

Heat Pumps: an adequate solution?

Do heat pumps as applied purely to space heating really contribute to a reduction in energy costs? Heating-only heat pumps, represented as low carbon and efficient heating solutions, have become positioned in market areas that are poorly serviced.

It is possible for us to be enticed into specifying heat pumps for heating-only applications despite having little real performance data. Irrespective of the heat exchange mechanism (air-to-air, air-to-water, ground-to-water) there are significant pitfalls to overcome in design, and where this is not appreciated many heating-only installations fail.

A large number of products claim to offer both high seasonal coefficient of performance (CoP) together with copious amounts of hot water delivered at over 60°C. In reality, heat pumps typically work most effectively when the leaving water temperature does not exceed 55°C, with lower leaving water temperatures producing superior energy efficiency.

With elevation in leaving water temperature seasonal CoP will suffer, or else leaving water must be kept low in order to maintain a good seasonal CoP. However, if the heat pump is used for both heating and cooling this problem can be overcome.

It is very easy to incorrectly size a heat pump; the application will fail, producing either higher running costs or installed costs.

Heat pumps have the best chance of success if they are designed as part of new, or well-constructed and thermally efficient, structures. Heat pumps require correct application, which takes skill in design, installation and commissioning. Perhaps more importantly the client should be made aware of all aspects of their use, both 'pros' and 'cons'.

Bruce Boucher, 17.01.11

Key Issues

- Don't rely on questionable performance data
- Calculate carefully both heating and potential domestic hot water loads
- Identify noise issues in air-to-air units
- Carefully check out heat emitters in air-to-water units
- Execute a detailed examination of geographical issues in ground-to-water units
- Consider solar-thermal as an addition where domestic hot water is to be generated
- Choose suppliers/contractors who know their products well
- If possible, see a similar working system with decent operational data
- Consider whether supplementary heating will be required
- If possible, monitor operational running costs after final commissioning

Web Links

Institute of Refrigeration - Air Conditioning & Heat Pump Institute (www.ior.org.uk/achpi)
Heat Pump Association (www.heatpumps.org.uk/)