

CASE STUDY

Q-TON DELIVERS HIGH-PERFORMANCE, NOX-FREE HOT WATER FOR LANDMARK LONDON HOTEL PROJECT



OVERVIEW

PROJECT:
Adagio Hotel, Fieldgate Street,
London

PROJECT OUTLINE:
Domestic hot water solution
for a new-build aparthotel
development

PRODUCTS:
3x Q-ton ESA30EH-25 units



THE BACKGROUND

The Q-ton CO₂ heat pump from Mitsubishi Heavy Industries Air-conditioning Europe (MHIAE) has been selected to provide the domestic hot water solution for a new-build hotel development at Adagio Hotel, Fieldgate Street, London.

The hotel was built on what architects described as an “obsolete garage” site in Whitechapel. The scheme include 140 aparthotel rooms and a new pedestrian route linking Whitechapel Road and Fieldgate Street. This pet-friendly aparthotel seamlessly blends apartment living with all the convenience and facilities of an hotel, in the historic Whitechapel location.

THE CHALLENGE

The project required a system capable of supporting hotel demand while helping the scheme respond to the London Plan, BREEAM1 requirements and wider carbon reduction targets. Given the need to avoid local NO_x emissions and the noted availability of gas as a project consideration, the project team needed an alternative to traditional gas-fired hot water generation.

Q-ton uses CO₂ refrigerant, also known as R744, to provide high-temperature sanitary hot water for commercial applications. As a natural refrigerant, CO₂ has a global warming potential (GWP) of 1 and an ozone depletion potential (ODP) of 0, making it a future-proof solution for heat pump systems. R744 operates

“The Q-ton was chosen as it was the ideal solution, to allow us to meet the ‘no local NOx emissions’ requirement of the London Plan and also significantly helping towards meeting our carbon reduction requirements for BREEAM and the London Plan requirements.”

MICK MATTHEWS, M&E CONSULTANT, DMS



at a higher pressure than refrigerants used in other heat pump systems, and as such has the ability to generate high temperature water reliably, making it suitable for this application as well as space heating.

Because the GWP is less than 1, it can support the project's BREEAM assessment under the impact of refrigerants criteria, helping the design team demonstrate reduced environmental impact compared with systems using higher-GWP refrigerants.

THE SOLUTION

For the Adagio Hotel project, the installed system comprises three MHI Q-ton ESA30EH-25 units, configured as one master and two slave units, providing a total system capacity of 90kW. The system serves five 1,000-litre hot water storage tanks with hot water recirculation and has been designed to produce hot water at 75°C, meeting the building's requirement for reliable, high-temperature domestic hot water.

Supplied by MHIAE's UK distributor Beijer Ref UK, the system is also designed as a direct domestic hot water solution. The water passing through Q-ton is the same water delivered to the taps, rather than being separated through an intermediate heat exchanger. This helps avoid efficiency losses that can occur during secondary heat-exchange stages, while also reducing the capital expenditure associated with additional heat-exchanger equipment.

Q-ton is designed to produce hot water from 60°C to 90°C and can operate in temperatures as low as -25°C. According to MHI, the system maintains 100% heating capacity down to -7°C ambient, furthermore supporting the project's requirement for dependable hot water production across various seasonal conditions.

The air-to-water heat pump approach also produces no local NOx emissions at the point of use, supporting the project's response to the London Plan and helping reduce reliance on combustion-based hot water generation.

CONCLUSION

The system has been designed for integration with the building management system through Modbus, allowing the hot water plant to be monitored and controlled as part of the wider building services strategy.

Contractor Direct Cooling Services described the installation and commissioning process as “very straightforward”, with the system reported to be performing “very well”. It also said it would “100%” use Q-ton on future projects.

The project demonstrates how CO₂ heat pump technology can be applied in a new-build hotel environment where hot water demand, planning requirements and carbon reduction targets all need to be considered together. For buildings with significant domestic hot water loads, Q-ton provides an alternative to traditional gas-fired generation while supporting lower-GWP refrigerant strategies, BREEAM objectives and reduced local emissions.

BREEAM

The Building Research Establishment Environmental Assessment Method, is a sustainability assessment framework used to measure the environmental performance of buildings. It considers areas such as energy use, carbon impact, materials, water, waste, health and wellbeing, and pollution. For building services specifications, the choice of refrigerant can contribute to the overall assessment where systems use refrigerants with a very low GWP.

LONDON PLAN

The project had to comply with the London Plan, is the statutory spatial development strategy for London. It sets out the long-term vision for how London should grow and develop, covering areas such as housing, transport, economic development, environmental sustainability, infrastructure, and design. Within the London Plan 2021, air quality is addressed principally through Policy SI 1 (Improving Air Quality). New developments are expected to be designed and operated to minimise emissions and contribute to better air quality.



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