
- Filter to Drain: forward flow to re-settle the carbon media
- Forward Closed Loop: replaces Filter to Drain mode to reduce wasted forward rinse water
- Sanitization: same as Backflush for Bed Re-characterization with heat exchanger energized bringing tower and media to sanitization temperature or 180 – 185 °F (82 – 85 °C)

HOT Series Benefits:

- Field proven to provide more effective microbial kill than conventional steaming processes
- More thorough kill lessens the bacteria counts to significantly increase periods between sanitizations
- Up to 75% reduction in backwash water to conserve precious resources
- Less biofouling and cleaner carbon significantly increase carbon performance and substantially reduce costs
- The heating system is capable of sanitizing the loop distribution piping and polishing equipment for improved operations
- Bacteria control is improved due to uniform heating of the carbon bed in the expanded state with reduced potential for cold spots during sanitization
- Depending on utility costs and carbon exchange frequency, return on investment can be less than 3 years

SPECIFICATIONS:

	HOT SERIES PART NUMBER		
PARAMETER	HOT150	HOT250	HOT350
Feedwater Flow Rate: gpm (lpm)	Feedwater flow rate must be capable of supplying 10–12 gpm/ft^2 (839–484 lpm/meter^2)		
*Backwash Flow Rate: gpm (lpm)	*96–283 (363–1071)	*284–442 (1075–1673)	*443–636 (1676–2408)
Min. Feed Pressure: psi (bar)	45 (3.1)	45 (3.1)	45 (3.1)
Max. Feed Pressure: psi (bar)	85 (5.8)	85 (5.8)	85 (5.8)
**Min. Feed Temperature: F (C)	33 (0.5)	33 (0.5)	33 (0.5)
Max. Feed Temperature: F (C)	90 (32)	90 (32)	90 (32)
Steam Pressure: psi (bar)	90–125 (6.2–8.6)	90–125 (6.2–8.6)	90–125 (6.2–8.6)
Steam: lbs/hr (kg/hr)	2000 (907)	3000 (1360)	4500 (2041)
Compressed Air: psi (bar)	90–125 (6.2–8.6)	90–125 (6.2–8.6)	90–125 (6.2–8.6)
General Control Spec	Programmable Logic Controller (PLC with HMI color touchscreen)		
Piping Material	316L Stainless Steel		
Electrical Requirements	Three Phase		
Process Valves	Butterfly		
Sample Valves	Ball		
Heat Exchanger	Plate, SS plates		
Cooling Exchanger (optional)	Plate, SS plates		
Electrical Enclosure	NEMA 4/12		

* Backwash Flow Rate is based on Service Flow @ 10 GPM / Ft^2 (398 – 484 LPM/m^2).
* Backwash Flow Rate is based on carbon tower being located within 50 feet of HOT skid.
* Backwash Flow Rate is based on Siemens CT Series Carbon Towers
** Feedwater temperature affects cycle time.

COMPARISON: HEAT SANITIZATION METHODS (for a single 84" diameter carbon tower)

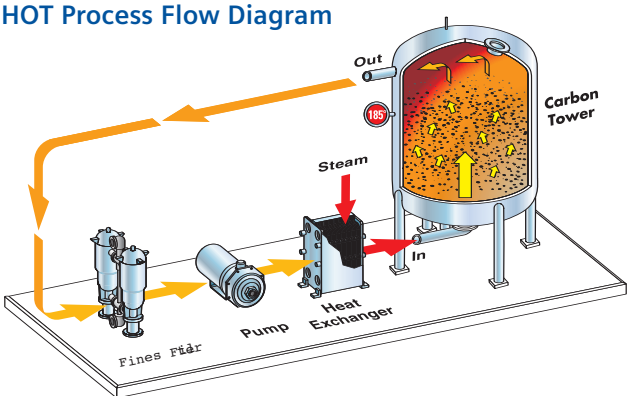
CYCLE	CONVENTIONAL STEAMING	HOT SERIES SYSTEMS	HOT SERIES WITH OPTIONAL COOLING EXCHANGER
Backwash to Drain - minutes	20	5	5
Backwash Recycle & Heat - minutes	–	60	60
Heat-up - minutes	240	–	–
Hold Time - minutes	30–60	–	15–30
Cool Down - minutes	480	480	60
Rinse to Drain - minutes	5	5	5
Total Time - minutes/hours	805/13.4	550/9.2	160/2.2
Operator Attention - hours	3	0.5	0.5
Total Water Used - gallons	13,800	4,500	4,500

PHYSICAL DIMENSION DATA

	HOT SERIES PART NUMBER		
PARAMETER	HOT150	HOT250	HOT350
Length: in (cm)	60 (152)	72 (183)	72 (183)
Width: in (cm)	72 (183)	84 (213)	96 (244)
Height: in (cm)	72 (183)	72 (183)	72 (183)
Operating Weight: lbs (kg)	1800 (816)	2000 (907)	2400 (1088)
Service Clearance: in (cm)	30 (76)	30 (76)	30 (76)

It is critical to consider the HOT Series system must work in conjunction with either a new or existing carbon tower that is rated for a minimum of 65 PSI and equipped with ASME rated pressure relief valves. The standard Siemens CT Series Carbon Towers are sized at 1 gpm/ft^3 flow rate; have a 5' bed depth, and are backwashed at 10 gpm/ft^2. The backwash flow rates and pump sizing of the HOT Series system are based on this standard. Some older, existing carbon towers utilize a 2' bed depth or a wider, stockier, vessel. This difference changes the required flow rates of the backwash and sanitization steps of the HOT process. HOT Series systems can be incorporated with either style of carbon tower. A Siemens Application Engineer will ensure the HOT Series system is sized correctly for retrofit vessels.

HOT Process Flow Diagram



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