Hotwell

The hotter the water the better, but pump cavitation can be a problem at higher temperatures. A hotwell should be correctly designed to mix returning hot condensate with cold “make up” water. Some hotwells can be too cool, or if a sparge has dropped off the water temperature can be stratified (hot at the top and cooler at the bottom) this means that cooler water is entering the boiler which will require more heat energy to bring the boiler water up to operating temperature. Depending on the amount of condensate returning, steam injectors are used to raise the water temperature in the hotwell which also means less anti-corrosion chemicals are required.

JBC can carry out hotwell surveys and make recommendations for improvement. New “bespoke” hotwells and are individually designed, manufactured and installed.

Steam traps

It is good practise to regularly test steam traps for correct operation. A leaking trap will waste energy and make the hotwell vibrate. A jammed trap will effect production.

Condensate heat recovery

Depending on the process (usually a close loop system) the temperature and amount of condensate returning back to the hotwell can cause vibration and excessive flash steam emitting from the vent. This is because the hot condensate flashes off to steam as the pressure in the system collapses. In effect, the water in the hotwell is boiling. In some applications it is possible to transfer heat from the hot condensate into the incoming feedwater (very much the same as a flue gas economiser).

Insulation

It is good practise to ensure that all pipework and heated vessels are fully insulated to prevent heat loss.

Metering

It is difficult to forecast exact savings and without accurate metering of fuel this is impossible. So it may be practical to install fuel metering before any modifications take place. JBC can provide a cost to install meters on all services if required.

If you are interested in saving energy and require a free energy audit please do not hesitate to contact us on 0113 2203830 or energy@jbcmail.co.uk where we will be more than pleased to help.

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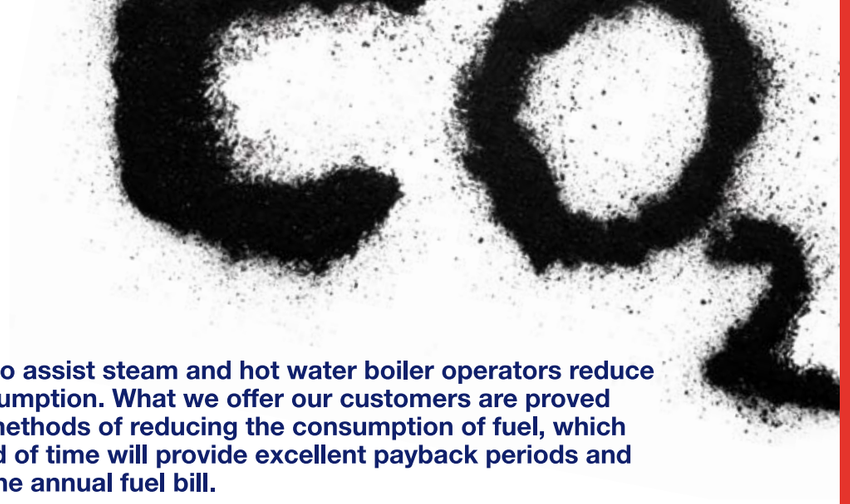
There are no ‘gimmicky’, ‘magical’ or ‘magnetic’ solutions, just proved and tested methods.



JBC is able to assist steam and hot water boiler operators reduce energy consumption. What we offer our customers are proved and tested methods of reducing the consumption of fuel, which over a period of time will provide excellent payback periods and savings on the annual fuel bill.

Digital combustion controls

This equipment replaces existing “old technology” mechanical burner modulation control linkages with an extremely accurate electronic control system. On a typical electronic modulation control system the combustion components of a burner i.e. fuel, air and primary air are each driven by an individual actuator.

These actuators are controlled by a programmable controller. Once commissioned, the inherent hysteresis of the redundant mechanical linkage is removed so optimal combustion is maintained throughout the modulation range. It is also important to ensure that the minimum amount of fuel is burnt to maintain the steam pressure target set point.

At no time, irrespective of load change is this target exceeded or fallen short of with a digital control system. Actuators have an incredibly repeatable high degree of accuracy (maximum error in degrees angular rotation is 0.1 degrees).

Minimum savings of 5% can rise to 8-9% dependant on the condition of the burner linkage.

Oxygen trim systems

Oxygen trim is an “add on” to the digital combustion controller. With this system, a probe is installed in the boiler flue exit.

This probe constantly samples the flue gases for the optimum oxygen content and “trims” the air setting to ensure that the burner fires at optimum efficiency throughout the firing range.

With the fuel characteristics programmed in and fixed, the combustion air is constantly adjusted whatever the firing rate to ensure optimum combustion efficiency throughout the firing range.

Additional savings of approximately 2% can be achieved by utilising a trim system.

Variable speed drive (VSD)

A VSD fitted to the forced draught (FD) fan motor on a burner will compliment the digital combustion control system and produce further savings.

Depending on the modulating characteristics of a burner there are considerable power savings to be made. These savings are maximised on lower fire settings and deteriorate as the burner modulates to high fire. As the burner modulates past half fire the savings gradually disappear. A typical “old technology” burner will have a fixed speed FD motor with the modulating air flow controlled by mechanical dampers.

When a VSD is fitted to the fd motor the dampers are removed with the fan speed controlling the amount of air required for the combustion setting. More savings are possible because the digital combustion control system combined with a VSD enables the turndown of the burner to increase from typically 4-1 for a mechanical system, to 8-1 with an electronically controlled system including VSD. This means that the burner will continue to fire on extremely low fire settings and reduce the need for the burner to keep constantly stopping and starting during periods of low steam consumption, which will consume more energy as well as cool the boiler down through periods of pre and post purge during the start up cycle.

Power savings can be 50% resulting from a 20% turndown from VSD to FD fan motor Further savings on combustion are approx 2%.

Flue gas economiser

Typical boiler high fire exit flue gas temperatures are approximately 250°C. This heat can be utilised to pre heat the feedwater entering the boiler. The hotter the water entering the boiler the less fuel energy is required to bring the water in the boiler up to operating temperature.

As we all know, water boils at 100°C so it will be necessary to pressurise the feed water so the temperature can rise to above 100°C. To achieve this pressure, it is necessary to convert the feedwater pump to run continuously and install a modulating feedwater control or alternatively a three port valve. Essentially an economiser transfers the waste heat from the boiler flue gases into the incoming feedwater from the hotwell.

Water not going into the boiler is transferred back to the hotwell so subject to the amount of hot water returning back it may be possible to shut off the hotwell steam heating, thus making additional savings.

Minimum savings of 5% can rise further subject to individual application to 7-8%.