

# Benefits of Direct Steam Injection for Starch Cooking

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*By Pick Heaters, Inc.*

Whether a starch conversion plant is using rice starch, corn starch or potato starch the liquefaction process is generally accomplished using a jet cooking (direct steam injection) system. After first prepping the slurry and making pH adjustments, the slurry is pumped through a direct steam injection heater where it is quickly heated to a temperature of 105°C or more. The slurry is then passed through a series of holding tubes for 5 to 7 minutes; time to allow the starch to gelatinize fully.

When considering a new process line, production facilities should examine the type of Direct Steam Injection Heater used. Many think of the jet cooking equipment as simply a high shear device, but that couldn't be further from the truth, and when maximizing production, high shear isn't always the best approach.

As taught in various food science courses, collapsing a swollen starch granule or breaking a granule before it reaches its full potential decreases gel formation and reduces gel strength. The key to maximizing gelatinized starch granules is to get them to uniformly swell to their maximum extent, while maintaining whole granule integrity without the need of heavy chemical modifications. Often times granular breakage is the results of crude high velocity eductor and choke-flow type steam jet eductors.

One way to avoid this is to use a low shear Pick SC Direct Steam Injection Heater with

multiple orifice injector that allows the starch granule to fully expand and release all the potential gel. Leaving behind no uncooked or sheared granules. The starch is fully cooked when it leaves the Pick SC or BX Jet Cookers, resulting in higher finished solids.

The potential benefits to using a Pick Heater are:

- Energy Efficient - Save Up to 28% in Fuel Costs
- Exceptional Temperature Control - +/- 1°C
- Wide Operating Range
- No Steam Hammer
- Low Noise Level - Typically Below 85dBA
- Low Liquid Pressure Drop - Less Than 2 PSI (0.14 BAR)
- Complete Mixing in Heater Body
- Instantaneous
- Compact Design
- Low Maintenance Cost
- No Minimum Straight Piping Before or After the Pick Heater

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