1 Hot Water Skid Functional Specifications

1.1 Brief Overview of the System

- Designed for supplying hot water to the beverage process, specifically to the tea steeping tank, mixing tank, and sugar tank heating jacket.
- Optionally, may be used for hot sanitization of pipes
- Anywhere hot water is recirculated (for hot sanitization), the lines are expected to clean so it is not picking up foreign material. Thus, no need to filter water entering the hot water tank.
- Tank is vented for safety standpoint because very easy to pull a vacuum on such a large tank
- Works by maintain a set outlet pressure on the hot water pump. Thus, can adjust to demand and remain fully autonomous
- Works using two plate heat exchangers – smaller on for heating fresh incoming filtered water and a larger heat exchanger for maintain tank water reservoir temperature through high volume recirculation.
- Contains an automatic steam shutoff system if temperature of water leaving recirculating exchanger exceeds roughly 195 °F (desirable to prevent water from flashing off when entering tank)
- Is fully automated and only requires cleaning once a year.
- Has the option to be put into manual mode by authorized personnel
- Has the option to be paused and un-paused by operator

1.2 Process Description

Filtered water is fed through a 2" line, equipped with an air actuated valve (27V004) and a flow control valve (27FV001) and a temperature transducer (27TT006), to a primary heat exchanger (HEAT EX. 2) specified for 20-gpm. The water is heated using steam fed from a 1 ½" line from the steam supply. The steam supply line has a condensate trap and steam strainers that remove any condensate before sending the steam through a pressure regulator (paired with a pressure indicator) and control valve 27V005. A pressure relief valve is also found before the steam enters the heat exchanger using a 2" line. Once the steam leaves the exchanger, it filters through a condensate trap and a check valve and returns to the condensate return. Meanwhile, the heated water travels to the hot H2O tank using a 3" line. The tank has two temperature transducers, top (27TT002) and bottom (27TT001) along with a bottom pressure transducer (27PT001) used for level measurements. The water in the hot water tank is controlled at a set temperature (up to 145 °F) and will continuously cycle through a 4" line at the bottom, through a 200-gpm heat exchanger (HEAT EX. 1) to maintain the setpoint. The output temperature of the water is measure by 27TT003 and then the water flows either through valve 27V001 or valve 27V002 depending on the water level within the hot water

tank. The hot water return line is also fed into the hot water tank and the input temperature is monitored by 27TT007. Note that the 200-gpm heat exchanger uses the same steam utility as the primary heater with similar indicators but with a minimum 3" steam inlet line due to the increased heating requirements. Note that the top of the hot water tank is outfitted with a detachable 3" CIP-S line connected to a spray nozzle. The hot water from the tank is pumped using a hot water pump (27M001) designed for 150-gpm at 45psi and running at 7.5 hp. The parameters of the water are measured at the outlet using TT (27TT004), FS (27FS010), and PT (27PT002) before being sent to other skids as a utility.

1.3   Specifications

- Supply Voltage: 480 VAC, 3 phase, 60Hz
- Total FLA: 29 Amps
- Largest Motor FLA: 9 Amps
- Secondary Voltage: 24 VDC
- Short circuit current rating: 10 ka

Process Side Design Pressure (excluding tank): 60 psig, test pressure 90 psig HYDROSTATIC

Heat Exchanger #1 - Recirculating:
- S/N: 30120-88374, yr. 2019
- Model: M10-MFG
- 200 gpm
- Area: 75.8 sq. ft.
- A-dim: 155mm, with 34, 0.6 mm plates

Heat Exchanger #2 – Fresh Water Feed:
- S/N: 30120-88373, yr. 2019
- Model: M10-MFG
- 20 gpm
- Area: 42.6 sq. ft.
- A-dim: 91 mm, with 20, 0.6 mm plates