Reduce footprint through biomass

In the first of a two-part article Martyn Griffiths, technical consultant for the Hot Water Association, looks at how to use unvented systems in conjunction with solid-fuel heating appliances

hot water association

One way of significantly reducing the carbon footprint of a property is to provide some or all of the energy for space and water heating by means of biomass.

There is a popular misconception that Part G3 of the Building Regulations does not permit the heating of unvented systems by solid fuel appliances.

This is not the case, since Part G3 relates to control of the temperature of the stored hot water, regardless of the type of heating appliance.

Part G3 relating to stored water temperature will be satisfied provided the heat input can be isolated by means of a zone valve or other no less effective means.

The problem with solid-fuel appliances has always been what happens next, since we now have to either shut down the heating appliance quickly or safely divert its output elsewhere.

It should be noted that this article is geared at small-scale domestic installations, and is intended for broad guidance only.

Any specific solutions for connecting solid fuel to unvented systems should be cleared with the manufacturers of the relevant equipment to prevent any possible injury to people or damage to equipment and property.

Most solid-fuel appliances installed in the UK produce hot water by the use of a vented copper cylinder using gravity circulation.

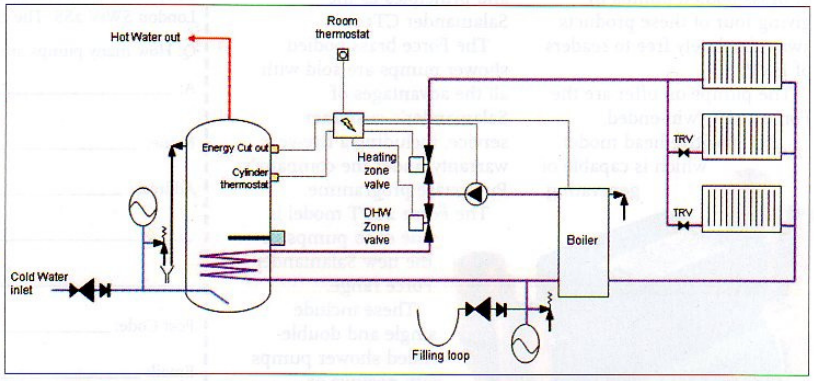

Figure 1: Boiler with a quick shut down (can also be used with vented primary)

In the event of excess heat being produced, the first thing that happens is that the cylinder acts as a heat dump with the water getting progressively hotter. In extreme cases boiling can occur, hence the requirement for the cylinder to be vented.

Such systems often use a heat dump radiator as an alternative means of dissipating excess heat. This radiator is on the hot water circuit and must not be fitted with a thermostatic radiator valve.

In this half of the article we will examine the easier options such as the new generation of wood pellet or woodchip boilers, where the fuel is fed into the boiler as required by means of a screw (or other means). In general, these appliances can be shut down relatively quickly should they receive an over-temperature signal from the cylinder controls.

These boilers can generally be used with fully-pumped indirect systems using either open-vented or sealed primaries and from a G3 unvented cylinder perspective their control is similar to gas or oil boilers.

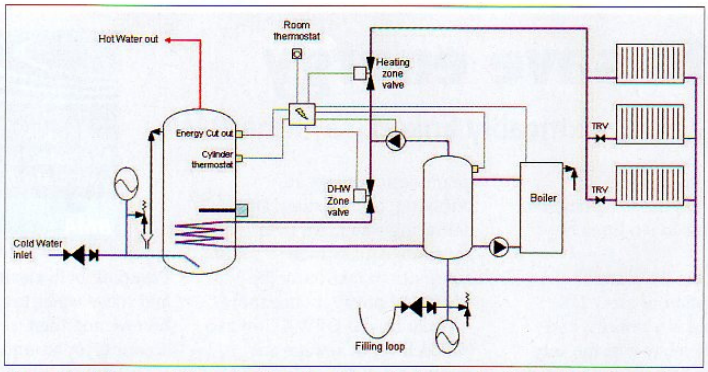

Figure 2: Boiler requiring a buffer store (can also be used with vented primary)

A typical system where more or less instant shut down is possible is shown in figure 1.

In some instances, and particularly with higher output boilers, an overrun period may be required where heat is diverted to the space heating circuit or an associated buffer store.

This type of system is shown in figure 2, and installers should remember that the buffer store should meet the same requirements for keeping temperatures below 100°C as for the domestic hot water vessel.

As a final boiler safety feature, many modern solid-fuel appliances have an internal quench coil to safely dissipate heat directly from the boiler, should the hot water and heating system be unable to absorb the output.

In the follow-up article next month, we will be dealing with other options including boilers with a higher thermal mass of combustible materials, thermal stores, neutralisers and the use of multiple appliances.

The Hot Water Association (HWA) is working with HETAS and associated trade organisations to give more detailed guidance on this subject. This also includes participation in the Renewable Energy Systems Integration Group – www.resintegration.co.uk.

Further information will also be posted on the HWA website at www.hotwater.org.uk.

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