



RAISING STANDARDS; RAISING PERFORMANCE

The GSHPA's Jake Salisbury sheds light on the need for industry standards

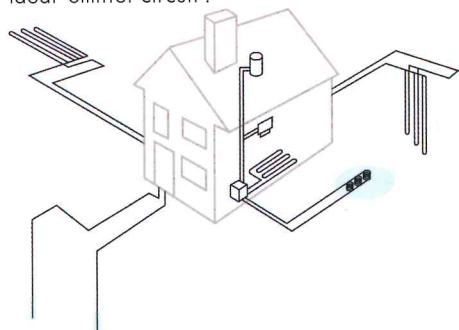
Some years ago, it was recognised across industry that the UK ground source heat pump (GSHP) industry was lacking the guidance required for the effective operation of installed systems. The Ground Source Heat Pump Association (GSHPA) was involved in this process and initiated the appropriate steps being taken - the writing and publication of Installation Standards.

There are other standards and guidance documents now available across the industry and the GSHPA has worked closely with DECC, the MCS, and the Environment Agency (EA) in their development. Within MCS, there is an installation standard of heat pumps: MIS3005, which references the GSHPA's Vertical Borehole Standards.

High Grade and Low Grade Heat

A gas fired central heating system is a system that we are all familiar with; what could be so hard with a GSHP system you ask? A gas fired boiler is mounted on the wall and generates heat by burning natural gas. This high grade heat is then circulated around a distribution system (central heating radiators for example) and the building warms up.

A heat pump system follows the same route – low grade heat is taken from, say, the ground and through some hocus pocus magic inside this 'box', that low temperature is upgraded to a useable level. A heat pump system works best when a distribution system operating at a low temperature is used; underfloor heating is the ideal 'emitter circuit'.



THOUGHTS FROM THE...

GSHP association

What is fundamental to the operation and lifetime of a GSHP system is what happens in the ground. Any building has a specific heat load or requirement – depending on the amount of heat lost through ventilation, glazing the general structure of the building. As with a gas boiler, a heat pump must deliver the right amount of heat to keep the building at a comfortable level.

Geological Variations

Not to get too technical here, but this is where things get a little complicated. Across the British Isles, the geology varies massively. As this geology varies, so too does the amount of heat stored in or available from that ground. This is termed as the thermal conductivity.

If one installs a GSHP system in a home in Penzance, the system will require a certain amount (meterage) of heat exchanger in the ground to deliver the required heat for the home. In an identical home in Aberdeen, the ground heat exchanger would need to be 40% bigger.

There are a number of ways of accessing the heat stored in the ground, using high density PE pipes (PE100+, PE-RC or PE-X), laid in different ways:

- Vertical Borehole: holes drilled in the ground to the required depth (up to 250m in the UK for large scale commercial installations) to provide sufficient heat for the heat pump and heat load of the building
- Thermal Pile: Piles that support the building can also be used as Energy Piles – i.e. the heat can be collected around the piles and brought into the building and heat pump.



Commonly this type of system could be used for commercial installations

- Horizontal Trenches: at a minimum depth of 1.2m, PE pipe can be laid horizontally – either as a slinky or as a straight pipe, in trenches
- Open Loop: still considered a type of GSHP system, an open loop system extracts heat from a body of groundwater rather than through a closed-loop system used in the examples above. Not as commonly used as closed-loop, these are still a viable option.

To date, the GSHPA has written and published two standards documents – the Vertical Borehole Design, Installation and Materials Standard (VBS) and the Thermal Pile Standard (TPS). Both of these are available on request from the GSHPA website:

www.gshp.org.uk/Standards.html

We are currently working on the final stages of our next Standard, on horizontal systems: Shallow Ground Source Standard (SGSS) which we aim to publish in line with the launch of the domestic Renewable Heat Incentive later this year, in spring 2014.

The 4th standard, also in the process of being written and aiming for publication during the first half of this year, is an Open Loop Standard which will provide the specification for this type of system, for which a number of different considerations must be undertaken.

On the UK's journey to a low carbon future and in line with the renewable energy targets we are aiming for in both 2020 (15% generation from renewable sources) and 2050 (80% reduction in carbon emissions on 1990 levels), GSHPs will undoubtedly become a major contributor to meet our heating & cooling demand. Targets suggest over 300,000 systems by 2020 and 10 million by 2050.

A long way to go, but supported by the specification standards of the GSHPA, training and installation standards developed by the Association and industry, this should be an exciting journey!

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