

## Application: Blanching of Vegetables & Potatoes

In the food industry, blanching of vegetables & potatoes is a common practice. Blanching is the exposure of the vegetables to boiling water or steam for a brief period and the vegetable must be rapidly cooled in ice water to prevent it from cooking. Enzymes in vegetables are inactivated by the blanching process. On demand hot water is also required for packaging applications that require containers to be cleaned and pauperized prior to being filled. Companies such as fruit & vegetable processors require hot water supply for cleaning and washing of packages and containers prior to filling.

Blanching processes will operate at temperatures of 190-205°F. Water is delivered to the blancher which in turn needs to be heated prior to processing the vegetables or potatoes in the blancher. Proper temperature control ensures processing optimization. A low pressure drop across the water heater allows for more efficient operation of the pumps and better control for the spray nozzles. There are several challenges associated with conventional water heating methods:

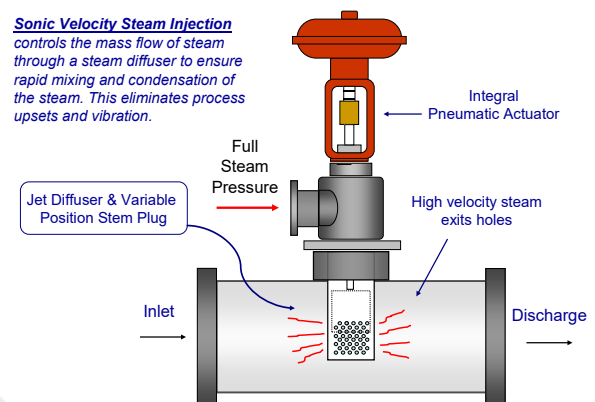
- Heat Exchangers require floor space for installation space and room to remove tubes for cleaning. Other issues are lag response time, mineral & scale build-up, and high pressure drop.
- Traditional mechanical spargers are prone to plugging & fouling.
- Conventional steam injection heaters with external steam control via a steam PRV are prone to process upsets such as hammer & vibration.

### PSX Heater Solution – Inline Heating

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.

#### 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.



### Key Direct Steam Injection Benefits

- **Precise Temperature Control** (+/- 1 °F) assures optimal processing conditions
- **Self Cleaning Design** eliminates costly maintenance issues from scale & mineral build-up
- **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 on the pasteurizer or in the water piping above.

## Application: Tank Heating for Vegetable Processing

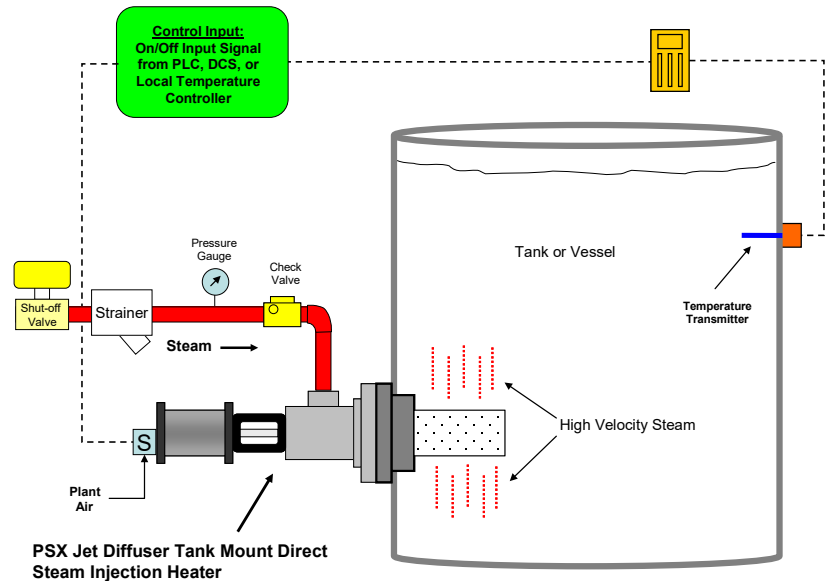
### Tank Heating - Jet Sparging

High velocity steam delivery assures complete mixing of steam, reducing occurrences of vibration, and saves energy losses from uncondensed steam escaping. Integral stem plug eliminates need for steam pressure control valve. A single Jet Sparger can be used for small tanks. When heating larger tanks, or if a higher temperature rise is required, multiple PSX Spargers can be placed around the tank.

### Common Applications:

- Wet Milling of Corn
- Re-hydration of Fruits
- Steeping vegetables & fruits
- Washing vegetable & fruits
- Wash down & cleaning water supply

### ProSonix Jet Diffuser Installation and Piping Recommendations



### ProSonix Jet Sparger Solution

Install the PSX Jet Diffuser Tank Mount Sparger on the tank wall to heat the tank until the tank reaches a steady state temperature. Various size tanks can be accommodated with single or multiple Jet Sparger arrangements.

The PSX heater has a high heating capacity which accelerates tank heat-up time over the time it takes conventional steam sparging. Once the desired tank temperature is achieved, a single PSX steam injector can be operated to allow for trim temperature control of the tank until the desired tank temperature achieved. Injection of high velocity steam minimizes improves condensation and mixing thus structural damage to the tank from the sparger can be eliminated. As the PSX heater utilizes sonic velocity steam injection, scale and mineral build issues in the steam injector is eliminated.

The tank temperature can be controlled via a tank sensor, a discharge sensor, a cascade control loop, or in a variety of configurations allowing consistent precise temperature control. The internal steam control design of the PSX heater controls the steam mass flow and not the steam pressure thus eliminating steam hammer and vibration issues.

*Note: Use of tank sparging for applications above 150 °F may be inefficient and lead to extended heating times. For tank heating applications above 150 °F, the PSX Inline heater is recommended.*

### Key Direct Steam Injection Benefits

- **Energy savings** resulting from more efficient steam condensation, faster tank heat-up, and reduced heat loss to atmosphere.
- **Lower maintenance** due to the PSX Jet Spargers self cleaning design
- **Reliable process heating** reduces process upsets and elimination of steam hammer)
- **Improved temperature control** allows for a more reliable heating process

For more information, please visit [pro-sonix.com](http://pro-sonix.com).