

How to implement blowdown heat recovery

As a daily or weekly routine, steam boiler plant operators blow down hot water from the boiler to avoid sludge forming. Unfortunately, the process leads to significant heat loss.

Blowdown heat systems can recover much of this wasted heat and reuse it, often to pre-heat make-up water for the boiler plant.

The business case

Each blowdown waste heat recovery project needs to be worked out individually for the quantity of blowdown being produced and the potential uses for the recovered heat.

The calculations are complicated and best carried out by a specialist. Most equipment suppliers will do this for free.

As a guide, though, you could recoup the costs of installing a system within five years.

The technology

A blowdown heat recovery system is made up of a flash vessel and a heat exchanger.

The flash vessel lowers the high-pressure blowdown stream to atmospheric pressure, generating flash steam and a flow of 100°C water. The flash steam is collected and used to provide heating elsewhere – by injecting into the boiler's hot well, for example.

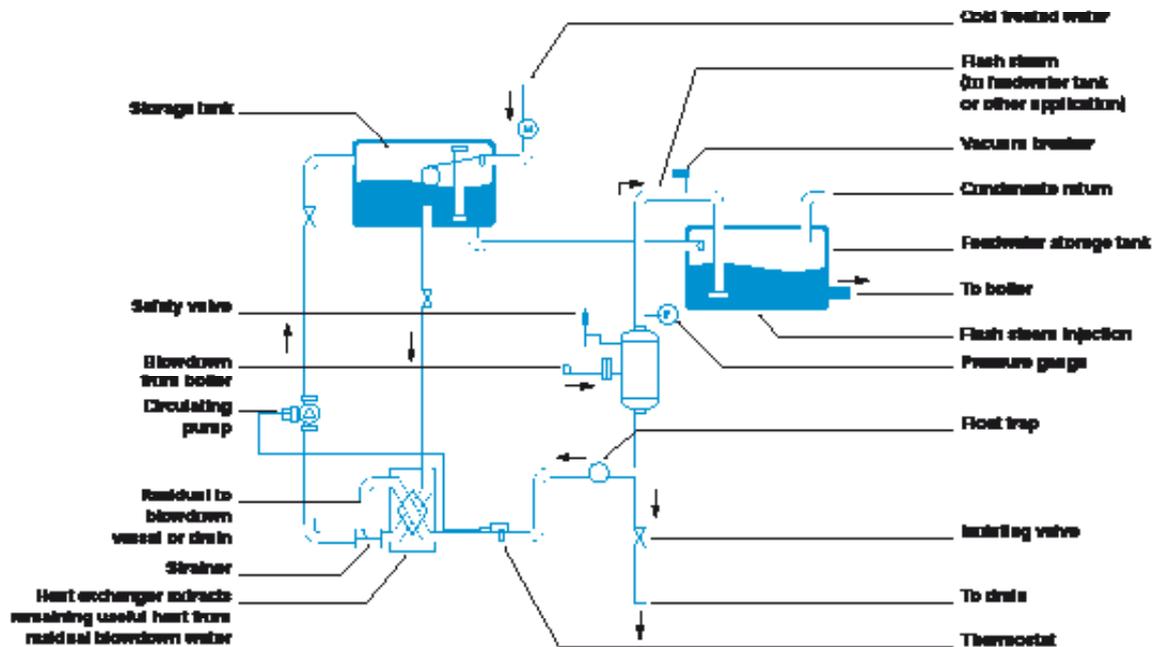
The hot water is discharged to the heat exchanger, from where its heat can be transferred to a process – make-up water for the steam system, for example.

Applications

Blowdown heat recovery systems can potentially be used with any steam boiler, but are unlikely to be cost-effective on boilers below 1,000kW. As a guide, they work best under the following conditions:

- Blowdown is carried out on a continuous basis, rather than intermittently. Continuous blowdown means you can install a much smaller heat recovery system.
- The boiler operates for long periods, preferably continuously.
- There are relatively low levels of condensation recovery, usually below 80%. Higher levels reduce the need for blowdown. It follows that waste heat recovery can be particularly worthwhile where a large amount of live steam injection is carried out.

Figure 1 A typical blowdown heat recovery system



Specification checklist

Choosing and specifying a blowdown heat recovery system takes specialist knowledge, especially as there are health and safety issues because of the high temperatures and pressures involved.

- You need to discuss the following with your supplier:
- The pressure and temperature of your steam/blowdown
- The litres of blowdown per hour or day
- The timing, temperature and quantity of heat needed by the process that will use the recovered heat.

Commissioning procedure

It's essential that any blowdown waste heat recovery system is installed by a contractor experienced in working with steam.

Leak tests are an essential part of the commissioning, vital for ensuring safe operation.

Any control systems associated with the heat exchanger system also need to be commissioned by a specialist controls contractor.

Common problems

Blowdown heat recovery systems rarely cause problems. Where they do, it's usually a matter of misapplication, rather than problems with installation and commissioning. Perhaps the most common problem is when there's not enough demand to absorb all the heat recovered from blowdown.

Finding a supplier

Blowdown heat recovery systems come under the Government's Enhanced Capital Allowances Scheme. You can see a list of ECA approved suppliers at www.eca.gov.uk

These systems should always be installed by a reputable heating contractor. You may already know of a good contractor; if not, contact a recognised trade association for advice.

The Heating and Ventilation Contractors' Association (HVCA)

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