

HEAT PUMP NEWS

Saving Energy

HPA
HEAT PUMP ASSOCIATION

Volume: 1 No. 3

MORE RECOGNITION FOR HEAT PUMP EFFICIENCY

Welcome to the latest issue of Heat Pump News. Our last issue reported a growing awareness of heat pumps at governmental level, and we are delighted that further recognition has been given – two new types of heat pump have been recognised by the Carbon Trust. Ground Source heat pumps and Gas Engined heat pumps have now been added to the Energy Technology List on the Carbon Trust website, thus qualifying commercial purchasers of such products for an Enhanced Capital Allowance. If they select a qualifying product of this type (all listed on the website) they are entitled by Inland Revenue to 100% depreciation in the first year!

This is not only good news for purchasers of these newly approved types – it is also a useful addition to the growing number of heat pumps seen as having clear benefits in energy efficiency and reduction of CO₂ emissions. There are other types of heat pump still to be added, and HPA efforts will continue.

Commercial Incentive

Enhanced Capital Allowances are reported to be providing a real commercial incentive on bigger projects, but the message needs to be better passed down to smaller purchasers of heating systems. Remember that qualifying products in all these categories are available for purchase in the UK today.

Another interesting potential development is the use of heat pumps in domestic heating installations. The current review of Building Regulation Part L is seeking low carbon options for house heating, and the heat pump is available in simple and efficient versions to respond to a large part of this need. Much discussion is taking place, so watch this space!

Once again this newsletter seeks to provide news of developments in technology and applications. I hope you find it useful.

Tony Bowen, President, HPA



Heat pumps for water heating – interesting solutions with useful by-products

When it comes to beer cellar cooling, not to mention wine and produce storage, the hotel and catering sector has much to gain from heat recovery systems. Heat pumps will provide localised cooling in commercial kitchens and also offer waste heat recovery from plant boiler rooms creating free hot water.

Favourably comparing with conventional cooling where domestic hot water usage exceeds 500 litres per day, pay back from initial investment in complete heat recovery packages can be less than one year.

Owners at the Hundred House Hotel in Norton, Shropshire, were delighted when the first of two Calorex cellar cooling heat pumps had already paid for itself within months of installation while the payback period of the second was about 18 months.

A Calorex AW450SC in the wine cellar is directly linked into the hotel's 1300 litre hot water storage tanks. This produces some 135 litres of hot water (10 - 50°C) per hour. Electric immersion heaters top up the temperature for the kitchen and at times of peak demand, an oil-fired boiler may be used.

Although the wine cellar was cooled to 10°C, the beer cellar next to it remained a little warm. A second AW450SC heat pump was installed that will allow the wine cellar temperature to be maintained and keep the beer cellar at

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a constant 13°C. In addition, the system produces 270 litres of effectively 'free' hot water per hour. Hot water use is sufficient to ensure operation of the coolers when needed.

The two units combined produce 12.6kW of heat to water and 8.8kW of cooling to the air for an effective COP of 3.15:1 per machine. This means that for every 1kW of electricity supplied to the machines, 3.15kW of water heating is available.

Social Housing

A 32-flat site in Paisley is a joint development programme between the Scottish and Danish Housing Authorities.

In the roof space of the building, a Calorex air to water heat pump converts air from the common kitchen and bathroom extract system to pre-heat the domestic hot water system. The heat pump is aided in this task by a vertical mounted solar collector.

All the flats in the building use a common extract system that will feed a supply of room temperature air to the heat pump at around 21°C.

This air stream feeds into the heat pump, where the energy is recovered to provide pre-heated domestic water in the 35-45°C temperature range.

The heat pump and subsidiary solar panels between them generate 80,000 kWhrs per annum of low cost energy.

**Calorex Tel: 01621 856611 or
www.calorex.com**

More efficient heat pump range from Carrier

Carrier has launched its XPower Split System range of inverter-controlled heat pump equipment for shops, offices, studios, restaurants and other light commercial applications.

Carrier regards this as Phase II, having already marketed an XPower single and multisplit range for residential applications.

The XPower Light heat pump range can provide cooling up to 13.5 kW, and heating up to 15 kW, encompassing four model sizes (050, 080, 110 and 130). The inverter controlled outdoor units provide up to 40% less energy than conventional fixed speed units.

The system can produce, not only high speed and high power but very efficient part-load, low-speed operation – mostly required out of peak conditions and typical of the UK. The outdoor unit uses a twin rotary compressor with a brushless DC motor.

The units use R-410A refrigerant and requires only a single-phase power supply, with no peaks in running current absorption.

XPower has also incorporated technology that has resulted from the Carrier Air4Life research project for healthy air.

The indoor units incorporate, for the first time, a high efficiency air purification system based on titanium



dioxide photo-catalytic technology that removes all pollutants up to 0.01micron in diameter. It is also believed to be one of the first air conditioners that is also an air purifier – incorporating the so-called XPower Air4Life satellite system.

In ducted models combines a high-efficiency fibre filter with photocatalytic oxidation and ultraviolet light technologies. The air purifier treats all air flow streams and traps odours, bacteria, and volatile and evil-smelling organic compounds – turning them into inoffensive elements.

XPower is easy to install – using single phase, just three wires, four angles are available for pipe connection, the outdoor units weigh less than others, and the indoor units are compact.

These Carrier heat pumps are manufactured under strict quality standards. Performance data is verifiable under the independent Eurovent certification program.

**Carrier Air Conditioning,
Tel: 0845 600 4888**

Gas engined heat pump saves carbon emissions

VRF (variable refrigerant flow) systems are normally powered by electric driven compressors with an inverter for variable speed control.

The Mitsubishi Heavy Industrie's GHP (gas heat pump) available from 3 D Air Sales Ltd is a VRF system, which has the compressor powered by an engine using natural gas as the input fuel.

This means that large heating/cooling systems can be installed in buildings, which have a limited electricity supply. The GHP requires some electrical power for the fans and controls, but this is minimal compared to the power requirements of a conventional VRF, chiller, or other type of system.

In winter, the heating performance is maintained in very cold ambient conditions, because the waste heat from the engine is utilised as a secondary heat source to enhance the output of the heat pump.

The concept provided by Mitsubishi Heavy Industries is claimed to provide many benefits for the designer, the installer, and reduces running costs for the client.

VRF systems are extensively applied to commercial buildings – approximately 7,800 systems a year are installed in the UK. All of these VRF systems are powered by electricity, usually a 3-phase power supply. ↗

Higher heating COPs save jeweller's energy costs



A Chester jewellers has become the first site in the UK to benefit from the new Mitsubishi Electric R410A inverter driven heat pump able to replace old R22 systems using the existing uncleaned pipework.

Beaverbrooks Jewellers in East Gate Street, Chester has just had two old R22 units replaced with Mitsubishi Electric, Mr Slim R410A units by contractors, Air Continental Services Ltd, in a project which will deliver a huge reduction in power consumption and has saved the customer both disruption and downtime

The pipework in this old timber framed building was concealed in an inaccessible service shaft and it would have been a massive job to remove and replace it," explained Rob Elliott, Air Continental's contracts manager.

When replacing the existing R22 system, Mitsubishi Electric's built-in 'cleaning-free' Replace technology removed contamination from the refrigerant circuit negating the need for new pipe work installation. The range includes four outdoor models of up to 12.7kW, all of which run on single phase power supply and provide high speed cooling and heating.

"It was important for us that the installation happened as quickly as possible so that our staff and our customers faced minimum disruption," commented Gary Jackson, Beaverbrooks' property services manager.

The Mr Slim R410A Power Inverter units uses DC inverter technology and a new

frame compliance scroll compressor to offer cooling COPs of up to 3.8, and heating COPs of up to 3.7 and offers a 40% saving on annual running costs.

"We are anticipating quite a lot of sales of these new Mr Slim's when the market realises just how much time and money can be saved," added John Stockton, of Mitsubishi Electric distributor, BAC, who supplied the units to Air Continental.

With legislation forcing the whole building services industry to examine energy efficiency, inverter driven heat pumps are pushing the boundaries for low carbon methods of heating and cooling buildings. The Carbon Trust, already endorses inverter drives and heat pumps as part of the Enhanced Capital Allowance Scheme.

For further information on the full Mitsubishi Electric range contact Sharon Oliver at Mitsubishi Electric on 01707 278 915 or visit www.mitsubishi.co.uk.

The compressor normally would use 96% of the electrical power of the outdoor unit, the remaining 4% being for the fans and control system.

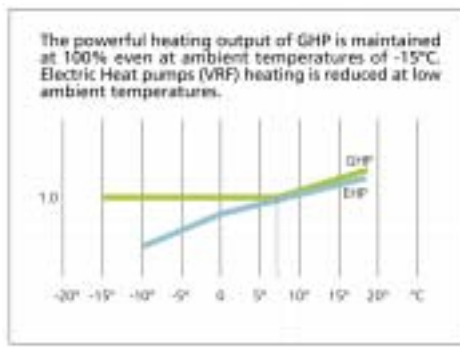
The GHP (VRF) compressor is driven by an engine, very similar to a car engine, having four cylinders, and capable of being controlled at varying speeds, i.e. similar to the inverter on an electric system. The engine is directly coupled to a Mitsubishi compressor.

Some of the special features are:

- Low carbon emissions
- Factory commissioned outdoor unit
- Indoor units and control systems identical to conventional Mitsubishi VRF systems
- Connection of up to 20 indoor units
- Pipework layout identical to VRF systems
- BEMS compatible: Trend, Satchwell, etc

Performance – Cooling & Heating:

- Fast warm up, and enhanced* performance heating, up to 67kW
- Heating performance is maintained in ambient temperature down to -15°C
- High efficiency cooling, up to 56kW



*The heat pump coefficient of performance is enhanced by utilising the waste heat from the engine. Because there is a constant source of heat energy from the engine, the normal de-frost function of conventional systems is eliminated, so there is no shut-down period for defrosting.

Mitsubishi has now developed the Mk4 GHP which is CE marked, and has the service interval extended to 10,000 hours of operation. That equates to 2 ½ years based on 75 hours per week.

The first installation of GHP in the UK is for a 3 D Air Sales client with a large computer room which is being expanded. The existing air conditioning plant is being removed, as the power is required for the new IT suite.

3 D Air Sales 020 8668 1112

Smaller heat pumps for easier installation



The new AWY 'ceiling wall' heat pump split from Fujitsu is, says the company, a hybrid combining the qualities of its wall and floor/ceiling models all within an extremely compact housing. The inverter models measure only 230mm high by 890mm wide and 288mm deep.

Heat pump models in the range start at 4.00/4.00 kW (heating/cooling) to 8.00/8.40 kW (heating/cooling) with condensers sized to match the selected load.

Fujitsu says that the neat size of the AWY ceiling wall models hides a powerful punch capable of conditioning an expansive area; up to six metres of high level horizontal cooling or floor level heating from the face of the unit, expanding up to a six metre wide area at its furthest point. Warm conditioned air is delivered exactly where it is required at floor level thereby eliminating cold spots around the feet. When in cooling mode air distribution is dispersed at ceiling level allowing the cooled, conditioned air to gently displace the warm air below.

Inverter technology increases the efficiency to power ratio and delivers benefits in temperature control and operation. A higher compressor speed means that the unit reaches temperature faster than conventional models and enables better control throughout the operating period.

According to Fujitsu tests have shown that inverter technology can deliver the required heating or cooling at 10% - 15% energy saving. Once at set point the compressor runs at 2,000 rpm.

An improved filter system is incorporated inside the system. Mould, fungus and saprophytic bacteria are disinfected inside the 'UV sterilisation lamp unit' which uses two different wavelengths. A hand held remote controller provides all control functions including an automatic filter maintenance routine that helps keep the filter in excellent condition.

New Ground Source Heat Pump Club – More impetus for a great technology!

Ground Source heat pumps are becoming more and more popular in the UK. Excellent results are being achieved in several multiple installations already, with commercial and domestic applications growing well. The technology has been boosted by its inclusion on the Energy Technology List (thus qualifying for ECAs), and has been recognised also by its inclusion in the Clearskies initiative.

It is now to see further development through the formation of a Ground Source Heat Pump Club. Based at the National Energy Foundation in Milton Keynes, the Club will bring together interested groups of manufacturers,

installers and specifiers to ensure that the market expands in a coherent and technically sound manner. Manufacturers will get together with installers and customer groups to ensure that products are properly understood, explained, offered, installed and serviced. Backed by Powergen and the DTI, the Club will work with the Heat Pump Association and the Heat Pump Network to ensure that performance standards are respected and that generic product information be made available.

The GSHP Club will have its first meeting at Milton Keynes on 6th October 2004.

Definitions

COP = Coefficient of performance. This is the method used by the Heat Pump manufacturers to define their performance efficiency, and results from dividing heating output by electrical input.

E.g. $12\text{kW Thermal output} \div 3.1\text{ kW Electrical input} = \text{COP } 3.87$.

However, industry jargon can be confusing. Another way of expressing this same efficiency is to state a % efficiency of 387%. This method

of expression makes it easier to compare technologies – boilers and heat exchangers are usually rated by % efficiency.

Remember that COPs are good for the Heat Pump unit only, are instantaneous measurements of performance and are usually quoted by manufacturers to an international standard. COPs will vary according to temperature of air/water entering the unit and temperature of air/water being treated by the unit.

HPA continues to gather momentum

It's a very busy time for the Heat Pump Association and this is good news for the technology with heat pumps now taking a very high position on the agendas of specifiers in the UK.

One of the key drivers for this popularity is that heat pumps are now officially recognised by UK government as a highly efficient low carbon producing technology, with products that meet the qualification criteria, being eligible for Enhanced Capital Allowances.

There is evidence to suggest that specifiers are increasingly more environmentally aware and are consequently using the government's Energy Technology List (ETL) to ascertain which products and technologies are the most energy efficient. The ETL can be accessed on the www.eca.gov.uk website and currently covers split, multi-split and packaged equipment both air and water source.

As part of the HPA's objective to achieve ECA's for all heat pump technologies, gas engine driven heat pumps and ground source heat pumps are listed as approved technologies from August 2004. The HPA will strive to ensure that the list doesn't end there!

As a consequence to this gathering interest in heat pumps the HPA now has three new groups to carry out the workload: a technical committee; a marketing committee; a ground source heat pump group.

The marketing committee has now produced three editions of the Heat Pump News (hope this, the latest, edition, is of interest). The 'News' highlights key heat pump installations

that have been undertaken in the UK along with other useful information on heat pumps.

The technical committee continues to work on eligibility criteria for the great range of heat pump technologies for future inclusion on the ETL.

As an association for manufacturers and suppliers, the HPA is fully aware of the need for supply chain communication and consequently looks forward to fully participating with the UK Heat Pump Network whose broad spectrum of membership covers everyone in the UK that has an interest in the technology from client through to component supplier.

The HPA is a constituent association of the Federation of Environmental Trade Associations. For further information call 01491 578674 or email info@feta.co.uk. Web www.feta.co.uk

Terry Seward, Secretary, HPA

Official recognition for heat pumps on the cards

Part L, currently under revisions, is seeking greater energy efficiency and carbon reductions in both commercial and domestic buildings and has recognised the importance of Heat Pump Technologies as an important means of achieving the objectives. Watch this space in the future for the outcome of the consultation.

EHPA (European Heat Pump Association) continues to grow

The European Heat Pump Association continues to grow in membership and is becoming widely representative as an energy relevant body in the European energy debate.

Current activities are focussed on training for ground source installers and

the development of a sound statistical base for better measurement of activities. A review is also under way on the best method of assessing COPs (efficiencies) across a wide range of different applications.

Association Members:

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Air Conditioning Ltd
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Calorex Heat Pumps Ltd
Carrier Air Conditioning
Clivet UK Ltd
Colt International Ltd
Daikin Air Conditioning UK Limited
David Reay & Associates
Department of Trade & Industry
Eaton-Williams Group Ltd
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Samsung Electronics (UK) Ltd
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Toshiba Carrier (UK) Ltd
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Viessmann UK Ltd

How to Join:

The Heat Pump Association is dedicated to the implementation of applying the available technology of heat pumps and will achieve this goal with the aid of new members joining the already committed companies.

Therefore any company that would like to receive information on how to join the HPA and share in the continuing benefits of all our members, please contact the HPA secretary Terry Seward:

E-mail: terrys@feta.co.uk.

Telephone: 0118 9403416

or by fax back form below.



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Attention of
Terry Seward HPA Secretary

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