Heating

Case Study

Woolley Wood School
July 2012

Making a World of Difference

State of the Art Heating for New Build School

In a bid to improve conditions for its pupils, Woolley Wood Primary School has relocated to a new building on a site in Chaucer Road, Sheffield, adjoining newly refurbished, Mansel Primary School, with whom it has worked for many years.

The school's previous home, built in 1934, was no longer suitable for its mix of disabled and able-bodied pupils and was unable to accommodate more than 60 children.

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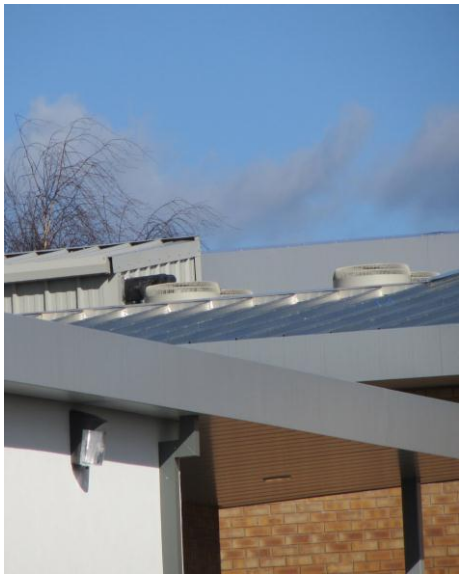

Air to water heat pumps have been discreetly sited on the roof of the new school building.

The uneven approach to its main entrance and narrow, congested corridors, often obstructed by essential equipment due to lack of storage space, made getting around difficult for some pupils. Also, a dining room separated from the main body of the school, combined to make the old building no longer suitable.

To solve this problem Sheffield's local education authority called upon Kier Sheffield LLP to create a new fit for purpose school building. Kier works in partnership with Sheffield City Council providing repairs and maintenance to council homes and municipal buildings, and forms part of the services division of Kier Group, managing and delivering a range of specialist services to both public and private sector clients, complemented by specialist businesses.

To fulfil their brief for the new school Kier contacted West Yorkshire-based M&E Consultant, Thornley & Lumb Partnership Ltd, to design and specify the building services required within it.

The new, cost-effective design complies with strict city council planning regulations, which call for at least 10% of the building's energy needs to be met by renewable or low carbon energy. It also requires a 20% reduction in the predicted carbon emissions.

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Telephone: 01707 278666
email: heating@meuk.mee.com
web: www.heating.mitsubishielectric.co.uk

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Travellers Lane, Hatfield, Hertfordshire, AL10 8XB, England General Enquiries Telephone: 01707 282880
IRELAND Mitsubishi Electric Europe Westgate Business Park, Ballymount, Dublin 24, Ireland
Telephone: Dublin (01) 419 8800 Fax: Dublin (01) 419 8890 International code: (003531)

APPROVED PRODUCT

Certificate Number: MCS HP0002
Product Reference: PUHZ-W50VHA-(BS)
PUHZ-W85VHA2-(BS),
PUHZ-HW140VHA2/YHA2-(BS)

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At standard conditions of 7°C, the CAHV unit will achieve a COP of 4.13 at a flow temperature of 35°C

Working in conjunction with Thornley & Lumb and Turn Key AC Ltd, value added reseller, PACAIR helped to design the new system to ensure it met all relevant criteria. “Supplying air to water heat pumps is the latest addition to our growing business and a logical next step for PACAIR, as it builds on the expertise the company already has in air conditioning and building services,” said Nigel Palmer, PACAIR’s, Managing Director. “We’re looking forward to the opportunities and challenges this will bring and helping to design a new system for the school has got us off to a great start.”

The new heating and hot water system uses six Mitsubishi Electric Ecodan® CAHV-P500YA-HPB monobloc air source heat pumps to serve the new underfloor heating. This has eliminated the need for wall mounted radiators and conserved valuable space. The units also provide heating and hot water for the school’s hydrotherapy pool.

The Ecodan CAHV from Mitsubishi Electric is a unique solution to the challenge of providing renewable heating to commercial buildings. The heat pump boiler can provide all a building’s heating and hot water requirements, either by itself or in conjunction with alternative systems.

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Before leaving Turn Key's manufacturing site the units were pressure-tested and an electricity supply incorporated.

Air source heat pumps are classified as renewable technology by the EU and the UK Government because they harvest renewable energy from the air to maximise efficiency and minimise energy consumption. For every 1kW of electricity consumed, an average of 3.2kW of usable heating energy is generated and supplied to the building - a Coefficient of Performance (COP) of 3.2.

The Ecodan CAHV system comes in units of 43kW and offers space heating and sanitary hot water up to 70°C. It is also available with multiple unit control of up to 16 units to provide a maximum of 688kW of renewable heating. The unit can operate effectively in ambient temperatures of -20° to 40°C making it ideal for use all year round.

"With large scale construction projects such as a school, the heat pump-based heating systems are frequently located on the roof. Traditionally, builders have constructed plinths for this equipment which then need to be lifted onto the roof before the system can be installed and integrated into the building," said James Forster, a Consultant for Thornley & Lumb.

"The process of getting equipment onto a roof can take time and involve several engineers working at height, often around other construction workers, which increases the potential for accidents and the risk of damage to the equipment itself. In order to help avoid these issues, I challenged the installers, Turn Key, to come up with a solution to this issue."

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Installing the CAHV equipment on pre-manufactured skids reduces installation time to hours rather than weeks.

Turn Key's answer is a bespoke solution which packages the units onto specially constructed skids for transportation to the building site. Designed on a 3D-CAD system, the skids offer far less risk of equipment damage as they are delivered on a Just-In-Time basis, thus avoiding the need for other specialists to work around the plant.

Before leaving Turn Key's manufacturing site in Tyne and Wear, the CAHV units were pressure-tested and an electricity supply incorporated.

This off-site manufacturing process reduced the install time by 75%, as the work that would normally have been carried out on the roof was completed before delivery to the site. This meant the installation took just hours rather than the usual two weeks and the whole process was safer and quicker, and eliminated the cost of constructing a roof plinth.

Turn Key located the skids directly onto anti-vibration pads, ensuring that the footprint stayed within the stipulated maximum loading as dictated by the structural engineer. The new plug and play solution meant that once in place, the system just needed to be connected up to the water and electricity supplies and was then ready for commissioning.

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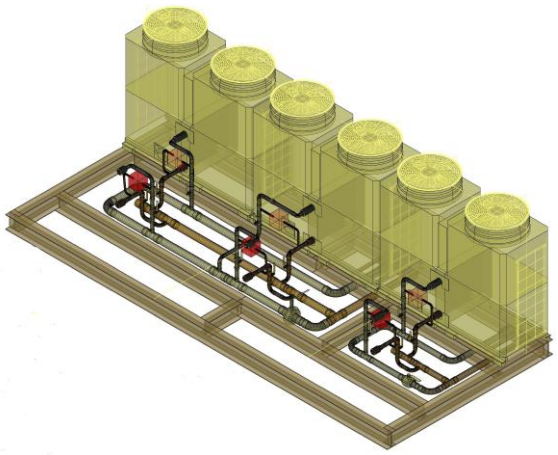

The new heating and hot water system uses six Mitsubishi Electric Ecodan® CAHV-P500YA-HPB monobloc air source heat pump boilers.

"The CAHV product is an ideal heating solution for large scale underfloor heating applications such as Woolley Wood," said Mitch Swirles, Managing Director of Turn Key AC Ltd. "And coupled with our new off-site construction option if offers a safer, more cost-effective installation too."

The new Ecodan air source heat pump boiler system provides high levels of efficiency and helps the new school building to achieve its renewable energy targets. From the developer's own SBEM calculations the solution delivers a 30% reduction in CO_2 emissions, far exceeding the minimum target. Cutting both running costs and CO_2 emissions it is ideal for new-build and retro-fit and can work particularly well with community heating schemes.

For further information on Thornley & Lumb visit www.thornleylumb.co.uk or call 01274 687 755.

For further information on PACAIR visit www.pacair.co.uk or call 01442 254401.

For further information on Turn Key AC Ltd visit www.tkac.co.uk/ or call 0207 038 8204.

For further information on Ecodan heat pump boilers visit www.heating.mitsubishielectric.co.uk or call 01707 282 880.

Installation Summary

Application type:	School heating scheme
Product:	6 x Ecodan CAHV heat pump boilers
Capacity:	258kW at -3°C ambient
Heat delivery method:	Underfloor heating and hot water

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