

Super U adopts Genetron® Performax™ LT for its refrigeration system

In a European political context of reducing greenhouse gas emissions and decreasing energy consumption, the new refrigerant Genetron Performax LT was chosen instead of R-404A for the Super U supermarket located near Perigueux. In Europe, this new installation is a first.

The Super U at Notre Dame de Sanilhac was opened on 9 March 2011 and has pulled out all the stops to build an environmentally friendly next-generation supermarket.



For David Ponnelle, Store Manager, the environmental aspect is part of his responsibility as a citizen. "Polluting the planet less is very important to me personally. At Super U, we have a team working on these environmental aspects. We also ask our contractors to take a proactive approach." Sud Ouest Réfrigération, the company in charge of refrigeration, has risen to the challenge and chosen **Genetron Performax LT** as the refrigerant.

Initially, the refrigeration system was designed for R-404A, but following a **Performax LT** presentation by Climalife, Cyrille Moquelet, Managing Director of Sud Ouest Réfrigération decided to opt for this new fluid after approval by the engineering department. "I chose Performax LT firstly to reduce energy consumption and secondly for its lower environmental impact with a GWP of 1824."

New refrigeration system consisting of two plants

The Super U store, covering an area of 2,150 m², has a refrigeration system consisting of two Profroid refrigeration plants equipped with Danfoss electric control technology. The positive medium temperature refrigeration plant consists of 5 Emerson Copeland D4DJ300 X semi-hermetic compressors, and the low temperature plant is composed of 3 Emerson Copeland D4DL150X semi-hermetic compressors. The system feeds the 18 cold rooms and laboratories and the 24 Bonnet Névé (Epta group) low consumption cabinets.

The choice of Performax LT as the refrigerant has not resulted in any specific technical changes either in the pipework, heat exchangers, or compressors other than the standard settings during commissioning of this system. "Start-up was achieved without any change compared to the R-404A," points out Mr. Nicolas Machu, a technician at Sud Ouest Réfrigération. After having drawn a full system vacuum, performing a filter check, charging it with Mobil EAL 22CC oil and performing all the safety tests, Performax LT is injected through the system's liquid line. At the end, 1,000 kg of Performax LT were charged and all the cold stations, display cases and evaporators were started up before adjusting the superheat.



At the end of the start-up, an on-site leak test by electronic detector was carried out daily for fifteen days. To this effect, the technician highlighted an additional benefit : "Performax LT is easier to detect than R-404A. As the electronic leak detector and the climate controller are more sensitive to this refrigerant, it is very fast. For a small leak, the sensor would have never sounded at that time with R-404A!" Two Murco MGD climate controllers have been installed in the machine room, in accordance with the F-Gas regulations in force.

A store at the cutting edge of technology to reduce environmental impact

In addition to the new Genetron Performax LT refrigerant, the store is equipped with an R system temperature monitoring system for all food stored in cold rooms and display cases. The GTC also enables refrigeration plants to be controlled through a system of alarms, to warn the installer and avoid downtime in the event of problems. All monitoring data is available remotely via a telephone connection.



All the low temperature cabinet doors are closed in the Super U to avoid energy losses.

In addition, a heat recovery system on the condenser is used to heat the store in winter. There is no backup resistor.

Finally, for floor maintenance, the store uses an automatic washer, which reduces 98% of the impact on the environment with a detergent-free Tennant machine that consumes 70% less water and reduces the health risks for both the contractor using it and its customers with an extra 25% floor grip for customers doing their shopping while the floor is being cleaned.

	Unit	LT plant		MT plant	
		Performax LT on-site measurements	R-404A selected plant data	Performax LT on-site measurements	R-404A selected plant data
Evaporating pressure	Bar eff.	0.5		3	
Evaporating temperature	°C	-34	-35	-12	-12
Condensing pressure	Bar	19		19	
Condensing temperature	°C	43	+45	43	+45
Discharge temperature	°C	+90	+99	-	+70
Refrigeration power	kilowatt	-	30	-	206
Compressor power	kilowatt	-	27	-	96.5
Compressor type / reference		D4DL 150X Semi-hermetic		D4DJ 300X Semi-hermetic	
Compressor brand		Emerson Copeland		Emerson Copeland	
Number of compressors		3		5	
Refrigerant charge	Kg	400	-	600	-
Outside temperature	°C	28 – 30	-	28 -30	-
Number of stations		2 cold rooms and 3 refrigerated cabinets		16 cold rooms and laboratories and 21 refrigerating cabinets	

Conclusive results for future installations

The results after the first two months of operation were a genuine success. Performance is good, there was a significant reduction in direct CO₂ emissions by 53%, Performax LT is easier to detect than R-404A, and is expected to decrease energy consumption by 10% to 15%, contributing to further reduction of the carbon footprint caused by indirect emissions. This supermarket is a benchmark for the various players in the refrigeration industry.

Point of view of different people in the cold chain:

"As a refrigeration system technician, there is no real change in the start-up compared to another refrigerant," according to Nicolas Machu. "Just performing the traditional adjustments and adjusting the heater to the electric controls or manual switches is enough. No additional time in the start-up. And, when the temperature drops, the vacuum cabinets drop just as fast as with the R-404A or even a little better."



Moreover, as Cyrille Moquelet **Sud Ouest Réfrigération's** Manager points out: "From the time you offer your customer a refrigerant that gives energy savings, the customer is happy. This is why I opted for this new refrigerant in this new system. In parallel, the fact that Performax LT has a GWP lower than R-404A is a plus because the representatives of certain large retailer brands are very sensitive to the environmental aspect. We are professionals and we need to advise the user on the most suitable refrigerant for the system. Today, although there is a slight price difference, I recommend this product because technically it is easy to use and in particular, it allows the electricity bill to be reduced."

For Emerson, the compressor manufacturer, according to François Lemoine, Refrigeration Sales Manager, Southern Europe, "at this stage, we are still in an engineering evaluation phase, which precedes a formal qualification phase. What is interesting for the user with Performax is that it does not affect the size of the compressors. Their dimensions are the same as when used with R-404A or R-22."

Genetron Performax LT is the refrigerant preparing the future

"The HFO refrigerants being developed today will eventually replace HFCs, with better capacities, a better efficiency and lower GWP, but we still do not know when they will be marketed," indicates Nacer Achaichia, Technical Manager at **Honeywell**. An undeniable advantage: "these future refrigerants will use the same components we have today. Therefore, we will work on conversions of the "Drop In" type; investments in machines today are not irredeemable investments".

"Performax LT makes it possible to keep the existing equipment without further modification constraint for compressor or heat exchanger manufacturers. It has both the technical advantage of improved performance compared to R-404A and is more environmentally friendly with lower GWP and TEWI. It is the ideal fluid to enable large retailers, among other things, to continue working with centralised single stage low pressure economically attractive systems, while greatly reducing the overall TEWI environmental impact. A genuinely simple and controlled solution," says Pierre-Emmanuel Danet, Head of Technical Support at **Climalife**.

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