CASE STUDY | COMMERCIAL
CATEGORY | OFFICES

63 Kew Road

Water-cooled VRV perfect solution for Richmond office refurbishment

A landmark 1980s 'head office' building in Richmond, London, has been given a new lease of life – and a fresh long-term tenant – after a £5 million refurbishment that included installation of Daikin VRV-W water-cooled air conditioning.

The 33,000 square foot four-storey building at 63 Kew Road – former UK headquarters of Pepsi Cola – is now home to the leading online marketplace for creative small businesses notonthehighstreet.com, which has taken a 10-year lease.

Owned by Low Carbon Workplace, the building has been substantially upgraded to raise its Energy Performance Certificate rating from E to B and to achieve a BREEAM Excellent rating. The improved ratings also meet the London Borough of Richmond's target for a 40% reduction in carbon emissions.

Low Carbon Workplace is a a partnership, launched in 2010, between the Carbon Trust, fund manager Columbia Threadneedle Investments and property developer Stanhope. The partnership acquires commercial office buildings and refurbishes them into modern, energy efficient workplaces.

In selecting the Kew Road building's new heating and cooling system, noise criteria and line-of-sight constraints ruled out chillers and air-cooled VRV outdoor units. Water-cooled VRV, on the other hand, could be contained – out of sight and earshot – in a plant room.

VRV-W also offered the efficiency advantage of two-stage heat recovery ¬– within each system and between systems on the water loop. This two-stage recovery substantially improves overall energy efficiency especially in situations where cooling is required even in winter.

Heat recovery was an obvious choice for a building with different aspects developing variable conditions that required simultaneous heating and cooling. The original design was also based on a Cat A selection process to ensure the system would have maximum flexibility to accommodate the requirements of any future tenants.

Year of installation

› 2016

Project requirements

- [x] Air conditioning
- [ ] Air curtain
- [ ] Air purification
- [x] Control
- [ ] Heating
- [ ] Hot water
- [ ] Refrigeration
- [ ] Ventilation

Installed systems

› Watercooled VRV
› Slim Concealed Ceiling Units
› Control interface
› Inteligent Touch Manager

Six systems totalling 13 condensers generate the total heating and cooling requirement for all floors and an air curtain in the lobby. Another four condensers serve the building's two air handling units, which supply tempered air at 18oC to the rear of fan coil units (FCUs) throughout the building. The building's total calculated load is 427kW (peak instantaneous: 348kW).

Two low-height, low-noise Guntner adiabatic dry air coolers reject heat from the water loop to the roof. A 546kW boiler generates hot water for the building and heat injection to the water loop to maintain a fixed 40oC flow to the Daikin VRV-W condensers during cold weather.

To fit the boiler and condensers into the plant room, the condensers were located using racking, one above the other . This satisfied the requirements for heating and cooling plant without compromising design – or the lettable floor area.

All FCUs are of the FXDQ type – slim concealed ceiling units, which can be mounted in ceiling voids as small as 240mm.

These medium external static pressure units can be used with flexible ducts of varying lengths. They are specially developed for small or well-insulated rooms such as hotel bedrooms and small offices – and so are ideal for ensuring future flexibility of the office layout at 63 Kew Road.

There is a flexible and energy efficient control strategy to attain both the EPC and BREEAM scores required by Low Carbon Workplace. The strategy includes PIR movement sensors linked to Daikin RTD interfaces to provide the control inputs for one or more FCUs to optimise conditions when people are present, but to drift from the set point after no response from the PIR, and eventually switch off.

To allow for Individual control, one branch selector box is provided per FCU. The 20% tempered fresh air delivered to the FCUs is controlled by dampers and CO2 sensors, which further enhances efficiency. There are no local controllers, with the system controlled centrally by Daikin Intelligent Touch Managers – facilitating sub-metering of the building if it is subsequently let to multiple tenants. The system gives individual tenants the facility to control their environment through web-based access to the ITMs.

Stephen Reynolds of Thornton Reynolds, mechanical and electrical consultant on the refurbishment, says:

"VRV-W ticks all the boxes at 63 Kew Road, satisfying environmental regulations and efficiency requirements – while providing the same standards of comfort expected from air-cooled VRV systems."

Code	Description	No of units
RWEYQ	Water-cooled VRV condensing units	17
FXDQ-A	Slim concealed ceiling unit	97
RTD20	Control interface	2
DCM601A51	Intelligent Touch Manager	4

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