ZEDboilerhouse

Prefabricated Biomass Boilerhouse and fuel store

Features

- 15kW ZEDspec Greentec wood pellet boiler by Ashwells
- Generic UK non specialist control system
- ZEDdistrict thermal store by DPS
- Prefabricated fuel store
- Automatic dual system fuel level remote monitoring by Terrabase
- Automatic Fuel ordering
- Automatic heat output monitoring
- Automatic ash monitoring
- Optional automatic systems monitoring
- Prefabricated Hot Dipped Galvanised frame
- All systems pre plumbed, prewired and tested
- Plug and play facility

Details

15kW ZEDspec Greentec Wood Pellet Boiler by Ashwells

- This power of boiler is suitable for up to 6 homes
- Larger boilers are available though we would recommend using further boiler houses rather than single, centralised boiler houses. This allows flexibility and keeps the heat main plumbing domestic in nature and hence allows non specialist (i.e. local plumber) maintenance and repair.
- Manufactured in the UK
- Designed to be tolerant of variable quality UK sourced wood pellet
- No computer control system – generic simple systems only again for easy of non specialist maintenance

ZEDdistrict thermal Store by DPS

- Large capacity thermal store allows the boiler to work at optimum efficiency
- Both the boiler and the store working together can satisfy peak demand
- Avoids the need for the boiler to run at partial load, hence coking up is avoided and wood pellet consumption is optimised
- Allows heat to be supplied for a period while the boiler is switched off for maintenance
- Allows simple thermostatic switching of the boiler rather than complex time/demand/profile controls hence no commissioning/balancing profile setting required.

Prefabricated Fuel store (Fuel ordering and payment system by Terrabase)

- Designed to give large intervals between refilling
- Shape optimised to allow pellet flow
- Filling from blown tankers or sack delivery

- Dual system level monitoring (ultrasonic and physical) with automatic broadcast back to an internet based ordering and payment system
- All systems prefabricated and tested ready for plug and play

Hot Dipped Galvanised Steel Frame

- Whole assembly constructed within a frame designed for flat bed truck delivery
- If access is available, installation can be direct from the truck to the final position using the truck's Hyab
- Lugs and fixing points to allow cladding in a variety of finishes to match the building to which it is to be attached.

The system

Output first…

A heat main in 28mm copper runs in a service trench along the rear of the terrace. From this Tees off 15mm copper branches to the monitored heat input exchangers on the ZEDstore district thermal stores. Each of these branches has a tamper proof landlord stop cock. At the end of the terrace there is a balancing valve between the flow and return mains.

The main is insulated after commissioning with high temperature 25mm armaflex insulation and fully taped.

The mains water is common to the thermal store. It is pumped and mixed to be at a constant 75deg. This allows the tank to be heated to 95deg giving 20degs of working storage.

The pump only operates when a signal is received from a ZEDstore thermostat. This is a standard 'triple and earth' thermostat signal to a basic zone controller where only the pump on/off contact is used.

NOTE: Questions to Richard

Could we use an underfloor heating manifold and controller and operate each store like a zone on a heating circuit? This would allow the heat meters to be located in the boiler house and hence only need one SMS sender.

However we would loose the direct viewing of heat usage by punters and would have to add lots of additional pipe runs. If this was a problem then the meters could be kept on the tanks and wired back to a central sender, though hopefully the senders are so inexpensive to make this unnecessary. As this could be in PEX, it might be simpler and more robust to install but should be costed up. The heat output might also not be enough through such lengths of 16mm pipe.

The Thermal Store

This is sized to store sufficient heat to deliver peak demand heat for the longest peak forseen with the boiler running at maximum power at the same time. A store should be chosen to be an economic standard size that could still have a small reserve of 75deg+ heat at the end of the forseen peak period.

The store can be un-pressurised with a header tank above it since it is only supplying ground floor ZEDstores.

The Boiler

The boiler heats the store with an external flat plate heat exchanger and pumped circuit. The boiler would mix its return temperature to avoid condensation as required by the manufacturer. The boiler circuit would be pressurised and buffered.

The boiler burns would be controlled by simple on and off thermostats on the buffer store. The upper stat would protect the store from boiling, the lower stat would be the off stat, a middle stat would be the on sat. (Advise from DPS required)

The during prototype testing, a running regime would be tuned that gave the maximum full power run times. This is imagined to be letting the middle stat call for heat once it gets down to 75degC, so assuming there is + 75degC above it. The boiler would then burn till the bottom of the tank reaches as high a temperature as possible without the top boiling. This set point would have to be determined following testing but would be assumed to be in the region of 80degC. The top sat would switch the boiler off at 98degC. The boiler would then await an on signal from the middle stat.

Fuel feed

To avoid duplication of mechanism and space requirement, the day hopper that normally comes with the boiler should be replaced with the main hopper. However the main hopper should be designed to feed to the same place the day hopper fed so the standard auger feed can be retained. This will dictate the shape and size of the store as the sides of the hopper will have to slope from this point. Use of ‘shinny metal’ slopes should be investigates to try and get the shallowest slope and hence the greatest volume of storage.

Fuel Level Gauge

In addition to the automatic web based management of fuel delivery, a crude visual level gauge should also be used. This could be in the form of a glazed panel in the store wall through which the pellets can be seen. Combined with LED lights within the store, the level will be especially obvious at night.

Fuel filling

Fuel filling facilities should be flexible. This means that both a tanker connection and vent should be build in and a sack grate with cutting spike/edge. The flap for this filling technique should also allow shovel filling from, say, a bulk lorry.

Frame

The frame should be hot dipped galvanised steel in channel or UB of UC sections. This will allow easy drilling for bolts and clamps. The main design driver will be the dimensions and load handling ability of a flat bed truck with Hyab. The lifting and transport loads are likely to be much higher than static loads. This will determine the maximum size. This size should be coordinated with the RuralZED gable wall and equipment. As large a size as possible is advantageous as this can be taken up by the wood pellet store.

As the boiler house may be placed on either end of the terrace, the whole unit should be capable of offering either long side to the outside without getting into handing issues. (This should be cost checked)