

Honeywell Genetron® Performax™ LT



CUSTOMER INSIGHT:
ASDA SUPERMARKETS (UK)

**Innovative Refrigerant
Helps Lower Carbon Footprint
and Energy Costs**

Honeywell

A-GAS®

“The benefits we are seeing are very much a combination of ASDA system optimisation and favourable properties of the refrigerant. I feel the most important aspect of this conversion to Performax will be its unparalleled efficiency and lower GWP versus R404A, which will enable us to reduce both direct and indirect emissions. I am impressed by the energy improvement.”

Brian Churchyard, Head of Refrigeration at ASDA.



The new Genetron® Performax™ LT is the best performing, cost saving and lowest GWP refrigerant for supermarket installations.

Summary: Creating a Sustainable Future

Supermarkets around the world are coming under intense scrutiny to prove their credentials when it comes to environmental impact and sustainability. Honeywell has responded by developing a new refrigerant blend – Genetron Performax LT – which is delivering outstanding results across key metrics linked to energy efficiency, carbon footprint reduction and running costs.

In the latest field test – completed with ASDA, one of the foremost supermarket chains in the UK – the new Honeywell refrigerant was assessed against the commonly-used R-404A and R-407A.

The results proved Genetron Performax LT to be the best performing refrigerant currently available for supermarket installations.

Unlike R407A, Genetron Performax LT can be used in both low temperature and medium temperature applications. The refrigerant delivered impressive results due to its higher capacity and efficiency and a GWP that is nearly 50% lower than R-404A and 15% lower than R-407A.

The Honeywell Genetron Performax LT advantage created for ASDA included:

- Up to 15 % saving in system energy bills
- Up to 40 % reduction in system CO₂ emissions
- Up to 10 % improvement in system running costs

Background: Contributing to ASDA's Carbon Reduction Goals

ASDA has made a public commitment through its Sustainability 2.0 agenda to reduce the environmental impact both of its own operations and those of its supply chain.

The ambitious goals for 2015 (compared to 2005 levels) include:

- Reducing energy consumption in existing stores by 35%
- Reducing new store carbon emissions by 60%

- Reducing overall carbon footprint by 10%
- Removing 20 million metric tons of CO₂ from its global supply chain
- Reducing 60% of emissions from its transport fleet

A key contributor to these targets for ASDA is the identification and application of eco-friendly refrigerants used to preserve meat and dairy products, with a particular focus on

reducing energy consumption (and cost) and lowering carbon emissions through improved GWP.

Following a successful laboratory test of Genetron® Performax™ LT, ASDA embarked on a full-scale field test of the Honeywell refrigerant at its new Hunts Cross store in Liverpool (UK).

Field Test Implementation: Monitoring and Assessing Data

To ensure the robustness of the project, a dedicated team of professionals was set up to run the trial. In addition to the involvement of ASDA's Head of Refrigeration and Energy Manager, the team included representatives from Honeywell Refrigerants Technical Management, Emerson Climate Technologies (Copeland scroll compressors), AGas, BJA Consulting, CBES Constructive Solutions and City Holdings.

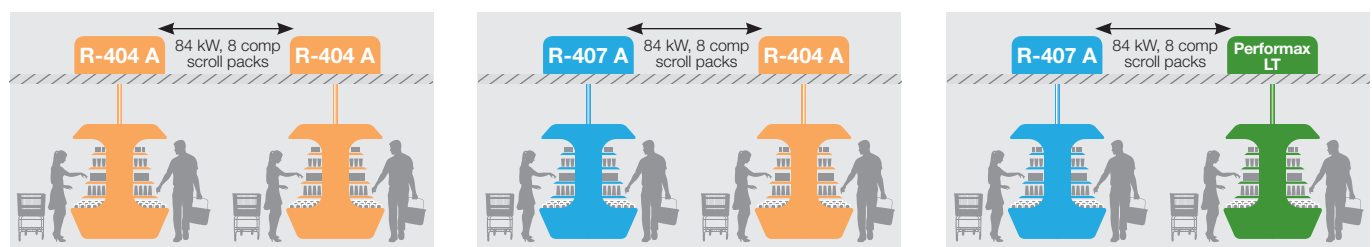
The Hunts Cross store was chosen because it had two identical MT (medium temperature) systems, which would allow for accurate comparisons of Genetron Performax LT alongside R-404A and R-407A (see Fig. 1).

The MT systems comprised:

- Identical connected loads
- Identical pipe work design and layout
- 8 compressors pack ZB45 (Copeland scroll)

In order to ensure like-for-like comparisons between all three refrigerants, System 1 was converted from R-404A to R-407A and performance and energy consumption measured over a 12 months period. System 2 was then converted from R-404A to Honeywell Genetron Performax LT and operated over an extended period to ensure that the results for each refrigerant could be compared, verified and validated.

Figure 1: Original system and two-steps transformation



Field Test Results: Proving the Value of Genetron® Performax™ LT

A thorough evaluation of the results by the entire project team confirmed for the Hunts-Cross store the power consumption shown in (Fig. 2).

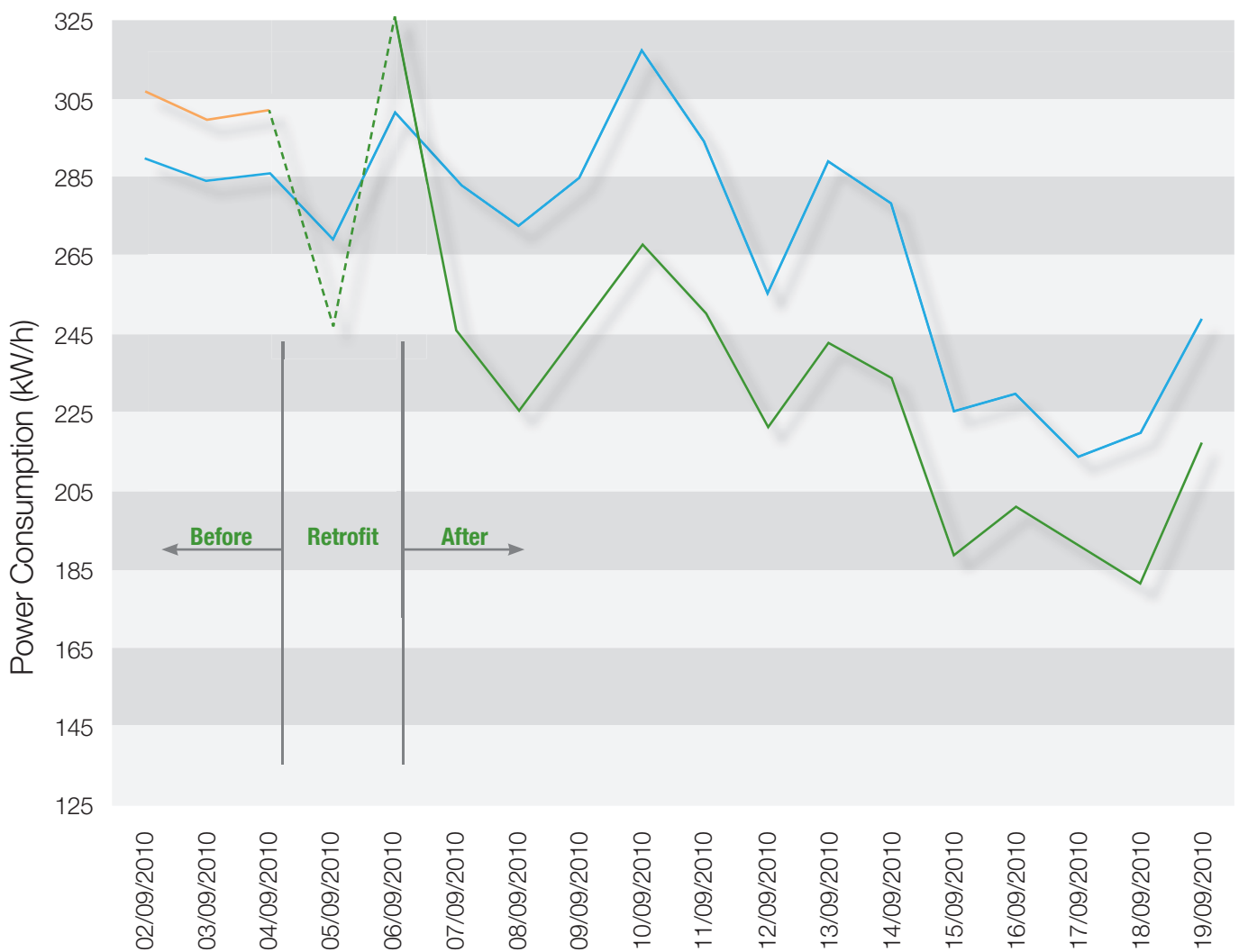
Energy Consumption:

- The R-404A system consumed 5% more energy vs. the R-407A system.
- The Honeywell Genetron Performax LT system consumed 13% less

power than the R-407A system and around 20% less than the original R-404A system.

The figures below show the energy consumption of the retrofitted pack.

Figure 2: ASDA Hunts Cross Energy Savings



Behavior right before and after retrofit.

■ R-407A ■ R-404A ■ Performax LT

Carbon Footprint and Operating Costs

The analysis (Fig. 3) below shows the impact of refrigerants on a standard store similar to the Hunts Cross store carbon footprint and on the system operating costs, based on a 15 year life-cycle assumption and

taking account of compressor energy consumption only. All other energy usage is assumed to be the same for all refrigerants. The results show significant emissions and cost advantages in using Honeywell Genetron®

Performax™ LT over R-404A and R-407A across a range of operating conditions. The cost of retrofitting is not included.

Figure 3: Results table - Technical case study Performax - Asda Hunts Cross

Refrigerant	MT			LT		Total system		
	R-404A	R-407A	Performax	R-404A	Performax	R-404A	R-407A	Performax
Refrigerant Charge	250	250	250	150	150	400	400	400
Average relative COP ¹	100%	105%	115%	100%	109%	100%	99%	112%
TEWI (Tonne CO ₂) Direct	2.255	1.212	1.049	1.353	629	3.608	2.565	1.678
TEWI (Tonne CO ₂) Indirect	1.390	1.324	1.209	1.006	875	2.396	2.330	2.084
TEWI (Tonne CO ₂) Total	3.645	2.536	2.258	2.359	1.504	6.004	4.895	3.762
Savings CO _{2eq}		30%	38%		36%		18%	37%
Yearly Operating Cost from compressor (£)	23.800	22.667	20.696	17.220	14.974	41.020	39.887	35.670
Savings compressor energy cost vs 404A		95%	87%		87%		97%	87%

Data & Criteria	
Annual leak rate ²	15%
System operational lifetime (years)	15
Recovery efficiency	95%
Electricity price (£/kWh) ³	0,14
CO ₂ emission factor (kg CO ₂ /kWh) ⁴	0,54522

ASDA Savings		
Direct emissions tons CO _{2eq}	1.930	* Life time
Indirect emissions tons CO _{2eq}	264	* Life time
Total reduction emissions; tons CO _{2eq}	2.194	* Life time

¹Performax vs 404A: CoP for MT from Asda field test; CoP for LT from Honeywell Research Lab bench test. R407A cannot be used for LT applications

²15% leak rate is the industry average. Asda's current leak rate is 2%.

³Source: <http://www.energysavingtrust.org.uk>

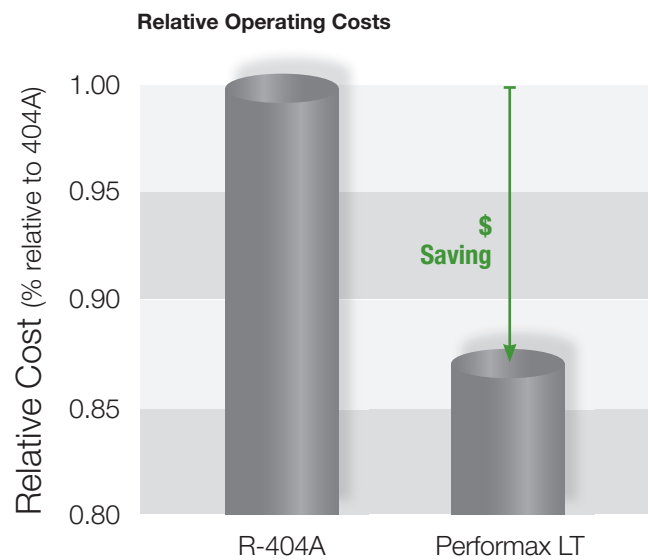
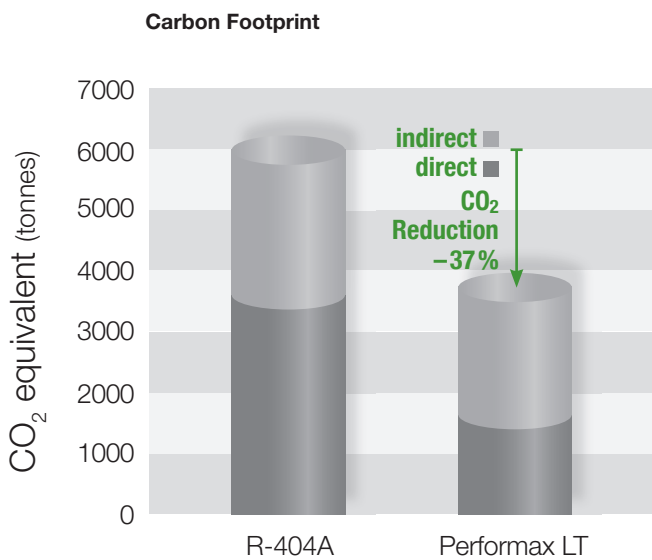
⁴Units kg CO_{2e} per unit, source Carbon Trust, conversion factor 2010

Feedback: A Win-Win Result for ASDA

“The benefits we are seeing are very much a combination of ASDA system optimisation and favourable properties of the refrigerant. I feel the most important aspect of this conversion to Performax will be its unparalleled efficiency and lower GWP versus R404A, which will enable

us to reduce both direct and indirect emissions. We have killed two birds with one stone; I am impressed by the energy improvement; this will bring us great opportunities when rolling-out this conversion also to LT packages and other stores”.

Brian Churchyard, Head of Refrigeration at Asda: ASDA will extend this program to the rest of refrigeration packs (MT and LT) in Hunts-Cross and use this experience for the further roll-out of conversion to Performax in other stores in the UK.



Sector Perspective: Rolling Out the Benefits of Performax LT Around the World

The ASDA Field Test confirms the excellent performance and energy efficiency of Genetron Performax LT and the potential for significant energy savings and carbon footprint reductions among supermarket operators.

Genetron® Performax™ LT outperforms alternative refrigerants across all am-

bient conditions – a benefit confirmed by subsequent retro-fit projects in the supermarket sector – creating potential for extended application into storage and packaging areas. The efficiency of the Honeywell refrigerant also provides potential for enhancing overall profitability – a true win-win situation when emissions reduction is

factored in. Industry-indicative results confirm the ASDA experience, with Genetron Performax contributing up to 15% savings in energy bills, a 40% reduction in CO₂ emissions and 10% lower running costs .

For more information on Genetron Performax LT visit www.genetronperformaxlt.co.uk

Genetron Performax LT is a non-flammable blend commercially available from Honeywell. Complete guidance for use (new and retrofit) can be found in the brochure "Genetron® Performax™ LT Refrigerant - Properties, Guidelines and Retrofits".

Notice: All statements, information and data given herein are believed to be accurate and reliable, but are presented without guaranty, warranty or responsibility of any kind, expressed or implied. Statements or suggestions concerning our products are made without representation or warranty that any such use is free of patent infringement and are not recommendations to infringe any patent. The use should not assume that all safety measures are indicated, or that other measures may not be required.

Honeywell
Fluorine Products Europe B.V.
Laarderhoogweg 18
NL-1101 EA Amsterdam
The Netherlands

Honeywell
Belgium N.V.
Haasrode Research Park
Grauwmeer 1
3001 Heverlee, Belgium
Phone: 32-16-391-278
Fax: 32-16-391-277

Honeywell
Belgium N.V.
RMP/RRP Leuven
TVA/BTW BE 0402130326

www.genetronperformaxlt.co.uk

March 2012

© Honeywell International Inc. All rights reserved.



A-GAS®

Honeywell