

Super chilled

What is claimed to be the leanest and greenest of a new generation of super-frugal chillers is being launched this month across Europe. RAC reports

■ AN ULTRA-EFFICIENT CHILLER BEING LAUNCHED BRINGS WITH

it claims of unprecedented energy savings for end-users and takes carbon reduction into new territory for the industry.

The Turbomiser II is the fruit of a two-year development programme by Italian manufacturer Geoclima and UK companies Klima-Therm and Cool-Therm.

It has been heralded as probably the most efficient HFC-based air-cooled chiller in the world, thanks to EERs of 10 and above without the need for additional free-cooling circuits and associated glycol (which can prove expensive and is not favoured in many applications). This saves both on initial cost and ongoing pump energy.

Building on the success of the first generation Turbomiser, which itself set a new standard for efficiency, the second generation Turbomiser II takes performance into new territory, its backers say.

The new chiller can reduce end-users' power bills by 30-50 per cent, while at the same time dramatically cutting carbon emissions. On some applications, the saving can cut payback time to less than a year.

Thanks to innovative design, the machine requires 30 per cent less refrigerant than comparable conventional chillers, reducing servicing costs and potential environmental damage from large-scale leakage.

Ken Strong, managing director of Bristol-based Cool-Therm says: "The energy performance is staggering. These kind of savings are unheard of with conventional technology, and it gives end-users a decisive advantage in terms of running costs. And the savings go on accumulating throughout the life of the plant."

The chiller uses a combination of high efficiency components and technologies, combined with an adaptive control system that integrates and optimises performance.

The heart of the system are inverter-controlled Turbocor compressors whose output can be precisely matched to load, while other features include: micro-channel aluminium condensers, that reduce refrigerant charge while increasing the effectiveness of heat exchange; flooded evaporators that ensure optimum energy transfer between refrigerant and water; and a Liquid Pressure Amplification (LPA) system that significantly increases thermodynamic efficiency across the chiller's range.

Unlike standard chillers whose head pressure is fixed the system is designed to operate with a floating head pressure, providing opportunities for savings not available to conventional designs. Thus the Turbomiser II chiller constantly self-regulates and optimises its performance in response to ambient conditions and load.

This is achieved with the use of the 1 kW LPA system, under the electronic control. This effectively increases capacity at all condensing temperatures, but has greatest effect at lower temperatures. As a result, it can deliver refrigerant many times more efficiently than a compressor.

Another key to the chiller's ultra-low energy consumption is the fact that the compressor does not have to run to maintain a fixed head pressure. By using

the LPA system at lower ambient temperatures, the compressor(s) can be switched off, while the LPA pump circulates refrigerant around the system. This provides a highly efficient, glycol-free alternative to conventional free-cooling and dramatically reduces energy consumption. On many applications, this can cut payback time to less than one year.

The Turbomiser II can halve the energy costs compared with a conventional screw-based machine, according to the companies behind it. A secondary benefit of the reduced compressor run-time is extended plant life. With the low-power LPA system taking the load, the compressor does not have to work so hard or for so long, reducing wear and the likelihood of breakdown.

A first generation version of the Turbocor chiller recently installed at The Dorchester Hotel in London is saving the end-user £10,000 per month in energy costs. The developers believe the Turbomiser II takes this performance to a higher level still.

The chiller is available in capacities from 250 kW to 1.5 MW, and can be used in most commercial and industrial applications. It is ideal for application in data centres, retail developments and deep plan buildings that have a constant base load, as well as applications such as hospitals and hotels needing all-year-round cooling.

TYPICAL PERFORMANCE COMPARISON BETWEEN A NEW TURBOMISER II CHILLER AND A CONVENTIONAL CHILLER*

Ambient temperature degC	-5	0	+5	+10
Conventional 790 kW Chiller with 50% free cooling coils**	694	535	383	117
Turbomiser II 790 kW Chiller with LPA**	600	550	530	310

*18-14 degC design temps **Units kW