Flash Economizer

Heat Recovery System for Continuous Blowdown
Continuous Blowdown

When a boiler is steaming, solids in the water are left behind in the boiler, increasing concentration. Boiler water treatment with phosphates or chelating agents does not reduce the amount of concentration but it chemically reacts with boiler solids to reduce or eliminate scale forming materials.

If the concentration of solids becomes too high, foaming and priming can occur, and excessive sludge can restrict circulation and heat transfer causing rupturing and blistering of boiler tubes or shell. Since the concentration is greatest at the point of highest steam release, the best location for the continuous blowdown is just below the water level in the boiler.

At this point of highest concentration (about 4” to 6” below the water level), boiler water is continually drained off to reduce the concentrated boiler water. Fresh make-up water with a much lesser concentration is, at the same time taken, into the boiler. While this is the best method of controlling Total Dissolved Solids (T.D.S.) in the boiler, valuable heat can be lost.

The Penn Flash Economizer Saves You Money

Continuous blowdown of 1 gpm on a 150 psig boiler wastes 169,000 BTUs/HR. This blowdown water, too hot to dump to streams or public sewage, must be cooled to at least 140°F in most localities. Tempering this water with added cold water or just taking the water and dumping it to a hot well or blowdown tank becomes costly because you’re losing both flash steam and hot water which can be recycled into the boiler. This water can be cooled by sending it through a Flash Economizer, which takes the heat out of the continuous blowdown and recycles it back into the make-up water. The drain temperature is reduced to 100-110°F.

With a Flash Economizer most of the heat is recycled back into the boiler. A Flash Economizer saves more BTUs than a conventional heat exchanger. When a percentage of the continuous blowdown flashes into steam in the upper portion of the Flash Economizer, you get 100% recovery of the BTUs in flash stream. Also, with today’s cost of treating make-up water, you reclaim a percentage of the blowdown water in flash stream and put it back into your system. For more information on these savings see Brochure F14.5.
Steam Outlet
- clean dry steam 97% quality to deaerator

Low Pressure Vortex Area
- expedites instant flashing of all steam to outlet

High Velocity Centrifugal Action
- drives liquid and solids to outside - only clean dry stream releases into central vortex area and up into steam outlet

Spiral Coil Heat Exchanger
- designed to provide maximum heat transfer

Sludge Area
- no pockets or baffles in heat exchanger area for sludge to deposit and reduce heat recovery efficiency or to clog the flow area

Cold Water
- boiler make-up enters system

Boiler Make-up
- exits heated by continuous blowdown at no extra cost

Tangential Inlet
- imparts high velocity spinning action to liquid

Stainless Steel Wear Plate
- a point of impingement prevents erosion of separator wall

Float Trap
- for continuous discharge of cooled water to drain

Cooled Blowdown
- to drain (100-110°F)
Heat Recovery Process

Continuous blowdown enters tangentially spinning around in the Flash Chamber. Flash steam is released in the center area and recycled into the deaerator or feedwater heater. Every pound of flash steam returns 1156 BTUs into your system which, when taken back to the deaerator or feedwater heater, is condensed. So you not only save BTUs but also make-up water. The remainder of the blowdown water flows directly down to the second area of recovery — the spiral coil heat exchanger. The hot water flows around the coils and heats the make-up water which flows through the coils.

The Penn Flash EconoMizer is designed for efficient trouble-free operation. Note that the only area in which sludge can accumulate is below the heat transfer area, and that there is no valve between the flash area and heat exchanger area to stick or clog. Maintenance is simple with the Flash EconoMizer. The unit is flanged to simply drop out the lower spiral coil section, clean the copper or stainless coils, and place the unit back in operation without even having to shut the boiler down. This is recommended maintenance at least once a year.

Design Features

- Tangential inlet produces clean dry steam for the Deaerator or Feedwater Heater
- 100% recovery of BTUs in the Flash Stage
- Reduces the amount of live stream needed for deaeration
- Stainless Steel Wear Plate in the Flash Area to eliminate erosion
- Efficient Spiral Coil Heat Exchanger
- No internal float valve to stick or clog
- One unit can serve many boilers even if they are operating at different pressures
- Maintenance is quick and easy

Free Heat Recovery Survey

Find out exactly how much you can save, by using the Penn Flash EconoMizer. We can save you important dollars, by recovering up to 90% of the heat normally lost with continuous blowdown with the economizer. There is no obligation to you for getting the facts about Penn’s Flash EconoMizer adapted to your boiler operation. For a free copy of our Heat Recovery Survey send us your name, title, company and address or telephone us at 888-PENNSEP (736-6737).
Save Money & Help Protect Our Environment

- CO₂ emissions reduced by 833 tons/yr.
- Reduction equivalent to CO₂ processed by 333 acres of trees/yr.
- Fuel consumption reduced by 61,582 gallons/year.
- Effluent 100°F

This facility utilizes Penn Flash EconoMizer Model AHRB 6-30

- 90% Total Savings
- 10% Loss Drain
- 55% Flash Steam Saved
- 35% Saved Coal Area

2800 lbs/hr Continuous Blowdown

Recovery Ability of BTUs in Blowdown

- Boiler 100,000 lbs/hr
- Fuel Oil 150 psig
- 40% load factor
- 80% boiler efficiency
- 7% blowdown
- Effluent to sewer 100°F