

Honeywell Solstice® N40 (R-448A)



CUSTOMER INSIGHT: EBROFRÍO / SIMPLY

Retail Solution: Improving Energy Efficiency and Reducing Environmental Impact

Honeywell

EF Ebrofrío, s.l.

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Elías Mantecón, Inasic Ingeniería



Summary: Contributing to an end-to-end energy efficiency strategy

'Simply' is redefining the franchise business model in the retail environment, through a formula that creates opportunities for entrepreneurs to buy into four stores sizes – Simply Market, Simply City, HiperSimply (developed by supermarket giant Group Auchan) and, most recently, Simply Basic. Simply is not only creating new retail centres (currently 132 super- and hypermarkets and 15 gas stations in nine different regions across Spain), it is also pushing the boundaries of energy efficiency and environmental impact, thanks to an ethos founded on sustainable growth.

Needless-to-say, retail businesses rely heavily upon effective refrigeration systems. In this sector, regulation is driving the adoption of more environmentally-friendly refrigerants – and Honeywell is responding by offering system designers, OEMs and end users a new generation of ultra-low GWP and more energy efficient refrigerants, based on new Hydro-Fluoro-Olefins (HFO) technology. In the case of Solstice[®] N40 (R-448A), it is a drop-in replacement for R-404A.

Solstice N40 has been incorporated into the latest Simply store near Zaragoza by system designers Ebrofrío, a company renowned for its forward-thinking and innovative approach.

Background: Placing innovation and sustainability at the heart of retail

Ebrofrío is a family-run company, employing 30 people, specialising in the design, installation and maintenance of commercial and industrial refrigeration systems. It is a business that thrives on innovation and which offers advice to engineers on the impact of regulatory change in the refrigeration sector.

The company delivers customised installations and high performance maintenance contracts, offering system architecture that take advantage of the latest advances in materials technology, such as Solstice N40.

In the case of the new 3,500 m² Simply store in Zaragoza, which opened in December 2014, Ebrofrío designed both the LT and MT systems, with Solstice N40 selected for the LT and R-134a used for the MT (though Ebrofrío would likely use Honeywell's recently-commercialised non-ozone depleting Solstice N13 (a low GWP replacement for R-134a) for future MT applications).

The underlying environmental benefits of the refrigeration system proposed by Ebrofrío aligned perfectly to the value proposition of Simply, which is founded on an end-to-end approach to sustainable business and incorporates goals covering energy efficiency and lower CO₂ emissions. Indeed, more than 20 Simply stores already have LED lights on the sales floor as well as refrigeration system heat recovery for winter heating. The stores also target a 20% reduction in water consumption.



Headline results

- Solstice N40 is shown to offer better refrigeration performance than R-404A.
- Monitored energy consumption shows a reduction in line with preliminary estimations.
- Solstice N40 possesses a GWP 66% lower than R-404A, delivering lower emissions and also lower cost of maintenance due to preferential taxes.
- Retrofitting of Solstice N40 was problem-free thanks to its drop-in replacement capability for R-404A, making it safe, easy and time-efficient for the technicians to perform the work.



Implementation: Contributing to a cleaner, lower carbon future

The Ebrofrío design took account of the entire system architecture – digital compressors, EC fans, doors, and, of course, refrigerant technology – in order to meet refrigeration performance standards while reducing both energy consumption and CO₂ emissions.

System design:

- The LT 'with doors' design enables the system to work comfortably at -30°C evaporation temperature (or even higher). This, together with the low discharge temperature of Solstice® N40 when compared to other R-404A alternatives, leads Ebrofrío to predict problem-free operation in summer conditions.
- The central pack includes four compressors in the Solstice N40 LT system.
- Eliwell controls nowadays incorporate R-448A. By the time of conversion, settings of R-404A were used, proving the suitability of Solstice N40 for direct retrofitting. During a regular site check four months after opening, the condensing temperature mid-point showed a 1-2°C difference vs the 404A setting in the control, so very similar to 404A.
- Charge: 135kg for R-448A.
- The problem-free retrofit of Solstice N40 as part of the design architecture ensures ease of working for maintenance technicians.

Ebrofrío is currently recording key performance data on system-critical parameters through the Coresense diagnostics tool from Copeland, including tracking energy consumption, in line with their determination to offer optimal solutions to their customers.



System Information

	MT Pack	LT Pack
Compressors (Copeland)	1 x 4MUD-25X and 2 x 6MM-30X AWM	4 x 4ML-15X AWM (R-448A)
Tevap °C	-8°C	-32°C
Tcond °C	+45°C	+45°C
Cooling capacity	118kW	42kW
Refrigerant	R-134a	Solstice N40 (R-448A)
Charge	220kg	135kg

Sector Perspective: Serving up Sustainable Refrigeration

Each year, the world uses more than 90 million tonnes of refrigerant, enough to keep food fresh in 240,000 supermarkets and to cool more than 300,000 commercial buildings. Honeywell is committed to continuing to invest in the development and introduction of new offerings, to make it easier for commercial and industrial sectors to adopt and use alternatives to higher global warming potential refrigerants.

Solstice N40 is technology proven to deliver outstanding results across key metrics linked to energy efficiency,

temperature, cost of operation and overall Coefficient of Performance (COP). Solstice N40 is 100% non-ozone depleting, possesses low toxicity (ASHRAE class A) and is non-flammable at ambient temperature (ASHRAE class 1), which makes it significantly safer in use than alternatives such as hydrocarbons and ammonia.

Ebrofrío learned about Solstice N40 last year during a Honeywell presentation at a regulatory meeting. For any new similar installations, the company would also consider Solstice N13 (R-450A) from the Solstice range of HFO refrigerants for MT applications.



Feedback: Delivering on Simply's Promises

Available tools

Simulation software

Honeywell's refrigerants modelling software is a free-download software program that eliminates the guesswork involved in selecting a refrigerant by allowing refrigeration engineers to run simulations based on actual data. The tool runs property calculations of refrigerants, conducts thermodynamic evaluations of air conditioning and refrigeration cycles, and provides a first principle thermodynamic comparison of new alternative refrigerants for retrofit applications or new system designs.

The software models systems from simplified basic cycles to large, complex refrigeration systems. The results can be exported to Microsoft Excel, where the data can be manipulated in a variety of ways. The software also creates typical Mollier diagrams (Pressure-Enthalpy, Temperature-Entropy).

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"The store system was commissioned and is running problem-free. Ebrofrío is providing a very good and responsive service and so far there have been no issues at all with the refrigeration system, no downtime time."

Jose Antonio Gracia Borobia, Simply Zaragoza Plaza Manager

"Our vision – 'A different way to understand franchises' – expresses a model that retains all our standards and values while offering entrepreneurs a profitable and sustainable business. Our targets of reducing energy consumption and CO₂ emissions were perfectly reflected in Ebrofrío's proposal for the Simply Plaza store – through their spirit of innovation they developed a solution for the store's refrigeration needs, while at the same time ensuring that both system GWP and energy usage are much lower."

Luis Canovai, Simply Technical Manager

"During recent machine room monitoring session, only one compressor was at 100% load, with -28°C evaporating temperature and a discharge temperature of 85°C. Performance in terms of capacity and efficiency is fulfilling both ours and our customer's expectations from the preliminary calculations we have made and presented to Simply."

Antonio Alós, Ebrofrío Technical Manager

"We first listened to our customer to understand their needs and constraints. Their position as the first promoter to run a franchise meant meeting the expectations of the store manager, company and retail chain. In our search to identify the best solution, we considered that Solstice N40 (R-448A) was the best proposal. Results so far have proved it."

Carlos Alós, Ebrofrío Commercial Manager

Smart phones apps

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Literature

Honeywell has a wide range of literature available on Solstice® N40 including case studies, customers references, etc.

Information and contact

For information and support on new applications, contact your local Honeywell representative, visit www.honeywell-refrigerants.com/europe or send us an email at fluorines.europe@honeywell.com



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OUR COMMITMENT TO SUSTAINABILITY

RESPONSIBLE CARE

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The safety of our employees
The quality of our products
Being responsible stewards for the protection of the environment, the communities in which we operate and our customers

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