

# High efficiency electrical heating



Refrigerators, freezers and office air conditioning unit are all forms of Air Sourced Heat Pump (ASHP). Low grade heat in the incoming air is upgraded to high temperature which is rejected back outside with the cold exhaust air being used to cool the original space.

However, ASHP's are reversible and in winter can become space heaters, operating in exactly the same way yet instead of rejecting the high temperature heat and using the cold, the reverse occurs, i.e. low grade heat in the incoming air is upgraded to high temperature which is used to heat a water loop, with cold air being rejected back outside.

Depending of the differential temperatures involved Heat Pumps can deliver as much as 4kW of heat output for each 1kW of electrical energy used, making them a very efficient way of using electricity for heating.

Ambient air is drawn into the unit, compressed. During this process high temperatures are created and transferred to a loop of circulating water, which can be used to heat a storage tank and for space heating.

Ideally this would be to low surface temperature such as under floor heating systems at around 35-40°C, but models are now available that can heat to 75°C making them usable with traditional radiator systems. Some manufacturers offer units that can be operated in reverse as coolers in the summer.

Sizing an ASHP is simple as they are made in a range of kW sizes to match the heating load requirements of the building and they can also be sized to provide a tank of hot water.

Models are available for external or internal mounting and in sizes from 2kW for residential, commercial and industrial applications.



As with all heat Pump technology, maintenance is low and problems are few as systems have very few moving parts. When the incoming air is extremely cold, frost forming on the coils will require the unit to perform a 'defrost' cycle. This is an automatic feature of all models offered and in operation you could notice a momentary fluctuation in performance.

Whilst they use electricity to operate they have a Coefficient of Performance (CoP) between 3 & 4, meaning lower energy bills and CO<sub>2</sub> emissions reduced to 30-35%. Further carbon savings can be made if the electricity used to power the heat pump is generated from a renewable energy source such as Photovoltaic, Wind or Hydro renewable source. (see separate information sheets for details on these technologies.)

Installation is not difficult and can be carried out by any competent plumbing / electrical engineer. A quality product installed into a well engineered system should have an operating life of over 20 years or more. Currently there are no grants available for installation of ASHP's.

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