

Fact Sheet - Sizing Kensa Compact Heat Pumps

Kensa always recommend that Compact heat pumps be sized to match the full heat losses of a building. We do not allow deductions from the size of the heat pump because there is another heating appliance fitted, such as a wood burning stove – or an electric “flow boiler” or “immersion heater”. The only exception is for *open-loop* systems, where the temperature of the ground loops will not fall as a result of excessive heat pump run time.

Most ground source heat pumps use a *closed-loop* ground array system, such as Slinky’s or boreholes, which use the ground as a solar battery. This is an exhaustible source of heat energy that needs to be recharged, for example, every time it rains, and through the warmer summer months. The design of *closed-loop* systems must match the heating requirements of the building. From a design perspective, the heat pump sits between the ground arrays and the building, but unlike the ground arrays, the heat pump is rated 24/7.

It is reasonably straightforward to calculate the size of a space-heating appliance for a new UK building because in order to comply with the Part L of the current Building regulations, it should not need more than about 50 watts per square metre of peak heating requirement.

The figure presently used in the UK is 10 metres of Slinky trench for every 1 kW of heat delivered from the heat pump, and for vertical systems, one 70 metre borehole should deliver between 3 and 5 kW of heat delivered from the heat pump. The amount of solar radiation landing at any point on the earth’s surface depends on latitude and climate – not soil type. So, the amount of energy available from a horizontal slinky ground array does not greatly depend on soil type – although different soil types have different thermal conductivities.

The only other factor that needs to be taken into account is the amount of time that the heating system needs to run - which will be different for the Isles of Scilly in the South and Inverness in Scotland.

For older properties, it is more difficult to calculate how much heat is required. It is important to realise that many buildings that are being built today, and will be built in the future, may be based on the old insulation requirements under old building regulations - because they were agreed in advance of the implementation of the new regulations. Some major house builders will not be required to insulate new houses until as late as 2005, so it should not be assumed that just because a house is new that it is well insulated.

To design a system that uses the ground as a battery is much more complex than for fossil fueled boilers, and will always be a compromise.

Maximum use of off-peak electricity is advised, by starting the heat pump at midnight, and running through until the thermostat is satisfied. Some people will not pay for any peak electricity at all under any circumstances. For instance some might prefer to light a wood burning stove in the deep winter, when seven hours off-peak heat pump operation might be insufficient. However, even in these circumstances, the heat pump/ground arrays must still be sized to meet 100% of the heating requirement of the property.