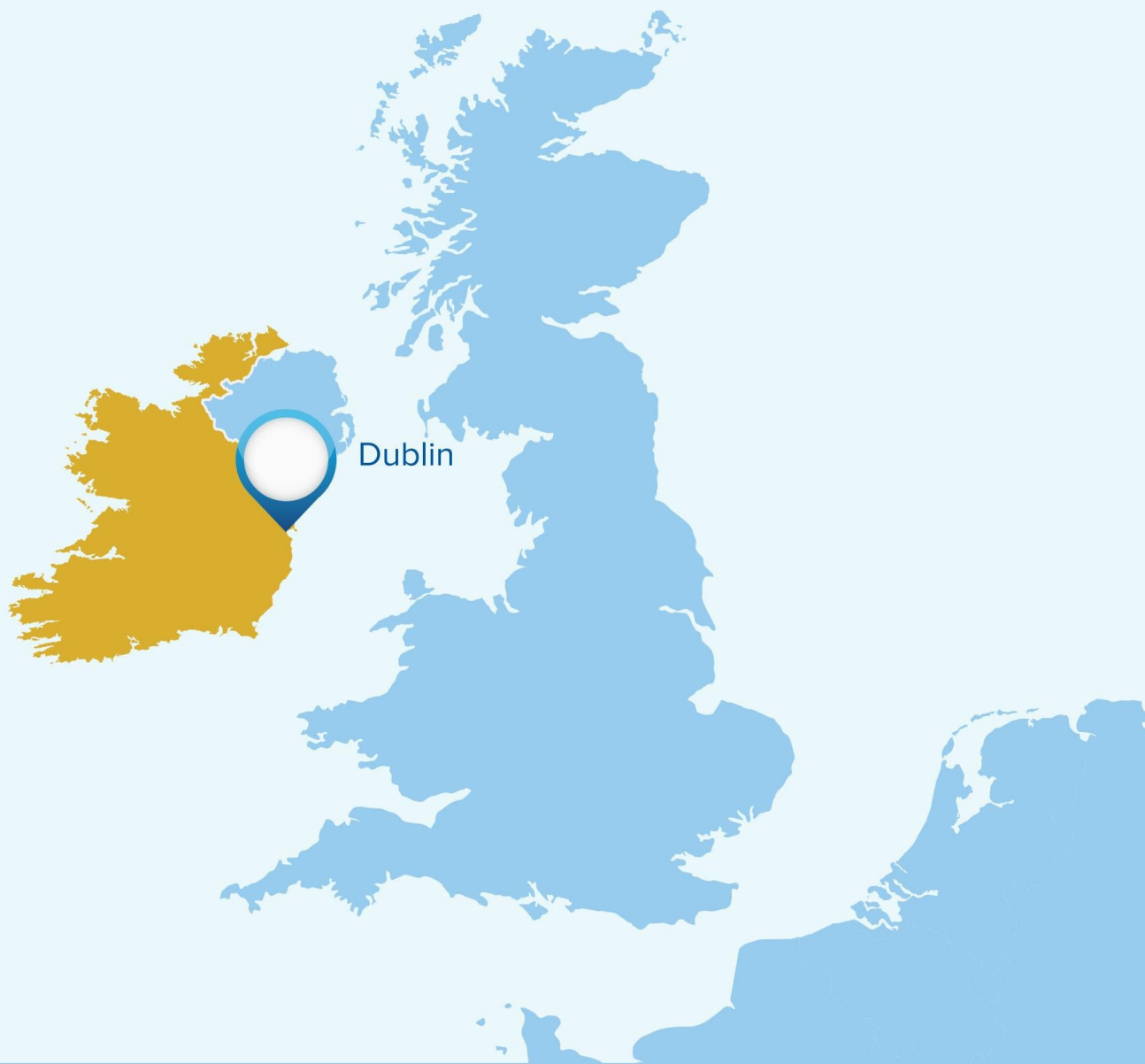




Case Study: Keelings Flowers & Refra





Fresh Thinking: How a Refra Propane Heat Pump and Chiller Keep 5 Million Bouquets Blooming in Ireland

The R290-based heat pump and chiller system from the Lithuanian manufacturer was installed at a new Keelings Flowers' processing facility in Dublin in 2023.

By Christina Hayes



Keelings Flowers produces roughly 5 million floral bouquets each year out of its Dublin processing facility.
Photo credit: Keelings Flowers

Each year, millions of flower bouquets journey thousands of miles, from greenhouses and fields in places like Colombia, Kenya and the Netherlands, to customers across Europe and North America. In this global market, valued at around €15 billion (\$16.9 billion) in 2015, freshness is key. Flowers must arrive vibrant, fragrant and undamaged to maintain both their aesthetic appeal and commercial value.

Central to ensuring this freshness is an unbroken cold chain. Cut flowers need to be stored and transported at between 1–4°C (33.8–39.2°F) to ensure they stay in peak condition from harvest to delivery.

The cold chain that enables the global flower trade is energy-intensive and largely relies on fossil fuel-based power and high-GWP synthetic refrigerants.

Determined to challenge this status quo, Ireland's Keelings Flowers, a division of the Keelings Group, turned to Lithuanian HVAC&R manufacturer Refra for a more sustainable solution. At its new flower processing facility in Dublin, Keelings installed a propane (R290)-based chiller and heat pump that balances operational flexibility with a strong environmental performance.

Ireland in bloom

Keelings Flowers was founded in 1995 in Dublin's iconic City Flower Market and has grown into one of Ireland's largest producers and distributors of floral products. Today, the company supplies around 5 million bouquets annually to the Irish market as well as a range of potted plants.

In 2023, Keelings unveiled its latest investment: a €20 million (\$22.7 million) 8,500m² (91,500ft²) flower processing facility located at its business campus in St. Margaret's, Dublin. Designed from the ground up for efficiency and scale, the facility is the first of its kind on the island of Ireland dedicated solely to processing cut flowers.

Keelings Flowers represents roughly 7% of total Keelings Group sales, and with the opening of its new flower processing plant, the company aims to double its operations by 2030.

"The aim of our flower business is to bring joy," said Caroline Keeling, former CEO of Keelings, in 2023. "This fantastic facility enables us to deliver fresher, brighter and longer-lasting flowers and plants to the people of Ireland."

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– Caroline Keeling,
former CEO of Keelings



From left: Simon Coveney, Ireland's then-Minister for Enterprise, Trade and Employment, Caroline Keeling, then-CEO of Keelings and Steven Devoy, Business Unit Director at Keelings Flowers, at the opening of Keelings Flowers' processing facility in 2023. Photo credit: Keelings



Cut lilies for bouquets. Photo credit: Keelings Flowers

Supporting seasonal demand

At the facility, Keelings receives and processes cut flowers and plants from both domestic and international growers. To meet the diverse requirements of its products, the facility contains three temperature-controlled zones:

❄️ 16°C (60.8°F)

This is the primary working area where flowers are unloaded, sorted, trimmed and arranged into bouquets. The temperature strikes a balance between product preservation and worker comfort.

❄️❄️ 8°C (46.4°F)

A cooler space for storing potted plants, helping reduce respiration and disease without risking cold damage.

❄️❄️❄️ 4°C (39.2°F)

Reserved for high-value cut flowers awaiting further processing or shipment.

Due to fluctuating seasonal demand – volumes can surge up to 20 times the average on peak periods like Mother's Day, Valentine's Day and Easter – Keelings Flowers designed the facility for maximum flexibility in both temperature and space, allowing for dynamic processing applications throughout the year.

To meet these rapidly shifting demands, Keelings also needed a highly flexible refrigeration system that could reliably maintain temperatures between 2 and 22°C (35.6–71.6°F) and adapt to varying load conditions without additional equipment.

Streamlined operations

To meet Keelings Flowers varying HVAC&R requirements, MBA Consulting Engineers designed an integrated system consisting of two key units from Refra:

- A Galaxy R290 chiller
- A reversible Ignis R290 heat pump

Together, they provide the facility with process cooling, comfort cooling and space heating. Domestic hot water is supplied by a separate f-gas-based heat pump due to the distance between hot water demand points and the main plant equipment.

The system is designed with flexibility in mind. The 380kW (108TR)-capacity propane chiller handles the majority of the facility's thermal needs throughout the year, thanks to built-in heat recovery. During periods of higher heating demand, it is supported by the 120kW (34TR)-capacity heat pump, which can also provide an additional 102kW (29TR) of cooling capacity. The heat pump typically runs steadily for only about two weeks each year, according to the system's designers.

A buffer tank smooths out thermal fluctuations by storing energy and releasing it during peak demand periods. The system is designed to operate in external temperatures from -5°C to 32°C (23°F to 89.6°F), with the ability to deliver internal temperatures ranging from 2 to 30°C (35.6–86°F).

"A combination of future-proof refrigerants, high-efficiency cooling components and heat recovery enhances operational sustainability, minimizing both energy consumption and environmental impacts," explained Paul Beattie, Associate Director at MBA Consulting Engineers.

Founded in 1994, Refra specializes in customized HVAC&R systems that use natural refrigerants.

"We have been on a mission to make a positive impact in the refrigeration industry since 2011, when Refra started producing refrigeration equipment with natural refrigerants," explained Aleksej Pavšukov, CEO of Refra. "Since then, we have always followed the same path, which is why today we can offer some of the most innovative propane chillers and heat pumps on the market."



Refra's heat pump (up) and chiller at Keelings' flower processing facility in Dublin. Photo credit: Anglo Irish Refrigeration

About Refra

In recognition of its leadership in sustainable refrigeration, Refra was first approved for ATMOsphere's Natural Refrigerants Label in 2024 and reapproved in 2025. The certification recognizes top-tier manufacturers and contractors who excel in delivering natural refrigerant systems and components. The label program is managed by ATMOsphere, publisher of NaturalRefrigerants.com.

Refra is also a founding member of the Coalition for PFAS Free Cooling & Heating, a global initiative working to eliminate harmful per- and polyfluoroalkyl substances (PFAS) from HVAC&R systems.



Refra earned reapproval for the ATMO Approved Label in 2025.

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– Paul Beattie,
Associate Director at MBA Consulting Engineers

A sustainable investment

Sustainability was a core design priority for the new facility. The Keelings Group plan to reduce its operational emissions by 50% by 2030. For Keelings Flowers, that meant avoiding high-GWP f-gases and maximizing system efficiency through heat recovery. Keelings Flowers was willing to invest in a long-term solution, according to Andrew Dunwoody, Technical Manager at Anglo Irish Refrigeration, the contractor responsible for the installation.

“Keelings wanted a natural refrigerant, so they chose R290 for the refrigeration system and the heat pump,” said Dunwoody. “The initial cost was 40% higher than an f-gas [refrigeration] solution, but the benefit is having the heating and cooling in one system. If you factor in [the cost of a conventional heating system], there probably was not a lot of difference in costs.”

The Keelings Flowers’ facility also includes further sustainability features. Automated systems gather plant off-cuts for composting to minimize waste, rainwater is collected and reused in production processes and a sedum roof garden supports the local ecosystem and biodiversity.

Prioritizing safety

The chiller and heat pump were installed on the roof, safely away from indoor operations and personnel. The total refrigerant charge is less than 13kg, and both units include integrated leak detection systems and extraction fans.

Inside the facility, heating and cooling are delivered via an ethylene glycol mixture through a four-pipe system. This approach ensures the refrigerant remains outside the building envelope, further minimizing risk.

Since commissioning, the system has performed reliably. The only technical issues reported have been minor glycol leaks at valve stations, which were quickly resolved by upgrading mechanical fittings.

The project has already earned industry recognition, with Anglo Irish Refrigeration winning the 2024 Heat Pump System of the Year award from the Institute of Refrigeration Ireland. Keelings also received a nomination in the Energy Efficiency Initiative category of the 2025 Business & Finance ESG Awards.

System Specs

Propane-based chiller and heat pump system for process cooling at Keelings Flowers' flower processing facility in Dublin, Ireland

Manufacturer: Refra

Model: Galaxy R290 chiller and Ignis R290 heat pump

Heat source: Air-source and heat recovery (refrigeration)

Total cooling capacity: 482kW (137TR)

Total heating capacity: 120kW (34TR)

R290 charge: 13kg

Minimum supply temperature: -5°C (23°F)

Maximum supply temperature: 30°C (86°F)

Glycol distribution loop

RDM controls

Danfoss expansion valves



Refra®

In 2023 & 2024, Refra placed in the market
Natural Refrigerant-based equipment avoiding lifetime GHG emissions of



40 %
(GWP_20 Years)

33 %
(GWP_100 Years)



of the entire CO₂ emissions of
Kaunas Metropolitan Region
in 2020

