

Unit 11, Conway Industrial Estate

Skull House Lane
Appley Bridge
West Lancashire
WN6 9EU
T: 01257 255825
E: david@ground-heat.co.uk

BELLAMY COURT PLANT ROOM

The Plant Room at Bellamy Court is to house the communal GSHP and associated plant consisting of :

40 kw Heliotherm GSHP.

1,000 ltr Buffer Cylinder, including unvented kit and heating expansion / pressure vessel

600 ltr Domestic Hot Water Store, including un vented kit and pressure vessel.

40 kw plate to plate heat exchange

Bore / brine distribution circulation pump.

Communal radiator circuit pump sets

The Communal GSHP shall provide 100% of the communal heating and DHW load.

The GSHP will feed the buffer cylinder supplying the communal radiators throughout the building. The buffer will be weather compensated with a design run temperature of 45 deg at peak load at -2.2 deg externally.

Ground, first, second and third floor to have separate circuits all terminated back to the plant room. Each circuit to be controlled via one room stat fitted to each floor in turn operating the circulation pump appertaining to each floor.

The heat pump can be set in summer disconnection mode. This allows us to input an average external outside temperature which puts the heat pump into summer disconnection mode leaving only the DHW in operation. The weather compensator does a similar job but relying on the compensator this allows unnecessary circuits to remain running when not required. Typically, we set this at 18bdeg external but this can be higher or lower to accommodate the residents' requirements. This setting prevents over heating during the summer months.

COMMUNAL DHW

The DHW shall be heated via a plate to plate heat exchanger. A bronze hot water circulation pump shall be fitted to the secondary hot water side of the plate to feed the store . A secondary hot water circulation pump shall be fitted to the DHW store for the M&E contractors to make off from for their secondary DHW circuit throughout the building.

DE SUPERHEAT (DS)

De super heat is the excess waste heat left over from the fridge cycle of the heat pump. Typically a heat pump has around 20-25% waste refrigerant heat at 70deg + whilst still in the gaseous state, before entering the expansion valve to return the refrigerant from a gaseous state to a liquid state.

The Heliotherm has an extra plate to retract this waste heat before entering the expansion valve. By doing this we can reclaim 20/25% of the units output (10 kw) of high temperature heat otherwise wasted. It is this heat that allows us to take the DHW temperature to 60deg+ without the need for electrical backup.

Buffer cylinder

The heat pump has three flows and three returns. One flow and return pre heats the store up to 50/52 deg. The second flow and return delivers low temperature flow and return to the radiator circuit (weather compensated). The third flow and return is the de superheat circuit.

When using buffer volumes above 800 ltr we achieve stratification. The heating circuit being the low temperature circuit is taken from the bottom half of the buffer cylinder, which we control via high and low sensors. The top half of the buffer is used for DE superheat storage of up to 80 deg, which is also controlled via high and low sensors.

The heat pump shall heat the DHW store to 50 deg DHW temp. The De superheat store is also feeding the DHW store to take the store temperature up to 60deg+.

Whenever the heat pump runs it will produce de superheat. We cannot stop this occurring when using DS.

When the heat pump is in heating mode, the DS is stored in the buffer to serve the DHW when required. Once the DHW temp is achieved, the DS is then circulated into the lower half of the buffer via the destrat pump and circulated through the communal radiator circuit. This will raise the radiator circuit temperature thus reaching room temperature more quickly and then go into the off position. Only once the DHW or heating circuit calls will the DS cycle start again. Effectively when in heating mode we can achieve free DHW and when in DHW mode we can receive 20/25% heating for free.

COAXIAL BORE FIELD

Bellamy Court shall have 12 x 200 m coaxial bore holes in total. Two of the bores shall supply the communal GSHP direct and not form part of the shared ground collector. The remaining 10 x 200 m bore holes shall supply the 106 apartment GSHPs. This design is necessary to achieve a separate standalone RHI application for the communal heat pump and another for the collective 106 GSHPs fitted to the apartments.

The coaxial system has a far greater working pressure to that of a traditional bore probe system. This allows us to negate the use of a plate heat exchanger between the bore field and riser system as needed with traditional probes. This also gives us around a 5% increase in efficiency negating a plate.

APARTMENT BRINE RISER SYSTEM

A 90mm brine riser system fitted throughout the building supplies the brine from the bore field. This is typically 8 deg during winter months and 10- 18deg during summer.

The bore and riser circulation pump is a dynamically controlled unit, so that when any apartment heat pump goes off then the circulation pump reduces the velocity of the brine circulating through the risers. As and when each heat pump calls for heat or DHW the circulation pump increases velocity.

REMOTE GATEWAY

Our unique web portal allows us to see, monitor and control every parameter within the GSHP. We have early warning alerts and error alerts via text and SMS. There is no requirement for a separate BMS as our system offers greater access and controllability. Should you prefer to use a BMS, then we can introduce dry pockets to our system to facilitate this for others to install.