

The new Turbomiser chiller with its Turbocor oil-less compressors is said to be breaking new ground in energy efficiency—a claim that is now being proven at two high profile UK hotels

Five-star efficiency

Chillers based on the oil-less centrifugal Turbocor compressor have been around for a while. Their compact design, variable speed capability and magnetic bearings are known to deliver a combination of excellent performance and class leading energy efficiency.

Now, however, leading Italian manufacturer Geoclima claims to have developed a new approach to harnessing the benefits of the innovative centrifugal machines that takes the technology an important stage further – and delivers unprecedented energy savings for clients.

Two recent high profile installations in the UK highlight the outstanding performance of the Turbomiser chiller, and substantiate the claims being made.

The first project was carried out recently at the world-famous Dorchester Hotel, on London's Park Lane. The installation has a combined chiller capacity of 3MW, and involved the installation of three Turbomiser chillers, model TMA 1050/34, each in turn housing three high efficiency Turbocor compressors.

The plant was supplied by Wimbledon-based specialist Klima-Therm/LH plc, while consulting engineer on the project was Cudd Bentley Consulting (Birmingham office), and the installer All Group Services.

LH plc de-commissioned and removed the existing water-cooled, R22-based Carrier chillers and cooling towers, which had reached the end of their working life. This was done in stages to minimise cooling down-time during final changeover.

The new plant was sited externally, with one chiller positioned on the roof of the rear third floor, and two chillers on the roof of the tenth floor, freeing up the hotel's basement plant room.

Limited roof space meant two of the chillers needed to be located in space previously occupied by the cooling towers. In addition, the main condenser water riser had to be converted for chilled water use. There were also strict planning conditions regarding noise.

Energy savings

The key benefit for the client of the Turbomiser design was anticipated savings in running costs – to be achieved through improved chiller energy performance and use of air-cooled condenser, saving on water and



The chiller being craned onto the roof of the Dorchester (above). The prestigious London Hotel (right) now has a combined chiller capacity of 3MW



chemical treatment costs.

Since being installed, the system is reported to have delivered in excess of £10k savings in energy costs per month, compared with the previous system. As a result, the installation is expected to deliver a payback on the additional capital cost over conventional chillers in the first year.

The other significant advantages of the solution were the compact dimensions and low weight of the Turbomiser chillers. This enabled the new machines to be sited on rooftops, freeing up the former plant room space for alternative use.

The chiller's energy performance is attributed to a combination of flooded evaporators to maximise heat exchange, high efficiency fans and control technology fully integrated with the compressor control.

The approach ensures maximum COP is delivered at all times, optimising chiller performance in response to changing ambient temperatures and load.

Ray Pask, chief engineer at The Dorchester Hotel, said: "The Turbomiser chillers

installed at The Dorchester Hotel have worked superbly and the energy savings already achieved are substantial, and should result in an even better pay-back time than anticipated."

Stansted Airport Hilton

The second Turbomiser installation was carried out at the Hilton, London Stansted Airport. Again a key design consideration was to minimise running costs. With only one existing machine on site, a further important requirement was to ensure chiller



The flooded evaporator design maximises the benefits of Turbocor

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replacement caused as little disruption to the hotel as possible. With careful project management and a flexible approach, Bristol-based Cool-Therm achieved the changeover with less than a 12 hour interruption to chilled water services.

The existing machine was a 630kW York air-cooled chiller, which had served the hotel well for 20 years. However, being based on R22 and with compressor problems beginning to arise, the decision was taken to replace it. Cool-Therm identified that the typical base load was around 150kW, with chilled water required 24/7 throughout the year. Part load performance would therefore be critical to achieving energy savings.

The Turbomiser chiller selected provides 630kW of cooling 6/12 at 35deg C ambient, based on two TT300 Turbocor compressors working with a flooded evaporator and operating on R134a refrigerant. On the controls side, the client has access to the machine via a GSM gateway for remote troubleshooting and setting adjustments. It also features SMS alarm notification.

The plant is anticipated to deliver 30 per cent energy savings compared with traditional designs based on reciprocating, screw or scroll-based compressors.

Ken Strong, managing director of Cool-Therm, says: "The flooded evaporator design maximises the benefits of Turbocor, enabling a high evaporating and low condensing temperature. In this application, at

the typical part load point, we find the machine running with 5degC saturated suction and 25degC condensing temperature. This delivers a remarkable COP of around five, including fans. This compares with the previous machine's part load COP of around two."

Trevor Bennett, facilities manager at the Hilton, London Stansted Airport, reported: "Noise was not a critical requirement in the project, however the results were impressive. When running at part load, the machine is so quiet you have to check the display to see if it is operating".

Further similar projects for Turbomiser installations at Hilton hotels are currently under discussion.

Ian Mundie says: "There is no doubt that Turbomiser is a technology whose time has come. We believe it has an important role to play in delivering what the market needs, and with a pay-back that is shortening with every rise in energy prices. The level of interest from clients supports this."

Ken Strong added: "With end users under pressure to reduce costs and their carbon footprints, we are convinced that the future of medium capacity water chillers will be oilless technologies, based on small centrifugal compressors with flooded evaporators, coupled with high efficiency fans. Turbomiser delivers this in a compact package, proven to work."

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