Spirax Sarco FREME

(Flash Recovery Energy Management Equipment)

Leighton Hospital improved energy recovery and has reduced its carbon emissions by around 95 tonnes a year, cutting fuel bills by more than £10,000.

Intelligent engineering saves energy in a flash

Spirax Sarco FREME (Flash Recovery Energy Management Equipment) system is an innovative heat recovery system that enables steam system operators to achieve major energy cost savings by re-using all the heat from their condensate recovery systems.

Returning condensate from the steam distribution system to the boiler house and using it to heat the boiler feedtank is an extremely effective energy saving measure. For every 6°C temperature boost in boiler feed water, 1% is knocked off a typical boiler energy bill. The cost savings in today's climate of runaway energy prices will be substantial.

Not all steam systems can recover the heat condensate, this is mainly because:

1. It would raise the feedtank temperature to above boiling point. In practice, the maximum boiler feedwater temperature is 85°C or 90°C – above this and damaging cavitation can be induced in boiler feed pumps.

2. Up to half of the recoverable energy in the condensate can be lost as flash steam, which is generated as condensate leaves the pressurised steam system and returns to atmospheric pressure.

The high pressure solution

Spirax Sarco FREME overcomes this problem by feeding energy recovered from the condensate into the high pressure side of the feed pumps. The higher pressure means the boiler feedwater can be heated to over 100^{o}C without boiling and causing pump cavitation.

FREME works by passing condensate returning from the steam distribution system through a flash steam separation vessel. The separate flash steam and condensate streams each travel through a dedicated plate heat exchanger, where they heat the pressurised feed water before it enters the boiler. The two returning streams are then recombined and sent back to the boiler feed tank. At this point the combined stream is sub-cooled, so it is sufficiently warm to begin heating the cold feed but not hot enough to overheat the feed tank.

Spirax Sarco can supply the whole installation as a pre-engineered, skid-mounted system. The responsibility and risk for ensuring that the system will operate as specified passes to us. This approach takes virtually all the stress out of designing, specifying, building and installing steam, hot water and other systems.

Benefits of FREME

- Recovers all energy from flash steam and condensate
- Removes unsightly plumes of flash steam
- Reduces steam raising costs and increases boiler efficiency
- Substantial savings on water, effluent and treatment chemical costs
- Prevents cavitation in the boiler feed pump
- Low maintenance
- Quick and easy to install

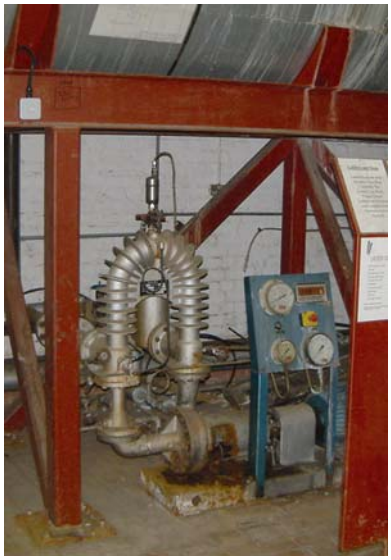
Don’t just take our word for it, here’s how FREME systems are currently saving steam operators thousands of pounds.

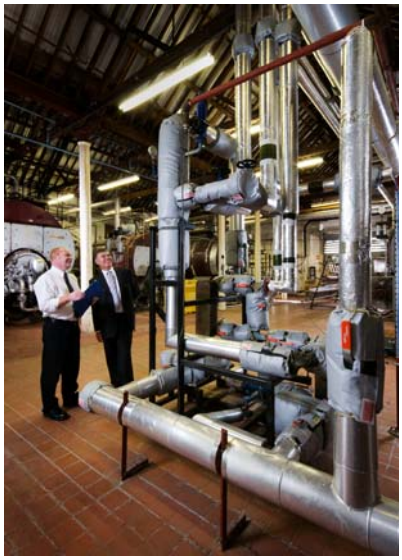
Award winning engineering

A FREME system from Spirax Sarco helped Abbey Corrugated become one of just 12 organisations across England and Scotland to be awarded the coveted “Carbon Trust Standard”. The installation of the Spirax Sarco system was the most valuable energy saving project undertaken by Abbey during its ongoing energy reduction campaign.

Abbey produces 160 million square metres of corrugated board annually at its site in Blunham, Bedfordshire. It uses most of its plant steam to heat the plates and rollers in its three corrugators. The skid-mounted FREME system from Spirax Sarco recovers the energy in condensate and flash steam from around the plant and uses it to preheat the feed water to the boiler. Supplying hotter feed water reduces the amount of work the boiler needs to do to raise steam.

Before the project, water entered the boiler at around 68 or 70°C. It now arrives at between 138 and 142°C, according to Abbey Corrugated's Facilities Manager, Paul Gale: "There was a lot of work going on at the time, but it's fair to say that the savings from this project were in the region of 25% of the gas used by the boiler."





Abbey Corrugated before… ***… and after***

Hospital cuts emissions

Leighton Hospital, in Crewe, improved energy recovery and has reduced its carbon emissions by around 95 tonnes a year, cutting fuel bills by more than £10,000 and helping the hospital meet its emissions trading targets.

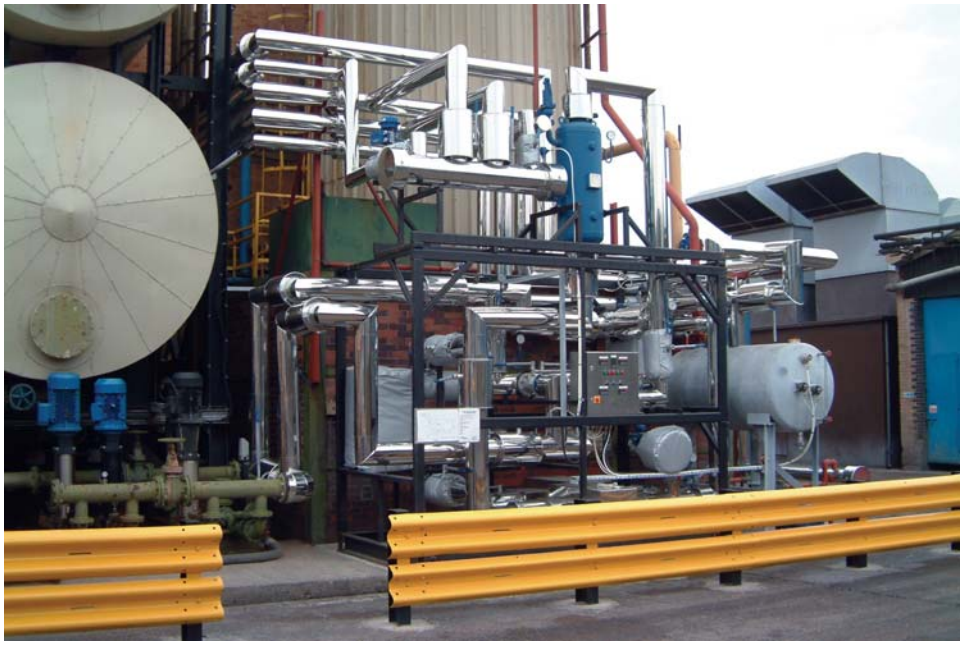
The skid-mounted FREME system is fitted on the condensate return from the hospital laundry. Around 1,500 kg/h of condensate heads back to the boiler room from the laundry, but an estimated 14% of this was previously vented to atmosphere as flash steam. The feed water used to pass directly from the feed tank to the boiler at around 80°C, but the flash steam now heats it under pressure to between 120 and 140°C – a rise of over 50°C.

Nicer for the neighbours

A similar Spirax Sarco flash steam recovery system is delivering direct energy savings of 10% plus a further 10% in indirect savings at De Mulder & Sons in Nuneaton. The system has also dramatically cut visible plumes of flash steam from the site, which is one of the UK's largest processors of meat and poultry residues.

De Mulder & Sons uses around 25 tonnes per hour of steam to dry and sterilise animal products. Before the new system was installed, the flash steam from the returning drier condensate was vented to atmosphere. The flash steam recovery system now raises the temperature of the pressurised feed to around 130°C, rather than the 90°C typically achieved before it was introduced.

There are five boilers on the De Mulder site, of which three were running prior to the arrival of the Spirax Sarco installation. Raising the feed water temperature improved efficiency and allowed one of the boilers to be taken off-line. This means that the remaining boilers now work closer to their optimal firing capacity, saving an extra 10% on top of the 10% saved directly by waste heat recovery.



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