



SustainableEnergy

Calorex[®] air source heat pumps

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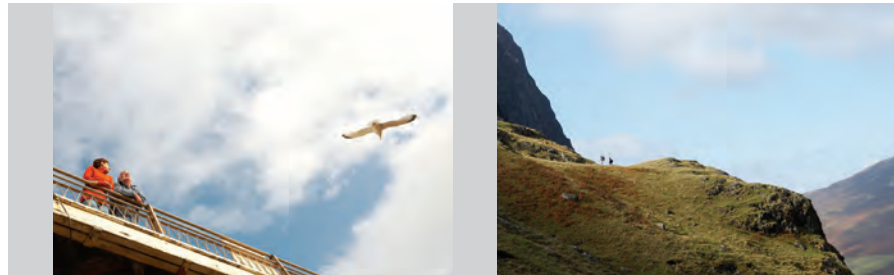
Sustainable Energy is the low carbon, decentralised energy expert within E.ON. We have the capabilities that comes from being part of a major energy company. We are leaders in providing energy from renewable sources and technologies - from small microgeneration systems to large, decentralised and Energy Service Company (ESCo) funded, community-based energy centres.

We're here to help you achieve your low carbon and energy reduction objectives in whatever way we can - from initial advice, planning and independent surveys to solution design, installation, maintenance, metering, billing and 24 hour support for you and your customers. We can also assist with funding by helping you to apply for Government grants, other financing opportunities and ESCo models for larger projects.

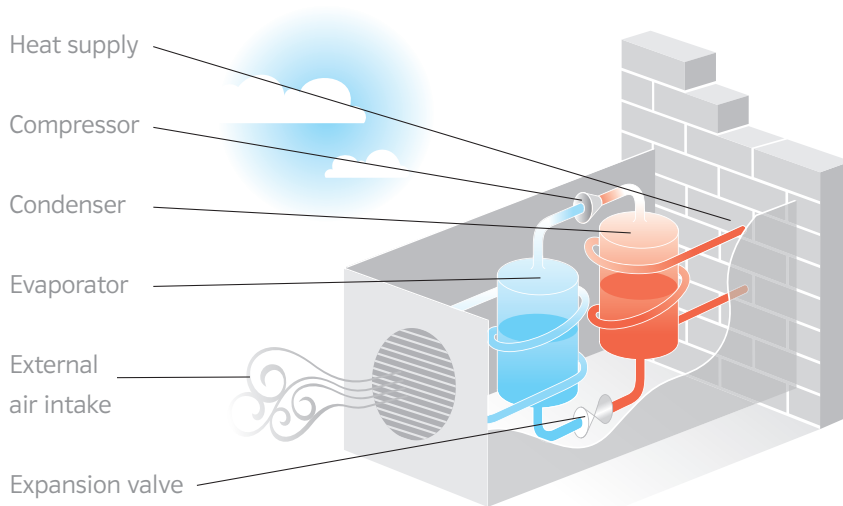
Our experience of implementing more sustainable solutions in a wide range of situations gives us a unique insight into the problems and opportunities you face. Our knowledge, expertise and capabilities are switched on and ready for you now.

All technical specifications, performance illustrations, characteristics and energy saving claims have been sourced from Calorex and other industry sources.

How an air source heat pump works



Air source heat pumps (ASHPs) work by extracting heat energy from the air and concentrating it before transferring it into water to supply heat and domestic hot water into a building. By extracting and compressing the heat from surrounding air, the heat energy released at the end of the compression cycle can be three to four times greater than the energy required to operate the ASHP. This makes an air source heat pump a very efficient means of heating both space and water.



Benefits

- More heat is supplied than electricity consumed by the pump. An ASHP with a Co-efficient of Performance (COP) of 3 will supply 3 kW of heat energy from 1 kW of electricity
- Significant carbon and running costs savings over electric and solid fuel heating with typical carbon savings of around 30-50%
- Helps achieve Code 3 of the Code for Sustainable Homes alone and Code 4 when used in conjunction with energy saving methods such as insulation
- Ideal for non-mains gas applications
- No flue or ventilation requirements make it easy to install and it requires only a water and electrical connection
- Avoids the need for expensive groundwork associated with ground source heat pumps
- Reliable proven technology with a long life expectancy of up to 15 years
- Low maintenance costs with no need for gas safety certificates as with a traditional boiler
- Can be used for space heating and domestic hot water
- Up to 50% funding available through the Government's Low Carbon Buildings Programme 2 Extension (LCBP2E)
- Can be used to reduce fuel poverty in off-gas areas

* Available to public sector and charity organisations only

Specifically developed for UK housing



Independently tested and accredited under the Government’s Microgeneration Certification Scheme (MCS), the Calorex range of air source heat pumps has been specifically developed for UK housing, climate conditions and heating systems.

Today, legislation requires that most planning application approvals depend on houses being built to levels 3 or 4 of the Code for Sustainable Homes, delivering energy efficiency above Building Regulations Part L. Calorex ASHPs help to achieve, the legislation, with no change to the basic structure of the building.

Funding support

Under the Government’s Carbon Emissions Reduction Target (CERT), the Low Carbon Buildings Programme 2 Extension (LCBPE2) and recent European legislation, Calorex ASHPs may be eligible for funding support because they qualify as a renewable energy generation source.

We can help you apply for any grants that may be available to you.

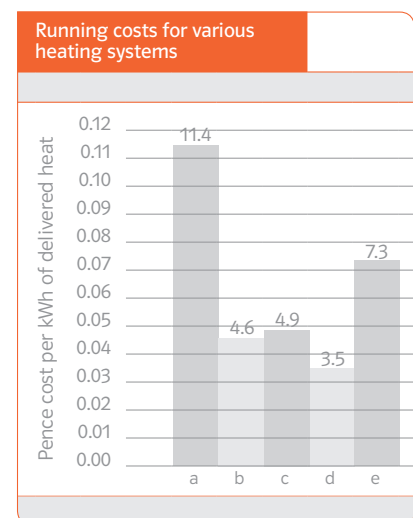
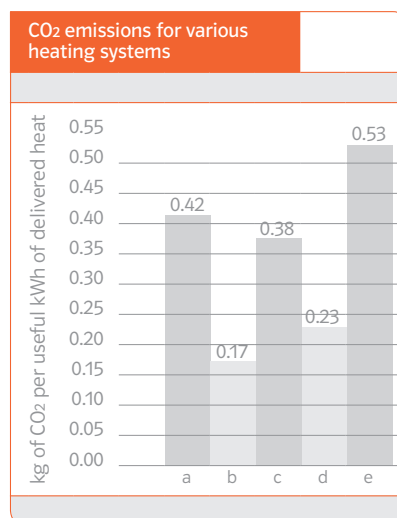
Independently tested

Calorex ASHPs have been tested by The Building Services Research and Information Association (BSRIA), the independent and professional industry organisation.

- a Direct electrical heating
- b ASHP ¹ with SPF ² of 250%
- c Oil boiler with SPF of 70%
- d Gas boiler with SPF of 83%
- e Coal system with SPF of 55%

¹ SAP 2005 Seasonal Performance Factors (SPFs) used. Actual performance will depend upon system design and usage patterns.

² Assumes ASHP is used with underfloor heating.



Based on published industry information. Actual cost of fuel will vary upon energy supply tariff.

Calorex® monovalent solutions



A monovalent system is ideal for new builds where an ASHP heating and hot water system can be specified from the outset, very well insulated properties or retro fitted in highly insulated existing dwellings with low temperature space heating requirements. It can be sized to provide 100% of the heating requirement on the coldest day of the year and all of the annual domestic hot water requirement and activate defrost cycles as rapidly as 4 minutes per hour when necessary.

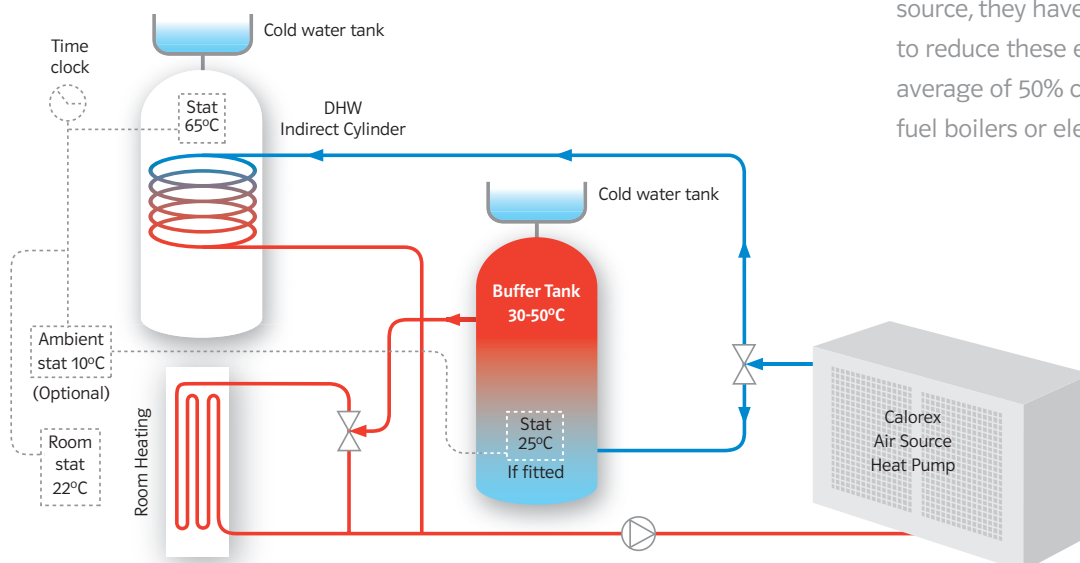
Reduced energy costs

Energy cost savings of 35% can be achieved by using a Calorex ASHP as opposed to a conventional electric,

oil or coal fired heating and hot water system. That's because a Calorex ASHP can deliver up to 2.5kWh of useful energy for every 1 kW of energy needed to run it.

Lower CO2 emissions

Domestic heating accounts for almost 30% of all the carbon emissions in the UK. Because heat pumps use a renewable energy source, they have been shown to reduce these emissions by an average of 50% compared to fossil fuel boilers or electric heating.



Calorex® benefits



As well as heating the home efficiently, Calorex air source heat pumps are designed to supply domestic hot water above 60°C without the need for electric heating back-up. Heating and hot water are managed by a standard central heating programmer with a room thermostat controlling the heat output in the same way as a conventional boiler.

Consumer benefits

- Simple and easy to understand operation and controls
- Designed to integrate with standard central heating programmer
- Very low sound levels
- Delivers space heating temperatures variable from 35°C to 55°C
- Requires only plumbing and electrical connections
- Works with underfloor heating or radiators
- No annual servicing requirements
- Models shown only require a single phase electrical connection
- 2 year warranty
- Fewer defrosts leading to more heating capacity

Technical benefits

- Dual temperature operation for maximum heating efficiency
- Able to operate up above 60°C water temperature, generating domestic hot water without any direct electrical resistance back-up
- Low starting currents that are well within domestic limits
- Operates to -15°C outside air temperature
- Reverse cycle defrost only 4 minutes per hour

- Uses non CFC gas R134a at a low operating pressure, prolonging the life of the compressor
- Twin compressors in larger models to optimise efficiencies
- Independently tested to EN 14511 standard by BSRIA

Calorex® specifications



| Calorex models and specifications | | | | |
|---|--------------------|---------------------|--------------|--------------|
| Model | Units | AW 4502 | AW 9002 | AW 12002 |
| Air temperature at 0°C 90% relative humidity¹ | | | | |
| Power output to water at 35°C/55°C ² | kW | 3.4/3.0 | 6.6/5.6 | 9.5/8.2 |
| Electrical input | kW | 1.1/1.5 | 2.2/2.9 | 3.1/4.3 |
| Co-efficient of Performance (COP) | | 3.1/4.5 | 3.1/1.9 | 3.1/1.9 |
| Air temperature at 7°C 87% relative humidity¹ | | | | |
| Power output to water at 35°C/55°C ² | kW | 4.4 | 8.4 | 12.2 |
| Electrical input | kW | 1.2 | 2.3 | 3.3 |
| Co-efficient of Performance (COP) | | 3.7 | 3.7 | 3.7 |
| Air temperature at 20°C 60% relative humidity¹ | | | | |
| Power output to water at 35°C/55°C ² | kW | 6.3/6.1 | 11.8/11.4 | 17.2/16.6 |
| Electrical input | kW | 1.4/1.8 | 2.6/3.3 | 3.7/4.8 |
| Co-efficient of Performance (COP) | | 4.5/3.4 | 4.5/3.4 | 4.6/3.5 |
| Electrical data | | | | |
| Electrical supply | V/ph/Hz | 230/240V~1N/50Hz | | |
| Minimum supply capacity | amps | 13 | 25 | 32 |
| Maximum supply fuse | amps | 15.0 | 32.0 | 40.0 |
| Soft start amps | amps | 19 | 35 | 31 |
| Air data | | | | |
| Air flow | m ³ /hr | 2700 | 3000 | 4400 |
| Water data | | | | |
| Water flow +/- 20% | litres/min | 7.5 | 15 | 20 |
| Pressure drop (water) | metres hd | 1.1 | 0.7 | 0.2 |
| Condenser volume | litres | 2.0 | 3.5 | 6.5 |
| Water connections | inches | 3/4" BSPM | 3/4" BSPM | 1" BSPM |
| Condensate water connections | inches | 3/4" domestic waste | | |
| Typical buffer tank sizes | litres | 50 | 100 | 150 |
| Sound data | | | | |
| Sound pressure at 1 metre/10 metres | dB(A) | 56/37 | 58/39 | 58/39 |
| Dimensions (nett) | | | | |
| Width/depth/height | mm | 1107/505/955 | 1140/557/961 | 1582/607/955 |
| Weight | kg | 150 | 164 | 264 |
| The above information is provided by Calorex and offered only as guidance. It is recommended that professionals technical advice is sought prior to design and selection system components. | | | | |

NOTES

¹ Outdoor heat exchanger inlet temperature.

² Indoor heat exchanger outlet temperature.

Calorex reserve the right to change or modify models without prior notice.

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