

Application Profile: Poultry Processing – Chicken Paw Scalding

In the Poultry industry, processing of chicken paws is an important product that requires heat and significant amounts of hot water.

A major U.S. Poultry processing company was looking to replace their existing steam injection heater for paw scalding & CIP washdown applications. They were experiencing steam cavitation & temperature controls issues, along with excessive cleaning cycles, with their DSI units. The temperature control issue was impacting quality control as over spec temperatures on their paw scalding line was “graying” the product. Conventional DSI heaters were not able to handle the steam turndown & variable water flow requirements due to initial system start-up (High steam demand) and then trim temperatures (low steam demand) during daily operations & cleaning. A PSX Inline heater was selected and installed on the re-circ line prior to the hot water tank. Proper temperature control has eliminated product quality issues in the scalding process. The PSX Heater’ wide turn down range for both liquid & steam has stabilized the hot water loop and allowed rapid response for start-up, daily operations, and plant sanitizing during clean-up operations. The Internally Modulated steam control design of the PSX has also eliminated steam cavitation problems during low steam demand periods.

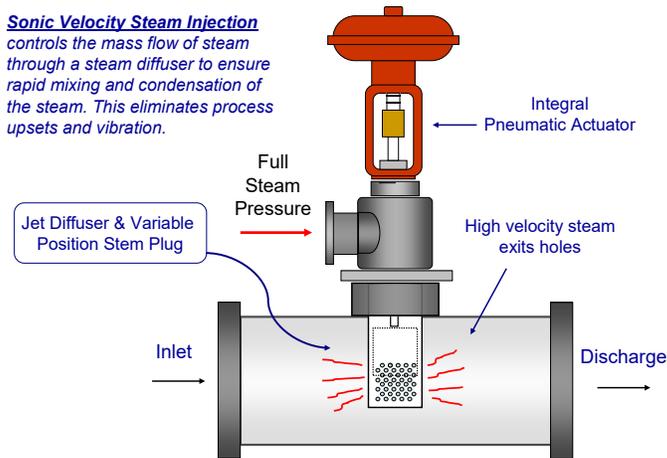
- **De-hiding** - Meat producers use a combination of scalding and de-hair to prepare for evisceration. Carcasses are immersed in the tank that is filled with water at 136 to 140°F. The carcasses will be turned to ensure even scalding during the 4-4½ minute cycle. The water temperature is critical, because high temperatures degrade the meat and can excessively soften the skin, which can lead to tissue damage from subsequent handling. Low temperatures lead to excessive immersion times or difficult hair removal.
- **Carcass Cleaning** - Slaughtered carcasses are sprayed with hot water after de-hiding and after evisceration to clean the surface of the carcass. The carcass is hung from the overhead conveyor and an operator uses a high-pressure sprayer to wash the surface of the carcass. Water must be at least 170°F and may contain acetic or lactic acid to help kill all micro-organisms. Too high of temperatures will damage the meat.
- **Equipment Sanitizing** - Cutting tools, knives, & evisceration equipment requires regular cleaning. FDA approved temperatures must be maintained.
- **Paw Scalding** - Chicken processor will scald chicken paws. Accurate temperature control is required to avoid “graying” the paw.
- **Wastewater Processing** - Most facilities pre-treat the wastewater before discharging the water to the public sewer system. Sludge processing in digesters is common to break down organic solids and to produce methane for boiler energy supply.

There are a number of challenges associated with conventional water heating methods:

- Heat Exchangers often plug & foul which reduces reliability & processing times.
- Water flow constantly varies based on processing conditions & clean-up periods.
- Processing plants must be able to demonstrate proper sanitizing temperatures are maintained to meet FDA approval.

Jet Diffuser Technology...

Sonic Velocity Steam Injection
controls the mass flow of steam
through a steam diffuser to ensure
rapid mixing and condensation of
the steam. This eliminates process
upsets and vibration.



ProSonix' unique method of steam injection utilizes an integral pneumatic actuator and a variable opening steam diffuser to deliver high velocity steam injection heating. We do not throttle or regulate steam pressure. This design offers a precise method of steam control through a **choked flow** delivery of the steam. Choked flow is the phenomenon of accelerating a vapor to maximum velocity by creating a pressure differential through an engineered nozzle. By establishing choked flow, the steam mass flow can be metered to precisely control the heating of the liquid. This produces predictable results based on position of the stem plug. Through a **variable-area steam diffuser**, steam flow is metered at the point where steam and liquid first contact and mix. This method eliminates the need for an external steam control valve or downstream mechanical mixing devices. **High velocity steam flow** optimizes the steam mixing and condensation with the liquid and eliminates problems with vibration/steam hammer.

Key Direct Steam Injection Benefits

- Precise Temperature Control (+/- 1 °F) assures optimal processing conditions
- Self Cleaning Design eliminates costly maintenance issues from plugging & fouling
- Energy Savings as the low pressure drop (typically 1-2 psig) reduces energy pump demand
- High Turndown of both steam and water flowrate allow for flexible operating conditions.
- Ease of Installation as the PSX Heater can be installed in the water piping saving valuable floor space.

For more information, please visit pro-sonix.com.