

Engineered System Packages Excel in Superheat Roaster Condensate System

A century-old Chicago wholesale chocolate manufacturer needed a condensate recovery system for a new roaster. The roaster uses high pressure (superheated) steam to heat air for roasting chocolate beans in a continuous process. Condensate at the roaster outlet is 16,000 lbs/hr at 120 psi by specification. A competitor had already proposed a design including a (duplex) electric condensate pump package, with no flash steam recovery.

- The maintenance and longevity advantages of steam-powered, totally mechanical condensate pumps (PPC) vs. electric pumps, particularly with high-pressure condensate.
- The energy benefits of using a flash tank system to convert high-pressure condensate to low-pressure steam for improving the function of the deaerator tank.

- The operational advantages of float and thermostatic (F&T) traps in process applications vs. the inverted bucket traps that the competitor proposed.

Packages for economy and simplicity

The solution incorporated the design and operational advantages of two engineered system packages for the condensate recovery system:

- A flash recovery module, completely skid-mounted with safety valve, backpressure regulator, float traps, strainers and other auxiliaries.
- A duplex condensate recovery module, with pumps, traps, connected piping and auxiliaries.

Savings exceed estimate

Spirax Sarco's estimated payback calculation projected a total cost savings of \$258,519.00 per year, an IRR of 365% and an ROI of 345%. Projected payback was only 3.3 months. The basis for the calculation was recovery of 16,000 lbs/hr of condensate and at least 1800 lbs/hr of flash steam at 5 psi or 1000 lbs/hr at 10 psi. The energy savings resulted from eliminating a separate heating source for the deaerator tank water.

The economic justification proved to be conservative; the customer obtained enough low-pressure flash steam recovery from the system that they could shut down

their low-pressure boiler, resulting in considerable fuel and operational savings. These exceeded expectations led the customer to approve a proposal for two condensate pump packages, now up and running equally well.

Condensate Recovery System at a Glance

- Steam separators, disc check valves, vent head (VH 8)
- FT 14, FT 15 traps for process and TD 52 traps for drips
- Module 1: Flash tank, CI-125 Strainers, IT Strainers, 25 BP regulator, SV75 Safety valve, FTB-20 traps and isolation valves
- Module 2: PPC (3" x 2") pumps, tank package, traps, strainers, etc.

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