

Shell and Tube Heat Exchanger

ver 7.0

Note: There are two heat exchangers running in parallel; any differences are noted

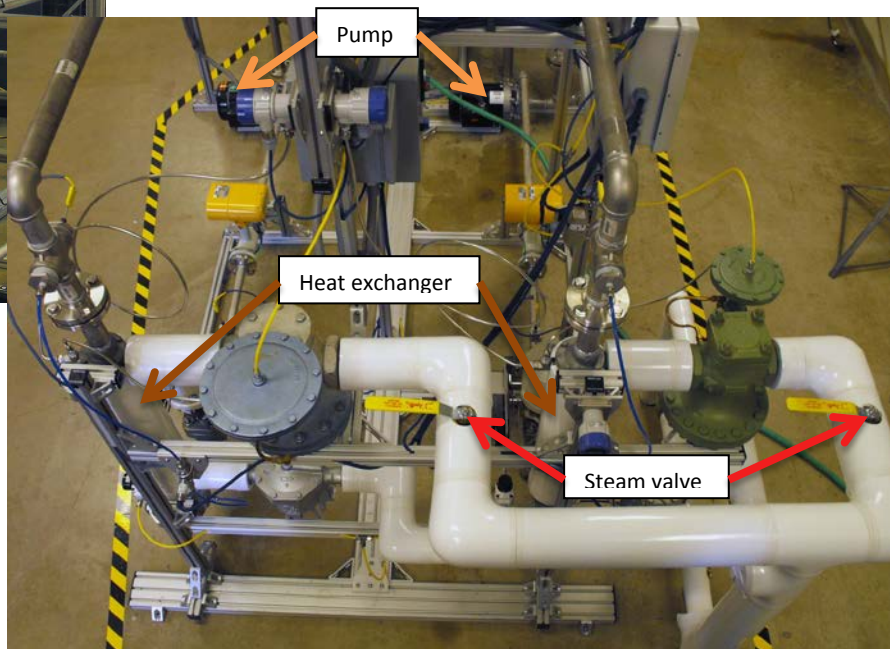
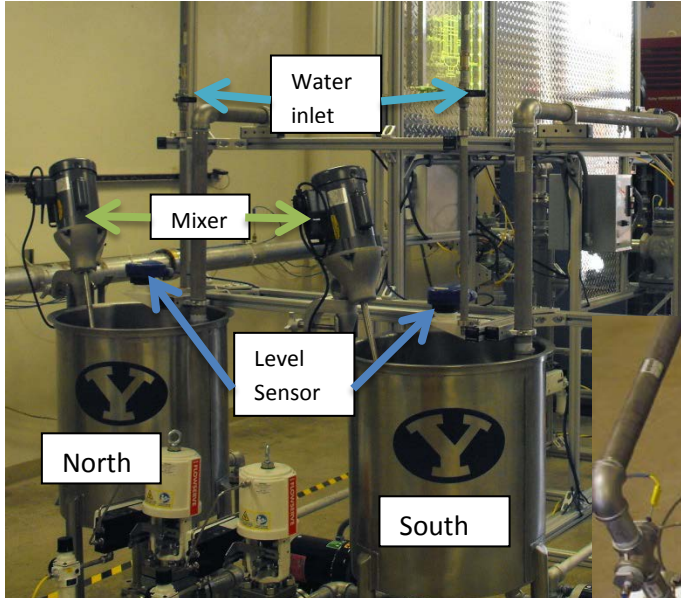
Startup:

1. Ensure the tank is about $\frac{3}{4}$ full; if there isn't enough water open the valve and fill it to that point. (there are two inlets: one as labeled and the other is a garden hose)
2. Once you've reached an appropriate water level, turn on the mixer.
3. Make sure that these two valves connected to the tank are open.
4. Do NOT turn the steam on yet.
5. Open Labview virtual instrument (VI) for [unit 1](#) or [unit 2](#).
6. Request control of the VI. All manual control overrides should be in auto (colored blue).
7. Select a starting flow rate. Turn on the pump.
8. Set the steam pressure set point. (flow, level and steam pressure should be operated within the ranges given on the next pages).
9. You can now go over to the steam valve and turn it on.

Note: The outlet temperature should not exceed 90°C . Be careful when operating at the extreme of the range for flow & steam temp. The system can overheat easily.

Shut Down:

1. Turn off the steam and let the equipment run for a few minutes to cool down.
2. Turn off both the pump and the inlet water.



Shell and Tube Heat Exchanger (Unit #1)

Main Power

Pump Switch

lighted up = on; unlighted = off

South unit – narrow baffles

Level Control

Level Setpoint (ft)

Liquid Level in Tank ft

Manual Control Override (Level) Auto

Set Manual Valve Position (Level)

Level Control Valve

Kc (Level)

Ti (Level) (min)

Td (Level) (min)

Flow Control

Flowrate Setpoint (GPM)

Water Flowrate gal/min

Manual Control Override (Flow) Auto

Set Manual Valve Position (Flow)

Flow Control Valve

Kc (Flow)

Ti (Flow) (min)

Td (Flow) (min)

Steam Pressure Control

Steam Pressure Setpoint (psig)

Steam Pressure psig

Manual Control Override (Steam Pressure) Auto

Set Manual Valve Position (Steam Pressure)

Steam Valve

Kc (Steam)

Ti (Steam) (min)

Td (Steam) (min)

House Steam Pressure psig

Tube-Side Pressure Drop psig

Specify Time between Data Points (sec)

Specify number of data points

Water Feed Temperature C

Water Inlet Temperature C

Water Outlet Temperature C

Level should be operated between 1.5 & 1.75 ft

Flow should be operated between 20 & 55 gal/min

Steam pressure should be operated between 10 psig & 50 psig

A link to get excel data file will be below

Shell and Tube Heat Exchanger (Unit #2)

lighted up = on; unlighted = off

Main Power Pump Switch

North unit -- wide baffles

Level should be operated between 1.5 & 1.75 ft

Level Setpoint (ft)

Liquid Level in Tank ft

Manual Control Override (Level) Auto

Set Manual Valve Position (Level)

Level Control Valve

Kc (Level)

Ti (Level) (min)

Td (Level) (min)

Flow should be operated between 20 & 55 gal/min

Flowrate Setpoint (GPM)

Water Flowrate gal/min

Manual Control Override (Flow) Auto

Set Manual Valve Position (Flow)

Flow Control Valve

Kc (Flow)

Ti (Flow) (min)

Td (Flow) (min)

Steam pressure should be operated between 10 psig & 50 psig

Steam Pressure Setpoint (psig)

Steam Pressure psig

Manual Control Override (Steam Pressure) Manual

Set Manual Valve Position (Steam Pressure)

Steam Valve

Kc (Steam)

Ti (Steam) (min)

Td (Steam) (min)

House Steam Pressure psig

Tube-Side Pressure Drop psig

Water Feed Temperature C

Water Inlet Temperature C

Water Outlet Temperature

Specify Time between Data Points (sec)

Specify number of data points

Push to Record

Cancel Data Collection

Data Point Count

Cancel

A link to get excel data file will be below