

***Start Up and Operating Instructions for the
Stickle Model 550
Blowdown Heat Recovery System***

Introduction:

The Stickle Blowdown Heat Recovery System is designed to recover the heat from continuous boiler blowdown in two stages. The first stage occurs at the time the blowdown water is introduced into the flash tank. The pressure of the blowdown is reduced from the boiler pressure to the flash tank operating pressure. At this point usually 5 to 20% of the blowdown is flashed into steam depending upon the specific conditions of the job. This liberated steam represents a major portion of the available blowdown heat. This steam may be used to supplement the heating steam in the deaerator, or for some other process requiring low pressure steam.

The second stage consists of putting the remaining blowdown condensate through the shell side of a shell and tube heat exchanger. Feedwater make-up is circulated through the tube side to recover the remaining portion of available blowdown heat. From the point the blowdown water may be drained into the sewer.

Enclosed are descriptive pamphlets of the various components covering their specifications, operation, and maintenance. Should a problem arise which is outside the scope of this literature please feel to contact Stickle Steam Specialties.

Thank you for allowing us the opportunity to satisfy your steam handling needs.

START UP PROCEDURE:

1. Inspect all connections, checking to insure that all lines have been correctly installed. Feedwater make-up should be started thru heat exchanger.
2. Inspect steam vent line from steam outlet on blowdown tank to steam inlet of receiving vessel. Check to insure that any isolating valve(s) be open and any check valve(s) is (are) installed in the proper direction. (Steam should travel from blowdown tank to receiving vessel).
3. Close the blowdown flow control valve(s) on the tangential inlet of the blowdown tank.
4. Open the valve in the line connecting the blowdown tank to the heat exchanger.
5. Close the valve in the by-pass line around the heat exchanger.
6. For mechanical actuated level control: Check alignment and movement of level arms (controller and discharge valve.) Ensure that the discharge valve is capable of full travel. If it is not readjust linkage/lever position until full travel of valve is achieved.
For pneumatically actuated level control: Check air supply pressure to controller. Supply pressure should be 20 psig. Adjust regulator accordingly. Using controller, stroke the discharge valve through its full travel checking valve to ensure smooth even movement of valve indicator (located on valve stem and diaphragm yoke).
7. Open isolating valve in heat exchanger discharge line.
8. From blowdown flow rate desired, determine the proper opening setting of blowdown flow control valve using the "Flow Data for Vogt Flow Control Valves" in conjunction with the following formula:

$$C_v = \frac{Q}{\sqrt{\frac{\Delta P}{G}}}$$

WHERE: Q = Desired blowdown flow rate, GPM.

ΔP = Boiler pressure minus blowdown tank pressure, psi
(Blowdown tank pressure is equal to pressure being maintained on receiver which is receiving the vented steam).

G = Specific gravity of water at boiler pressure and temperature.

9. Slowly open blowdown flow control valve(s) to desired setting.
10. Observe response of level controller as water level rises to modulating level in blowdown tank. On mechanical actuators if a change in operating level is required rotate the turnbuckle on the connecting linkage. If the adjustment is not great enough change the float lever arm position on the rotating shaft of the controller (consult the controller instruction manual).

On pneumatic actuators a change in operating level is made by opening the access door on the controller and turning the level adjusting knob (consult the controller instruction manual).
11. Observe pressure guage.
12. Observe temperature gauges at feedwater make-up outlet and blowdown outlet.
13. Check for leaks.