

No Steam Flowing ...

1. Verify the external steam valve is opening properly.
2. Verify the PSX heater stem is opening.
3. Insure that all check valves are functioning and properly oriented.
4. Blow out the steam strainer upstream of the heater.
5. Insure the steam pressure exceeds the system pressure as shown in Equation 1.

Rough operation ...

1. **Flow Rate** has quickly dropped, leading to overshoot on temperature and potential flashing in the pipe. **Pump** - The fluid or slurry pump should operate with a steady, continuous flow to the PSX heater. In particular, sudden drops in flow can cause temperature overshoot. Please insure that reductions in flow rate occur slowly.
2. **Heater On/Off** – If steam isolation valve is shut down before heater is closed, fluid can back-up into the steam injector & steam line. Follow heater shut down procedures by always closing heater steam injector first
3. **Steam Flow Control** - Only control steam flow via PSX Heater integral modulating actuator. Do not control steam with external modulating steam control valve on steam line.
4. **Excessive condensate** in the steam supply. This generally occurs only at startup or if steam trap is undersized. Purge condensate from the steam line and insure the system is properly trapped.
5. **Water pressure** is not sufficient to prevent flashing or two phase flow at the water discharge temperature. This condition usually occurs above 212°F (100°C). It can also occur at lower temperature if there is a vacuum in the discharge piping.
6. **Dissolved air or other gasses** in the liquid vaporize (or small bubbles become much larger) when heated. These bubbles implode against the walls of the discharge pipe. Insure there are no high points in the piping where gasses can collect. Install air eliminator to remove gasses in liquid.
7. The system pressure exceeds the allowable level listed in Equation 1.

To ensure stable operation of the PSX Heater, the steam pressure should exceed the liquid pressure according to the following formula:

$$P_l \leq \{(P_{st} + 14.7) \times 0.7\} - 14.7$$

Equation 1 (English)

$$P_l \leq \{(P_{st} + 101) \times 0.7\} - 101$$

Equation 2 (SI)

Where: P_l = Liquid pressure present at PSX Heater (PSIG)(KPa)

P_{st} = Steam pressure at PSX Heater steam inlet (PSIG)(KPa)

Note: If the process requirements exceed this limit, please contact ProSonix Customer Service.

Noise...

1. Excessive condensate in the steam supply. This generally occurs only at startup or if steam trap is undersized. Purge condensate from the steam line and insure the system is properly trapped
2. Flow rate is excessive for the heater model. Verify heater sizing.
3. Excessive superheat is present (> 75° F, 42°C) contact ProSonix to review.

Trouble achieving temperature rise ...

1. Verify steam piping is sized to meet steam flow and pressure as shown on PSX Heater sizing worksheet.
2. Verify current conditions & steam pressure versus original PSX Heater sizing worksheet.
3. See "No Steam Flowing" above

Poor temperature control...

1. Heater is operating outside of recommended range. Please verify design conditions. If necessary, new diffuser with different operating capacity should be installed.
2. Temperature probe is in a location providing poor feedback to the control loop. Relocate per OM manual guidelines.
3. Actuator not properly setup. Recalibrate per OM guidelines (not off-set plug seating).
4. Actuator not fully opening or closing. Recalibrate. If necessary, an actuator positioner should be installed to provide full operating range.
5. The PSX Heater will respond instantly to temperature control changes; while temperature transmitters & control loop will lag in their response. The typical temperature control loop response can be 30-90 seconds. Changes to temperature or flow should allow for control response loop stabilization.

Steam Flashing after Heater Closed ...

1. The PSX Heater is a modulating steam control device and is a class II shut-off. There will be trace steam leakage through the heater even when closed. A steam isolation valve should be installed on the incoming steam line and closed when heater is closed or flow has stopped.

Steam Stem moves slowly, is frozen, or moves erratically...

1. Air is not sufficient to stroke actuator. (Verify that at air pressure available to the actuator is at least 5 psig in excess of the maximum bench set stamped on the actuator).
 - a. If a positioner is used, check that the air supply to the positioner meets the air supply requirements of the positioner.
 - b. If an I/P transducer is used, make sure that the pressure to the I/P is above the necessary actuator pressure.
2. The control signal is missing, or erratic?
 - a. In direct pneumatic control, the air line may have an erratic output due to water, oil, plumbing tape or other matter in the air pipe.
 - b. In an electronic control system, the control signal may be erratic or missing.
 - i. Is there electronic interference or ground loop issues?
 - ii. Is the controller outputting a consistent signal?
3. Is the stem packing interfering with the stem movement?
 - a. Is the packing too tight? Please follow packing tightening procedures from manufacturer or in this manual
4. Is there buildup on the steam stem? Clean or replace the stem
5. Has foreign material gotten into the heater stem housing or the gap between the Stem plug and steam jet diffuser?
 - a. Are steam strainers installed per the instructions in this manual?
 - b. Has there recently been work done on the system piping that may have introduced material (weld slag, construction debris, etc.) into the heater?
 - c. Has there been a system "Backup" which may have forced particulates or other material into the steam chamber?
 - d. Is the steam system prone to build-up on other steam components? If so, boiler feedwater treatment may need to be adjusted.

Note: Please refer to your Heater OM Manual before operation or servicing. Never pressurize the PSX Heater if the actuator is not fully assembled and connected to the steam stem and use proper lookout procedures. To receive a free copy of your PSX Heater O&M Manual, please contact us at 800-849-1130 or info@pro-sonix.com.