



Case study: Building 25

HVRF solution design & installation

British American Tobacco (BAT) is one of the world's largest tobacco companies, operating in around 180 countries worldwide, in a global market estimated to be worth between £450 and £500 billion. Its Southampton campus houses its UK research and development facility and associated administrative departments.

Brief

Working in conjunction with CBRE, who are responsible for facilities management at the site, and following a competitive tendering process, Evotech were appointed to carry out the detailed design of a two storey office refurbishment situated on site. This included designing an energy efficient heating and cooling system, capable of ensuring comfortable working conditions throughout the building, at all times of the year.

Summary of works provided

An initial feasibility study was completed to further develop the design brief that was based upon the client's outline specification, which required mechanical, electrical, and public health systems to be incorporated into the design.

Increasing office space within the building was a major factor in the refurbishment and the higher occupancy levels demanded a futureproof energy efficient solution with a lower global warming potential (GWP) rating when compared to traditional systems.

After careful consideration, our team presented detailed analysis of the Mitsubishi Electric Hybrid Variable Refrigerant Flow (HVRF) system, outlining its fundamental advantages over a standard VRF system. The hybrid system enables simultaneous heating and cooling in separate areas of the building, which was key for this particular project, where server rooms and areas with high heat generating equipment density were likely to need different environmental profiles than other areas of the building.



Client

British American Tobacco

Sector

Tobacco

Location

Southampton

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Following client appraisal of the solution, Evotech were responsible for the bespoke design, supply and installation of a Mitsubishi Electric HVRF system.

The system was designed to have a heating capacity of 221 kW and a cooling capacity of 197 kW, with guaranteed external operating temperatures of -20°C and -5°C for heating and cooling modes respectively.

Hybrid VRF uses advanced refrigerant technology between the outdoor unit and the branch controller, energy is then transferred around the building using a pair of water pipes per fan coil unit capable of supplying both hot and cold water. This not only provides a stable and comfortable environment but keeping refrigerant away from working environments negates the need for costly leak detection systems within these zones, ensuring simple compliance to BS EN378.

The main water pipes from the hybrid branch control box can be easily isolated, making future layout changes to the building straightforward as there is no need to reclaim refrigerant and then re-charge following works. Furthermore, the decentralised nature of the system ensured phased installation was possible.

The existing building layout included structural concrete beams within the proposed ceiling voids. Rectangular ductwork transition sections were prefabricated to navigate around the beams and calculations were performed to ensure that the pressure drop of the transition sections lay within design limits.

The mains cold water, domestic hot water and LTHW heating services for communal areas were also sized to accommodate for future expansion and the external hybrid VRF condenser compound was designed to accommodate the installation of additional units.

With the installation complete, BAT can expect stable temperatures and fewer draughts, with the potential to expand the system should the need arise. The system is expected to achieve a reduction in CO2 emissions of 3,300 kgCO2e compared to traditional 4-pipe wet system and annual energy savings of around 17%. In addition, a 7-year manufacturer's warranty ensures peace of mind for the client.

Outcomes

3.3 tonnes
reduced CO2 emissions

17%
reduction in annual energy usage

7-year
manufacturer's warranty

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