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ICELAND'S QUEENSFERRY FOOD WAREHOUSE TRANSITIONS TO A2L REFRIGERATION WITH SOLSTICE ADVANCED MATERIALS

CASE STUDY





SOLSTICE L40X PROPELS ICELAND'S FIRST A2L RETAIL STORE

BACKGROUND

The global hydrofluorocarbon (HFC) phase-down is tightening the supply of high-global warming potential (GWP) refrigerants that food retailers have relied on for years, such as R-407F. So, when Iceland – the British supermarket chain specializing in frozen groceries, ready meals and budget-friendly household food – began planning its new Food Warehouse in Queensferry, North Wales, it wanted to future-proof its refrigeration strategy without giving up the operational familiarity and commercial performance its stores depend on.

Working in conjunction with North Yorkshire-based refrigeration specialist Omega Solutions and Cambridgeshire-based installation and maintenance contractor Climate Cooling, Iceland selected Solstice® L40X (R-455A) refrigerant from Solstice Advanced Materials, which combines a low global-warming potential (GWP) of 146 with mild flammability, low operating pressures and an HFC-like architecture.

The Queensferry site is significant because it represents the first deployment of A2L refrigerant technology within Iceland's retail estate and was conceived as a live proof of concept for the wider business.

CHALLENGE

Iceland and its partners faced several challenges during the development of Queensferry, including:

Iceland required a substantial cut in GWP from R-407F (GWP of 1,825) and thus had to switch to a refrigerant compliant with both current and future F-gas regulations.

The alternatives considered by Iceland came with considerable trade-offs. CO_2 transcritical systems, for example, require high-pressure components, specialized training and high capital costs, while hydrocarbon (A3) refrigerants face strict charge limits that add circuits and complexity.

After determining A2L was the best path forward, the project team needed to achieve compliance solely through equipment placement and pipe routing, without adding mitigation systems or cost.

With the Queensberry store scheduled to open in June 2025, the project had just five months to move from design to commissioning.

SOLUTION

Omega Solutions led the refrigeration system design, coordinating with the manufacturers, specifiers and installing contractor, while Climate Cooling was tasked with ensuring the system would be practical to install and maintain. Together with Solstice Advanced Materials, the partners selected Solstice L40X due to its low-GWP, low flammability and potential to scale across Iceland's estate.

Hardware-wise, Friga-Bohn mini-pack systems were chosen for the chilled retail cabinets, Marstair condensing units with thermostatic expansion valves (TEVs) were selected for the frozen storage and Rivacold R290 monobloc systems were specified for the high-temperature cold stores. The cabinets, meanwhile, were installed by Kent-based Bond Group.

Because Solstice L40X operates at pressures similar to legacy HFCs, the systems used standard components, TEVs and layouts familiar to the contractors and service engineers, with no need for high-pressure pipework, specialized compressors or retraining. Back-to-back positioning kept service routes between evaporators and plant short, minimizing refrigerant charge and installation complexity.

Careful equipment placement and short pipe runs enabled the team to achieve full compliance without additional mitigation systems. **The result?** A system designed, installed and commissioned in five months – in time for the store's June launch.



RESULTS

Since its opening, Queensferry has matched or outperformed comparable Iceland sites on energy, carbon and cost. Key outcomes include:

1. Switching from R-407F (GWP of 1,825) to Solstice L40X (GWP of 148) has delivered a 92% reduction in refrigerant emissions, with Iceland's low leakage rate of approximately 4.6% reducing lifecycle emissions further.
2. Queensferry's sales area refrigeration averages 122 kWh a day – about 20% more efficient than Iceland's Speke store and broadly comparable to its Trafford location.
3. Queensferry's 20-year lifecycle cost (capex and opex) of £1.52 million is lower than the £1.69 million at Speke and £1.90 million at Trafford. Furthermore, the project delivers a lifetime net carbon saving of approximately 14 tonnes of CO_2 (24%) versus Speke.
4. Methodologies developed at Queensferry will be adopted across Iceland's wider estate, and the project was shortlisted for Retail Project of the Year at the RAC Cooling Industry Awards 2026 in London.

> R-455A proved to be suitable, delivering the GWP reduction Iceland desired while working with their established design and service practices. The collaboration across the team was exemplary.
>
> **Chris Griffiths**
> UK Technical Manager
> Omega Solutions

To learn more about how Solstice Advanced Materials can support your A2L food retail refrigeration requirements, or to explore its portfolio of low GWP refrigerants, visit our website.

For More Information Visit
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