Klima-Therm installs first chiller with Turbocors running on HFOs

EIGHTEEN months on from announcing that it was to be the first company to use HFO1234ze with the highly efficient oil-less Turbocor compressor on one of its Turbomiser chillers, UK company Klima-Therm has achieved its wish with an installation at a department store in Milton Keynes.

Klima-Therm broke new ground last year with the installation of two reciprocating chillers running on HFO1234ze at a Waitrose store in Bromley, near London. It was the first application of the new fourth generation low global warming refrigerants in a working supermarket.

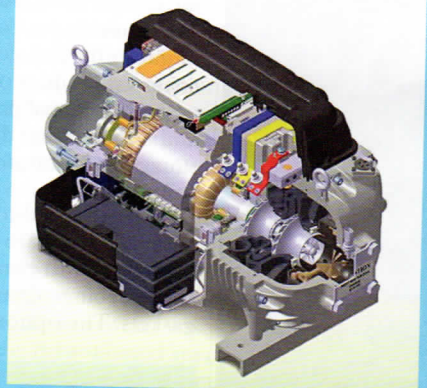
Now the company is claiming another first: harnessing the world's first Turbocor compressors to run on HFOs in a commercial building. It announced plans for a trial installation last year, but put the project on hold pending completion of tests and an official green light from Danfoss Turbocor.

Two of the new HFO Turbomisers have just been installed in a department store in Milton Keynes, as part of the end user's ongoing trials of promising environmentally friendlier technology. The company has also received an order for a further installation of HFO Turbomiser machines for a major retail development in the South West of England

Tim Mitchell, Klima-Therm sales director, says: "The HFO Turbomiser is a very attractive combination. In its favour is the exceptional and proven energy performance of Turbomiser, which can cut energy use by up to 60%, coupled with the very low global warming potential of HFO1234ze.

"This has a global warming potential of just 6 compared with 1300 for HFC134a. This is a huge difference in terms of environmental acceptability. End users have to take notice - and they are."

One of the Turbomiser chillers with its Turbocor compressor under test



The Danfoss Turbocor compressor combines magnetic bearings, two-stage centrifugal compression, a variable speed permanent magnet motor and intelligent electronic controls to achieve what are claimed to be the highest compressor efficiencies for water-cooled, evaporative cooled and air-cooled hvac applications.

Higher COP

The first HFO Turbomiser project involves the installation of two of the new green machines as part of a store refurbishment project. Each of the chillers is rated at 230kW, making a combined cooling capacity of 460kW at the site.

The HFO Turbomisers will supply all the cooling needs for the store, delivering comfort cooling via the store's chilled-water-based air conditioning system.

Tests carried out by manufacturer Geoclima at its new test facility in Italy are said to have demonstrated that the HFO Turbocor-based Turbomisers operate with a full-load COP of around 4.

It is known that use of HFO R1234ze results in a loss of cooling capacity of around 24% compared with R134a across various application conditions. However, tests are said to have shown that mean power absorbed is around 27% less, giving an overall COP for the HFO actually better than R134a.

"The design of the new HFO Turbomiser compensates for the reduction in capacity, employing slightly larger heat exchanger surfaces and clever design and component lay-out," says Tim Mitchell. "The HFO Turbocor compressor employed, type TG310, is based upon the existing model TT350."

There will be a slight cost premium as a result over the standard Turbomiser chiller running on R134a. However, Klima-Therm believes cost comparisons per kW of cooling compared to other low GWP solutions will be highly attractive, given the dramatic environmental benefits of using low GWP HFOs instead of very high GWP HFC refrigerants.

A further important benefit of the HFO solution is that it may overcome the equipment siting and charge capacity restrictions that accompany the use of other refrigerants, such as hydrocarbons. Klima-Therm points out that HFO-based chillers can be as flexible in use as standard HFC machines, but without the environmental penalty.

The company will be monitoring the performance of the machines over the coming months to assess energy efficiency and reliability. The servicing requirements for the machines are greatly reduced compared with standard oil-based reciprocating and screw compressor chillers, as Turbocor compressors have no requirements for oil changes or related maintenance.

This reduced need for servicing, together with the exceptional efficiency that can cut energy use by as much as two-thirds, is another factor driving the adoption of Turbomiser chillers.

Klima-Therm says availability of the HFO-based Turbomiser has resulted in substantial enquiries from a wide range of end-users, and indicated a high level of interest in the new technology among retailers.

Tim Mitchell says: "Many people are looking with interest to see how arguably the 'world's greenest chiller on paper' performs in practice. If the results are as anticipated, we expect more end users to adopt it in the near future."

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