

Waitrose trials first HFO chiller

THE first chiller using the new HFO refrigerants is being trialled by Waitrose at its supermarket in Bromley, Kent.

Believed to be the world's first such installation, the Italian-made Geoclima chillers, supplied by Wimbledon-based Klima-Therm use Frascold reciprocating compressors and operate on Honeywell's HFO-1234ze.

The system uses two 180kW chillers with Frascold semi-hermetic compressors providing chilled water as a condensing medium for the in-store integral cases running on propene.

Although measured over a relatively short period of time, initial comparisons to a same-size store in Canterbury running identical systems on R290 (propane) is said to have shown a 22% reduction in energy consumption.

Adoption

If the trial is successful, Waitrose plans to adopt the HFO solution as part of its refrigeration platform for future stores, along with the continued use of hydrocarbons and tri-generation energy centres where appropriate.

Jim Burnett of Waitrose said: "We believe the HFO solution shows great promise, as it combines good efficiency with very low global warming potential. This is obviously a highly desirable profile in a refrigerant. If the ongoing monitoring of energy continues to prove successful, we plan to include HFO-based chillers in our choice of refrigeration platforms for stores in the future."



A Frascold 1234ze compressor under test

Tim Mitchell of Klima-Therm said: "The focus at the moment is on HFO-1234ze, as the refrigerant is already available at commercial levels. In the longer term, we are also interested in the potential of HFO-1234yf, which has an even lower GWP and potential other benefits. This is one for the future, but it is in our sights."

Giuseppe Galli, managing director of Frascold, said: "From a compressor engineering point of view, the properties and operating characteristics of HFOs are a very good match for traditional refrigerants, but obviously without the environmental penalty of high GWP HFCs."

Tests carried out by Frascold with its eight-cylinder reciprocating compressors W40168Y running on HFO R1234ze indicate a loss of capacity of around 24% compared with R134a across various application conditions. However, mean power absorbed is almost 27% less,

giving an overall COP actually better than R134a across a range of applications and conditions.

Frascold's research and development team believe that performance with HFOs can be significantly improved with further optimisation. This could include refinements to the valve plate design, motor sizing and reducing pressure losses through the compressor.

HFO-1234ze was initially developed as a blowing agent and propellant, its half-brother 1234yf being seen as the preferred option for the replacement of R134a in car air conditioning systems.

While 1234yf is described as mildly flammable (A2L), 1234ZE is a non-flammable gas according to ASTM E-681 tests, and by EU Test method A-11.

Independent flammability tests carried out by Chilworth Technologies concluded "beyond reasonable doubt that the material (Honeywell HFO-1234ze blowing agent) will not possess oxidizing or explosive properties."

Controversial

Earlier this year, Klima-Therm caused a storm of controversy when, in association with Cooltherm, it announced the imminent introduction of a Geoclima chiller using an oil-less Turbocor compressor running on 1234ze. The planned introduction was subsequently put on ice when Turbocor manufacturers Danfoss insisted that the compressor had not been verified for use with HFO refrigerants.